

“Regional Integration and its Link with Plants’ Dynamics: A Difference-in-Difference Approach”

Adriana Peluffo[♦]

Abstract

This paper analyses the effects of increased competition resulting from the creation of the Southern Common Market (MERCOSUR) on productivity, mark-ups and size of manufacturing plants in Uruguay.

We use impact evaluation techniques without and with matching for the period 1988-1995.

We further explore on the behavior of plants belonging to the export oriented and import competing sectors. One of the most robust findings using both methodologies is that increased trade liberalization seems to improve total factor productivity with a greater effect on plants belonging to the import competing sector. For size we do not find a significant effect for the plants belonging to the tradable and export oriented groups but there is evidence of a contraction for those plants belonging to the import competing sector. Results for mark-ups are mixed with some evidence of pro-competitive effects for the tradable and export oriented group but an unexpected increase in mark-ups for plants belonging to the import competing sector. Furthermore the regression equations seem to indicate not only a role for trade policy on plant’ performance but also for other factors such as technological change. On the whole, these results seem to indicate that trade openness along with complementary policies, such as competition policies, would lead to a more efficient economic result.

Key word: trade openness, plants’ dynamics, difference-in-difference

JEL Classification: F10, L11

Acknowledgments

I am especially grateful to Ariel Barraud, Germán Calfat, Marcelo Olarreaga and Marcel Vaillant. Responsibility for any mistakes are on my own.

[♦]Institute of Economics, University of the Republic, Uruguay.

Requena 1375, CP. 11.200, Montevideo, Uruguay.

Email: apeluffo@iecon.ccee.edu.uy

1. Introduction

Recently, the examination of the new microeconomic evidence points out that exporting firms are more productive than non-exporting ones, and that increased exposure to international markets may increase productivity. This stylized fact gives rise to new trade models that incorporate firms' heterogeneity.

These new models of trade with firm heterogeneity (e.g. Melitz, 2003; Bernard et al, 2003; Bernard, Yeaple, 2005; Redding and Schott, 2007; Melitz and Ottaviano, 2008), predict that trade liberalization could generate significant across and within-industry reallocation effects. In these models opening to trade and consequently increased trade exposure may not only generate the traditional resource reallocation effects from comparative disadvantage industries to comparative advantage ones, but also from less to more productive firms within industries. These models predict that a movement from autarky to free trade leads to an increase in productivity and size, reductions in mark-ups and a decrease in the number of firms.

Up to the mid of the 90s trade models have assumed representative firms and usually perfect or monopolistic competition. Melitz (2003) was the first to elaborate a theoretical model introducing explicitly firm heterogeneity. He presents a model with one factor and one sector of production and constant mark-ups, and shows that in the presence of firm's heterogeneity in productivity trade openness leads to significant within-industry reallocation effects from less to more productive firms. In Melitz's model exposure to trade generate within-industry reallocation effects which increases the average productivity and average size of firms while reduces its number. Due to the perfect competition assumption mark-ups should remain constant.

Moreover, trade and investment liberalisation may promote technological progress and productivity growth in developing countries through several channels, such as technological progress embodied in imported capital goods and intermediate inputs, technology transfers accompanying FDI and learning by exporting effects.

The impact of trade liberalization on economic performance is an important but controversial issue. Though, most of the cross-country empirical evidence finds that more open economies experience a faster growth,¹ some economists are sceptical to the robustness of this result (e.g. Rodriguez and Rodrik, 2000).

¹ For recent surveys see Lewer and Van den Berg (2003) and Lopez (2005).

Some studies that analyse the impact of trade liberalisation on productivity show mixed results, though most of the empirical evidence at the micro level using sound econometric methodologies seems to show increases in productivity. Among these works are those by Pavcnik (2002) for Chile, Tybout and Westbrook (1996) for Mexico, Harrison (1994) for Côte d'Ivoire, Fernandes (2007) for Colombia, Krishna and Mitra (1997) and Topalova (2004) for India.

Trefler (2004) using a difference-in-difference regression approach finds evidence that the Canada-US Free Trade Agreement has led to a substantial increase in plants' labour productivity, a contraction of plants in the import competing and an expansion of plants in the export oriented industries.

Regarding to mark-ups there is a group of studies for developing countries reported in Robert and Tybout (1996) for Colombia, Mexico, Morocco, Turkey and Krishna and Mitra (1997) for India. In most of the countries studies, results suggest that looking at the plant-level the evidence points out the existence of pro-competitive effects of foreign competition.

The impact of trade liberalization on plants' size for developing countries has been less explored empirically. Tybout and Westbrook (1996) review some works on internal returns to scale and firms' size. Moreover they analyse gains in scale for Mexico finding that the scope for improving scale efficiency in developing countries is modest. The explanation they posed is that large plants, which are close to minimum efficient scale, account for a disproportionate share of production.

Head and Ries (1999), Gu et al. (2003) and Trefler (2004) analysing the impact of the Free Trade Agreement with the United States, on Canadian firms, using the same data base and different methodologies arrive to different results. Head and Ries (1999) find a decline in the number of plants accompanied by increases in output per plant. Gu et al. (2003) find no evidence that tariff cuts lead to an increase in average firm size. While Trefler (2004) working with the same data base also finds that the Free Trade Agreement had no statistically significant impact on output per plant. Nevertheless, when discriminating into export oriented and import competing sectors he finds that plants belonging to export oriented sector expand while plants in import competing sector tend to reduce their output.

In the case of Uruguay, Casacuberta et al. (2003), cited among the few works analysing the Manufacturing Uruguayan Sector, find an increase in total factor productivity, especially in sectors where tariff reductions were larger and unions were not present.

In this work we analyze the effect of increased trade openness on plants' productivity, mark-ups and size using a difference-in-difference approach without (DID) and with matching (MDID) which compares the effect of the increase in trade exposure on Uruguayan manufacturing plants' performance before and after the creation of the Southern Common Market (MERCOSUR). Further,

the matching and difference in difference approach (MDID) has the advantage of removing the effects of common shocks providing in this manner a more accurate analysis of the impact of trade openness. In this regard, this is the first attempt applying this methodology to analyse the impact of trade liberalization for Uruguay- and in particular of MERCOSUR's creation- using micro level data.

Isolating the effects of trade from other policies implemented simultaneously with trade reform is not a trivial issue. In most studies, the identification of trade effects relies on the comparison of plant performance before and after a policy change. As a consequence, this approach attributes changes originating from other sources to trade policy. Most studies use data covering only a short time period after the reform which implies that the estimates of productivity growth can be heavily affected by the cyclical behaviour of the economy. The MDID methodology should eliminate the effects of common shocks and provides a more precise description of the impact of trade policy as we explain in Section 2.

Uruguay seems a nice setting to study the impact of increased trade exposure. Since the mid-1970s, Uruguay has experienced a gradual and continuous process of trade liberalization. In the 1990s, the process was deepened through tariff reduction, the elimination of non-tariff barriers, the signing of trade agreements with neighbouring countries, participation in the negotiations of the Uruguay Round under the General Agreement on Tariff and Trade (GATT), and the accession to the World Trade Organisation (WTO). The creation of MERCOSUR increased Uruguay's foreign commitments in the area of trade policy, while exposing the economy to more foreign competition and reducing the government's room to use trade policy instruments in a discretionary manner.

Nevertheless, trade reform was slower in certain sectors considered "sensitive", for which a relatively protected internal market was maintained. In practice, this delay responded more to the ability of various sectors to exert pressure on the government than to technical criteria that revealed those sectors' viability, or to the existence of reconversion plans to make them viable. Consequently, the pace with which liberalization was implemented was not necessarily adapted to the scale of the adjustment costs or the burdens that each sector or segment of society had to bear and some sectors remained relatively isolated from foreign competition.

This work is organised as follows: after this introduction, we present the empirical implementation, in the third section the results and finally our conclusions.

2. Empirical implementation

2.1. Methodology

2.1.1. Difference-in-Differences without Matching (DID)

In the case of regression equations - or difference-in-differences without matching- our baseline equation to estimate is the following:

$$Y_{it} = \beta_0 + \beta_L TL_{it} + \beta_X X_{it} + D_j + D_t + \varepsilon_{it} \quad (1)$$

where Y_{it} is the outcome for plant i in industry j at time t . As outcome variables we consider total factor productivity (TFP), mark-ups (pcm) and size proxied by sales at the plant level.² TL_{it} is the trade liberalization variable. It is constructed by interacting plants belonging to the tradable industries (Lib_{it} , where tradables=1 and non-tradables=0) with a time dummy that takes the value of one from 1992 onwards (a year after the creation of the MERCOSUR).³

X_{it} is a set of control variables or covariates which includes size and the export status of the firm. As explanatory variable size is defined as a categorical variable that takes the value of 1 if the firm is small (less than 40 employees which is the median for the whole period analysed), 2 if the firm is of medium size (between 40 up to 100 employees) and 3 if the firm is big (more than 100 employees).

We define a dummy variable that takes the value of one if the firm exports and zero otherwise.

D_j is a vector of industry specific effects and D_t is a vector of time dummies. We also try the model with two different types of time trends: a linear time trend, where t is 1 for 1988, 2 for 1989, 3 for 1990 and so forth, till t is equal 8 in 1995 and also a quadratic one.

2.1.2. Matching firms with similar propensity scores and difference-in-difference (MDID)

We also try a matching and difference-in-differences methodology which allows to study the impact of increased trade exposure to international markets (the treatment) on the liberalizing group (the treated) relative to plants in industries that did not increase their exposure to foreign competition (the control group). To this aim, we classify industries into two groups: tradable industries as those that received the treatment (which experienced an increased exposure to international markets) and non-tradable industries or control group (those that were not affected by trade liberalization or control group).

The effect of trade liberalization is the estimated difference-in-difference of the outcome variable (productivity, mark-ups and plants' size) between the treated and the control groups.

² We have also analysed gross output per plant finding relatively similar results, which are available upon request.

³ The Asuncion Treaty, signed on the 26th March of 1991 is a regional integration agreement to create the Southern Common Market. It was signed by Argentina, Brazil, Paraguay and Uruguay.

Y_{it} is the outcome for plant i in industry j at time t . As we comment above, the outcome variables considered are total factor productivity (TFP), mark-ups (pcm) and size proxied by sales at the plant level.⁴ TL_{it} is the trade liberalization variable. It is constructed by interacting plants belonging to the tradable industries (Lib_{it} , where tradables=1 and non-tradables=0) with a time dummy that takes the value of one from 1992 onwards (a year after the creation of the MERCOSUR)⁵. We analyse the impacts in particular for the year 1995.

Thus, our aim is to evaluate the impact of increased trade exposure on performance (Y), where Y represents productivity, size and mark-ups.⁶

Let $TL_{it} \in \{0,1\}$ be an indicator (dummy variable) of whether plant i was exposed to greater foreign competition after MERCOSUR's creation, and $Y_{i,t+s}^1$ the outcome at $t+s$, after the creation of the MERCOSUR. Also denote by $Y_{i,t+s}^0$ the outcome of plant i had it not experienced a greater trade exposure. The causal effect of trade openness for plant i at period $(t+s)$ is defined as: $Y_{i,t+s}^1 - Y_{i,t+s}^0$.

The fundamental problem of causal inference is that the quantity $Y_{i,t+s}^0$, referred as the counterfactual, is unobservable. Causal inference relies on the construction of the counterfactual, which is the outcome the plants would have experienced on average had they not been exposed to greater trade competition after the creation of the Southern Common Market. The counterfactual is estimated by the corresponding average value of plants that belong to the non-tradable industries. An important issue in the construction of the counterfactual is the selection of a valid control group and to this end we make use of matching techniques.

The basic idea of matching is to select from the group of plants belonging to the non-tradable industries (non-treated or control group) those plants in which the distribution of the variables \mathbf{X}_{it} affecting the outcome is as similar as possible to the distribution to the plants belonging to the tradable industries (treated group). The matching procedure consists on linking each treated individual with the same values of the \mathbf{X}_{it} . We adopt the "propensity score matching" method. To this end, we first identify the probability of being a firm affected by increased trade openness (the "propensity score") for all firms, irrespective if they belong to tradable or non-tradable sectors by means of a logit model. A firm k belonging to the non-tradable industries, which is "closest" in terms of its "propensity score" to a firm belonging to the tradable industries, is then selected as a match for the former. There are

⁴ We have also analysed gross output per plant finding similar results, which are available upon request.

⁵ The Asuncion Treaty, signed on the 26th March of 1991 is a regional integration agreement to create the Southern Common Market. It was signed by Argentina, Brazil, Paraguay and Uruguay.

⁶ Blundell and Costa Dias (2000) present a review of the microeconomic evaluation literature.

several matching techniques, and in this work we use the “nearest-neighbour” matching method and we also try the “kernel” matching method to check the robustness of the results.

A matching procedure is preferable to randomly or arbitrarily choosing the comparison group because it is less likely to suffer from selection bias by picking firms with markedly different characteristics.

As Blundell and Costa Dias (2000) point out, a combination of matching and difference-in-difference is likely to improve the quality of non-experimental evaluation studies. The difference-in-difference approach is a two step procedure. Firstly, the difference between the average output variable before and after MERCOSUR’s creation is estimated for firms belonging to the tradable sectors, conditional on a set of covariates (\mathbf{X}_{it}). However, this difference can not be attributed only to increased trade exposure since after the creation of MERCOSUR the output variables might be affected by other macroeconomic factors, such as policies aimed to stabilization of the economy. To deal with this the difference obtained at the first stage is further differenced with respect to the before and after difference for the control group of non-tradable plants. The difference-in-difference estimator therefore removes effects of common shocks and provides a more accurate description of the impact of trade openness.

According to the literature the independent variables to include in the logit regression should be correlated to the outcome variable and to participation in the policy, but they should not be potentially changed by the policy itself. Thus, the choice of variables prioritises the use of time invariant variables which poses another challenge to the analysis. This is not a trivial task since most of the variables are continuous ones, so we choose to construct categorical variables. To tackle the issue we construct some categorical variables such as a dummy equal to one if the plant has more than 100 employees, high value added –defined as a dummy that takes the value of one if the plant has a value added higher than the median- high gross output, high capital intensity (capital labour ratio) and export status as we explained below.

We choose as covariates those that satisfied the balancing properties for the three sets of plants analysed: tradable, export oriented and import competing plants. After analysing the balancing tests,⁷ we retain as covariates the export status of the firm (dummy that takes the value of one for exporting firms and zero otherwise), a dummy equal one for those plants with a gross output higher than the median of the whole sample and a dummy for plants with value added higher than the median for the whole sample.

⁷ The balancing tests are available upon request.

2.2. Data Sources

We use two data sources. Data at the firm level is from the National Institute of Statistics (INE) for the period 1988-1995. Data at the industry level on imports and gross product was taken from UNIDO dataset (Nicita and Olarreaga, 2007). This last set of data was used to classify industries as tradable and non-tradable as explained below.

The micro level data provided by the National Institute of Statistic, Uruguay (INE) contain information on gross product, value added, expenditures on intermediates and materials, energy, employment, wages, sales, exports and capital at the plant level for the period 1988-1995. In 1988, the starting year of our sample, the Second National Economic Census was conducted. The rest of the data is derived from annual surveys. The surveys report information from manufacturing plants with five or more employees. All the plants with more than 100 employees are compulsorily included in the sample. A random sampling process is conducted on plants with less than 100 employees and has to satisfy the requirement that the total employment of all the selected establishments must account at least for 60 % of the total employment of the sector according to the economic Census of 1988. These selection criteria biased the database towards big plants. Each year the INE revises the sample coverage, and if necessary, due to the closure of firms, includes new ones. Once a firm enters the survey, it is followed until its death. Therefore, when we have no more data for a particular establishment this is interpreted as a plant exit.

Gross output, value added, sales and exports were deflated by the wholesale index with base year 1988. Capital was deflated by specific industry price deflators for capital, as well as employment, wages and energy. The deflators were provided by the Department of Economics, School of Social Science.

In the period there was an important reduction in the number of plants, which along with missing observations in the panel left us with an important reduction in the number of observations. Actually in the period there is exit as well entry which is quite difficult to analyze due to the sampling methodology followed by the INE. The INE periodically includes new establishments, but these do not necessarily belong to newborn establishments. Thus we can not identify newborn plants in the data. Over the period 606 plants exit, i.e. nearly 48 % of the plants in activity in 1988. We observe an important reduction in the Textile and Clothing sector in the late 80s which explains a great share of total exits even before MERCOSUR's creation in 1991, indicating an anticipation of increased competition. In Appendix 1 we present the number of plants by year and according to our classification and the number of exiting firms by industry.

In Table 1 we present descriptive statistics for plants belonging to the tradable and non-tradable industries as well as for the pooled data (whole sample).⁸ Average values of sales, wages, value added, total factor productivity and labour productivity are higher for plants belonging to non-tradable industries, and lower for the tradable ones. Marks-ups show a cyclical behaviour, with an average for the period higher for plants belonging to non-tradable industries. Export propensity is higher for plants belonging to tradable industries and lower for non-tradable ones as expected according to the definition used.

In Table 2 we present the same variables discriminating the plants belonging to the tradable industries into export oriented and import competing as defined below.⁹ We can observe that plants belonging to the export oriented sector have in average higher employment, wages, value added, capital and labour productivity, but lower total factor productivity and higher mark-ups after the creation of the Southern Common Market than plants belonging to the import competing industries.

2.3. Definition of Variables

To construct the liberalization variable (TL_{it}), we define the treated group as those establishments belonging to the tradable industries (Lib_{it}) after MERCOSUR's creation. Our control group is integrated by firms belonging to the non-tradable industries, which are likely to be less affected by trade openness. In so doing we follow a definition similar to the one adopted by Pavnick (2002)¹⁰ defining as tradable industries those with an import penetration ratio (IP) equal or greater than 0.20 and/or and exports to output (EXP_O) ratio greater than 0.20 and non-tradable otherwise.¹¹ We checked that these variables (IP and EXP_O) were greater than 0.20 for the whole period (1988-1995) taking into account the level as well as the stability of the import penetration and export-output ratio.¹² We should note that this definition of the tradable and non-tradable groups is not free of criticism: on one hand it may be sensitive to the level of aggregation used. Moreover, usually the non-tradable industries –except for the work of Pavcnik, 2002- are defined as the service sector (construction, communication, transport, and financial institutions) though with the aim of analysing wages. Lack of plant level data on services for the period analysed prevented us from checking the sensitivity of the result using services as a control group. Besides, Barraud and Calfat (2008) analysing the effect of

⁸ In Charts 1 to 3 we present TFP, mark-ups and sales for the tradable, non-tradable and the whole sample.

⁹ In Charts 4 to 6 we present TFP, mark-ups and sales for the export oriented and import competing group as well as for the whole sample.

¹⁰ Pavcnik (2002) uses as cut off point 0.15 and conducted sensitivity tests for 0.10 and 0.20 finding qualitative similar results for the different cut off points.

¹¹ Import penetration is defined as total imports in the industry over total output, while exports to output as total exports over total output at the industry level. To construct these variables we use data from Nicita and Olarreaga (2007).

¹² Furthermore, we check the sensitivity of the results using as cutting point the value of 0.25 for import penetration and export-output ratios to define the Tradable group of plants. Results are available upon request (Appendix 4).

trade liberalization on wages for Argentina find evidence of significant impacts of trade liberalization on several non-tradable sectors as well as an important shift of manufacturing workers to services, which would indicate that the service sector is also likely to be affected by liberalization. Furthermore, in the Uruguayan case services were liberalised and consumed by not residents –namely tourism, transportation and financial services- in the early 1970s, except for the public services provided to domestic resident by public companies (electricity, fuels and telecommunications).

As we have mentioned above, we further classify tradable industries into different groups according to its trade orientation: export oriented industries, import competing industries and intra-trade industries, since trade liberalization may have a different impact on plants belonging to the tradable industries according to the trade orientation of the various sub-groups.

We define export oriented industries as those industries (EXPO) with an export/output ratio equal or greater than 0.20 and an import penetration ratio lower than 0.20 during the whole period under study.

The import competing industries (IMPC) are defined as those with an import penetration ratio equal or greater than 0.20 but an export to output ratio lower than 0.20 during the whole period.¹³

Further, there is a group of intra-industry trade industries (IIT) defined as those industries with an import penetration and export ratio equal or greater than 0.20 for the whole period.¹⁴ In Appendix 2 we present the import penetration and export-output ratio for the 26 industries considered in this work (we exclude industries 353 and 354 due to missing data).

We also tried different definitions of export oriented plants and import competing to take into account plants' heterogeneity. Some of the definitions tried were: (a) export oriented firms as those that undertake exports and import competing otherwise; (b) export oriented according to the export propensity of the plant and we tried as cut off point 0.15 and 0.10 to defined export oriented firms and import competing otherwise; (c) import competing firms as those with an average import penetration equal or greater than 0.25 and export oriented as those sectors with and export orientation greater than 0.25. Nevertheless, when using the first two definitions we lose the competition of imports so results are less robust than when using the definition according to the industry trade orientation, while in the third case we were left with too few observations for the import competing group.¹⁵

In a first step we compare tradable versus non-tradable industries, while afterwards we take a closer look into the tradable group according to the trade orientation of the various groups of industries that composed it. Thus, we also estimate variants of equation (1) to examine if the impact of trade

¹³ Furthermore, there is a group of intra-industry trade industries with IP and EXPO greater than 0.20 and a group that change dramatically its behaviour to which we named as not specialized and are included in the tradable group but not classified as import competing or export oriented.

¹⁴ The average plant export propensity of the tradable group is 0.15, while for the export oriented this figure is 0.25 and 0.05 for import competing plants, according to this definition.

¹⁵ Thus, we try also the definition using the average value of import penetration and export-output ratios for the period which throws weak results for the import competing group. Results are available in Appendix 3 and 4.

liberalization differs within the tradable industries depending on the trade orientation of the various sub-sectors that integrates it (EXPO and IMPC).

The advantage of these openness measures is that they are specific to the manufacturing industries while cross-country comparisons use aggregate measures that avoid having a better insight on industry and plants' dynamics.

Variables were deflated by the corresponding wholesale deflator in the case of gross output, value added and sales, while for energy, capital and wages specific industry deflators were used. The base year is 1988.

3. Results

3.1. Difference-in-Differences without Matching

First we define the liberalization variable as those plants belonging to the tradable industries (which take the value of one and zero for firms belonging to the non-tradable sectors) interacted by a dummy equal to one from 1992 up to 1995 –after the creation of Southern Common Market (MERCOSUR) and zero otherwise. We named the liberalization variable TL1.

We performed the regression for total factor productivity, price cost margins and size (proxied through sales per plant) in natural logarithm as our dependent variables.

As control variables we include size and the export status of the firm as defined above, as well as industry dummies, and time dummies or trends.

Thus, we compared the performance of firms belonging to the tradable sector after MERCOSUR creation—and the consequent increase trade exposure- in relation to the non-tradable sectors as defined above.

3.1.1. Performance of plants belonging to Tradable vs. Non-Tradable Industries

For TFP, in three out of the four specifications tried (Table 3.1.1, columns 1 to 4, increased trade exposure shows a positive effect on productivity. Since the dependent variable is measured in natural logarithms the parameter of the liberalization dummy can be interpreted as $100[\exp(\beta_{tl1})-1]$ change in percentage terms. The coefficient of the liberalization variable takes the values of 0.05 to 0.115 which throws an increase in productivity of 8.87 % to 12.19 % respectively.

Size has a positive effect on productivity in all the specifications tried while the export status of the firm is not significant. One of the most important explanatory variables in explaining productivity seems to be increased trade exposure (TL1). Moreover, the linear time trends shows a positive and significant effect, pointing out that in the period there are increases in productivity probably due to technological change.

Results for mark-ups are presented in Table 3.1.1, columns 5 to 8.

Contrary to our expectations increased trade openness turns out to have a positive and significant effect on mark-ups in three out of four specifications with an estimated coefficient ranging from 0.17 to 0.209 which translates in an elasticity ranging from 19 to 23%.

The size of the plant measure by employment shows a positive significant impact on mark-ups consistently across specifications. On the other hand the export status of the plant has a negative impact meaning that exporting plants charge lower mark-ups.

Further time trends are negative and significant suggesting a reduction of mark-ups is the period. For the linear trend (t) this reduction is of 2.76 %.

We analyse size proxied by sales in natural logarithms.¹⁶ Most specifications (Table 3.1.1, columns 9 to 12) do not show a significant impact of increased trade exposure on plants' sales. Thus, it seems that increase trade exposure does not affect plants' size in the period analysed. These results are in line with the predictions of Head and Ries (1999) and Trebler's finding (2004). Nevertheless, we should keep in mind that the sample is biased toward bigger plants due to the methodology employed by the Instituto Nacional de Estadística to gather data.

The export status of the plant has a positive significant impact on sales in all the specification with a coefficient from 1.720 to 1.727 which implies an elasticity ranging from 458 % to 462 %.

Regarding to the quadratic trend the linear term (t) has a positive and significant effect while the quadratic time trend (t2) shows a negative and significant sign pointing out to an increase in sales up to certain point and then a decreasing effect. From the inspection of descriptive statistics we observe that firms in tradable industries increase their sales from 1988 till 1990, experienced a decrease in 1991 and then a slight raise again till 1995 (the final year of our sample).

3.1.2. Performance of plants belonging to Export Oriented industries

To have a closer insight on the behaviour of the plants belonging to export oriented sectors we define the liberalization variable as the plants belonging to the export oriented industries (which take the value of one and zero for plants belonging to the non-tradable sectors) interacted by a dummy equal to one from 1992 up to 1995 –after the creation of Southern Common Market (MERCOSUR) and zero otherwise. We named this variable TL2. This gives us an overview of the dynamics of plants in the export oriented sector compared to those in the non-tradable sectors. Results are reported in Table 3.2.

For Total Factor Productivity, in most of the specifications tried (Table 3.1.2, columns 1 to 4) increased trade exposure do not show a significant effect on productivity, except for the first

¹⁶ Though we do not report results here we also analyse employment (total employment at the plant level finding significant reductions in the period for plants belonging to the tradable and export oriented sectors. The quadratic time trend it is significant with the linear term positive and significant while the square negative and significant.

specification that does not control for time dummies or time trends. Size has always a positive and significant effect on productivity. The linear time trend tried is positive and significant pointing out an increase in productivity in the period not explained by the rest of the variables included in the model.

The main difference in the behaviour of plants belonging to the export oriented sector with respect to the whole set of tradable industries is that the trade liberalization variable for export oriented industries does not help to explain productivity while it is positive and significant for plants belonging to the tradable sectors compared to non-tradable industries. This result is not unexpected since those plants belonging to the export oriented sector were already subject to a greater foreign competition compared to the whole set of tradable industries.

Results for mark-ups are presented in Table 3.1.2, columns 5 to 8.

For plants belonging to the export oriented sectors increased trade openness seems to reduce mark-ups in two out of the four specifications while in the other half the sign is negative but not significant.

Size measured by employment shows a negative impact on mark-ups consistently across specifications. This result differs from the previous ones for the pooled plants in the tradable sector. One possible explanation for this result is that bigger firms in this group are more efficient and price more competitively.

On the other hand time trends are negative and significant indicating a reduction in mark-ups over the period.

Results for size (Table 3.1.2, column 9 to 12) are in line with those obtained in section 4.1. Most of the specifications show a not significant impact of increased trade exposure on plants' sales (three out of four equations). The only specification that shows a positive and significant effect of trade liberalization on plants size is when we include a linear time trend. On the other hand, time trends are positive and significant indicating an increase in sales over the period.

3.1.3. Performance of plants belonging to Import Competing Industries

As done previously, to have a closer insight on the behaviour of the firms belonging to import competing sectors we define the liberalization variable as the firms belonging to the import competing industries (which take the value of one and zero for firms belonging to the non-tradable sectors) interacted by a dummy equal to one from 1992 up to 1995 –after the creation of Southern Common Market (MERCOSUR) and zero otherwise. We named this variable TL3. This gives us an overview of the dynamics of firms in import competing industries compared to those in non-tradable ones. Results are reported in Table 3.1.3.

The trade openness indicator variable shows a positive and significant impact on productivity in the four specifications tried with an elasticity ranging from 12 % to 20 % (Table 3.1.3, column 1 to 4).

These results are consistent with those obtained by Pavnick (2002) who using a different approach finds important effects of trade liberalization on import competing industries. Size also shows a positive significant effect on productivity. Finally, the linear time trend is positive and significant pointing out increases in productivity over the period, not explained by the variables included in the model.

Results for mark-ups are presented in Table 3.1.3, columns, 5 to 8.

Contrary to our expectations, we can observe a positive effect on mark-ups in the 3 out of the 4 specifications tried. The trade variable coefficient ranges from 0.163 to 0.26 throwing out an elasticity ranging from 18 % to 30 %.

The positive effect on mark-ups might be explained by the bankruptcy of less profitable plants when exposed to increased foreign competition, so if firms with higher profits remain in the market the exposure to trade would lead to increases in mark-up of this sub-set of plants belonging to import competing sectors.

Once again, size measured through employment turns out to show a negative impact on mark-ups consistently across specifications similarly to the results obtained in the previous sections.

Finally, the linear time trends are significantly negative indicating a reduction in mark ups over the period.

Regarding to size, those plants belonging to the import competing sectors the openness indicator has a negative sign and half of the specifications are negative and significant (Table 3.1.3, column 9 to 12). Thus, there is some evidence of the contraction of plants in these sectors when exposed to increased competition. The elasticity ranges from -23 % to -24 % in those cases where the coefficient was significant. Moreover, the linear time trends present a positive sign while the squared time trend is negative.

According to these results it seems that the increased trade exposure as a consequence of the creation of the Southern Common Market translates into increases in total factor productivity of plants belonging to the tradable industries. The greatest increase in productivity is observed in plants belonging to import competing sectors while the liberalization variable is not significant for plants belonging to the export oriented sector. Moreover, the linear time trend is positive and significant pointing out to increases in productivity not explained by other variables included in the specification. Contrary to our expectations mark-ups seem to increase with trade exposure for plants belonging to the tradable and import competing sectors while results are slightly less robust, but in the same line for plants belonging to export oriented sectors. Nevertheless, the time trend is negative and significant indicating a reduction in mark-ups over the period. On the other hand sales seem to be unaffected by increased trade exposure in the three samples tried, but again the time trend is positive and significant

implying an increase in average plants' sales. Thus, even though increased trade openness seems to impact on plants' dynamics, the significant impact of the time trend –and with the expected sign– indicates that other factors not modelled in this analysis, such as technological change¹⁷ may also be important in explaining plants' dynamics.

3.2. Matching and Difference-in-Differences

3.2.1. Tradable vs. Non-Tradable

First we define the liberalization variable as those plants belonging to the tradable industries (which take the value of one and zero for firms belonging to the non-tradable sectors) interacted by a dummy equal to one after the creation of the MERCOSUR – for the year 1995- and zero otherwise. We named the liberalization variable TL1.

We performed the MDID estimation for total factor productivity, price cost margins and size (proxied through sales per plant) as our output variables.

Thus, we compared the performance of firms belonging to the tradable sector after MERCOSUR creation–and the consequent increase trade exposure- in relation to the non-tradable sectors as defined above.

In Table 3.2.1 we present the results of the difference-in-difference estimation using as matching method the nearest-neighbour (with 3 and 5 neighbours with replacement), the kernel with two weighting functions the Epanechnikov and the Gaussian) and kernel with bootstrapped standard errors. In Table 3.2.1.1 we report the propensity scores and in Table 3.2.1.2 the balancing tests.

The results for plants belonging to the tradable sector indicate that total factor productivity increases significantly in all the matching procedures proposed¹⁸. The magnitude of the estimated effect is of 12 per cent in all the estimations.

Price-Cost-Margin shows a significant reduction of approximately 0.02 to 0.03 points.

Finally, size shows an increase though the effect is not significantly different from zero. This result is similar to Trefler's finding for Canada.

3.2.2 Export Oriented vs. Non-Tradable

To have a closer insight on the behaviour of the plants belonging to export oriented sectors we define the liberalization variable as the plants belonging to the export oriented industries (which take the value of one and zero for firms belonging to the non-tradable sectors) interacted by a dummy equal to

¹⁷ It is worth to note that as some work points out (Casacuberta et al., 2004) it could be a trade induced technological change.

¹⁸ A T-stat equal or higher than 1.67 is significant at the 10 % level.

one—after the creation of the MERCOSUR—for the year 1995- and zero otherwise. We named this variable TL2. This gives us an overview of the dynamics of plants in the export oriented sector compared to those in the non-tradable sectors.

En Table 3.2.2 we present the difference-in-difference estimates for plants belonging to the export oriented industries while in Table 3.2.2.1 the propensity scores and in Table 3.2.2.2 the balancing tests.

On one hand, total factor productivity shows of an increase of 6 per cent although not statistically different from zero in the five estimations tried.

Price-cost margins seem to decrease in 0.03 points and in all the cases the reduction is statistically significant.

On the other hand size show increases and the increases are higher compared to the whole set of tradable plants albeit the results are not statistically significant. Thus, for the group of export oriented plants we find no significant increases in productivity and in size, but significant reductions in price-cost margins.

3.2.3. Import Competing vs. Non-Tradables

As done previously, to have a closer insight on the behaviour of the plants belonging to import competing sectors we define the liberalization variable as the plants belonging to the import competing industries (which take the value of one and zero for plants belonging to the non-tradable sectors) interacted by a dummy equal to one after the creation of Southern Common Market (MERCOSUR) and zero otherwise. We named this variable TL3. This gives us an overview of the dynamics of plants in import competing industries compared to those in non-tradable ones.

In the case of plants belonging to the import competing industries and in particular for the case of total factor productivity, and possibly due to the low number of observations, results are extremely sensitive to the matching procedure. In order to increase the number of observations and reduce sensitivity we include in this sub-sample the industries with an average import penetration higher than 0.20 for every year but also with an export ratio higher than 0.20, i.e. those industries with high levels of intra-industry trade but with an import penetration ratio greater than the export propensity, mainly during the pre-Mercosur period, i.e. during the 1988-1990 period. Thus the set of import competing industries comprises now 351, 371 372, 382, 383, 385 and 384.¹⁹

¹⁹ The new industries included as import competing are: 351: Chemicals, 372: Non-Ferrous Metal Basic industries, and 384: Transport Equipment, while the previous group comprises: 371: Iron and Steel, 382: Machinery except Electrical, 383: Electrical Machinery Apparatus, 385: Professional and Scientific Equipment not elsewhere classified.

The results of the difference-in-difference estimation are displayed in Table 3.2.3 while in Table 3.2.3.1 the propensity scores and in Table 3.2.3.2 the balancing tests.

We find significant increases in total factor productivity and these increases are higher than for the plants belonging to the tradable and export oriented industries. The average increase is approximately of 22 per cent. Moreover, there is a significant increase in mark-ups (0.06 points) and a significant decrease in sales ranging from 24 to 53 per cent.

Thus, productivity shows a significant increase for the plants in the tradable and import competing sectors, with a higher increase in import competing sectors and no changes at all in the plants belonging to the export oriented sectors. This is not unexpected since the effect of greater trade exposure might be more important for plants belonging to import competing sectors than for export oriented plants already used to compete in foreign markets.

The results for mark-ups for plants belonging to the tradable and export oriented sectors are in line with the expected theoretical prescriptions. On the contrary, an increase in mark-ups for plants in the import competing sector pops out as an unusual result. The increase in mark-ups for this set of plants it is likely to be the result of a typical oligopolistic structure, as well to the bankruptcy of less profitable plants in this subgroup. Furthermore, the number of import competing plants is relatively low and it is reduced nearly to the half over the period. A close look to the value of the output variables analysed and the number of plants in 1988 and 1995 seem to indicate a composition effect, with more efficient firms surviving and influencing therefore the results (Table 4). Furthermore, we find an increase in concentration in the import competing group of plants, with a Herfindhal index raising from 0.19 to 0.33 in 1995, while the increase in this index is lower for the whole set of industries analysed –it was 0.18 in 1988 and increase to 0.28 in 1995- and for the export oriented group of plants –it was 0.07 in 1988 and 0.14 in 1995-.²⁰ As we have commented before this may be a result of anti-competitive behaviour and oligopolistic market structures. It is worth noting that even though the Uruguayan Constitution has an article against anti-competitive behaviour, the country was back behind most countries in the regulation and implementation of anticompetitive practices. The first regulation in the country dealing in depth with competition policies is from 1991 and was taken and reformulated in 2001 and 2007.

Regarding to size we find that there is a not significant increase for those plants belonging to tradable and the export oriented sector. The not significant effect of increased trade exposure on sales is in line

²⁰ A Herfindahl index below 0.15 (or 1,500) indicates a non-concentrated market structure, an index between 0.15 to 0.25 (or 1,500 to 2,500) indicates moderate concentration and an index above 0.25 (above 2,500) indicates high concentration

with the findings by Roberts and Tybout (1996) for developing countries. These authors explain this issue due to the fact that gains in scale are limited since bigger plants account for a greater share of total production. Besides, the sampling methodology followed by the Instituto Nacional de Estadística biases the sample towards bigger plants, making it difficult to capture the real impact on smaller plants. On the other hand there is a significant decrease in the size of the firms belonging to the import competing sector. Trefler (2004) also find a contraction in import competing sectors and an expansion in exported oriented ones.

4. Concluding Remarks

Since the return to the democratic regime in 1985, the Uruguayan economy underwent considerable policy reforms. Among them, one of the most salient and stable of these reforms has been trade liberalisation and the increasing integration of the country with the region and the world economy. This increased trade liberalisation raised voices of concern regarding the likelihood of a negative impact on the Manufacturing Uruguayan industry, which has been developed in a framework of high protection. In this regard our work contributes to the debate improving our understanding of the effects of increased liberalization on manufacturing performance of a small developing country at a disaggregated level.

In order to analyse plants' dynamics/performance we use a difference-in-difference approach both without and with matching procedures which is not very common for evaluating trade reform. One of the most robust findings is that trade liberalization seems to increase total factor productivity. This is so for the difference-in-difference regressions without matching as well as for the six matching procedures tried. In Table 5 we present a summary of the results.

Regarding to mark-ups according to the theory one should expect that increased foreign competition translates into a reduction of mark-ups, reducing monopolistic rents and producing gains in consumer welfare due to lower prices. Nevertheless, only for matching and double differencing²¹ we find a negative impact on mark-ups for firms belonging to the tradable sectors as well for the sub-sample of plants belonging to the export oriented, while there is an increase for import competing sectors. The absence of the expected association between import penetration and mark ups could be explained by an oligopolistic distribution sector which is the case in Uruguay as well as by the bankruptcy of less profitable plants. Further, the Herfindahl index reveals a higher increase in concentration in the import competing sector. Nevertheless, we should note that for the regression equations time trends are negative and significant pointing out a decrease in mark-ups for the three samples considered over the period analysed.

²¹ This methodology allow correcting for selection bias.

The results for size using both methodologies –DID and MDID- show not significant increases in sales for plants belonging to the tradable and export oriented sectors while there is a significant contraction for the import competing one.²² The size of plants in the tradable and export oriented sectors remain unchanged being more sensitive downwards for import competing ones.

To summarize, one of the most robust results that emerge from this work are increases in total factor productivity and no evidence of significant impact in size for plants belonging to the export oriented sector and a significant reduction in average sales for plants belonging to the import competing sector. For mark-ups results show differs according to the approach used. If we are to trust the MDID methodology we find evidence of pro-competitive effects for the tradable and export oriented sectors and an unexpected increase in the import competing one. Further, the DID methodology seem to indicate not only a role for trade policy on plants' performance but also for other factors such as technological change. On the whole these results seems to indicate a role for trade openness which could further be improved by the simultaneous introduction of complementary policies, such as competition policies in order to maximize the positive effects on efficiency and welfare.

References

- Alvarez, R., and Lopez, R. A. (2005).** “Exporting and Performance: Evidence from Chilean Plants”. *Canadian Journal of Economics* 38(4): 1384-1400.
- Aw, B. Y., Chung, S., and Roberts, M. J. (2000).** “Productivity and Turnover in the Export Market: Micro-Level Evidence from the Republic of Korea and Taiwan (China)”. *World Bank Economic Review* 14(1): 65-90.
- Baldwin, R. and F. Robert-Nicoud (2008).** “Trade and Growth with heterogenous firms”, *Journal of International Economics* 74(1): 21-34, January 2008.
- Barraud, A. (2008).** “Labor income impacts of trade opening in Argentina. A difference-in-difference estimator approach”, University of Antwerp, mimeo.
- Barraud, A. and Calfat G. (2008).** “Poverty effects from trade liberalization in Argentina”. *Journal of Development Studies*, 44(3): 365-383, March 2008.
- Bernard, A. B., Eaton, J., Jensen J. B., and Kortum, S. (2003).** “Plants and Productivity in International Trade”. *American Economic Review* 93(4): 1268-1290.
- Bernard, A.B., and Jensen, J. B. (1995).** “Exporters, Jobs and Wages in US Manufacturing: 1967-1987”. *Brooking Papers on Economic Activity: Microeconomics*, 67-119.
- Bernard, A.B., and Jensen, J. B. (1999).** “Exceptional Exporter Performance: Cause, Effect or Both?”. *Journal of International Economics* 47(1): 1-25.

²² Though results for import competing sectors are not exactly comparable due to the different definition of this sector adopted for matching.

- Bernard, A. B., Redding, S. J., and Schott, P. K. (2007).** “Comparative Advantage and Heterogenous Firms”, *Review of Economic Studies* 74(1): 31-66.
- Blundell, R. and Costa Dias, M. (2000).** “Evaluation Methods for Non-Experimental Data”. *Fiscal Studies*, 21(4): 427-468.
- Blundell R., Costa Dias, M., Costas M., Van Reenen, J. (2004).** “Evaluating the Employment Impact of Mandatory Job Search Program”. *Journal of the European Economic Association*, 2(4): 569-606, June 2004.
- Eaton, J., and Kortum, S. (2002).** “Technology, Geography and Trade”. *Econometrica* 70(5): 1741-1780.
- Fernandes, Ana (2007).** “Trade Policy, Trade Volumenes and Plant Level Productivity in Colombian Manufacturing Industries”. *Journal of International Economics* 71(1):52-71, March 2007.
- Foroutan, F., (1996).** “Turkey, 1976-85: foreign trade, industrial productivity, and competition”. In Roberts, M. J. and Tybout, J. R., eds., Industrial Evolution in Developing Countries, pp. 314-336.
- Giavazzi, F. and Tabellini, G. (2005).** “Economic and Political Liberalizations.” *Journal of Monetary Economics* 52(7):379-399.
- Girma, S., Greenaway, D. and Kneller, R. (2008).** Does Exporting Lead to Better Performance? A Microeconometric Analysis of Matched Firms”, *Review of International Economics*, 12(5):855-866, November.
- Grether, Jean-Marie (1996).** “Mexico, 1985-90: trade liberalisation, market structure, and manufacturing performance”. In: Industrial Evolution in Developing Countries. Roberts, M. J. and Tybout, J. R., eds.
- Haddad, M., de Melo, J. And Horton, B. (1996).** “Morocco, 1984-89 trade liberalisation, exports and industrial performance”. In Industrial Evolution in Developing Countries, Roberts, M. J. and Tybout, J. R., eds.
- Harrison, Ann E. (1994).** “Productivity, Imperfect Competition and Trade Reform: Theory and Evidence”. *Journal of International Economics* 36(1-2): 53-73.
- Head K., and Ries, J. (1999).** “Rationalization Effects of Tariff Reductions”. *Journal of International Economics* 47(2): 295-320.
- Isgut, A. (2001).** “What ‘s Different about Exporters? Evidence from Colombian Manufacturing”. *Journal of Development Studies* 37(5):57-82.
- Krishna, P., and Mitra, D. (1998).** “Trade Liberalization, Market Discipline and Productivity Growth: New Evidence from India”. *Journal of Development Economics*, 56(2): 447-462.
- Leuven, E. and Sianesi, B. (2003).** “Psmatch2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing”, <http://ideas.repec.org/c/boc/bocode/s432001.html>,
- Lewer, J. J., and Van den Berg, H. (2003).** “How Large is International Trade’s Effect on Economic Growth?”. *Journal of Economic Surveys* 17(3):363-396.
- Lopez, R. A. (2005).** “Trade and Growth: Reconciling the Macroeconomic and Microeconomic Evidence”. *Journal of Economic Surveys* 19(4):623-648.

- Melitz, M., and G. I. P. Ottaviano (2008).** “Market Size, Trade, and Productivity”. *Review of Economic Studies*, 75 (1): 295-316.
- Meyer, B. D. (1995).** “Natural and Quasi-Experiments in Economics”. *Journal of Business & Economic Studies*, 13(2):151-161.
- Nicita A., and Olarreaga, M. (2007).** “Trade, Production and Protection 1976-2004”, *World Bank Economic Review* 21(1): 165-171.
- Petrin, Amil and Levinsohn, James A.,** "Measuring Aggregate Productivity Growth Using Plant-Level Data" (December 2005). NBER Working Paper No. W11887 Available at SSRN: <http://ssrn.com/abstract=875738>
- Pacvnick, Nina (2002).** “Trade Liberalization, Exit and Productivity Improvements: Evidence from Chilean Plants”. *Review of Economic Studies*, 69(1): 245-276.
- Roberts, M. C. and James Tybout (1996).** (eds.) Industrial Evolution in Developing Countries. New York, N. Y.: Oxford University Press.
- Rodrik, D. (1988^a).** “Imperfect Competition, Scale Economies and Trade Policy in Developing Countries”. Mimeo, Harvard University.
- Rodriguez, F., and Dani Rodrik (2000).** “Trade Policy and Economic Growth: A Skeptic’s Guide to the Cross-National Evidence”, in *NBER Macro Annual 2000*, B. Bernake and K. Rogoff (eds.) (Cambridge, Massachusetts: National Bureau of Economic Research).
- Rodrik, Dani (1992).** “Closing the Productivity Gap: Does Liberalisation Really Help?”, in Gerald K. Hellener (ed.), Trade Policy Industrialization and Development: New Perspectives, Oxford: Clarendon Press.
- Sianesi, Barbara (2001).** “Implementing Propensity Score Matching Estimators with STATA”, University College London and Institute for Fiscal Studies, prepared for UK Stata Users Group, VII Meeting, London, May 2001.
- Slaughter, M. J. (2001).** “Trade Liberalization and Per Capita Income Convergence: A Difference-in-Difference Analysis”. *Journal of International Economics* 55(1): 203-228.
- Topalova, P. (2004).** “Trade Liberalization and Firm Productivity: The Case of India”. *IMF Working Paper*, Asia and Pacific Department, WP/04/28.
- Trefler, D. (2004).** “The Long and Short of the Canada-U.S. Free Trade Agreement”. *The American Economic Review* 94(4): 870-896.
- Tybout, J. (2003).** “Plant-and Firm- Level Evidence on “New” Trade Theories” in E. K. Choi and J. Harrigan (eds.), Handbook of International Trade . Oxford: Blackwell.
- Tybout, J. (2001).** “Plant and Firm-Level Evidence on New Trade Theories”. In: Handbook of International Economics, ed. James Harrigan. Vol 38 Basil-Blackwell.
- Tybout J. and Westbrook, M.D. (1996).** “Scale Economies as a Source of Efficiency Gains”. In Industrial Evolution in Developing Countries, Micro Patterns of Turnover, Productivity, and Market Structure, pp. 104-141. Oxford University Press.
- Tybout, J. R. (1996).** “Chile, 1979-86: trade liberalisation and its aftermath”. In: Industrial Evolution in Developing Countries. Oxford University Press.

Weiss, J. And k. Jayanthakumaran (1995). “Trade Reform and Manufacturing Performance: Evidence from Sri Lanka, 1978-89; *Development Policy Review*, 13(1):65-83.

Yeaple, S. (2005). “A Simple Model of Firm Heterogeneity, International Trade, and Wages”, *Journal of International Economics* 65(1):1-20.

Table 1: Descriptive Statistic for firms belonging to the Tradable and Non-Tradable Industries and for the whole sample

Variable	Sub-sample	1988	1989	1990	1991	1992	1993	1994	1995	Average
Employment (number of employees per plant)	T	96	114	109	97	90	86	81	80	94
	NT	93	125	120	114	114	107	101	96	109
	All	96	115	110	99	93	89	84	82	96
Sales (constant pesos base year=1988)	T	9,885	12,511	12,650	10,646	10,866	11,804	12,569	12,615	11,693
	NT	10,506	16,509	16,262	17,266	17,922	18,390	19,890	19,135	16,985
	All	9,964	12,941	13,057	11,361	11,682	12,627	13,513	13,439	12,323
Wages (constant pesos base year=1988)	T	107,238	150,453	165,320	154,011	152,151	142,502	137,351	140,040	143,633
	NT	129,341	213,659	239,975	246,646	262,143	250,621	231,744	245,708	227,480
	All	110,066	157,249	173,736	164,023	164,868	156,017	149,515	153,396	153,609
Value Added (constant pesos base year=1988)	T	445,554	555,019	534,725	487,558	498,186	498,254	526,596	511,323	507,152
	NT	721,933	1,110,250	1,114,723	1,163,570	1,127,086	1,172,695	1,257,300	1,221,311	1,111,108
	All	481,624	614,722	600,107	563,991	571,069	582,886	620,754	601,058	579,526
Capital (constant pesos base year=1988)	T	488,623	538,251	518,064	509,682	346,894	357,981	377,427	405,513	442,804
	NT	1,701,606	1,814,391	1,743,312	1,922,512	1,976,279	1,958,151	1,958,342	1,995,863	1,883,807
	All	628,900	687,945	663,344	669,393	537,436	557,033	584,100	608,233	617,048
Capital per employee (constant pesos base year=1988)	T	12,491	11,846	12,053	13,881	3,817	3,851	4,371	5,338	8,456
	NT	13,463	15,077	17,186	22,618	24,382	22,996	27,998	24,864	21,073
	All	12,606	12,225	12,658	14,929	6,435	6,316	7,439	7,832	10,055
Labour Productivity (constant pesos base year=1988)	T	4,695	4,544	5,449	4,994	5,652	7,422	5,910	5,660	5,541
	NT	5,201	6,387	7,860	7,667	6,954	7,738	8,655	9,425	7,486
	All	4,761	4,745	5,721	5,311	5,813	7,463	6,263	6,135	5,777
Total Factor Productivity (% in relation to the industry average TFP)	T	72.35	77.17	75.57	75.20	82.83	83.38	88.98	90.52	81
	NT	100.26	109.49	107.18	121.27	110.60	130.60	121.24	113.85	114
	All	75.47	80.73	78.97	80.41	86.15	89.37	93.22	93.59	85
Price-Cost-Margins (ratio)	T	0.29	0.29	0.26	0.23	0.28	-0.37	0.29	0.27	0.19
	NT	0.35	0.34	0.31	0.31	0.25	0.29	0.27	0.31	0.30
	All	0.30	0.29	0.27	0.24	0.27	-0.29	0.29	0.28	0.21
Export Propensity (%)	T	0.15	0.18	0.19	0.16	0.16	0.16	0.17	0.17	0.17
	NT	0.04	0.05	0.05	0.05	0.06	0.06	0.06	0.05	0.05
	All	0.14	0.17	0.17	0.15	0.15	0.15	0.15	0.16	0.15

T: Tradable Industries, NT: Non-Tradable Industries, ALL: the whole sample, Average: average for the whole period.

Table 2: Descriptive Statistic discriminating between export oriented and import competing firms in the Tradable Industries

Variable	Sub-sample	1988	1989	1990	1991	1992	1993	1994	1995	Average
Employment (number of employees per plant)	EXPO	132	158	153	136	123	113	109	106	129
	IMPC	61	69	65	60	57	58	54	53	60
	T	96	114	109	97	90	86	81	80	94
Sales (constant pesos base year=1988)	EXPO	12,839	16,520	16,833	14,085	14,400	15,239	16,740	17,284	15,492
	IMPC	17,488	18,339	18,263	16,574	15,524	17,001	19,190	16,803	17,398
	T	9,885	12,511	12,650	10,646	10,866	11,804	12,569	12,615	11,693
Wages (constant pesos base year=1988)	EXPO	127,617	184,568	201,616	185,482	184,788	163,507	165,369	164,216	172,145
	IMPC	87,478	115,317	128,626	123,934	120,039	121,185	109,591	115,478	115,206
	T	107,238	150,453	165,320	154,011	152,151	142,502	137,351	140,040	143,633
Value Added (constant pesos base year=1988)	EXPO	493,101	657,263	603,171	565,176	568,743	550,424	585,555	551,579	571,877
	IMPC	399,338	449,719	465,527	414,631	428,387	445,150	468,180	470,421	442,669
	T	445,554	555,019	534,725	487,558	498,186	498,254	526,596	511,323	507,152
Capital (constant pesos base year=1988)	EXPO	447,255	493,679	478,163	464,257	434,334	453,042	477,166	500,640	468,567
	IMPC	530,247	582,236	556,818	553,075	259,750	264,313	276,906	307,202	416,318
	T	488,623	538,251	518,064	509,682	346,894	357,981	377,427	405,513	442,804
Labour Productivity (constant pesos base year=1988)	EXPO	4,819	3,706	5,043	4,334	5,450	8,175	4,807	4,959	5,161
	IMPC	4,575	5,391	5,851	5,614	5,848	6,664	6,988	6,372	5,913
	T	4,695	4,544	5,449	4,994	5,652	7,422	5,910	5,660	5,541
Capital per Employee (constant pesos base year=1988)	EXPO	2,831	2,835	3,334	2,943	3,372	3,420	3,927	4,399	3,382
	IMPC	22,086	20,709	20,448	24,352	4,250	4,271	4,817	6,308	13,405
	T	12,491	11,846	12,053	13,881	3,817	3,851	4,371	5,338	8,456
Total Factor Productivity (% in relation to the industry average TFP)	EXPO	70.67	78.12	76.90	73.53	85.42	76.13	82.06	87.31	79
	IMPC	74.08	76.19	74.23	76.90	80.22	90.71	96.15	93.87	83
	T	72.35	77.17	75.57	75.20	82.83	83.38	88.98	90.52	81
Price-Cost-Margins (ratio)	EXPO	0.26	0.26	0.26	0.18	0.27	0.26	0.26	0.24	0.25
	IMPC	0.33	0.32	0.32	0.31	0.29	-5.29	0.38	0.36	-0.37
	T	0.29	0.29	0.26	0.23	0.28	-0.37	0.29	0.27	0.19
Export Propensity (%)	EXPO	0.25	0.30	0.31	0.28	0.26	0.27	0.26	0.27	0.27
	IMPC	0.05	0.06	0.07	0.06	0.06	0.06	0.07	0.08	0.06
	T	0.15	0.18	0.19	0.16	0.16	0.16	0.17	0.17	0.17

EXPO: Export oriented firms, IMPC: Import Competing firms, ALL: the whole sample, Ni: number of observations in 1988; Nf: Number of Observations in 1995, N %Var: percentage variation in the number of observations from 1988 to 1995 in relation to the initial number in 1988.

Table 3.1.1: Effects of Increased Trade Exposure on Firms belonging to the Tradable vs. Non-Tradable Industries

Explanatory Variables	Ln(Total Factor Productivity)				Ln(Price-Cost-Margins)				Ln(Sales)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
TL1	0.115 (0.015)***	0.051 (0.053)	0.052 (0.026)*	0.050 (0.027)*	0.036 (0.020)	0.209 (0.056)***	0.180 (0.036)***	0.170 (0.036)***	-0.012 (0.041)	-0.195 (0.126)	-0.096 (0.073)	-0.087 (0.073)
Size	0.045 (0.010)***	0.046 (0.010)***	0.046 (0.010)***	0.046 (0.010)***	0.036 (0.013)***	0.035 (0.013)***	0.034 (0.013)***	0.036 (0.013)***	-----	-----	-----	-----
Exports	-0.019 (0.017)	-0.020 (0.017)	-0.021 (0.016)	-0.021 (0.016)	-0.199 (0.024)***	-0.192 (0.024)***	-0.194 (0.024)***	-0.193 (0.024)***	1.727 (0.042)***	1.720 (0.042)***	1.724 (0.042)***	1.724 (0.042)***
Constant	4.049 (0.025)***	4.023 (0.030)***	4.008 (0.029)***	4.038 (0.035)***	-1.533 (0.033)***	-1.453 (0.036)***	-1.451 (0.035)***	-1.332 (0.043)***	8.036 (0.053)	7.937 (0.065)***	7.989 (0.063)***	7.883 (0.084)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No
T (linear trend)			0.016 (0.006)***	-0.003 (0.014)	No		-0.035 (0.007)***	-0.115 (0.019)***	No		0.021 (0.015)	0.091 (0.039)**
T^2 (quadratic term)				0.002 (0.002)				0.090 (0.002)***				-0.008 (0.004)*
F stat	142.04	151.61	174.08	168.08	81.2	41.54	55.06	51.77	145.25	116.83	140.5	135.9
R. sq. adj.	0.18	0.18	0.18	0.18	0.08	0.09	0.08	0.09	0.34	0.34	0.34	0.34
No. Obs.	4120	4120	4120	4120	5918	5918	5918	5918	6043	6043	6043	6043

TL1: dummy for increased trade exposure for firms belonging to tradable industries. Size: categorical variable that takes the value of 1 if the firm is small (less than 40 employees), 2 if the firm is medium (between 41 and 100 employees) and 3 if the firm is big (more than 100 employees).

Exports: dummy variable that takes the value of 1 if the firm has exporting activity and zero otherwise. Total Factor Productivity measure using Levinshon and Petrin's methodology.

Robust standard errors in parenthesis. * significant at the 10 % level. ** significant at the 5 % level. *** significant at the 1 % level

Table 3.1.2: Effects of Increased Trade Exposure on Firms belonging to the Export Oriented vs. Non-Tradable Industries

Explanatory Variables	Ln(Total Factor Productivity)				Ln(Price-Cost-Margins)				Ln(Sales)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
TL2	0.074 (0.018)***	0.009 (0.054)	0.012 (0.032)	0.012 (0.032)	-0.068 (0.030)**	-0.119 (0.059)**	-0.033 (0.044)	-0.036 (0.044)	0.060 (0.067)	-0.161 (0.131)	-0.170 (0.101)**	-0.158 (0.101)
Size	0.038 (0.011)***	0.039 (0.011)***	0.039 (0.011)***	0.039 (0.011)***	-0.066 (0.016)***	-0.065 (0.016)***	-0.066 (0.016)***	-0.065 (0.016)***	-----	-----	-----	-----
Constant	4.076 (0.029)***	4.027 (0.035)***	4.036 (0.034)***	4.039 (0.042)***	-1.260 (0.037)***	-1.217 (0.043)***	-1.235 (0.042)**	-1.178 (0.055)***	8.691 (0.056)***	8.411 (0.082)***	8.527 (0.078)***	8.326 (0.115)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No
T (linear trend)			0.016 (0.007)**	0.014 (0.018)			-0.009 (0.008)***	-0.050 (0.026)*	No		0.059 (0.020)***	0.192 (0.059)***
T^2 (quadratic)				0.0002 (0.002)				0.005 (0.003)				-0.015 (0.007)**
F stat	269.63	253.22	310.31	288.71	159.74	82.06	129.51	111.12	35.68	24.3	34.68	313.52
R. sq. adj.	0.16	0.17	0.17	0.17	0.03	0.03	0.03	0.03	0.07	0.08	0.07	0.54
No. Obs.	2322	2322	2322	2322	3283	3283	3283	3283	3376	3376	3376	3376

TL2:dummy for increased trade exposure for firms belonging to export oriented industries. Size: categorical variable that takes the value of 1 if the firm is small (less than 40 employees), 2 if the firm is medium (between 41 and 100 employees) and 3 if the firm is big (more than 100 employees).

Age: in years, Capital Intensity measured as the ratio of capital to labour, Total Factor Productivity measure using Levinshon and Petrin's methodology.

Robust standard errors in parenthesis.

* significant at the 10 % level. ** significant at the 5 % level. *** significant at the 1 % level.

Table 3.1.3: Effects of Increased Trade Exposure on Firms belonging to the Import Competing vs. Non-Tradable Sectors

Explanatory Variables	Ln(Total Factor Productivity)				Ln(Price-Cost-Margins)				Ln(Sales)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
TL3	0.182 (0.048)***	0.120 (0.070)*	0.112 (0.061)**	0.112 (0.061)*	0.077 (0.047)	0.26 (0.070)***	0.178 (0.061)**	0.163 (0.061)***	-0.005 (0.127)	-0.277 (0.180)	-0.280 (0.157)*	-0.264 (0.157)*
Size	0.039 (0.022)**	0.041 (0.022)*	0.041 (0.022)*	0.041 (0.022)*	0.051 (0.022)**	0.057 (0.022)***	0.052 (0.022)***	0.056 (0.022)**	-----	-----	-----	-----
Constant	4.624 (0.073)***	4.57 (0.085)***	4.539 (0.083)***	4.563 (0.099)***	-1.009 (0.060)***	-0.870 (0.068)***	-0.907 (0.067)***	-0.723 (0.085)***	8.697 (0.121)***	8.323 (0.158)***	8.403 (0.155)***	8.180 (0.202)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No
T (linear trend)	No	No	0.018 (0.010)*	0.003 (0.035)	No	No	-0.025 (0.009)***	-0.153 (0.034)***	No	No	0.068 (0.024)***	0.216 (0.089)**
T^2 (quadratic)	No			0.002 (0.003)				0.015 (0.003)***	No			-0.017 (0.010)*
F stat	193.33	115.31	208.63	192.44	189.82	39.99	110.89	75.97	72.61	46.07	68.94	63.79
R. sq. adj.	0.21	0.22	0.2157	0.2158	0.11	0.14	0.11	0.13	0.22	0.23	0.23	0.22
No. Obs.	904	904	904	904	1325	1325	1325	1325	1363	1363	1363	1363

TL3: dummy for increased trade exposure for firms belonging to import competing industries. Total Factor Productivity measure using Levinshon and Petrin's methodology. Size: categorical variable that takes the value of 1 if the firm is small (less than 40 employees), 2 if the firm is medium (between 41 and 100 employees) and 3 if the firm is big (more than 100 employees).

Robust standard errors in parenthesis.

* significant at the 10 % level. ** significant at the 5 % level. *** significant at the 1 % level.

Table 3.2.1: Difference-in-Differences using Matching Methods, plants belonging to the Tradable vs Non-Tradable industries

Matching Procedure	Output Variable	Treated	Controls	Difference*	S.E.	T-stat	No.	No.	No. total
							treated	controls	
<i>Nearest Neighbor=3</i>	Total Factor Productivity	90.52	78.99	11.52	3.75	3.07	370	629	999
	Price-Cost-Margins	0.27	0.29	-0.022	0.01	-1.99	581	1,202	1,783
	Sales	12,615	12,404	211	1,595	0.13	629	1,281	1,910
<i>Nearest Neighbor=5</i>	Total Factor Productivity	90.52	78.73	11.79	3.76	3.13	370	629	999
	Price-Cost-Margins	0.27	0.29	-0.023	0.01	-2.08	581	1,202	1,783
	Sales	12,615	12,344	271	1,597	0.17	629	1,281	1,910
<i>Kernel (Epanechnikov)</i>	Total Factor Productivity	90.52	78.93	11.58	3.75	3.09	370	629	999
	Price-Cost-Margins	0.27	0.29	-0.019	0.01	-1.73	581	1,202	1,783
	Sales	12,615	11,678	937	1,585	0.59	629	1,281	1,910
<i>Kernel (Gaussian)</i>	Total Factor Productivity	90.52	78.28	12.23	3.73	3.28	370	629	999
	Price-Cost-Margins	0.27	0.30	-0.032	0.01	-2.84	581	1,202	1,783
	Sales	12,615	10,629	1,986	1,582	1.26	629	1,281	1,910

* ATT: average treatment effect on the treated

With bootstrapped standard errors and kernel (Epanechnikov) estimation

Matching Procedure	Output Variable	Observed*	Bias	Std.Err.	T-stat	No. Obs.
<i>Kernel (Epanechnikov)</i>	Total Factor Productivity	11.58	1.32	3.12	3.71	999
	Price-Cost-Margins	-0.02	0.00	0.01	-1.80	1783
<i>Bootstrapped S.E.</i>	Sales	937.39	-187.92	1434.18	0.65	1910

* ATT: average treatment effect on the treated

3.2.1.1: Propensity score estimation

Variable	Coef.	Std. Err.	z	P>z
Hvbp2	0.26	0.242	1.09	0.28
Hva	-0.38	0.233	-1.61	0.11
Exp	0.48	0.149	3.21	0.00
Constant	-0.66	0.113	-5.86	0.00

Number of obs=999; Log likelihood=-651.38; LR chi(3)=14.24; Prob>chi2=0.002, Pseudo R2=0.01

Results from: . psmatch2 t11 hvbp2 hva exp, kernel outcome(tfplp) common logit ties

Table 3.2.1.2. Balancing tests

Variable	Sample	Mean		%bias	% Reduction	t-test	
		Treated	Control			t	p>t
Hvbp2	Unmatched	0.727	0.552	36.90		9.20	0.000
	Matched	0.651	0.620	6.50	82.20	0.87	0.383
Hva	Unmatched	0.711	0.553	33.10		8.26	0.000
	Matched	0.619	0.610	1.90	94.20	0.26	0.798
Exp	Unmatched	0.203	0.249	-11.10		-2.78	0.005
	Matched	0.470	0.399	17.10	-53.80	1.96	0.050

Results from the balancing tests after kernel matching with pstest (Leuven and Sianesi, 2003)

Table 3.2.2. Difference in Difference estimation for plants belonging to Export Oriented vs Non-Tradable Industries

Matching Procedure	Output Variable	Treated	Controls	Difference*	S.E.	T-stat	No.		No. total
							treated	controls	
<i>Nearest Neighbor=3</i>	Total Factor Productivity	87.31	80.99	6.32	5.41	1.17	189	377	566
	Price-Cost-Margins	0.24	0.27	-0.031	0.02	-1.95	293	712	1,005
	Sales	17,284	15,655	1,629	2,834	0.57	317	752	1,069
<i>Nearest Neighbor=5</i>	Total Factor Productivity	87.31	80.42	6.90	5.43	1.27	189	377	566
	Price-Cost-Margins	0.24	0.27	-0.029	0.02	-1.81	293	712	1,005
	Sales	17,284	15,583	1,701	2,838	0.60	317	752	1,069
<i>Kernel (Epanechnikov)</i>	Total Factor Productivity	87.31	81.31	6.00	5.39	1.11	189	377	566
	Price-Cost-Margins	0.24	0.27	-0.031	0.02	-1.94	293	712	1,005
	Sales	17,284	15,956	1,328	2,824	0.47	317	752	1,069
<i>Kernel (Gaussian)</i>	Total Factor Productivity	87.31	81.11	6.21	5.36	1.16	189	377	566
	Price-Cost-Margins	0.24	0.29	-0.045	0.02	-2.83	293	712	1,005
	Sales	17,284	13,923	3,361	2,808	1.20	317	752	1,069

* ATT: average treatment effect on the treated

With bootstrapped standard errors and kernel (Epanechnikov) estimation

Matching Procedure	Output Variable	Observed*	Bias	Std.Err.	T-stat	No. Obs.
<i>Kernel (Epanechnikov)</i>	Total Factor Productivity	6.00	0.25	5.68	1.06	566
	Price-Cost-Margins	-0.03	0.00	0.016	-1.99	1,005
<i>Bootstrapped S.E.</i>	Sales	1,328	44	2,956	0.45	1,069

* ATT: average treatment effect on the treated

3.2.2.1. Propensity score estimation

Variable	Coef.	Std. Err.	z	P>z
Hvbp2	0.37	0.321	1.15	0.25
Hva	-0.47	0.296	-1.59	0.11
Exp	0.60	0.200	3.02	0.00
Constant	-0.94	0.172	-5.45	0.00

Number of obs=566; Log likelihood=-353.75; LR chi(3)=13.49; Prob>chi2=0.00, Pseudo R2=0.02
Results from: . psmatch2 tl2 hvbp2 hva exp, kernel outcome(tfplp) common logit ties

Table 3.2.2.2. Balancing tests

Variable	Sample	Mean		bias	%	t-test	
		Treated	Control			t	p>t
hvbp2	Unmatched	0.762	0.614	32.50		5.87	0.000
	Matched	0.587	0.549	8.30	74.60	0.96	0.338
hva	Unmatched	0.722	0.599	26.30		4.79	0.000
	Matched	0.517	0.518	0.00	99.80	0.00	0.996
exp	Unmatched	0.260	0.295	-8.00		-1.46	0.145
	Matched	0.451	0.371	17.80	-122.90	2.04	0.042

Results from the balancing tests after kernel matching with pstest (Leuven and Sianesi, 2003)

Table 3.2.3. Difference in Difference estimation for plants belonging to Import Competing vs Non-Tradable Industries

Matching Procedure	Output Variable	Treated	Controls	Difference*	S.E.	T-stat	No. treated	No. controls	No. total
<i>Nearest Neighbor=3</i>	Total Factor Productivity	114.99	92.74	22.25	9.31	2.39	72	225	297
	Price-Cost-Margins	0.40	0.34	0.058	0.02	3.05	116	401	517
	Sales	8,773	13,257	-4,484	2,403	-1.87	128	436	564
<i>Nearest Neighbor=5</i>	Total Factor Productivity	114.99	91.89	23.10	9.33	2.48	72	225	297
	Price-Cost-Margins	0.40	0.34	0.058	0.02	3.03	116	401	517
	Sales	8,773	13,611	-4,838	2,417	-2.00	128	436	564
<i>Kernel (Epanechnikov)</i>	Total Factor Productivity	114.99	93.74	21.25	9.26	2.30	72	225	297
	Price-Cost-Margins	0.40	0.34	0.057	0.02	3.03	116	401	517
	Sales	8,773	14,038	-5,266	2,374	-2.22	128	436	564
<i>Kernel (Gaussian)</i>	Total Factor Productivity	114.99	92.35	22.63	9.06	2.50	72	225	297
	Price-Cost-Margins	0.40	0.34	0.061	0.02	3.30	116	401	517
	Sales	8,773	11,122	-2,349	2,309	-1.02	128	436	564

* ATT: average treatment effect on the treated

With bootstrapped standard errors and kernel (Epanechnikov) estimation

Matching Procedure	Output Variable	Observed*	Bias	Std.Err.	T-stat	No. Obs.
<i>Kernel (Epanechnikov)</i>	Total Factor Productivity	21.25	1.26	8.33	2.55	564
	Price-Cost-Margins	0.06	0.00	0.02	3.12	517
<i>Bootstrapped S.E.</i>	Sales	-5265.62	1249.42	2135.00	-2.47	564

* ATT: average treatment effect on the treated

3.2.3.1. Propensity score estimation

Variable	Coef.	Std. Err.	z	P>z
Hvbp2	-0.56	0.533	-1.06	0.29
Hva	0.28	0.525	0.53	0.59
Exp	0.97	0.324	3.00	0.00
Constant	-1.31	0.232	-5.63	0.00

Number of obs=297; Log likelihood=-159.66; LR chi(3)=9.68; Prob>chi2=0.02, Pseudo R2=0.03
Results from: . psmatch2 tl5 hvbp2 hva exp, kernel outcome(tfplp) common logit ties

Table 3.2.3.2. Balancing tests

Variable	Sample	Mean		bias	%	t-test	
		Treated	Control			t	p>t
Hvbp2	Unmatched	0.676	0.560	24.10		2.94	0.003
	Matched	0.611	0.616	-1.00	95.90	-0.06	0.954
Hva	Unmatched	0.695	0.577	24.70		3.00	0.003
	Matched	0.653	0.647	1.30	94.80	0.08	0.939
Exp	Unmatched	0.183	0.155	7.50		0.94	0.349
	Matched	0.431	0.376	14.70	-95.70	0.67	0.506

Results from the balancing tests after kernel matching with pstest (Leuven and Sianesi, 2003)

Table 4: Value of the output variables and the number of firms in 1988 and 1995

Variable/Sample	1988			1995		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Tradables						
Productivity	507	72.36	31.80	364	88.72	60.54
Mark-ups	965	0.29	0.19	546	0.26	0.21
Sales	978	10,501	25,745	546	14,533	36,406
EXPO						
Productivity	255	70.66	27.78	183	83.64	60.04
Mark-ups	476	0.27	0.20	271	0.23	0.20
Sales	482	13,563	31,550	271	20,217	47,910
IMPC						
Productivity	105	74.99	35.63	72	114.99	66.61
Mark-ups	169	0.34	0.18	107	0.40	0.17
Sales	172	9,936	23,166	107	10,494	20,460

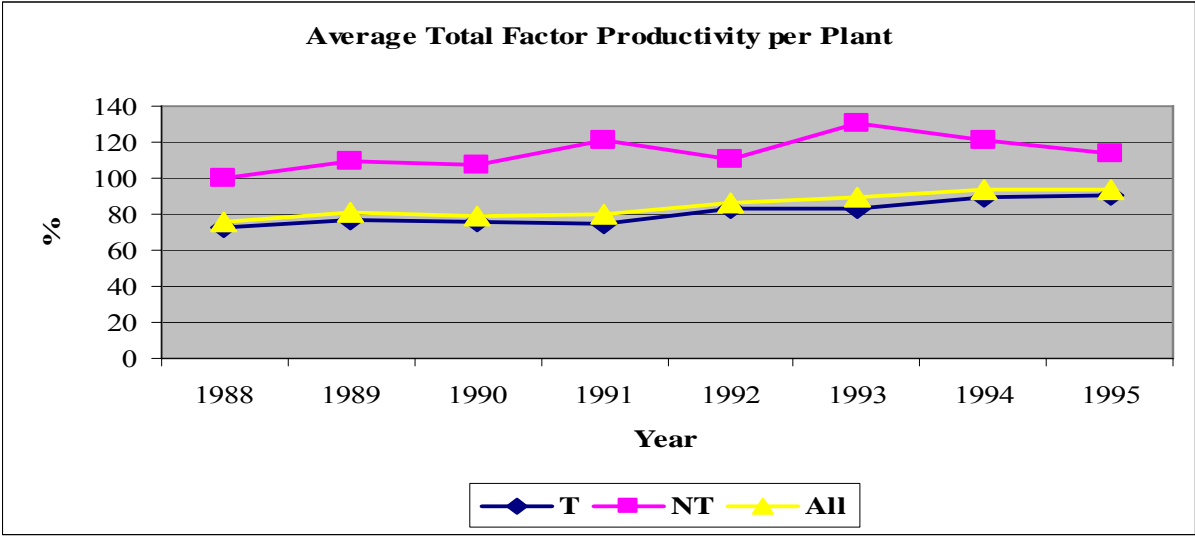
Table 5: Summary of the results

Output	Sample	Diff-in-Diff Regressions*		Matching and Diff-in-Diff Estimation**	
		Trade Liberalization Var.	Time Trend	Treatment Effect	
TFP	TRADABLE	+ Significant in 3/4, + NS in 1/4	+ Significant	Positive Significant in 5/5	
	EXPO	+ Not Significant (NS) in 3/4, + Signif. in 1/4	+ Significant	Positive Not Significant in 5/5	
	IMPC	+ Significant in 4/4	+ Significant	Positive Significant in 5/5	
PCM	TRADABLE	+ Significant in 3/4, + NS in 1/4	- Significant	Negative Significant in 5/5	
	EXPO	- Significant in 2/4 equations, - NS in 2/4	- Significant	Negative Significant in 5/5	
	IMPC	+ Significant in 3/4, + NS in 1/4	- Significant	Positive Significant in 5/5	
Sales	TRADABLE	Not Significant in 4/4	+ Significant	Positive Not Significant in 5/5	
	EXPO	- Not Significant 4/4	+ Significant	Positive Not Significant in 5/5	
	IMPC	- Significant in 2/4 equations, - NS in 2/4	+ Significant	Negative Significant in 4/5	

*Panel of plants 1988-1995

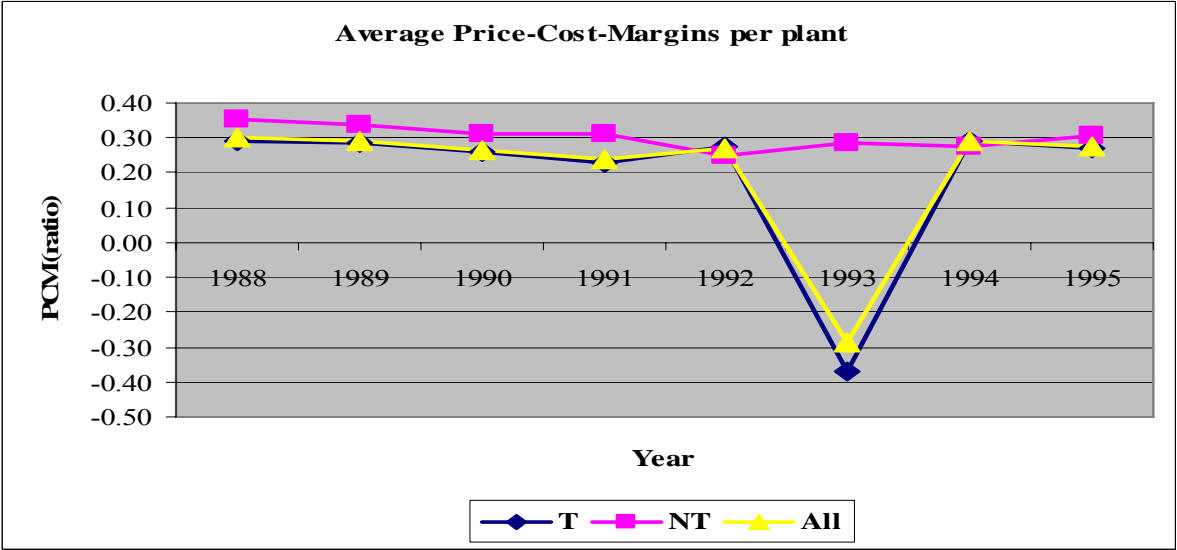
** 1988 vs. 1995.

Chart 1: Total Factor Productivity per plant for Tradable, Non-Tradable and the whole sample, 1988-1995



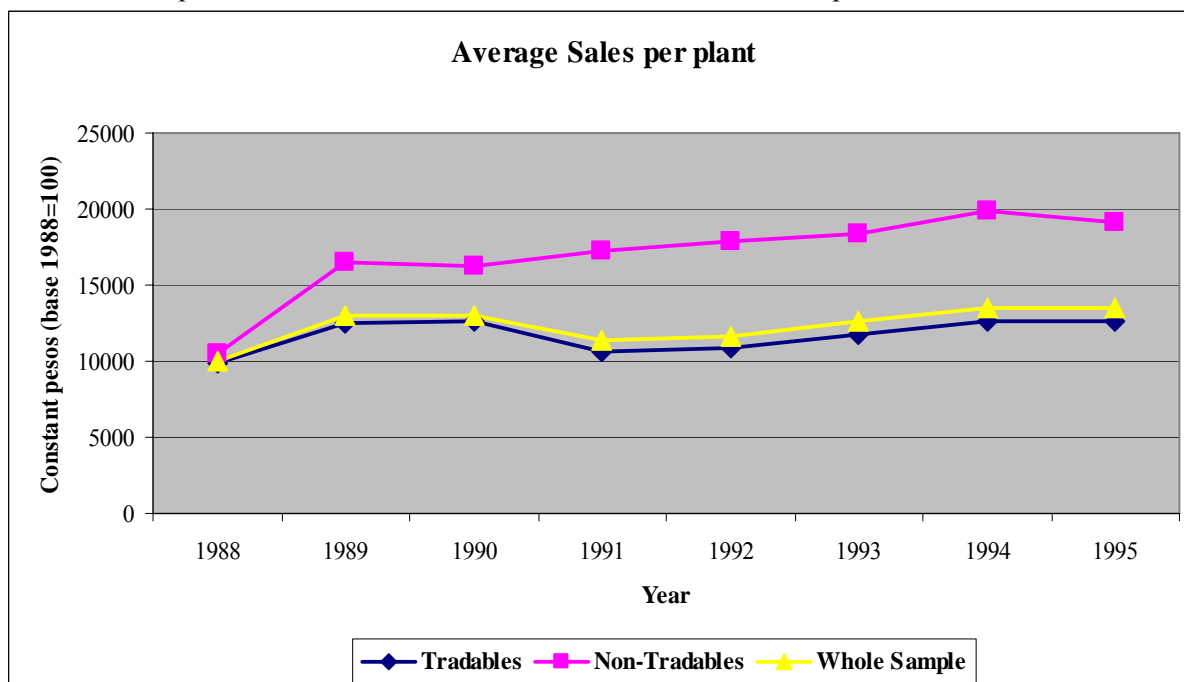
T: Tradable; NT: Non-Tradable, All: whole sample.

Chart 2: Price-Cost-Margins per firm for Tradable, Non-Tradable and the whole sample, 1988-1995



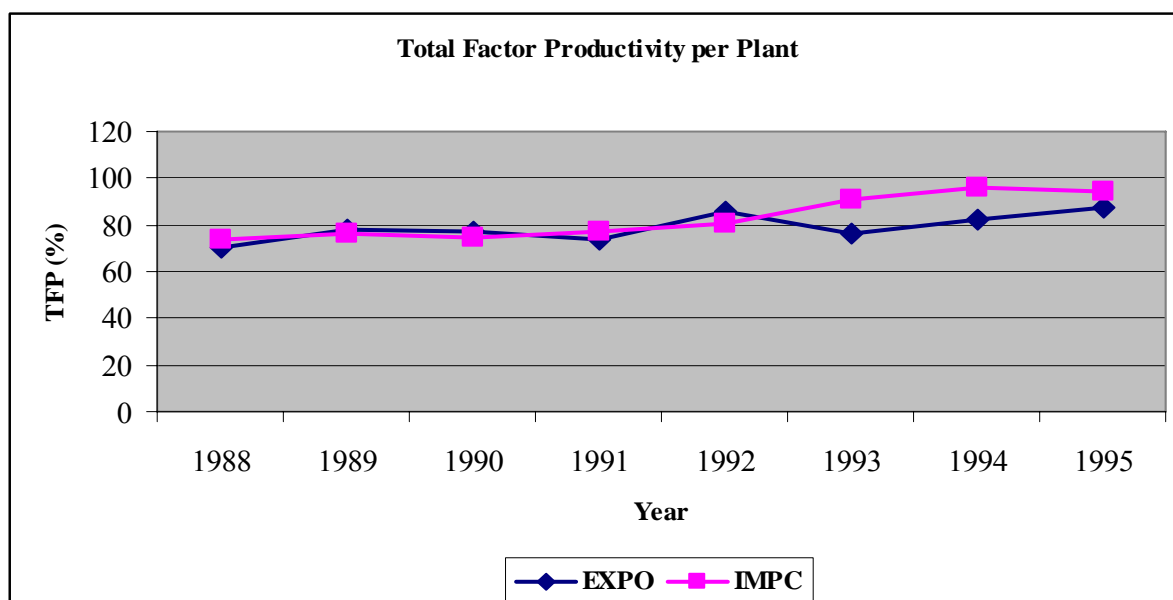
T: Tradable; NT: Non-Tradable, All: whole sample.

Chart 3: Sales per firm for Tradable, Non-Tradable and the whole sample, 1988-1995



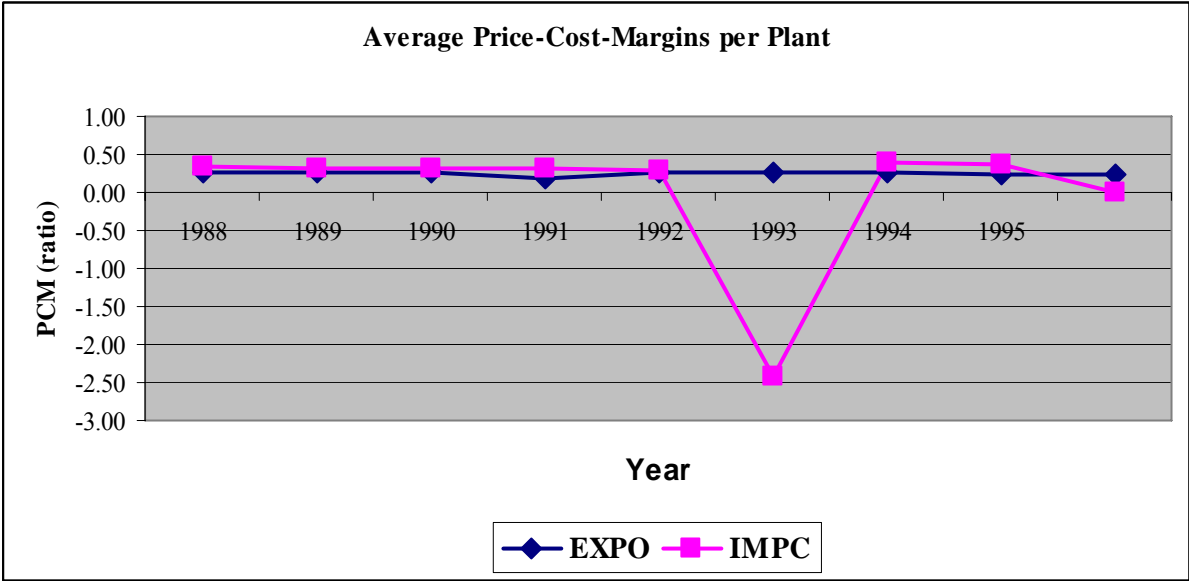
T: Tradable; NT: Non-Tradable, All: whole sample.

Chart 4: Average Total Factor Productivity per plants in the Export Oriented and Import Competing Sector, 1988-1995



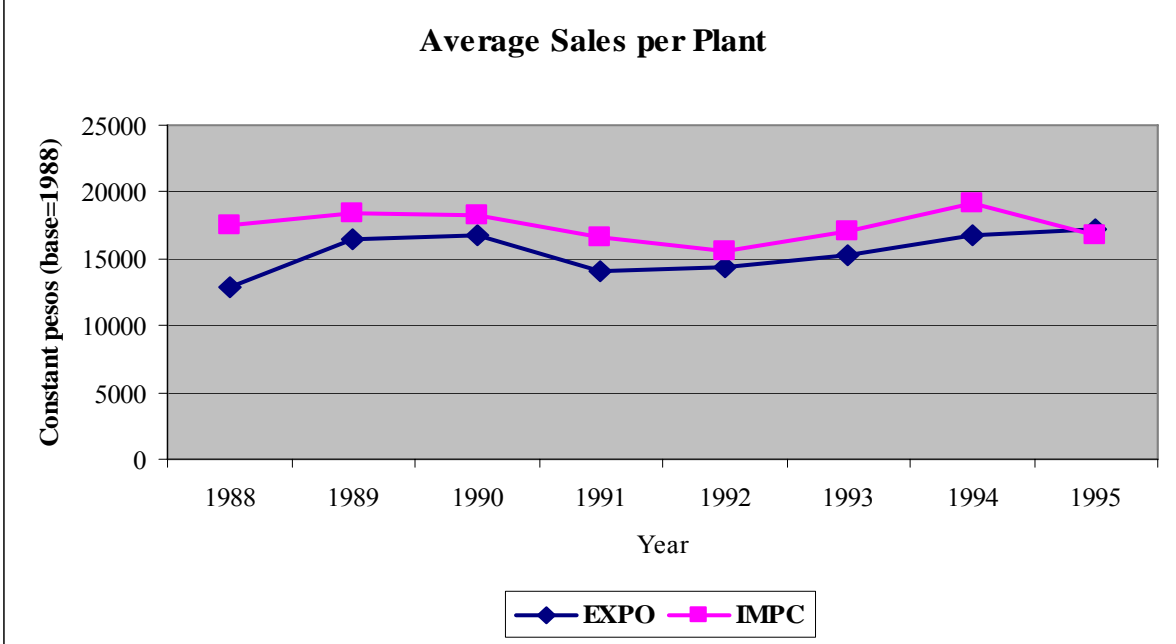
IMPC: import competing; EXPO: export oriented

Chart 5: Price-Cost-Margins per firm for Export Oriented and Import Competing industries, 1988-1995



IMPC: import competing; EXPO: export oriented

Chart 6: Sales per firm for Export Oriented and Import Competing industries, 1988-1995



IMPC: import competing; EXPO: export oriented

Appendix 1. Classification in Tradable and Non-Tradable Industries

Table 1.1. Tradable Industries

Trade Orientation	ISIC code	Industry	No. Obs.*
EXPO	311	Meat products	1,921
EXPO	321	Textiles	1,313
EXPO	322	Wearing apparel	704
EXPO	323	Leather and fur products	400
EXPO	324	Footwear products	216
IMPC	371	Iron and steel basic industries	112
IMPC	382	Machinery except electrical	336
IMPC	383	Electrical machinery	496
IMPC	385	Professional and scientific equipment	120
IIT	351	Industrial chemicals	208
IIT	355	Rubber products	144
IIT	372	Non-ferrous metal basic industries	80
IIT	384	Transport equipment	312
NS	331	Wood and cork products	392
NS	332	Furniture (except primary of metal)	208
NS	341	Paper and paper products	280
NS	352	Other chemical products	720
NS	362	Manufactures of glass and glasses	85
NS	381	Fabricated metal products(except machinery and equipment)	736
NS	390	Other industries nec	256
			9,039

Trade Orientation	ISIC code	No. Obs.*
EXPO	311	1,921
EXPO	321	1,313
EXPO	322	704
EXPO	323	400
EXPO	324	216
IMPC	371	112
IMPC	382	336
IMPC	383	496
IMPC	385	120
IIT	351	208
IIT	355	144
IIT	372	80
IIT	384	312
NS	331	392
NS	332	208
NS	341	280
NS	352	720
NS	362	85
NS	381	736
NS	390	256
		9,039

EXPO: export oriented, IMPC: import competing

IIT: intra-industry trade. NS: Not Specialized, i.e. tradable not classified as import competing or export Oriented or intra-industry group.

*Number of observations for the whole period

Table 1.2. Non-Tradable Industries

ISIC code	Industry	No. Obs.*
313	Beverages	368
314	Tobacco	14
342	Printing and publishing	384
356	Plastic products nec	296
361	Pottery, china and earthenware products	56
369	Non-metallic mineral products	352
		1,470

ISIC code	No. Obs.*
313	368
314	14
342	384
356	296
361	56
369	352
	1470

*Number of observations for the whole period.

Table 1.3. Number of plants in 1988 and exit flows of plants according to its trade orientation

ISIC	No. of plants in									Trade Orientation
	1988	E89*	E90	E91	E92	E93	E94	E95	T or NT	
311	228	42	5	10	14	8	6	8	T	EXPO
313	44	13	1	1	0	0	0	1	NT	NT
314	3	1	0	0	0	0	0	0	NT	NT
321	162	20	3	11	13	11	4	12	T	EXPO
322	87	19	3	4	4	4	7	1	T	EXPO
323	46	13	5	2	6	0	4	3	T	EXPO
324	24	5	2	2	0	2	1	0	T	EXPO
331	49	21	2	2	3	5	0	1	T	NS
332	26	12	1	0	2	2	1	1	T	NS
341	35	6	2	3	1	1	3	1	T	NS
342	48	11	1	2	0	2	5	3	NT	NT
351	26	1	0	3	3	0	1	3	T	IIT
352	90	13	2	7	7	3	3	4	T	NS
355	18	2	0	0	0	1	2	1	T	IIT
356	35	12	0	0	1	1	0	2	NT	NT
361	7	0	2	0	0	1	0	1	NT	NT
362	11	4	1	0	1	0	0	1	T	NS
369	44	16	0	0	1	1	2	1	NT	NT
371	13	3	0	1	1	0	0	0	T	IMPC
372	9	1	1	0	0	1	0	2	T	IIT
381	90	23	2	9	1	3	2	1	T	NS
382	40	11	1	2	0	0	2	2	T	IMPC
383	56	5	4	3	4	4	3	2	T	IMPC
384	33	4	0	1	3	2	4	2	T	IIT
385	15	5	0	0	3	0	0	0	T	IMPC
390	32	14	1	0	2	0	0	2	T	NS
Total	1271	277	39	63	70	52	50	55	606	

*E89-E95: number of exiting plants from the sample.

T vs. NT: Tradable or Non-Tradable sub-group.

Trade Orientation: EXPO: export oriented; IMPC: import competing; IIT: intra-industry sub-group; NS: not-specialised.

Appendix 2: Export propensity, import penetration and openness index

Table 2.1. Import Penetration

ISIC code	1988	1989	1990	1991	1992	1993	1994	1995	Average
311	0.019	0.015	0.017	0.022	0.036	0.047	0.069	0.072	0.037
313	0.005	0.003	0.003	0.005	0.034	0.031	0.040	0.037	0.020
314	0.003	0.003	0.003	0.002	0.001	0.001	0.001	0.003	0.002
321	0.046	0.043	0.045	0.058	0.085	0.124	0.139	0.148	0.086
322	0.024	0.012	0.021	0.029	0.058	0.051	0.165	0.159	0.065
323	0.069	0.051	0.103	0.143	0.151	0.202	0.139	0.145	0.125
324	0.044	0.032	0.040	0.101	0.162	0.242	0.298	0.395	0.164
331	0.222	0.171	0.167	0.219	0.350	0.593	0.839	0.815	0.422
332	0.002	0.003	0.005	0.004	0.207	0.447	0.506	0.543	0.215
341	0.170	0.185	0.220	0.258	0.299	0.366	0.457	0.505	0.308
342	0.010	0.006	0.008	0.011	0.019	0.015	0.022	0.032	0.015
351	0.956	0.895	0.810	1.000	2.089	1.854	2.300	2.036	1.492
352	0.096	0.113	0.104	0.124	0.229	0.221	0.265	0.285	0.180
353				0.055	0.105	0.995	9.762	0.161	2.216
354				0.456	0.601	0.520	0.719	0.801	0.619
355	0.094	0.126	0.128	0.217	0.333	0.369	0.490	0.490	0.281
356	0.080	0.067	0.056	0.120	0.145	0.230	0.191	0.237	0.141
361	0.070	0.066	0.054	0.039	0.046	0.074	0.072	0.091	0.064
362	0.246	0.211	0.194	0.237	0.447	0.426	0.741	0.933	0.430
369	0.172	0.152	0.171	0.130	0.077	0.126	0.160	0.187	0.147
371	0.859	0.574	0.602	0.683	1.205	0.889	0.830	0.730	0.796
372	2.427	2.983	2.337	2.384	1.012	1.011	0.968	0.992	1.764
381	0.207	0.172	0.185	0.189	0.218	0.349	0.318	0.304	0.243
382	4.615	2.469	2.406	2.382	5.882	5.839	5.422	6.734	4.469
383	0.586	0.608	0.675	0.745	1.348	1.494	2.210	2.198	1.233
384	0.514	0.508	0.472	0.572	1.105	1.782	2.094	2.559	1.201
385	4.215	0.697	0.597	0.623	1.341	1.291	1.658	1.624	1.506
390	0.943	0.527	0.498	0.388	0.442	0.835	1.081	0.930	0.705

Import Penetration: Imports/Gross Output at the industry level.

Table 2.2. Export Propensity

ISIC code	1988	1989	1990	1991	1992	1993	1994	1995	Average
311	0.250	0.269	0.325	0.238	0.237	0.231	0.250	0.233	0.254
313	0.080	0.077	0.078	0.088	0.056	0.055	0.063	0.097	0.074
314	0.006	0.002	0.005	0.007	0.014	0.002	0.004	0.009	0.006
321	0.598	0.464	0.485	0.442	0.527	0.508	0.495	0.506	0.503
322	1.068	0.619	0.490	0.470	0.396	0.237	0.486	0.500	0.533
323	0.566	0.595	0.679	0.587	0.556	0.569	0.553	0.741	0.606
324	0.198	0.211	0.241	0.272	0.329	0.396	0.320	0.292	0.282
331	0.004	0.004	0.007	0.010	0.062	0.067	0.134	0.196	0.060
332	0.000	0.020	0.018	0.002	0.026	0.018	0.125	0.337	0.068
341	0.081	0.069	0.081	0.107	0.135	0.145	0.139	0.156	0.114
342	0.015	0.015	0.011	0.032	0.016	0.018	0.018	0.018	0.018
351	0.288	0.250	0.250	0.273	0.479	0.449	0.481	0.464	0.367
352	0.053	0.063	0.052	0.054	0.096	0.063	0.082	0.089	0.069
353	.	.	.	0.002	0.003	0.008	0.057	0.029	0.020
354	.	.	.	0.000	0.008	0.011	0.004	0.000	0.005
355	0.129	0.236	0.257	0.253	0.310	0.360	0.575	0.593	0.339
356	0.022	0.026	0.020	0.021	0.028	0.043	0.022	0.050	0.029
361	0.124	0.132	0.122	0.131	0.127	0.146	0.132	0.147	0.133
362	0.085	0.138	0.133	0.136	0.165	0.224	0.316	0.354	0.194
369	0.138	0.143	0.135	0.093	0.125	0.108	0.087	0.080	0.114
371	0.141	0.156	0.094	0.149	0.187	0.126	0.130	0.128	0.139
372	0.148	0.259	2.519	0.889	0.237	0.403	0.298	0.572	0.666
381	0.017	0.030	0.026	0.019	0.016	0.013	0.014	0.025	0.020
382	0.265	0.108	0.044	0.021	0.142	0.141	0.148	0.242	0.139
383	0.036	0.026	0.042	0.023	0.039	0.072	0.127	0.149	0.064
384	0.103	0.081	0.068	0.091	0.198	0.513	1.023	0.661	0.342
385	0.205	0.052	0.044	0.040	0.073	0.078	0.112	0.120	0.090
390	0.312	0.258	0.225	0.121	0.075	0.112	0.155	0.145	0.175
Average	0.190	0.166	0.248	0.163	0.166	0.183	0.227	0.248	0.199

EO: export oriented industry, IC: import competing industry

Table 2.3. Openness index (defined as imports plus exports over output at the industry level)

ISIC code	1988	1989	1990	1991	1992	1993	1994	1995	Avg.88-95	Avg. 88-90	Avg. 92-95
311	0.269	0.284	0.342	0.260	0.273	0.278	0.318	0.305	0.291	0.298	0.294
313	0.085	0.079	0.081	0.093	0.089	0.086	0.104	0.134	0.094	0.082	0.103
314	0.009	0.005	0.008	0.010	0.014	0.004	0.005	0.011	0.008	0.007	0.009
321	0.644	0.507	0.529	0.500	0.612	0.632	0.633	0.654	0.589	0.560	0.633
322	1.092	0.631	0.511	0.499	0.454	0.288	0.651	0.658	0.598	0.745	0.513
323	0.635	0.646	0.782	0.730	0.707	0.771	0.692	0.886	0.731	0.688	0.764
324	0.242	0.244	0.281	0.373	0.492	0.638	0.618	0.687	0.447	0.255	0.609
331	0.226	0.175	0.174	0.229	0.412	0.661	0.973	1.011	0.483	0.191	0.764
332	0.002	0.023	0.023	0.006	0.233	0.465	0.631	0.880	0.283	0.016	0.552
341	0.252	0.254	0.301	0.366	0.434	0.511	0.596	0.662	0.422	0.269	0.551
342	0.026	0.021	0.019	0.043	0.034	0.033	0.040	0.050	0.033	0.022	0.039
351	1.243	1.145	1.060	1.272	2.569	2.303	2.781	2.500	1.859	1.150	2.538
352	0.150	0.175	0.156	0.177	0.325	0.284	0.347	0.374	0.248	0.160	0.332
353				0.057	0.108	1.003	9.819	0.190	2.235		2.780
354				0.456	0.609	0.531	0.723	0.801	0.624		0.666
355	0.223	0.362	0.385	0.470	0.643	0.728	1.065	1.083	0.620	0.323	0.880
356	0.102	0.093	0.077	0.142	0.174	0.273	0.214	0.287	0.170	0.090	0.237
361	0.195	0.198	0.176	0.170	0.173	0.220	0.204	0.238	0.197	0.190	0.209
362	0.331	0.349	0.327	0.373	0.612	0.651	1.057	1.287	0.623	0.336	0.902
369	0.310	0.295	0.306	0.223	0.202	0.234	0.247	0.268	0.261	0.304	0.238
371	1.000	0.730	0.697	0.833	1.393	1.015	0.959	0.857	0.935	0.809	1.056
372	2.575	3.242	4.856	3.273	1.249	1.414	1.266	1.563	2.430	3.558	1.373
381	0.225	0.203	0.211	0.209	0.234	0.362	0.333	0.329	0.263	0.213	0.315
382	4.880	2.577	2.450	2.403	6.024	5.980	5.570	6.976	4.608	3.303	6.138
383	0.622	0.634	0.717	0.768	1.388	1.566	2.337	2.348	1.297	0.658	1.910
384	0.617	0.589	0.540	0.663	1.303	2.294	3.117	3.220	1.543	0.582	2.484
385	4.420	0.749	0.641	0.663	1.414	1.369	1.770	1.744	1.596	1.937	1.574
390	1.254	0.784	0.722	0.510	0.517	0.947	1.236	1.076	0.881	0.920	0.944
Average	0.832	0.577	0.630	0.563	0.810	0.912	1.368	1.110	0.850	0.679	1.050

Table 2.4. Summary of import penetration, export orientation and openness index

ISIC	Import Penetration (IP2)			Export Propensity			Openness Index		
	Avg 88-95	Avg 88-90	Avg. 92-95	Avg.88-95	Avg. 88-90	Avg. 92-95	Avg.88-95	Avg. 88-90	Avg. 92-95
311	0.037	0.017	0.056	0.254	0.281	0.238	0.291	0.298	0.294
313	0.020	0.004	0.036	0.074	0.078	0.068	0.094	0.082	0.103
314	0.002	0.003	0.002	0.006	0.005	0.007	0.008	0.007	0.009
321	0.086	0.044	0.124	0.503	0.516	0.509	0.589	0.560	0.633
322	0.065	0.019	0.108	0.533	0.726	0.405	0.598	0.745	0.513
323	0.125	0.075	0.159	0.606	0.613	0.605	0.731	0.688	0.764
324	0.164	0.039	0.274	0.282	0.217	0.334	0.447	0.255	0.609
331	0.422	0.187	0.649	0.060	0.005	0.115	0.483	0.191	0.764
332	0.215	0.003	0.426	0.068	0.013	0.126	0.283	0.016	0.552
341	0.308	0.192	0.407	0.114	0.077	0.144	0.422	0.269	0.551
342	0.015	0.008	0.022	0.018	0.014	0.017	0.033	0.022	0.039
351	1.492	0.887	2.070	0.367	0.263	0.468	1.859	1.150	2.538
352	0.180	0.104	0.250	0.069	0.056	0.082	0.248	0.160	0.332
355	0.281	0.116	0.420	0.339	0.207	0.459	0.620	0.323	0.880
356	0.141	0.068	0.201	0.029	0.023	0.036	0.170	0.090	0.237
361	0.064	0.063	0.070	0.133	0.126	0.138	0.197	0.190	0.209
362	0.430	0.217	0.637	0.194	0.119	0.265	0.623	0.336	0.902
369	0.147	0.165	0.138	0.114	0.139	0.100	0.261	0.304	0.238
371	0.796	0.678	0.913	0.139	0.130	0.143	0.935	0.809	1.056
372	1.764	2.582	0.996	0.666	0.975	0.378	2.430	3.558	1.373
381	0.243	0.188	0.297	0.020	0.025	0.017	0.263	0.213	0.315
382	4.469	3.163	5.969	0.139	0.139	0.168	4.608	3.303	6.138
383	1.233	0.623	1.813	0.064	0.035	0.097	1.297	0.658	1.910
384	1.201	0.498	1.885	0.342	0.084	0.599	1.543	0.582	2.484
385	1.506	1.837	1.478	0.090	0.100	0.096	1.596	1.937	1.574
390	0.705	0.656	0.822	0.175	0.265	0.122	0.881	0.920	0.944
AVG	0.677	0.478	0.778	0.199	0.201	0.206	0.850	0.679	1.050

Appendix 3: Different definitions of export oriented and import competing plants

3.1. Plants that have exporting activities are considered export oriented and import competing otherwise

3.1.1. Regression results for Export Oriented Plants

Explanatory Variables	Ln(Total Factor Productivity)			Ln(Price-Cost-Margins)			Ln(Sales)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
TL2	0.091 (0.021)***	0.028 (0.043)	0.030 (0.032)	0.020 (0.036)	0.204 (0.068)**	0.154 (0.052)**	0.016 (0.067)	-0.260 (0.127)**	-0.209 (0.098)**
Size	0.011 (0.013)	0.012 (0.013)	0.012 (0.013)	0.051 (0.020)**	0.051 (0.020)**	0.051 (0.020)**	-----	-----	-----
Constant	4.173 (0.044)***	4.138 (0.050)***	4.132 (0.047)***	-1.887 (0.070)***	-1.831 (0.075)***	-1.808 (0.072)***	10.015 (0.076)***	9.820 (0.096)***	9.881 (0.087)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	No	Yes	No	No	Yes	No	No	Yes	Yes
T (linear trend)	No	No	0.016 (0.006)**	No	No	-0.034 (0.010)***	No	No	0.056 (0.018)**
T (linear trend)							No		
T^2									
F stat	18.12	14.71	17.73	12.57	10.8	12.62	34.8	28.06	33.94
R. sq. adj.	0.18	0.18	0.19	0.10	0.11	0.11	0.23	0.23	0.23
No. Obs.	2038	2038	2038	2622	2622	2622	2822	2822	2822

TL2: dummy for increased trade exposure for firms belonging to export oriented industries. Size: categorical variable that takes the value of 1 if the firm is small (less than 40 employees), 2 if the firm is medium (between 41 and 100 employees) and 3 if the firm is big (more than 100 employees).

Total Factor Productivity measure using Levinshon and Petrin's methodology.

* significant at the 10 % level. ** significant at the 5 % level. *** significant at the 1 % level.

3.1.2. Regression results for Import Competing plants

Explanatory Variables	Ln(Total Factor Productivity)			Ln(Price-Cost-Margins)			Ln(Sales)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
TL3	0.130 (0.022)***	0.064 (0.057)	0.071 (0.037)*	0.038 (0.024)	0.182 (0.063)***	0.182 (0.040)***	0.037 (0.024)	-0.350 (0.140)**	-0.148 (0.093)
Size	0.078 (0.014)***	0.079 (0.014)***	0.079 (0.014)***	0.021 (0.015)	0.023 (0.015)	0.021 (0.015)	-----	-----	-----
Constant	3.956 (0.036)***	3.933 (0.042)***	3.918 (0.040)***	-1.439 (0.038)***	1.353 (0.043)***	-1.358 (0.043)***	7.868 (0.064)***	7.784 (0.079)***	7.800 (0.076)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	No	Yes	No	No	Yes	No	No	Yes	Yes
T (linear trend)	No	No	0.015 (0.007)***	No	No	-0.006 (0.002)***	No	No	0.029 (0.018)
T^2 (quadratic)							No		
F stat	22.43	17.99	21.79	12.86	11.46	13.15	26.79	21.55	25.91
R. sq. adj.	0.19	0.20	0.19	0.08	0.08	0.09	0.15	0.15	0.15
No. Obs.	2444	2444	2444	3840	3840	3840	3819	3819	3819

TL3: dummy for increased trade exposure for firms belonging to import competing industries. Total Factor Productivity measure using Levinshon and Petrin's methodology. Size: categorical variable that takes the value of 1 if the firm is small (less than 40 employees), 2 if the firm is medium (between 41 and 100 employees) and 3 if the firm is big (more than 100 employees).

Robust standard errors in parenthesis. * significant at the 10 % level. ** significant at the 5 % level. *** significant at the 1 % level.

3.2. Plants with an export propensity higher than 0.10 are considered export oriented and import competing otherwise

3.2.1. Regressions results for export oriented plants

Explanatory Variables	Ln(Total Factor Productivity)			Ln(Price-Cost-Margins)			Ln(Sales)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
TL2	0.087 (0.026)***	0.028 (0.057)	0.031 (0.041)	0.059 (0.042)	0.251 (0.068)***	0.179 (0.059)***	0.062 (0.077)	-0.204 (0.149)	-0.217 (0.116)*
Size	-0.002 (0.017)	-0.001 (0.017)	-0.001 (0.017)	-0.008 (0.021)	-0.008 (0.021)	-0.008 (0.021)	----- -----	----- -----	----- -----
Constant	4.202 (0.060)***	4.147 (0.065)***	4.164 (0.063)***	-1.756 (0.077)***	-1.732 (0.083)***	-1.686 (0.078)***	9.981 (0.088)***	9.742 (0.120)***	9.816 (0.103)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	No	Yes	No	No	Yes	No	No	Yes	Yes
T (linear trend)	No	No	0.014 (0.008)*	No	No	-0.03 (0.010)**	No	No	0.069 (0.022)**
T^2 (quadratic)							No		
F stat	105.51	120.05	124.3	84.42	30.86	48.53	162.5	125.61	153.76
R. sq. adj.	0.20	0.21	0.20	0.11	0.12	0.11	0.24	0.24	0.24
No. Obs.	1626	1626	1626	2301	2301	2301	2246	2246	2246

TL2:dummy for increased trade exposure for firms belonging to export oriented industries. Size: categorical variable that takes the value of 1 if the firm is small (less than 40 employees), 2 if the firm is medium (between 41 and 100 employees) and 3 if the firm is big (more than 100 employees).

Total Factor Productivity measure using Levinshon and Petrin's methodology.

* significant at the 10 % level. ** significant at the 5 % level. *** significant at the 1 % level

3.2.3. Regression results for Import Competing plants

Explanatory Variables	Ln(Total Factor Productivity)			Ln(Price-Cost-Margins)			Ln(Sales)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
TL3	0.121 (0.017)***	0.057 (0.053)	0.052 (0.029)*	0.012 (0.023)	0.199 (0.057)**	0.172 (0.038)***	0.053 (0.052)	-0.243 (0.137)**	-0.078 (0.090)
Size	0.058 (0.011)***	0.059 (0.011)***	0.059 (0.011)***	0.019 (0.014)	0.022 (0.014)	0.019 (0.014)	-----	-----	-----
Constant	4.004 (0.028)***	3.984 (0.033)***	3.959 (0.033)***	-1.461 (0.034)***	-1.365 (0.038)***	-1.370 (0.037)***	8.135 (0.065)***	8.032 (0.080)***	8.061 (0.077)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	No	Yes	No	No	Yes	No	No	Yes	Yes
T (linear trend)	No	No	0.017 (0.006)***	No	No	-0.04 (0.007)***	No	No	
T^2 (quadratic)	No						No		0.032 (0.017)*
F stat	141.52	127.31	168.33	133.83	36.74	52.37	48.58	39.83	47.37
R. sq. adj.	0.23	0.23	0.23	0.09	0.10	0.09	0.16	0.17	0.16
No. Obs.	2980	2980	2980	4327	4327	4327	4569	4569	4569

TL3: dummy for increased trade exposure for firms belonging to import competing industries. Total Factor Productivity measure using Levinshon and Petrin's methodology. Size: categorical variable that takes the value of 1 if the firm is small (less than 40 employees), 2 if the firm is medium (between 41 and 100 employees) and 3 if the firm is big (more than 100 employees).

Robust standard errors in parenthesis. * significant at the 10 % level. ** significant at the 5 % level. *** significant at the 1 % level

3.3. Plants with an export propensity higher than 0.15 are considered export oriented and import competing otherwise

3.3.1. Regressions results for export oriented plants

Explanatory Variables	Ln(Total Factor Productivity)			Ln(Price-Cost-Margins)			Ln(Sales)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
TL2	0.094 (0.032)**	0.034 (0.058)	0.039 (0.045)	0.057 (0.041)	0.249 (0.072)***	0.169 (0.058)***	0.079 (0.089)	-0.189 (0.122)	-0.199 (0.122)
Size	-0.001 (0.018)	0.000 (0.018)	-0.000 (0.018)	-0.015 (0.021)	-0.014 (0.021)	-0.014 (0.021)	-----	-----	-----
Constant	4.196 (0.061)***	4.147 (0.069)***	4.158 (0.065)***	-1.775 (0.076)***	-1.756 (0.084)***	-1.710 (0.079)***	10.016 (0.097)***	9.778 (0.122)***	9.852 (0.109)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	No	Yes	No	No	Yes	No	No	Yes	Yes
T (linear trend)	No	No	0.014 (0.008)*	No	No	-0.028 (0.010)**	No	No	0.069 (0.021)**
T^2 (quadratic)							No		
F stat	14.96	12.16	14.54	10.46	9.12	10.38	27.58	22.18	27.04
R. sq. adj.	0.19	0.20	0.19	0.11	0.11	0.11	0.23	0.24	0.24
No. Obs.	1516	1516	1516	2169	2169	2169	2104	2104	2104

TL2:dummy for increased trade exposure for firms belonging to export oriented industries. Size: categorical variable that takes the value of 1 if the firm is small (less than 40 employees), 2 if the firm is medium (between 41 and 100 employees) and 3 if the firm is big (more than 100 employees).

Total Factor Productivity measure using Levinshon and Petrin's methodology.

* significant at the 10 % level. ** significant at the 5 % level. *** significant at the 1 % level.

3.3.2. Regression results for import competing plants

Explanatory Variables	Ln(Total Factor Productivity)			Ln(Price-Cost-Margins)			Ln(Sales)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
TL3	0.120 (0.016)***	0.055 (0.053)	0.049 (0.029)*	0.013 (0.023)	0.199 (0.057)***	0.175 (0.039)***	0.053 (0.051)	-0.242 (0.137)*	-0.086 (0.087)
Size	0.057 (0.010)***	0.059 (0.010)***	0.058 (0.010)***	0.024 (0.013)*	0.027 (0.013)**	0.024 (0.013)*	----- -----	----- -----	----- -----
Constant	4.008 (0.027)***	3.985 (0.032)***	3.962 (0.032)***	-1.466 (0.034)***	-1.370 (0.037)***	-1.374 (0.037)***	8.174 (0.065)***	8.055 (0.079)***	8.096 (0.077)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	No	Yes	No	No	Yes	No	No	Yes	Yes
T (linear trend)	No	No	0.018 (0.006)**	No	No	-0.039 (0.007)***	No	No	0.034 (0.017)*
T^2 (quadratic)	No						No		
F stat	141.63	128.85	168.66	139.75	37.16	52.75	49.66	40.85	48.45
R. sq. adj.	0.22	0.22	0.22	0.08	0.09	0.09	0.16	0.16	0.16
No. Obs.	3090	3090	3090	4459	4459	4459	4711	4711	4711

TL3:dummy for increased trade exposure for firms belonging to import competing industries. Total Factor Productivity measure using Levinshon and Petrin's methodology. Size: categorical variable that takes the value of 1 if the firm is small (less than 40 employees), 2 if the firm is medium (between 41 and 100 employees) and 3 if the firm is big (more than 100 employees).

Robust standard errors in parenthesis. * significant at the 10 % level. ** significant at the 5 % level. *** significant at the 1 % level.

Appendix 4: New Definition of Tradable, Non-Tradable, Export Oriented and Import Competing

Tradable defined as those sectors with an import penetration (IP) and/or export-output (EXPO) ratio equal or greater than 0.25 in average over the period.

Import competing are defined as those sectors with an import penetration ratio equal or greater than 0.25 in average for the period and export oriented as those with an export-output ratio greater than 0.25. There are some industries not-specialized or intra-industry trade industries, with an average IP and EXPO equal or greater than 0.25.

We choose the average value for the period and do not control for the level and stability of the indices for every year, since very few industries of the whole sample record levels of IP and EXPO equal or greater than 0.25 for every year over the period. The caveat of this definition is that it includes industries that change dramatically its behaviour over the period as can be seen in appendices 1.1 to 1.4, chapter 4 of the thesis, in particular for the import competing subgroup, since the average IP ratio increases dramatically for most of the sectors that fall into this category after MERCOSUR's creation, raising the average figure for the period.²³

If we were to control for the level and stability of the indices values –as we did for the value of 0.20 reported in the thesis- we were left with almost no observations for the import competing group, and also the number of tradable industries would decrease.

Furthermore, the tradable industries now includes sector that were almost unaffected by IP before MERCOSUR's and afterwards become strongly import competing, translating in difficulties in matching and fitting the probabilistic model for the import competing group of plants.²⁴

The new definition has implied to re-do namely the tradable and import competing sectors.

Furthermore, the non-tradable group increased since the cut-off point is higher than the one we report in the thesis. New 81 estimations were done (36 regressions and 81 matching and double-difference estimations). Furthermore, in Appendix 4, Chapter 4 of the thesis we report several different sensitivity analyses.

We present the estimation results in Tables 2 and 3 for the regression equations and form matching and double differencing respectively. We should note that results for the import competing group are not good due to the lack of significance of the propensity score estimation. Further in Table 4 we present a summary of the results for the new definition.

²³ In particular in Appendix 1.4 we can observe changes in the behaviour of IP and EXPO before and after the creation of the MERCOSUR, and its average value over the period.

²⁴ Actually, the probabilistic model for the import competing group is not globally statistically significant, making the results not trustful. Nevertheless, we report the results.

We conclude that not controlling for the change in the level of IP over the period does not allow draw sound conclusions on the import competing group.

4.1. New classification

4.1.1. Tradable sectors

Trade orientation	ISIC code
EXPO	311
EXPO	321
EXPO	322
EXPO	323
EXPO	324
IMPC	331
IMPC	341
IMPC	362
IMPC	371
IMPC	372
IMPC	382
IMPC	383
IMPC	385
IMPC	390
NS o IIT	351
NS o IIT	355
NS o IIT	384

4.1.2. Non-Tradable sectors

ISIC code
313
314
332
342
352
356
361
369
381

4.2. Regressions

4.2.1. Effects of Increased Trade Exposure on Plants belonging to the Tradable vs. Non-Tradable industries

Explanatory Variables	Ln(Total Factor Productivity)				Ln(Price-Cost-Margins)				Ln(Sales)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
TL1	0.109	0.169	0.047	0.044	0.011	-0.078	0.145	0.132	0.014	0.126	-0.027	-0.014
	(0.014)***	(0.028)***	(0.029)	(0.028)	(0.019)	(0.037)**	(0.041)***	(0.041)***	(0.039)	(0.075)*	(0.080)	(0.081)
Size	0.045	0.046	0.046	0.046	0.035	0.035	0.034	0.035	-----	-----	-----	-----
	(0.010)***	(0.010)***	(0.010)***	(0.010)***	(0.013)***	(0.013)***	(0.013)***	(0.013)***	-----	-----	-----	-----
Exports	-0.019	-0.020	-0.021	-0.021	-0.198	-0.192	-0.195	-0.193	1.726	1.721	1.725	1.722
	(0.016)	(0.016)	(0.016)	(0.016)	(0.024)***	(0.024)***	(0.024)***	(0.024)***	(0.042)***	(0.042)***	(0.042)***	(0.042)***
Constant	4.052	4.026	4.011	4.036	-1.521	-1.439	-1.443	-1.326	8.025	7.925	8.002	7.894
	(0.025)***	(0.030)***	(0.030)***	(0.026)***	(0.032)***	(0.036)***	(0.036)***	(0.044)***	(0.052)***	(0.065)***	(0.066)***	(0.085)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	No	Yes	No	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes
T (linear trend)	No	No	0.016	-0.003	No	No	-0.033	-0.112	No	No	0.01	0.082
			(0.006)**	(0.143)			(0.009)***	(0.019)***			(0.017)	(0.040)**
T^2 (quadratic term)				0.002	No			0.009	No			-0.009
				(0.002)				(0.002)***				(0.004)**
F stat	186.67	154.37	173.9	166.57	59.18	57.41	73.26	63.98	145.32	120.01	140.23	135.66
R. sq. adj.	0.18	0.18	0.18	0.18	0.08	0.09	0.09	0.09	0.34	0.34	0.34	0.34
No. Obs.	4120	4120	4120	4120	5918	5918	5918	5918	6043	6043	6043	6043

TL1: dummy for increased trade exposure for plants belonging tradable industries. Size: categorical variable that takes the value of 1 if the firm is small (less than 40 employees), 2 if the firm is medium (between 41 and 100 employees) and 3 if the firm is big (more than 100 employees).

Exports: dummy variable that takes the value of 1 if the firm has exporting activity and zero otherwise. Total Factor Productivity measure using Levinshon and Petrin's methodology. Robust standard errors in parenthesis. * significant at the 10 % level. ** significant at the 5 % level. *** significant at the 1 % level

4.2.2. Effects of Increased Trade Exposure on Plants belonging to the Export Oriented vs. Non-Tradable industries

Explanatory Variables	Ln(Total Factor Productivity)				Ln(Price-Cost-Margins)				Ln(Sales)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
TL2	0.074 (0.018)***	0.009 (0.054)	0.012 (0.032)	0.012 (0.032)	-0.068 (0.030)**	-0.119 (0.059)**	-0.033 (0.044)	-0.036 (0.044)	0.060 (0.067)	-0.161 (0.131)	-0.170 (0.101)**	-0.158 (0.101)
Size	0.038 (0.011)***	0.039 (0.011)***	0.039 (0.011)***	0.039 (0.011)***	-0.066 (0.016)***	-0.065 (0.016)***	-0.066 (0.016)***	-0.065 (0.016)***	-----	-----	-----	-----
Constant	4.076 (0.029)***	4.027 (0.035)***	4.036 (0.034)***	4.039 (0.042)***	-1.260 (0.037)***	-1.217 (0.043)***	-1.235 (0.042)**	-1.178 (0.055)***	8.691 (0.056)***	8.411 (0.082)***	8.527 (0.078)***	8.326 (0.115)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No
T (linear trend)			0.016 (0.007)**	0.014 (0.018)			-0.009 (0.008)***	-0.050 (0.026)*	No		0.059 (0.020)***	0.192 (0.059)***
T^2 (quadratic)				0.0002 (0.002)				0.005 (0.003)				-0.015 (0.007)**
F stat	269.63	253.22	310.31	288.71	159.74	82.06	129.51	111.12	35.68	24.3	34.68	313.52
R. sq. adj.	0.16	0.17	0.17	0.17	0.03	0.03	0.03	0.03	0.07	0.08	0.07	0.54
No. Obs.	2322	2322	2322	2322	3283	3283	3283	3283	3376	3376	3376	3376

TL2: dummy for increased trade exposure for firms belonging to export oriented industries. Size: categorical variable that takes the value of 1 if the firm is small (less than 40 employees), 2 if the firm is medium (between 41 and 100 employees) and 3 if the firm is big (more than 100 employees).

Exports: dummy variable that takes the value of 1 if the firm has exporting activity and zero otherwise. Total Factor Productivity measure using Levinshon and Petrin's methodology. Robust standard errors in parenthesis. * significant at the 10 % level. ** significant at the 5 % level. *** significant at the 1 % level

4.2.3. Effects of Increased Trade Exposure on Plants belonging to the Import Competing vs. Non-Tradable industries

Explanatory Variables	Ln(Total Factor Productivity)				Ln(Price-Cost-Margins)				Ln(Sales)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
TL3	0.156 (0.034)***	0.082 (0.044)*	0.098 (0.040)**	0.097 (0.040)**	0.06 (0.038)	0.15 (0.053)**	0.176 (0.047)***	0.165 (0.046)***	-0.009 (0.094)	-0.209 (0.121)*	-0.182 (0.112)	-0.175 (0.112)
Size	0.051 (0.016)***	0.053 (0.015)***	0.053 (0.016)***	0.053 (0.015)***	0.041 (0.017)**	0.044 (0.017)**	0.041 (0.017)**	0.044 (0.017)**	-----	-----	-----	-----
Constant	5.288 (0.047)***	5.256 (0.054)***	5.216 (0.052)***	5.275 (0.062)***	-1.531 (0.157)***	-1.375 (0.157)***	-1.420 (0.158)***	-1.197 (0.161)***	7.018 (0.409)***	6.804 (0.412)***	6.850 (0.412)***	6.676 (0.419)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No
T (linear trend)	No	No	0.015 (0.005)***	-0.022 (0.002)*	No	No	-0.028 (0.006)***	-0.182 (0.026)***	No	No	0.042 (0.015)***	0.155 (0.057)***
T^2 (quadratic)	No			0.004 (0.002)*				0.018 (0.003)***	No			-0.013 (0.006)**
F stat	167.57	136.58	199.6	184.42	176.06	44.19	86.99	56.63	67.89	50.86	65.38	63.28
R. sq. adj.	0.22	0.23	0.22	0.23	0.08	0.11	0.09	0.10	0.22	0.22	22	0.22
No. Obs.	1986	1986	1986	1986	2903	2903	2903	2903	3022	3022	3022	3022

TL3: dummy for increased trade exposure for firms belonging to export oriented industries. Size: categorical variable that takes the value of 1 if the firm is small (less than 40 employees), 2 if the firm is medium (between 41 and 100 employees) and 3 if the firm is big (more than 100 employees).

Exports: dummy variable that takes the value of 1 if the firm has exporting activity and zero otherwise. Total Factor Productivity measure using Levinshon and Petrin's methodology. Robust standard errors in parenthesis. * significant at the 10 % level. ** significant at the 5 % level. *** significant at the 1 %

4.3. Matching and Double-Differences

4.1.1. Matching and Difference-in Differences for plants belonging to the Tradable vs. Non-Tradables sectors

Matching Procedure	Output Variable	No.							
		Treated	Controls	Difference*	S.E.	T-stat	No. treated	controls	No. total
<i>Nearest Neighbor=3</i>	Total Factor Productivity	93.64	78.83	14.81	4.25	3.48	288	711	999
	Price-Cost-Margins	0.28	0.28	-0.002	0.01	-0.20	459	1,324	1,783
	Sales	13,944	12,518	1,427	1,854	0.77	500	1,410	1,910
<i>Nearest Neighbor=5</i>	Total Factor Productivity	93.64	78.71	14.93	4.26	3.51	288	711	999
	Price-Cost-Margins	0.28	0.28	-0.004	0.01	-0.29	459	1,324	1,783
	Sales	13,944	12,511	1,433	1,855	0.77	500	1,410	1,910
<i>Kernel (Epanechnikov)</i>	Total Factor Productivity	93.64	78.71	14.93	4.24	3.52	288	711	999
	Price-Cost-Margins	0.28	0.29	-0.005	0.01	-0.44	459	1,324	1,783
	Sales	13,944	12,555	1,389	1,846	0.75	500	1,410	1,910
<i>Kernel (Gaussian)</i>	Total Factor Productivity	93.64	78.68	14.96	4.22	3.55	288	711	999
	Price-Cost-Margins	0.28	0.29	-0.014	0.01	-1.18	459	1,324	1,783
	Sales	13,944	10,579	3,366	1,839	1.83	500	1,410	1,910

With bootstrapped standard errors and kernel (Epanechnikov) estimation

Matching Procedure	Output Variable	Observed*	Bias	Std.Err.	T-stat	No. Obs.
<i>Kernel</i>	Total Factor Productivity	14.93	1.15	3.93	3.80	999
<i>(Epanechnikov)</i>	Price-Cost-Margins	-0.01	0.00	0.011	-0.50	1,783
<i>Bootstrapped S.E.</i>	Sales	1389.036	375.027	1587.435	0.875	1910.000

4.3.1.2. Propensity score estimation

Variable	Coef.	Std. Err.	z	P>z
Hvbp2	0.237	0.258	0.920	0.358
Hva	-0.323	0.247	-1.310	0.191
Exp	0.646	0.159	4.080	0.000
Constant	-1.134	0.124	-9.140	0.000

Number of obs=999; Log likelihood=-589.25; LR chi(3)=21.52; Prob>chi2=0.000, Pseudo R:

Results from: psmatch2 tl2 hvbp, hva exp, kernel outcome(tfplp) common logit ties

4.3.1.3. Balancing tests

Variable	Sample	Mean		%bias	% Reduction	t-test	
		Treated	Control			t	p>t
Hvbp2	Unmatched	0.730	0.575	32.80		7.79	0.000
	Matched	0.670	0.646	5.10	84.50	0.60	0.546
Hva	Unmatched	0.712	0.575	28.90		6.87	0.000
	Matched	0.635	0.636	-0.20	99.30	-0.02	0.982
Exp	Unmatched	0.219	0.235	-3.80		-0.90	0.367
	Matched	0.510	0.453	13.60	-262.90	1.37	0.171

Hvbp: dummy variable that takes the value of 1 for those plants with a gross output higher than the median for the sample,

Hva: dummy variable that takes the value of 1 for those plants with value added higher than the median for the sample,

Exp: dummy variable that takes the value of 1 for those plants that undertake exports and zero otherwise.

Results from the balancing tests after kernel matching with ptest (Leuven and Sianesi, 2003)

5.3.2.1. Matching and Difference-in-Difference estimation for plants belonging to the Export Oriented vs. Non Tradable industries

Matching Procedure	Output Variable	No.		Difference*	S.E.	T-stat	No.		No. total
		Treated	Controls				treated	controls	
<i>Nearest Neighbor=3</i>	Total Factor Productivity	87.31	80.99	6.32	5.41	1.17	189	377	566
	Price-Cost-Margins	0.24	0.27	-0.031	0.02	-1.95	293	712	1,005
	Sales	17,284	15,655	1,629	2,834	0.57	317	752	1,069
<i>Nearest Neighbor=5</i>	Total Factor Productivity	87.31	80.42	6.90	5.43	1.27	189	377	566
	Price-Cost-Margins	0.24	0.27	-0.029	0.02	-1.81	293	712	1,005
	Sales	17,284	15,583	1,701	2,838	0.60	317	752	1,069
<i>Kernel (Epanechnikov)</i>	Total Factor Productivity	87.31	81.31	6.00	5.39	1.11	189	377	566
	Price-Cost-Margins	0.24	0.27	-0.031	0.02	-1.94	293	712	1,005
	Sales	17,284	15,956	1,328	2,824	0.47	317	752	1,069
<i>Kernel (Gaussian)</i>	Total Factor Productivity	87.31	81.11	6.21	5.36	1.16	189	377	566
	Price-Cost-Margins	0.24	0.29	-0.045	0.02	-2.83	293	712	1,005
	Sales	17,284	13,923	3,361	2,808	1.20	317	752	1,069

With bootstrapped standard errors and kernel (Epanechnikov) estimation

Matching Procedure	Output Variable	Observed*	Bias	Std.Err.	T-stat	No. Obs.
<i>Kernel</i>	Total Factor Productivity	6.00	0.25	5.68	1.06	566
<i>(Epanechnikov)</i>	Price-Cost-Margins	-0.03	0.00	0.016	-1.99	1,005
<i>Bootstrapped S.E.</i>	Sales	1,328	44	2,956	0.45	1,069

4.3.2.2. Propensity score estimation

Variable	Coef.	Std. Err.	z	P>z
Hvbp2	0.37	0.321	1.15	0.25
Hva	-0.47	0.296	-1.59	0.11
Exp	0.60	0.200	3.02	0.00
Constant	-0.94	0.172	-5.45	0.00

Number of obs=566; Log likelihood=-353.75; LR chi(3)=13.49; Prob>chi2=0.00, Pseudo R2=0.02

Hvbp: dummy variable that takes the value of 1 for those plants with a gross output higher than the median for the sample, Hva: dummy variable that takes the value of 1 for those plants with value added higher than the median for the sample, Exp: dummy variable that takes the value of 1 for those plants that undertake exports and zero otherwise.

4.3.2.3. Balancing tests

Variable	Sample	Mean		bias	% Reduction	t-test	
		Treated	Control			t	p>t
hvbp2	Unmatched	0.762	0.614	32.50		5.87	0.000
	Matched	0.587	0.549	8.30	74.60	0.96	0.338
hva	Unmatched	0.722	0.599	26.30		4.79	0.000
	Matched	0.517	0.518	0.00	99.80	0.00	0.996
exp	Unmatched	0.260	0.295	-8.00		-1.46	0.145
	Matched	0.451	0.371	17.80	-122.90	2.04	0.042

Hvbp: dummy variable that takes the value of 1 for those plants with a gross output higher than the median for the sample, Hva: dummy variable that takes the value of 1 for those plants with value added higher than the median for the sample, Exp: dummy variable that takes the value of 1 for those plants that undertake exports and zero otherwise. Results from the balancing tests after kernel matching with ptest (Leuven and Sianesi, 2003)

4.3.3.1. Matching and Difference-in-Differences for plants belonging to the Import Competing industries vs. Non-Tradable sectors

Matching Procedure	Output Variable	No.							
		Treated	Controls	Difference*	S.E.	T-stat	No. treated	controls	No. total
<i>Nearest Neighbor=3</i>	Total Factor Productivity	86.87	80.41	6.45	6.58	0.98	70	412	482
	Price-Cost-Margins	0.31	0.30	0.016	0.02	0.86	122	777	899
	Sales	6,254	7,398	-1,144	1,565	-0.73	133	828	961
<i>Nearest Neighbor=5</i>	Total Factor Productivity	6254.20	7453.72	-1199.52	1563.63	-0.77	70	412	482
	Price-Cost-Margins	0.31	0.29	0.017	0.02	0.93	122	777	899
	Sales	6,254	7,454	-1,200	1,564	-0.77	133	828	961
<i>Kernel (Epanechnikov)</i>	Total Factor Productivity	86.87	80.47	6.40	6.55	0.98	70	412	482
	Price-Cost-Margins	0.31	0.30	0.010	0.02	0.55	122	777	899
	Sales	6,254	7,689	-1,435	1,550	-0.93	133	828	961
<i>Kernel (Gaussian)</i>	Total Factor Productivity	86.87	82.77	4.09	6.50	0.63	70	412	482
	Price-Cost-Margins	0.31	0.31	0.005	0.02	0.27	122	777	899
	Sales	6,254	8,008	-1,754	1,532	-1.14	133	828	961

With bootstrapped standard errors and kernel (Epanechnikov) estimation

Matching Procedure	Output Variable	Observed*	Bias	Std.Err.	T-stat	No. Obs.
<i>Kernel (Epanechnikov)</i>	Total Factor Productivity	1.00	-0.58	4.34	0.23	482
	Price-Cost-Margins	0.01	0.00	0.019	0.53	899.00
<i>Bootstrapped S.E.</i>	Sales	-1,435	695	1,302	-1	961.00

* ATT: average treatment effect

4.3.3.2. Propensity score estimation

Variable	Coef.	Std. Err.	z	P>z
Hvbp2	0.00	0.55	0.00	1.00
Hva	-0.54	0.55	-0.990	0.32
Exp	0.495	0.314	1.570	0.115
Constant	-1.63	0.19	-8.62	0.00

Number of obs=482; Log likelihood=-197.44; LR chi(3)=4.54; Prob>chi2=0.20, Pseudo R2=0.01

Hvbp: dummy variable that takes the value of 1 for those plants with a gross output higher than the median for the sample, Hva: dummy variable that takes the value of 1 for those plants with value added higher than the median for the sample, Exp: dummy variable that takes the value of 1 for those plants that undertake exports and zero otherwise. Results from the balancing tests after kernel matching with ptest (Leuven and Sianesi, 2003)

4.3.3.3. Balancing tests

Variable	Sample	Mean		bias	% Reduction	t-test	
		Treated	Control			t	p>t
Hvbp2	Unmatched	0.654	0.539	23.60		3.38	0.001
	Matched	0.486	0.491	-1.20	95.00	-0.07	0.947
Hva	Unmatched	0.662	0.553	22.30		3.19	0.001
	Matched	0.486	0.496	-2.10	90.80	-0.12	0.907
Exp	Unmatched	0.110	0.152	-12.50		-1.74	0.082
	Matched	0.314	0.317	-0.90	93.00	-0.04	0.971

Hvbp: dummy variable that takes the value of 1 for those plants with a gross output higher than the median for the sample, Hva: dummy variable that takes the value of 1 for those plants with value added higher than the median for the sample, Exp: dummy variable that takes the value of 1 for those plants that undertake exports and zero otherwise. Results from the balancing tests after kernel matching with ptest (Leuven and Sianesi, 2003).