INDUSTRIAL POLICY IN URUGUAY: WHICH ARE THE EFFECTS?

Very Preliminary Draft

Do not quote

Álvaro Brunini[*]

Adriana Peluffo[†]

Mauricio Suárez[‡]

Abstract

In this work we analyze the Temporary Admission Regime using a panel of Uruguayan firms for the period 2005-2016. We use two techniques: panel with fixed effects by firm and propensity score matching. The latter allows controlling for selectivity into the treatment and selection bias. We find positive effects of Temporary Admission on export performance while we find no significant effects on the firm's labour.

Keywords: industrial policy, temporary admission, export performance, productivity, causal effect.

JEL classification: F13, F14, F16, O24

1. Introduction

A number of countries have fostered exports with different programs in order to promote growth through exports. Though subsidies to exports are considered against the rules of the World Trade Organization (WTO), the policies of Temporary Admission and Draw-Back are among those allowed by the WTO. Usually, the justification for these policies is that they correct the anti-trade bias due to high tariffs (Cadot et al., 2003).

Though tariff reduction has been a generalized phenomenon in last decades, there are still significant differences between developed and developing countries. While in the formers tariffs are low, in the latter they are high, which gives place to Temporary Admission and Draw-Back policies.

Imported inputs can foster export performance, through gains in productivity due to lower costs and higher quality and variety of imported inputs. Moreover, imported inputs can affect employment with an ambiguous net effect, since they can compete with and reduce domestic production (and employment) but it can also translate efficiency gains into higher employment.

Due to the low number of studies for emerging countries and Uruguay in particular, the objective of this work is to analyze the impact of using the Temporary Admission regime on firms' productivity, export performance, trade diversification and employment levels.

This work structures as follows, after this brief introduction we present a review of the literature, then the data used and the econometric methodology and finally the results and the conclusions.

[*]Research Assistant, Uruguay XXI, abrunini@uruguayxxi.gub.uy

[†] Associate Professor, Instituto de Economía, FCEA – UdelaR, adriana.peluffo@fcea.edu.uy

[‡] Assistant Professor, Instituto de Economía, FCEA – UdelaR, mauricio.suarez@fcea.edu.uy

2. Literature review

Usually, it is argued about the importance of trade to foster economic growth, and more recently on the micro-foundation: the increase in firms' productivity due to trade openness.

Through the implementation of industrial policies, policy-makers have tried to foster economic growth and development. These policies usually use monetary or fiscal incentives, investment in infrastructure or research, or various aspect of trade policy.

Endogenous growth models have postulated the importance of R&D and knowledge transfer between countries as a key factor to explain endogenous growth. A channel of knowledge transfer is through imports of intermediates and capital goods.

Recently, the evidence points out that imports and exports are related through various channels. Imports affect exports. Firstly, by reducing tariffs on imported inputs it reduces input costs improving competitiveness. Secondly, a part of sunk costs related to international trade are common for imports and exports. Thirdly, imported inputs can be of higher quality and/or cheaper and use a higher variety of inputs. Moreover, there may be technology transfers embodied in imported goods.

Regarding employment, international trade has ambiguous effects. On one side, improvements in productivity can be labor saving impacting negatively on employment. Also, imports may compete with domestic producers affecting in a negative way employment. Nevertheless, gains in efficiency can lead to an increase in production and employment. Moreover, imports by transferring advanced technologies can affect the demand of skilled labor (Blanchard et al., 2019; Barba Navarreti and Soloaga, 2002).

The regime of temporary admission (TA) allows imports of intermediate imports to be used and re-exported over an 18-month period. The goal is to promote exports that utilize imported inputs, avoiding double taxation (the double payment of tariffs), since final goods when exported would have to pay the tariff of the destination country including those of the intermediate inputs used in production.

Lo Turco and Maggioni (2013) , and Feng et al. (2016), Aristei et al. (2013), and Laurin and Pierre (2022), find positive effects of imported inputs on exports and the number of destinations, with the origin of imports from high income countries easing exports to these countries. Moreover, imported inputs is a way of achieving more diversified and higher quality exports (Castellani and Fasio, 2019; and Fan et al., 2015).

Elliot et al. (2019) show that decisions to export and import are determined simultaneously, and that sunk-entry costs play a significant role in a firm's decision to enter international markets.

Nowadays the literature on the relationship between input imports and productivity is abundant and point out a positive relation between these two variables. More recently, there is also evidence on the positive effect of imports on productivity (Bass and Strauss-Kahn, 2014), while earlier works find mixed results (Sjoholm, 1999).

Some studies show that the impact of imported inputs on productivity is related to the absorptive capacity of the firm (Augier et al., 2013).

Furthermore, some studies find that both, exports and imports enhance firms' productivity (Ali et al., 2018, Camino-Mogro y López, 2021). The latter researchers find complementarity between imports and exports in affecting productivity.

Most of the research has been conducted for manufacturing firms while studies for trade in services is scarce (Morikawa, 2019).

Peluffo and Zaclicever (2013) show that imported inputs increase firms' productivity and this effect is higher the higher the absorptive capacity measured by the share of skilled labor at the firm level.

Lo Turco and Maggioni (2013) find positive impacts of trade (imports and exports) on employment growth at the firm level. Nevertheless, there are some works that find mixed impacts, for instance Fajnzylber and Fernandez (2009).

Some studies have found different results of China on US (Caliendo et al., 2015; Autor et al., 2013; Méndez; 2015) and Japan (Taniguchi, 2019), with a negative effect of imports from China on USA employment while it is positive for Japan.

Regarding Uruguay we can find a number of studies: Terra (2006), and Lorenzo et al. (2005) show that most firms that use TA export to Mercosur's partners. Cadot et al. (2003) using a political economy framework show that a Custom Union would eliminate the need for TA. (2015). Fernandez (2015) point out the importance of TA and that it is far more important for exports to Mercosurs' partners. Lalanne (2020) finds also the importance of imports using TA for exports to the Mercosur.

Lavalleja and Scalesse (2020) show that TA is an important incentive to promote production and exports.

3. Empirical Strategy

3.1. Data

We use two data sources to perform our analysis, administrative customs information and industrial firm-level data.

The customs data is collected by the National Customs Service (DNA, *Dirección Nacional de Aduanas*). This data is available from 2005 to 2016 at the transaction level from customs declarations. The level of detail of the database is quite comprehensive as products are coded at the 10 digit MERCOSUR Common Nomenclature (NCM, *Nomenclatura Común del MERCOSUR*). The NCM shares the same structure as the Harmonized System in its first six digits so our analysis is comparable to other studies in the literature. For each product, the database provides information on the CIF and FOB values traded in current US dollars, the country of origin or destination, as well as the measurement unit in which the product was traded, which allows us to calculate unit values and the methodology proposed by Khandelwal (2010, 2013) to estimate quality.

The second source of information used is the Annual Economic Activity Survey (EAAE; Encuesta Anual de Actividad Económica) from 2005 to 2016, carried out by the National Institute of Statistics (INE, Instituto Nacional de Estadística). The EAAE is based on a stratified sampling with

probabilistic samples which are representative of the economic sectors as defined by the International Standard Industry Classification (ISIC). The exception is for the stratum of largest firms in terms of income or employment for which a census is performed. In the year 2006 only firms of compulsory inclusion were surveyed[1].

The survey covers firms that perform an economic activity related to industry, commerce or services in the Uruguayan territory, except for those establishments in Export Processing Zones (EPZ). It does not include industries related to agriculture and livestock, extractive industries, construction, or financial services controlled by the Central Bank, among others.

In Table 1 we present some descriptive statistics. It can be observed that firms over the period have 111 workers in average, and 24 are professionals and technicians, 40 % are exporting firms. Export intensity measured as exports over sales is 14 %.

Nearly 14 % of the firms in the period undertake TA. The number of imported products at 8-digit of the NCM is 46 and comes from 8 different countries on average, while the number of exported products is around 7, with 6 different countries as destination approximately.

Table 1: Some descriptive statistics, average for the period 2005-2016

Statistics	Workers per firm	Number of professionals and technicians	Exporters	Export Intensity	TA
Mean	111,88	23,80	0,4045	0,1333	0,1384
sd	370,92	154,02	0,4908	1,6651	0,3454
N	34,433	12,780	39,151	30,636	10,365

Source: Own elaboration based on data from the INE y DNA.

	Number of Products		Number of Countries			
stats	NPI8	NPE8	NCI	NEC	R&D	Training
mean	46,20	6,94	7,86	5,98	0,5622	0,6814
sd	67,77	10,49	7,86	8,07	0,4961	0,4659
N	11,311	5,739	11,311	5,739	39,095	39,095

Note: NPI8 number of imported products at 8-digit NCM classification, NPE8 number of exported products at 8-digit NCM classification; NCI number of source countries; NEC number of destination countries. Source: Own elaboration based on data from the INE y DNA.

[1] The data is confidential but not exclusive and can be requested to the sources.

In Chart 1 there is the percentage of firms that undertake TA by year. The highest percentage is in 2006 due to the fact that in that year data was recorded only for the stratum of compulsory firms, which are the biggest ones and have a higher propensity to undertake TA. Moreover, we observe that the share of firms that use the regime present a declining trend over the sample period (Chart 1).

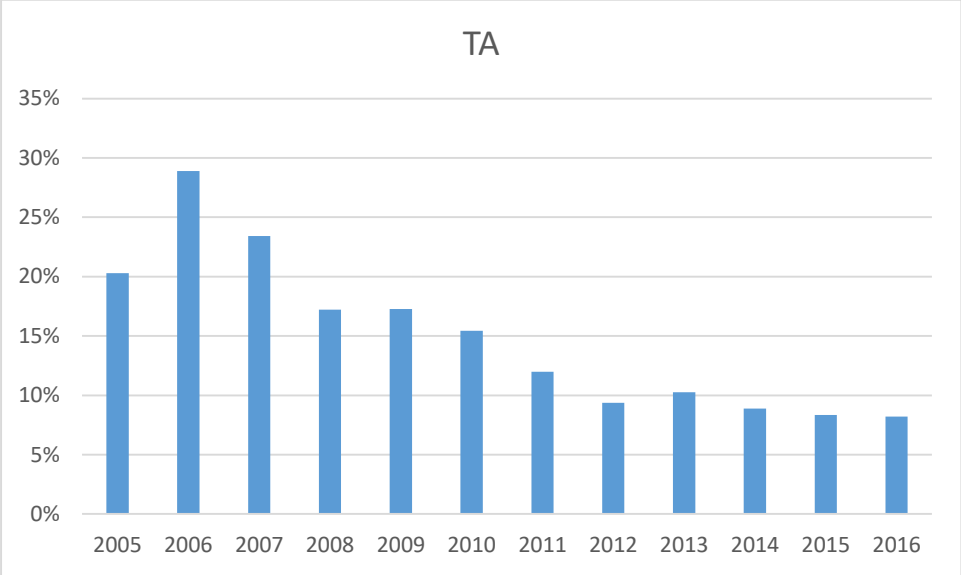

Chart 1: Percentage of firms that undertake temporary admission
Source: Own elaboration based on data from the INE y DNA

We estimate the total factor productivity (TFP) following different techniques. First, using the Olley and Pakes (1995) methodology, with (lntfp1) and without (lntfp3) the Davidon-Fletcher-Powell optimizer. Second, we used the Wooldridge (2009) technique (lntfp2).
Observing the correlation matrix, we find that all the techniques are highly correlated with each other. We present the results for TFP estimated using Olley and Pakes methodology with the DFP optimizer.

Table 2: Correlation matrix between different methodologies for TFP estimation

	lntfp1	lntfp2	lntfp3
lntfp1	10.000		
lntfp2	0.9997	10.000	
lntfp3	0.9459	0.9377	10.000

Note: number of observations 27,819
Source: Own elaboration

In Chart 2 we can observe that bigger firms have a higher propensity to undertake TA as commented above.

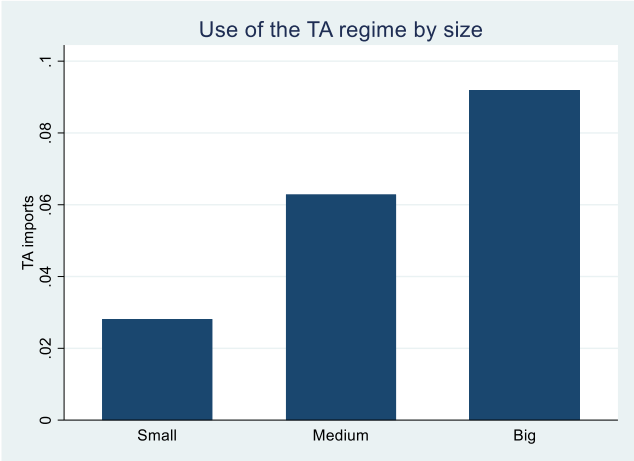

Chart 2: Firms that undertake TA according to categories of size

Source: Own elaboration based on data from the INE y DNA.

3.2. Econometric Methodology

First, we exploit our panel data running fixed effects regressions (FE) by individual. Fixed effects models, allow us to control for unobservable variables as long as they do not change over time. In so doing, it controls for omitted variable bias. Nonetheless, it is necessary to assume that the unobservable individual (firm) effects are correlated with the regression variables. In our case, this assumption is not difficult to hold as long as the capital intensity (LnKI), the size of the firm (LnSize), average wages (Avg Wages), doing R&D or training activities and being foreign firms can be easily associated with unobservable features of the firm such as its corporate culture, management skills, working environment, among others.

Secondly, we use a matching methodology which allows studying the causal effect of Temporary Admission (TA, i.e., the treatment) on firms using the regime over the period relative to firms that do not use TA.

Thus, our aim is to evaluate the effect of TA on firms' productivity, employment, diversification of imports and export performance. We measure export performance by the level of exports, export intensity and diversification of products and markets. Thus, ***Y*** is our outcome variable, i.e. firms' productivity, employment, diversification of imports and export performance.

We perform the analysis for the treatment and for various outcome variables as we commented above. The effect of TA is the estimated difference of the outcome variable considered between treated (firms that undertake TA) and the controls (firms that do not undertake TA) with similar covariates.

Let Y_{it} be the outcome – productivity, employment, diversification of imports and export performance - for firm ***i*** in industry ***j*** at time ***t***. We consider total employment per firm, professionals and technicians and white collars (professionals and technicians plus employees

in non-production activities), and the share of professionals and technicians and white collars over total employment. We analyse export performance by export intensity measured by exports over sales, and the number of products and markets of exports. We also considered whether AT has affected import diversification.

Let imports by temporary admission, $TA_{it} \in \{0,1\}$ denote an indicator (dummy variable) of whether firm i has received the treatment in moment t- and $Y^1_{i,t+s}$ is the outcome at ***t+s***, after the treatment. Also denote by $Y^0_{i,t+s}$ the outcome of firm ***i*** had it not received the treatment. The causal effect of the treatment for firm ***i*** at period (t+s) is defined as: $Y^1_{i,t+s} - Y^0_{i,t+s}$

The fundamental problem of causal inference is that the quantity $Y^0_{i,t+s}$, referred as the counterfactual, is unobservable. Causal inference relies on the construction of the counterfactual, which is the outcome the firms would have experienced on average had they not undertaken TA. The counterfactual is estimated by the corresponding average value of firms that do not have invested. 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 firms belonging to the control group those firms in which the distribution of the variables $\mathbf{X_{it}}$ affecting the outcome is as similar as possible to the distribution to the firms belonging to the 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 undertaking AT (the "propensity score") for all firms, irrespective if they belong to treated or control group by means of a logit model. A firm ***k*** belonging to the control 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 several matching techniques, and in this work we use the "kernel" matching method which penalizes distant observations. In particular, we use the Epanechninkov kernel, although other kernels were used as robustness checks. 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. To estimate the propensity score (i.e. the probability of undertaking TA) we use as covariates lagged capital intensity, lagged size of the firm measured as the total income from sales, average wages, and dummies for R&D, training activities and for foreign firms. In all the cases we tested that the balancing properties were met

4. Results

The estimations using panel data regressions with fixed effects by firm, show a positive and significant effect of the regime on overall employment, export intensity (defined as the ratio between exports and sales), and trade diversification both in the number of countries (of origin and destination) and the number of products (imported and exported). The effect on the other variables were found non-significant.

Table 1: Fixed Effects estimations

VARIABLES	LnTFP	LnEMP	LnSL	LnWC	SL/L	WC/L	INTEXP	LnNCI	LnNCE	LnNPI-6	LnNPI-8	LnNPE-6	LnNPE-8
LnKI(-1)	-0.0575**	-0.0185	0.0608	0.0588**	0.00356	0.00820	0.0324	0.0182	0.00531	0.0320	0.0297	0.0359	0.0237
	(0.0236)	(0.0132)	(0.0574)	(0.0297)	(0.00963)	(0.00772)	(0.0228)	(0.0175)	(0.0295)	(0.0252)	(0.0252)	(0.0382)	(0.0398)
LnSize(-1)	0.263***	0.218***	0.0736	0.0867**	0.000331	-0.0122	0.179***	0.156***	0.160***	0.163***	0.172***	0.175***	0.184***
	(0.0472)	(0.0320)	(0.0827)	(0.0388)	(0.0116)	(0.0114)	(0.0605)	(0.0294)	(0.0506)	(0.0455)	(0.0461)	(0.0648)	(0.0669)
Avg Wages	1.06e-07**	-5.91e-08**	-5.22e-07***	-1.58e-07***	-8.43e-08*	8.10e-08**	-5.40e-08***	-4.83e-09	-5.13e-08***	-4.72e-09	-4.12e-09	1.72e-08	1.21e-08
	(4.49e-08)	(2.89e-08)	(1.73e-07)	(5.21e-08)	(5.11e-08)	(3.82e-08)	(1.78e-08)	(3.09e-08)	(1.67e-08)	(3.31e-08)	(3.22e-08)	(1.25e-08)	(1.56e-08)
R&D	0.0142	-0.0181	0.0533	-0.0362	0.0190	0.0122	-0.111*	0.0234	-0.116*	0.0774	0.0831	0.00688	-0.0171
	(0.0457)	(0.0277)	(0.139)	(0.0482)	(0.0177)	(0.0109)	(0.0667)	(0.0416)	(0.0692)	(0.0563)	(0.0573)	(0.0767)	(0.0774)
Training	0.0710**	0.00615	0.00367	0.0202	-0.00217	0.000644	-0.0302	-0.0158	0.0242	0.0268	0.0333	-0.138*	-0.138*
	(0.0329)	(0.0226)	(0.0958)	(0.0350)	(0.00879)	(0.0105)	(0.0570)	(0.0321)	(0.0617)	(0.0468)	(0.0476)	(0.0799)	(0.0825)
Foreign firms	-0.00571	0.129*	-0.617**	-0.0376	0.00198	-0.0175	0.0556	-0.115	0.362	-0.0663	-0.0807	-0.286	-0.0662
	(0.0989)	(0.0772)	(0.262)	(0.0672)	(0.0223)	(0.0229)	(0.249)	(0.0734)	(0.238)	(0.0927)	(0.101)	(0.254)	(0.163)
TA	0.0345	0.0992**	0.00918	0.0409	-0.00859	-0.00471	0.608***	0.150***	0.117*	0.186***	0.185***	0.0886	0.102*
	(0.0483)	(0.0406)	(0.121)	(0.0461)	(0.00992)	(0.00850)	(0.0986)	(0.0386)	(0.0632)	(0.0518)	(0.0525)	(0.0584)	(0.0592)
Constant	7.870***	0.542	0.0485	1.506*	0.126	0.777***	-2.759**	-1.472***	-2.245**	-0.701	-0.762	-2.512**	-2.469*
	(0.807)	(0.590)	(1.569)	(0.826)	(0.254)	(0.239)	(1.120)	(0.551)	(1.019)	(0.798)	(0.810)	(1.254)	(1.300)
Observations	4,544	4,582	1,813	1,813	1,813	1,813	4,582	4,582	1,641	4,582	4,582	1,641	1,641
R-squared	0.088	0.241	0.044	0.078	0.049	0.190	0.088	0.064	0.077	0.031	0.031	0.045	0.045
Nunber of firms	1,266	1,269	849	849	849	849	1,269	1,269	507	1,269	1,269	507	507

Notes: Robust standard error in parenthesis, *** p<0.01, ** p<0.05, * p<0.10.

Where LnTFP is the logarithm of the total factor productivity; LnEMP is overall employment in logarithm; LnSL, skilled labour in logarithm; LnWC white-collar labour in logarithm; IntExp the export intensity; LnNCI and LnNCE number of import and export countries in logarithm respectively; and finally LnNPI and LnNPE, the number of products imported and exported in logarithm (8 digits in the MERCOSUR Common Nomenclature).

Consistently, when we estimate the effect of the temporary admission policy using matching techniques, the effects on the aforementioned variables are positive and statistically significant (export intensity, countries of origin, countries of destination, and products imported). In addition, a positive effect is also found in the firm productivity at a 10% significance level. More interestingly, there is also a positive effect on the number of products exported. This result suggests a higher diversity of exports due to the treatment.

Table 2: Policy effect using PSM

Variable	Difference	Significance	T-stat	Untreated	Treated	Obs
LnTFP	-0,09	*	1,55	4189	328	4527
LnPO	-0,08		1,13	4223	332	4564
LnSL	0,19	*	1,44	1599	202	1808
LnWCL	-0,67		0,59	1599	202	1808
SL/L	0,01		0,65	1599	202	1808
WCL/L	-0,00		0,07	1599	202	1808
IntExp	21,3	***	10,56	4223	332	4564
LnNCI	0,31	***	6,03	4223	332	4564
LnNCE	0,30	***	4,08	1331	288	1634
LnNPI - 6	0,24	***	3,03	4223	332	4564
LnNPI - 8	0,25	***	3,11	4223	332	4564
LnNPE - 6	0,14	**	2,13	1331	288	1634
LnNPE - 8	0,18	***	2,66	1331	288	1634

Notes: LnTFP: total factor productivity in natural logarithm, LnPO: Size of the firm measured by the number of total workers, LnSL: number of skilled workers measured by professional and technicians; LnWC: ln white collars measured by professionals and technicians and employees in non-production activities; SL/L: share of professional and technicians in total employment; WCL/L: share of white collar in total employment; IntExp: export intensity; LnNCI: number of source countries in logs; LnNCE: number of destination countries; LnNPI-6: number of imported products at 6-digit level of NCM; LnNPI-8: number of imported products at 6-digit level of NCM;; LnN-6: Number of exported products at 6-digit level of NCM; LnNEC-8: Number of exported products at 8-digit level of NCM.

5. Concluding remarks

The results at which we arrived let us conclude three main points. The first one, is that in terms of export performance it is a successful policy as long as it has positive effects on the level of exports and export intensity. The second, is that it has not got significant effects on the labour market. Finally, it lets us reaffirm previous descriptive findings such as the higher intensity of the TA in bigger firms. In sum, the TA policy can be considered an effective one according to the objectives it aimed at when created.

This results, despite being informative, leave many areas open to carry out further research. In this sense, there are two main fields of interest for us. One is to evaluate the policy not by binary treatments but using continuous treatment effects instead. The other one, is to include the quality of the exports as another variable of result.

References

Ali, A. A., Ali, A. Y. S., & Dalmar, M. S. (2018). The impact of imports and exports performance on the economic growth of Somalia. *International journal of economics and Finance*, *10*(1), 110-119.

Aristei, D., Castellani, D., & Franco, C. (2013). Firms' exporting and importing activities: Is there a two-way relationship? *Review of World Economics*, *149*(1), 55-84. https://doi.org/10.1007/s10290-012-0137-y

Augier, P., Cadot, O., & Dovis, M. (2013). Imports and TFP at the firm level: The role of absorptive capacity. *Canadian Journal of Economics/Revue Canadienne d'économique*, *46*(3), 956-981. https://doi.org/10.1111/caje.12034

Barba Navaretti, G., & Soloaga, I. (2002). Weightless machines and costless knowledge: An empirical analysis of trade and technology diffusion. *CEPR Discussion Papers*.

Bas, M., & Strauss-Kahn, V. (2014). Does importing more inputs raise exports? Firm-level evidence from France. *Review of World Economics*, *150*(2), 241-275. https://doi.org/10.1007/s10290-013-0175-0

Blanchard, P., Peluffo, A., & Zaclicever, D. (2019). Revisiting the role of Imported intermediates on Productivity: A firm-level analysis for Uruguay. *Serie Documentos de Trabajo; 03/19*.

Cadot, O., de Melo, J., & Olarreaga, M. (2003). The protectionist bias of duty drawbacks: Evidence from Mercosur. *Journal of International Economics*, *59*(1), 161-182. https://doi.org/10.1016/S0022-1996(02)00084-3

Camino-Mogro, S., & López, A. (2021). Two-way traders: Searching for complementarities between exports and imports in a developing country. *Applied Economics Letters*, *28*(10), 856-859. https://doi.org/10.1080/13504851.2020.1784379

Castellani, D., & Fassio, C. (2019). From new imported inputs to new exported products. Firm-level evidence from Sweden. *Research Policy*, *48*(1), 322-338. https://doi.org/10.1016/j.respol.2018.08.021

Elliott, R. J. R., Horsewood, N. J., & Zhang, L. (2019). Importing exporters and exporting importers: A study of the decision of Chinese firms to engage in international trade. *Review of International Economics*, *27*(1), 240-266. https://doi.org/10.1111/roie.12374

Fajnzylber, P., & Fernandes, A. M. (2009). International economic activities and skilled labour demand: Evidence from Brazil and China. *Applied Economics*, *41*(5), 563-577. https://doi.org/10.1080/00036840601007336

Fan, H., Li, Y. A., & Yeaple, S. R. (2015). Trade liberalization, quality, and export prices. *Review of Economics and Statistics*, *97*(5), 1033-1051.

Feng, L., Li, Z., & Swenson, D. L. (2016). The connection between imported intermediate inputs and exports: Evidence from Chinese firms. *Journal of International Economics*, *101*, 86-101.

Fernandez, D. (2015). *Regimen-de-at-industrial.pdf*. https://www.gub.uy/ministerio-economia-finanzas/sites/ministerio-economia-finanzas/files/documentos/publicaciones/regimen-de-at-industrial.pdf

Lalanne, A. (2020). *Sistematización y evaluación de las reglas y la certificación de origen de las exportaciones uruguayas*. https://repositorio.cepal.org/handle/11362/45104

Laurin, F., & St-Pierre, J. (2022). *THE INTERNATIONALISATION OF SMES AND THE RELATIONSHIPS BETWEEN IMPORTS AND EXPORTS*.

Lavalleja, M., & Scalese, F. (2020). *Los incentivos y apoyos públicos a la producción en el Uruguay*. https://repositorio.cepal.org/handle/11362/45107

Lo Turco, A., & Maggioni, D. (2013). Does Trade Foster Employment Growth in Emerging Markets? Evidence from Turkey. *World Development*, *52*, 1-18. https://doi.org/10.1016/j.worlddev.2013.06.003

Lorenzo, F., Paolino, C., Perelmuter, N., & López, L. (2005). *Políticas nacionales de competitividad en el Uruguay y su impacto sobre la profundización del MERCOSUR*. https://repositorio.cepal.org/handle/11362/3621

Morikawa, M. (2019). Firm heterogeneity and international trade in services. *The World Economy*, *42*(1), 268-295. https://doi.org/10.1111/twec.12699

Pakes, A., & Olley, S. (1995). A limit theorem for a smooth class of semiparametric estimators. *Journal of Econometrics*, *65*(1), 295-332.

Peluffo, A., & Zaclicever, D. (2013). *Imported intermediates and productivity: Does absorptive capacity matter? A firm-level analysis for Uruguay*. https://www.colibri.udelar.edu.uy/jspui/handle/20.500.12008/2253

Sjöholm, F. (1999). Exports, Imports and Productivity: Results from Indonesian Establishment Data. *World Development*, *27*(4), 705-715. https://doi.org/10.1016/S0305-750X(98)00160-0

Terra, M. I. (2006). *RÉGIMEN DE ADMISIÓN TEMPORARIA EN URUGUAY*. 60.

Wooldridge, J. M. (2009). On estimating firm-level production functions using proxy variables to control for unobservables. *Economics letters*, *104*(3), 112-114.

Appendix

Table A1: Balancing tests – LnTFP

Variable	Mean			t-test	
	Treated	Control	%bias	t	p>t
		LnTFP			
LnKI(-1)	13.004	12.996	0.6	0.09	0.930
LnSize(-1)	19.252	19.3	-3.5	-0.44	0.660
Avg Wages	2.9e+05	2.9e+05	-1.2	-0.34	0.732
R&D	.52134	.5182	0.6	0.08	0.936
Training	.79573	.79384	0.4	0.06	0.952
Foreign firms	.2439	.25743	-3.4	-0.40	0.690
		LnPO			
LnKI(-1)	13.004	12.996	0.6	0.09	0.930
LnSize(-1)	19.252	19.3	-3.5	-0.44	0.660
Avg Wages	2.9e+05	2.9e+05	-1.2	-0.34	0.732
R&D	.52134	.5182	0.6	0.08	0.936
Training	.79573	.79384	0.4	0.06	0.952
Foreign firms	.2439	.25743	-3.4	-0.40	0.690
		LnSL			
LnKI(-1)	12.895	12.868	2.0	0.22	0.830
LnSize(-1)	19.072	19.131	-4.3	-0.45	0.655
Avg Wages	2.4e+05	2.4e+05	1.0	0.35	0.730
R&D	.20297	.17583	5.4	0.69	0.488
Training	.66337	.62602	8.2	0.78	0.434
Foreign firms	.20297	.206	-0.8	-0.08	0.940
		LnWCL			
LnKI(-1)	12.895	12.868	2.0	0.22	0.830
LnSize(-1)	19.072	19.131	-4.3	-0.45	0.655
Avg Wages	2.4e+05	2.4e+05	1.0	0.35	0.730
R&D	.20297	.17583	5.4	0.69	0.488
Training	.66337	.62602	8.2	0.78	0.434
Foreign firms	.20297	.206	-0.8	-0.08	0.940
		SL/L			
LnKI(-1)	12.895	12.868	2.0	0.22	0.830
LnSize(-1)	19.072	19.131	-4.3	-0.45	0.655
Avg Wages	2.4e+05	2.4e+05	1.0	0.35	0.730
R&D	.20297	.17583	5.4	0.69	0.488
Training	.66337	.62602	8.2	0.78	0.434
Foreign firms	.20297	.206	-0.8	-0.08	0.940

Variable	Mean			t-test	
	Treated	Control	%bias	t	p>t
		WCL/L			
LnKI(-1)	12.895	12.868	2.0	0.22	0.830
LnSize(-1)	19.072	19.131	-4.3	-0.45	0.655
Avg Wages	2.4e+05	2.4e+05	1.0	0.35	0.730
R&D	.20297	.17583	5.4	0.69	0.488
Training	.66337	.62602	8.2	0.78	0.434
Foreign firms	.20297	.206	-0.8	-0.08	0.940
		IntExp			
LnKI(-1)	13.014	13	1.0	0.14	0.889
LnSize(-1)	19.255	19.303	-3.5	-0.43	0.665
Avg Wages	2.9e+05	2.9e+05	-1.2	-0.35	0.729
R&D	.52108	.5197	0.3	0.04	0.971
Training	.79518	.79474	0.1	0.01	0.989
Foreign firms	.24398	.25484	-2.8	-0.32	0.747
		LnNCI			
LnKI(-1)	13.014	13	1.0	0.14	0.889
LnSize(-1)	19.255	19.303	-3.5	-0.43	0.665
Avg Wages	2.9e+05	2.9e+05	-1.2	-0.35	0.729
R&D	.52108	.5197	0.3	0.04	0.971
Training	.79518	.79474	0.1	0.01	0.989
Foreign firms	.24398	.25484	-2.8	-0.32	0.747
		LnNCE			
LnKI(-1)	13.015	13.038	-1.7	-0.22	0.823
LnSize(-1)	19.31	19.366	-4.0	-0.48	0.634
Avg Wages	2.9e+05	3.0e+05	-2.8	-0.79	0.430
R&D	.5	.5026	-0.5	-0.06	0.950
Training	.77778	.76453	2.9	0.38	0.706
Foreign firms	.26736	.26653	0.2	0.02	0.982
		LnNPI - 6			
LnKI(-1)	13.014	13	1.0	0.14	0.889
LnSize(-1)	19.255	19.303	-3.5	-0.43	0.665
Avg Wages	2.9e+05	2.9e+05	-1.2	-0.35	0.729
R&D	.52108	.5197	0.3	0.04	0.971
Training	.79518	.79474	0.1	0.01	0.989
Foreign firms	.24398	.25484	-2.8	-0.32	0.747
		LnNPI - 8			
LnKI(-1)	13.014	13	1.0	0.14	0.889
LnSize(-1)	19.255	19.303	-3.5	-0.43	0.665
Avg Wages	2.9e+05	2.9e+05	-1.2	-0.35	0.729
R&D	.52108	.5197	0.3	0.04	0.971
Training	.79518	.79474	0.1	0.01	0.989
Foreign firms	.24398	.25484	-2.8	-0.32	0.747

Variable	Mean			t-test	
	Treated	Control	%bias	t	p>t
		LnNPE - 6			
LnKI(-1)	13.015	13.038	-1.7	-0.22	0.823
LnSize(-1)	19.31	19.366	-4.0	-0.48	0.634
Avg Wages	2.9e+05	3.0e+05	-2.8	-0.79	0.430
R&D	.5	.5026	-0.5	-0.06	0.950
Training	.77778	.76453	2.9	0.38	0.706
Foreign firms	.26736	.26653	0.2	0.02	0.982
		LnNPE - 8			
LnKI(-1)	13.015	13.038	-1.7	-0.22	0.823
LnSize(-1)	19.31	19.366	-4.0	-0.48	0.634
Avg Wages	2.9e+05	3.0e+05	-2.8	-0.79	0.430
R&D	.5	.5026	-0.5	-0.06	0.950
Training	.77778	.76453	2.9	0.38	0.706
Foreign firms	.26736	.26653	0.2	0.02	0.982