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ABSTRACT

Recent trade models with heterogeneous firms (Bernard et al., 2003 and Melitz, 2003) show how lower trade costs can spur aggregate productivity by forcing lower productivity firms out of the market, cutting off the lower tail of the productivity distribution. In this paper we find significant heterogeneity regarding this impact across different industries. In particular, we find that the exit of inefficient plants due to stronger import competition is very prominent in light industries, that is, in industries in which only a limited amount of capital is needed and where most plants are of small-scale. In contrast, we find no significant effects of import competition on the exit of plants in heavy industries. The result has important policy implications regarding the role of trade reform in boosting aggregate productivity, particularly in industries with high levels of distortions.

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I. Introduction

A large body of empirical research at the micro level has shown the existence of positive links between international trade and productivity (see e.g. Aw, Chung, and Roberts, 2000; Bernard and Jensen., 1999; Bernard and Jensen, 2004; Clerides, Lach, and Tybout, 1998; Harrison, 1994; Pavcnik, 2002: Alvarez and Lopez, 2005; and Fernandes, 2007). One of those links comes from effects of import competition. Recent trade models with heterogeneous firms (Bernard et al., 2003), for example, show how lower trade costs and the subsequent increase in import competition can spur aggregate productivity by forcing lower productivity firms out of the market, cutting off the lower tail of the productivity distribution and releasing resources to the most productive firms.

Empirical evidence supporting this trade-induced reallocation channel has been found in Bernard et al., (2006) and Eslava et al., (2009). How do this trade-related reallocation effect play out in different industries, however, is relatively less known. This paper aims to fill this gap in the literature. Using plant-level data from Venezuela, we find significant heterogeneity regarding the impact of import competition on resource reallocation in different industries. In particular, we find that the exit of inefficient plants due to stronger import competition is very prominent in light industries, that is, in industries in which only a limited amount of capital is needed and where most plants are of small-scale. In contrast, we find no significant effects of import competition on the exit of plants in heavy industries.

Plants in heavy industries are normally of large-scale and frequently big investments are required to set them up. It is possible that plants in these industries have bigger pockets and thus are better prepared to stand the increase competition from lower trade barriers. An alternative argument is that the presence of heavy industries is the direct result of some factor abundance in the country. For instance, large endowments of oil can lead to a vibrant downstream industry of petroleum sub-products and derivatives. Such a comparative advantage may guarantee the survival of the plants even after trade protection is lowered. A final possibility is that governments might confer strategic importance to heavy industries –even if they do not have comparative advantages- and nurtures them with various instruments like tax breaks, preferential credit rates or by imposing barriers to entry. It is in this case that trade might lose its Darwinian effect of weeding out the low productivity firms failing to improve aggregate productivity. This case underlies the potential limited role of trade in boosting aggregate productivity in certain industries. We present some evidence regarding the likelihood of these hypotheses and discuss their relevance for pursuing additional research.

The rest of the paper is divided as follows. The next section explains the estimating methodology which takes in consideration key insights from the new trade models. This section also describes the datasets employed. The main results are presented section III while section IV finalizes with some concluding remarks.

II. Methodology

An increasing body of evidence indicates that a large share of aggregate productivity growth arises from the reallocation of resources from low to high productivity plants (see e.g., Bernard and Jensen, 1999, and Bartelsman, et. al., 2004). Very influential new trade models with heterogeneous firms indeed suggest that international trade plays an important role in this reallocative process. For instance, declining trade costs force low productivity plants to exit the market in Bernard et al. (2003) and in Melitz (2003) leading to an increase in aggregate efficiency. The mechanisms by which the exit of the inefficient plants occurs, however, differs slightly between the two models. In Melitz (2003), for example, lower trade costs abroad attract new firms into the export market increasing the labor demand at home, the real wage and forcing the least productive firms to exit. In Bernard et al. (2003) the low productivity plants exit the market because of the direct increased import competition from abroad. In our empirical work we use trade costs for imports, therefore, our analysis is closer in spirit to Bernard et al. (2003).

Based on this theoretical framework, we specifically ask whether plants in industries with larger reductions in tariff rates are more likely to exit the market. To this end we run the following probit model based on Bernard, Jensen and Schott (2006):

$$\Pr(e_{ijt+1}) = \phi(\beta \Delta Tar_{jt-1} + \gamma X_{jit} + \alpha_j + \alpha_t + \alpha_r) \qquad (1)$$

where e_{jit+1} takes the value of 1 if plant *i* in industry *j* exits between periods *t* and *t+1*, ΔTar_{jt-1} is the change in the tariff rate in industry *j* between *t-1* and *t*; X_{ijt} is a vector of plant characteristics and α_j, α_t and α_r are industry, time and region effects respectively.

Equation (1) is the baseline model that will be applied to the entire sample of firms and to the sub-groups of industries. The strategy consists on comparing the estimated beta coefficients for these sub-groups of industries.

II.2 Data

We use a panel of manufacturing plants drawn from the Venezuelan Industrial Survey (Encuesta Industrial de Venezuela). This is an annual survey of manufacturing conducted by the Venezuelan Statistics Agency, the *Instituto Nacional de Estadística* (INE). The survey covers manufacturing plants that employ at least five individuals and collects detailed information on plant characteristics, such as geographic location, manufacturing industry, production, value added, exports, employment, intermediate inputs, and investment.

Sales, and value added from this survey were deflated to 1995 prices with sectoral price indices obtained from the Venezuelan Central Bank. The capital stocks were constructed using the perpetual inventory method for various types of capital including structures, vehicles and machinery and equipment. Appropriate deflators from the Venezuelan Central Bank for the various capital equipments were used to deflate the different components. The initial capital stock is constructed as the value of capital stock reported in books (deflated) minus the reported depreciation that year. Subsequent years were calculated using the perpetual inventory method with depreciation rates equal to 5% for structures, 15% for machinery and equipment and 20% for vehicles (see Liu, 1993).

A key issue in calculating total factor productivity with firm level data is the potential correlation between unobservable productivity shocks and input levels. Profit-maximizing firms respond to positive productivity shocks by expanding output, which in turn requires more inputs. A widely used estimator that employs investment as a proxy for these unobservable shocks is given by Olley and Pakes (1996). Another estimator that uses intermediate inputs as proxies of these shocks has been introduced more recently by Levinsohn and Petrin (2003). These authors argue that intermediates may respond more smoothly to productivity shocks. We use the Levinsohn and Petrin methodology to construct our measures of total factor productivity.[1]

Given the dynamic nature of the plant exit/survival process, we are interested in covering the longest time period possible. The available data spans from 1995 to 2004. The survey is conducted using a stratified random sample procedure with 828 strata corresponding to 4 occupational categories, 23 estates and 9 economic activities (ISIC revision 2 at 2 digits). Only the largest occupation category -that is plants with more than 100 employees- is treated like a census during this entire period of analysis. This implies that only the plant exits that are recorded in this occupational category represent "true" exits of the market and not the result of the random sampling process. Accordingly, we use only the plants in this occupational category which provides us with a panel of 6,431 observations. Table 1 shows a summary statistics of the main variables used from this survey.

The ad valorem tariff rates come from Nicita and Olarreaga (2006). The information refers to applied tariff rates which take into consideration preference schemes. The data is provided at the 3 digit ISIC revision 2 industry level, where the rate in industry *j* is the import weighted average across all products in *j*. Table 2 reports the information for three alternative years. The average tariff rate in Venezuela and its dispersion increased from 1995 to 2000, but declined since then. Between 2000 and 2004, the external protection rate fell in 28 out of 29 industries.

III. Empirical Results

Before testing the prediction of the model stated above, we would like investigate whether firms that exit are in general less productive than firms that do not exit. This is shown in Table 3. The table reports the result from a regression of the following form:

$$\ln(TFP_{it}) = \alpha + \beta L_{it} + \gamma X_i + \alpha_j + \alpha_t + \alpha_r + \varepsilon_{it} \qquad (2)$$

[1] In particular, we use value added as the dependent variable and electricity consumption to proxy for unobserved productivity. We estimate separate production functions at a 2-digit ISIC level of disaggregation to guarantee that there is enough variation to estimate the coefficients.

where the dependent variable is the TFP of plant; L_{it} is the plant's labor force (a proxy for size); X_i is a dummy equal to 1 if the plant exit during the sample period and α_j, α_t and α_r are industry, year and region fixed effects. The coefficient in the table reports the estimated $\hat{\gamma}$ for the regression.

The result indicate that after controlling for differences in size, industry and region characteristics, plants that exit are indeed less productive than plants that do not exit. Plants that exit are on average 18% less productive than plants that do not exit. While not directly testing the effects of trade costs on resource allocation, this result provides a preliminary element that is important for the improvement of the reallocation of resources to take place, namely that the plants that normally exit are on average less productive than the plants that do not exit. We now investigate in more detail what is the likelihood that a plant would exit the market in the face of declining trade costs.

Results of estimating equation (1) are presented in Table 4. The first column focuses only on the tariff rate. The second column includes the plant's productivity. According to the theory, productivity should be negatively associated with plant exit. In column 3 we include additional plant controls that may be related to the probability of exit: the plant's labor force (the proxy for size) and its capital intensity. Finally, in column (4) we also include the interaction between the productivity of the plant and the change in trade costs. This interaction term seeks to explore whether the probability of exit when trade costs fall is relatively lower for high-productivity plants.

According to the results from all the columns, a reduction in trade costs increases the probability of plant exit. The coefficient for the change in the tariff rate is statistically significant at conventional levels in all the regressions. Productivity is also found to be negatively associated with plant exit. This is consistent with results in Tybout (1991), Liu (1993), Liu and Tybout (1996), and Pavcnik (2002) that find that the probability of exiting is smaller for the more efficient plants. Plants that have higher capital labor ratios also exhibit lower probabilities of exit while size does not seem to have a statistically significant impact.

Regarding the interaction term, the coefficient does not seem to be statistically significant. However, the interaction effects in nonlinear models cannot be evaluated simply by looking at the sign, magnitude, or statistical significance of such coefficients (see Ai and Norton, 2003). The marginal effects of interaction terms in nonlinear models require computing cross derivatives that standard econometric packages do not perform. In addition, such marginal effects could have different signs and different statistically significances for different observations. Therefore, in order to check whether the marginal effect of productivity increases with falling trade costs, we use the Ai and Norton's algorithm for computing marginal effects of interaction terms in nonlinear models. The procedure calculates the interaction effect, standard error, and z-statistic for each observation. Results are shown in Figures 1a and 1b. The interaction term (Figure 1a) varies substantially with positive values for some observations and negative values for others. In terms of the significance, while the mean z-statistic for all the observations (-0.20) is not statistically significant, the interaction effects for a group of observations are indeed statistically significant (see Figure 1b). Note that the significant observations are positive in value which is consistent with the theory: the marginal propensity that a plant will exit the market driven by falling trade costs decreases with the level of productivity.

Having shown that lower trade costs increase the probability of exit, particularly for the low productivity plants, we now like to examine whether these results hold across different industries. In particular, we separate the plants into two groups: plants that belong to light industries and those that belong to heavy industries. Light industries are normally characterized by having small-scale plants that need only a limited amount of capital to operate, tend to make small products mainly to be bought by individuals and are relatively footloose. Typical examples of these industries are clothing, shoes, food-processing, toys or electronics. Heavy industries, on the other hand, tend to make large products often bought by other manufacturing companies, plants are normally of large-scale, often require large capital investments, and are relatively constrained in their locational choices given their typical intensive used of raw materials. Examples of these industries are steel, oil-refining, chemicals or transport equipment.

More specifically we grouped as light industries the following activities: manufacturing of food, beverages and tobacco (ISIC 31), textile and wearing apparel (ISIC 32), wood products and furniture (ISIC 33), paper and paper products (ISIC 34), and machinery and equipment (ISIC 38) except transport equipment (ISIC 384). On the other hand, heavy industries include: chemical, petroleum products and refineries (ISIC 35), non-metallic mineral products (ISIC 36), basic metal industries (ISIC 37) and transport equipment (ISIC 384).

Table 5 presents a comparison between these two industries in some key variables. It is clear that plants in heavy industries are on average larger and are more capital intensive that their counterparts in the light industries. For instance, plants in heavy industries have on average about 100 more workers than their counterparts in the light industries and twice as much capital per worker. The third column in the table also shows that plants in heavy industries tend to exhibit a lower exit rate on average than the plants in light industries. We now investigate whether the *response* of the exit rate to lower trade costs also differ among the two groups.

Table 6 shows the results of estimating equation (1) for the sub-group of light industries. The results are very similar to those in Table 4 in the sense that a reduction in trade costs increases the probability of plant exit even after controlling for various plant characteristics. The productivity of the plant and its capital intensity are also negatively correlated with plant exit. Finally, while the interaction term does not seem to be statistically significant, the marginal effects computed with the Ai and Norton's algorithm show that for a small group of observations they are positive and statistically significant (see Figures 2a and 2b) as predicted by the theory. Once again, this indicates that lower trade costs increase the probability of exit relatively more in plants of low productivity.

In Table 7, we repeat the same exercises but now for the group of plants belonging to the heavy industries. The results are striking. There is no effects of trade costs on the exit of plants. While the estimated coefficients of trade costs are negative, they are not statistically different from zero in any of the regressions. The reductions in trade costs do not increase the likelihood of plant exit in any of the estimations. The interaction effect computed with the Ai and Norton's procedure is shown in Figures 3a and 3b. The marginal effects of the interaction are not statistically significant for any of the observations. This implies that lower trade costs do not even increase the probability of exit for the low productivity plants.

The results shown in Tables 6 and 7 indicate that there is a high degree of heterogeneity across light and heavy industries in terms of their response to reductions in trade barriers. We now present some arguments that may help explain these differences. One possibility is related to intrinsic distinctions in plant characteristics. For example, plants in heavy industries are normally of large-scale and frequently big capital investments are required to set them up. Table 5 indeed shows that these plants are larger and have more capital investment per worker than the average plant in light industries. It is possible then that their scale and their capital intensity allow them to have easier access to financial resources –for instance, they have larger tangible capital to use as collateral- than the smaller plants in the light industries. Therefore, to the extent that these plants may have access to more resources, they may be better prepared to adjust and potentially restructure if they face stronger competition from abroad.

A second possibility is that the presence of heavy industries is a direct consequence of some form of comparative advantage. For instance, large endowments of oil can lead to a vibrant downstream industry of petroleum sub-product and derivatives. These plants might be already world class competitors and thus reductions in their levels of protection might not disrupt in any significant way their production processes. The analysis in this paper uses data on Venezuelan plants where the lion's share of the heavy industries lies on chemical, petroleum products and refineries (ISIC 35) and on basic metal industries (ISIC 37). In both cases, the raw materials used in these industries – oil in the first case and iron in the second - are found in abundance beneath Venezuelan soil. For instance, Venezuela is among the top 10 exporters of oil and among the top 15 producers of iron. Proximity to these natural resources may provide some comparative advantages to the downstream industries that use them intensively. Therefore, we cannot rule out that comparative advantage may play a role in the lack of response of the exit rate.

A third possibility is that governments might confer strategic importance to heavy industries and nurtures them with various instruments like tax breaks, preferential credit rates or by imposing barriers to entry. This has certainly happened many times in history. For example, between 1973 and 1980 Korea embarked on a heavy industrialization program that focused on building up sectors like steel, nonferrous metals and chemicals, among others. But the existence of preferential treatment to plants in heavy industries might lead to a misallocation of resources if governments fail to let them go when they become unproductive. It is in this case that trade might lose its Darwinian effect of weeding out the low productivity firms failing to improve aggregate productivity. This possibility underlies the potential limited role of trade in boosting aggregate productivity in industries with large levels of with distortions. In the particular case of this paper, we cannot rule out the role of state intervention in explaining part of the outcome. The Venezuelan government has traditionally owned companies in the petrochemical and basic metal industries, for example. But analyzing precisely the extent to which state-ownership or other types of state intervention are related to the lack of trade response in heavy industries goes beyond the scope of this paper.

IV. Concluding Remarks

High trade costs tend to distort an efficient allocation of resources by protecting inefficient producers and by limiting the expansion of the efficient ones. A decline in trade costs, then, should promote a more efficient factor reallocation by increasing the likelihood that the inefficient producers exit the market, releasing resources to the most efficient producers thereby increasing aggregate productivity. While empirical evidence supporting this trade-induced reallocation channel has been found in Bernard et al., (2006) and Eslava et al., (2009) no particular attention has been given in the literature on whether these effects differ across various classes of industries. In this paper we test this proposition by dividing plants into two very simple classes: light and heavy industries. We find that the exit of inefficient plants due to stronger import competition is very prominent in light industries but no effects were observed in heavy industries.

The lack of response in heavy industries calls for a greater attention on dissecting the effects of trade by industry-type incorporating industry-idiosyncratic elements to the analysis. We have raised three distinct hypotheses that may help explain the lack of response of the exit rate to changes in trade costs in heavy industries. One of these hypotheses is the possibility that governments might confer strategic importance to heavy industries and nurtures them with various instruments like tax breaks, preferential credit rates or by imposing barriers to entry. It is in this case that trade might lose its Darwinian effect of weeding out the low productivity firms failing to improve aggregate productivity. This mere possibility generates important policy implications regarding the role of trade reform. That is, it is possible that trade might not boost aggregate productivity (as argued by new trade models) if industries are highly distorted by state intervention. Indeed, this possibility might not be exclusive to interventions in heavy industries, but to any part of the economy. How pervasive might be the effects of government interventions in limiting the reallocation effects of trade is clearly an area that deserves more empirical research.

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Table 1: Summary Statistics

Variable	Mean	Std Dev
Labor	5.37	0.82
Capital / Labor	6.81	1.40
Total Factor Productivity	6.26	1.19
Exit Rate	0.05	0.02
No of observations	6431	

Notes: The table reports means and standard deviations of the log of labor, the log of the capital-labor ratio, the log of TFP and the exit rate. The exit rate is the number of plants that reported positive production in period t but not in period t+1 divided by the total number of plants in period t.

Table 2: Ad valorem tariffs by three-digit ISIC industry

Industry		Tariffs (%)		
		1995	**2000**	**2004**
311	Food manufacturing	14.3	18.8	13.9
312	Prepared animal feeds & food products nec	14.1	18.6	13.7
313	Beverages	17.0	18.7	18.6
314	Tobacco	19.9	20.0	18.0
321	Textiles	11.5	17.8	16.2
322	Wearing, apparel	13.5	19.8	19.5
323	Leather products	9.1	17.4	16.0
324	Footwear	14.7	20.0	19.5
331	Wood products	8.7	13.9	13.6
332	Furniture	15.3	19.2	16.8
341	Paper and products	7.8	9.9	7.9
342	Printing and publishing	12.6	6.9	7.1
351	Industrial chemicals	8.8	7.8	7.1
352	Other chemicals	9.0	11.1	8.8
353	Petroleum refineries	8.9	9.8	8.7
354	Miscellaneous petroleum and coal products	8.5	8.4	6.7
355	Rubber products	11.5	13.5	13.1
356	Plastic products	15.1	18.4	16.7
361	Pottery, china, earthenware	10.7	17.6	13.7
362	Glass and products	12.4	14.3	12.4
369	Other non-metallic mineral products	12.7	13.9	12.5
371	Iron and steel	10.9	11.9	9.5
372	Non-ferrous metals	5.1	9.8	6.0
381	Fabricated metal products	13.7	15.4	13.8
382	Machinery, except electrical	10.9	9.2	8.7
383	Machinery, electric	13.8	10.6	9.1
384	Transport equipment	16.1	24.6	21.0
385	Professional and scientific equipment	11.9	7.9	7.4
390	Other manufactured products	17.0	17.9	14.7
Average		12.2	14.6	12.8
Standard deviation		3.3	4.8	4.5

Table 3: Average plant's TFP relative to comparator

Plants that exit / plants do not exit	-0.180***
	(0.0373)

Notes: Plant-level regression results. Dependent variable is the plant's TFP. Regressors include the plant's size (Labor), year, industry and location fixed effects, and a dummy equal to 1 if the plant exit during the sample period. The coefficient in the table reports the result for this dummy variable

*** ; ** ; * significant at the 1%, 5% and 10% level respectively

Table 4: Probability of exit. All industries

Regressor	Probit (1)	Probit (2)	Probit (3)	Probit (4)
Change in tariff	-0.0949***	-0.0872***	-0.0860***	-0.0930**
	(0.0328)	(0.0305)	(0.0306)	(0.0323)
Productivity		-0.0107***	-0.0102***	-0.0098***
		(0.0028)	(0.0028)	(0.0028)
Labor			-0.0005	-0.0005
			(0.0031)	(0.0031)
Capital / Labor			-0.0044**	-0.0045**
			(0.0018)	(0.0018)
Change in tariff x productivity				-0.0297
				(0.0221)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes
Observations	4923	4846	4846	4846
Pseudo R2	0.08	0.09	0.09	0.09

Notes: Plant-level probit regression results. Numbers are marginal effects. Robust standard errors adjusted for clustering at the three-digit ISIC level in parentheses. Industry fixed effects are also at the three-digit ISIC level. Dependent variable indicates plant exit between years t and t+1. First regressor is the change in the tariff rate between t-1 and t. Next three regressors are plant controls for year t where productivity, labor and capital/labor are the plant's TFP, its total labor force and the capital labor ratio respectively. All plant controls are in logs. Last regressor is the interaction between the change in the tariff rate and the plant's TFP.

***; **; * significant at the 1%, 5% and 10% level respectively

Table 5: Light versus heavy industries.

Averages of selected variables in levels

Variable	Light industries	Heavy industries
Labor	287	371
Capital / Labor	1569	3105
Exit Rate	0.0544	0.0393

Notes: The table reports the average of labor, capital-labor ratio, and the exit rate for all the plants in each industry category.

Table 6: Trade costs and probability of exit. Light industries

Regressor	Probit (1)	Probit (2)	Probit (3)	Probit (4)
Change in tariff	-0.1095**	-0.1024**	-0.1002**	-0.1123**
	(0.0404)	(0.0372)	(0.0373)	(0.0429)
Productivity		-0.0123***	-0.0117***	-0.0115***
		(0.0037)	(0.0038)	(0.0038)
Labor			-0.0025	-0.0025
			(0.0050)	(0.0050)
Capital / Labor			-0.0042*	-0.0043*
			(0.0023)	(0.0023)
Change in tariff x productivity				-0.0390
				(0.0321)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes
Observations	2910	2847	2847	2847
Pseudo R2	0.09	0.10	0.10	0.10

Notes: Plant-level probit regression results. Numbers are marginal effects. Robust standard errors adjusted for clustering at the three-digit ISIC level in parentheses. Industry fixed effects are also at the three-digit ISIC level. Dependent variable indicates plant exit between years t and t+1. First regressor is the change in the tariff rate between t-1 and t. Next three regressors are plant controls for year t where productivity, labor and capital/labor are the plant's TFP, its total labor force and the capital labor ratio respectively. All plant controls are in logs. Last regressor is the interaction between the change in the tariff rate and the plant's TFP.

***; **; * significant at the 1%, 5% and 10% level respectively

Table 7: Trade costs and probability of exit. Heavy industries

Regressor	Probit (1)	Probit (2)	Probit (3)	Probit (4)
Change in tariff	-0.0581	-0.0517	-0.0529	-0.0530
	(0.0464)	(0.0438)	(0.0430)	(0.04237)
Productivity		-0.0074*	-0.0073*	-0.0071*
		(0.0041)	(0.0038)	(0.0042)
Labor			-0.0009	-0.0009
			(0.0029)	(0.0029)
Capital / Labor			-0.0047	-0.0047
			(0.0029)	(0.0030)
Change in tariff x productivity				-0.0074
				(0.0317)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes
Observations	1892	1878	1878	1878
Pseudo R2	0.09	0.10	0.10	0.10

Notes: Plant-level probit regression results. Numbers are marginal effects. Robust standard errors adjusted for clustering at the three-digit ISIC level in parentheses. Industry fixed effects are also at the three-digit ISIC level. Dependent variable indicates plant exit between years t and t+1. First regressor is the change in the tariff rate between t-1 and t. Next three regressors are plant controls for year t where productivity, labor and capital/labor are the plant's TFP, its total labor force and the capital labor ratio respectively. All plant controls are in logs. Last regressor is the interaction between the change in the tariff rate and the plant's TFP.

***; **; * significant at the 1%, 5% and 10% level respectively

Figure 1a: Interaction Effects
All industries

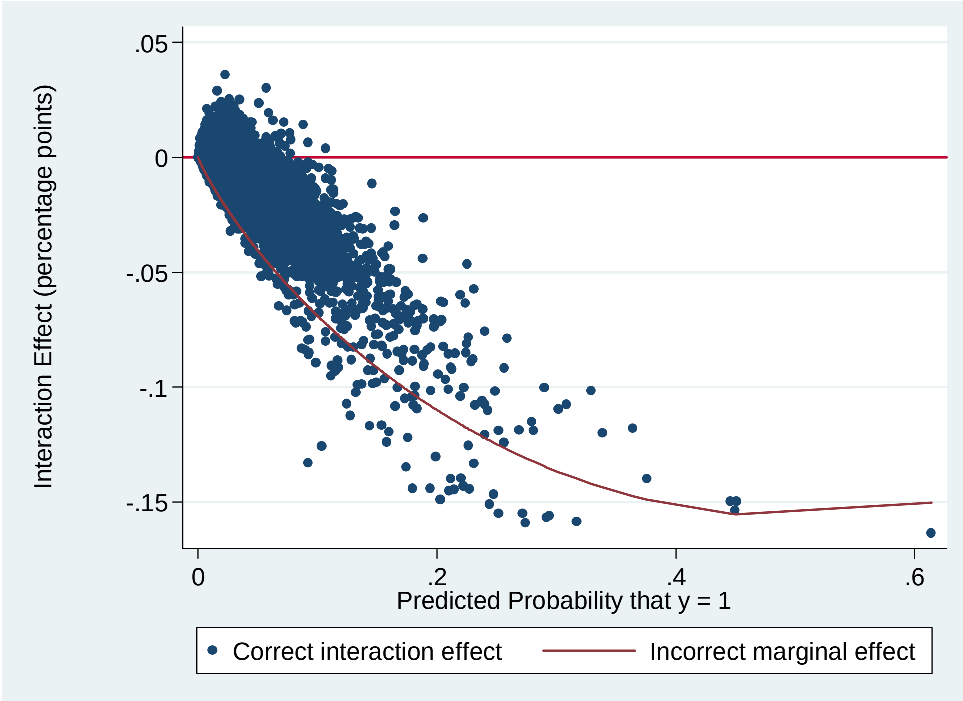

Figure 1b: z-statistics of interaction effects
All industries

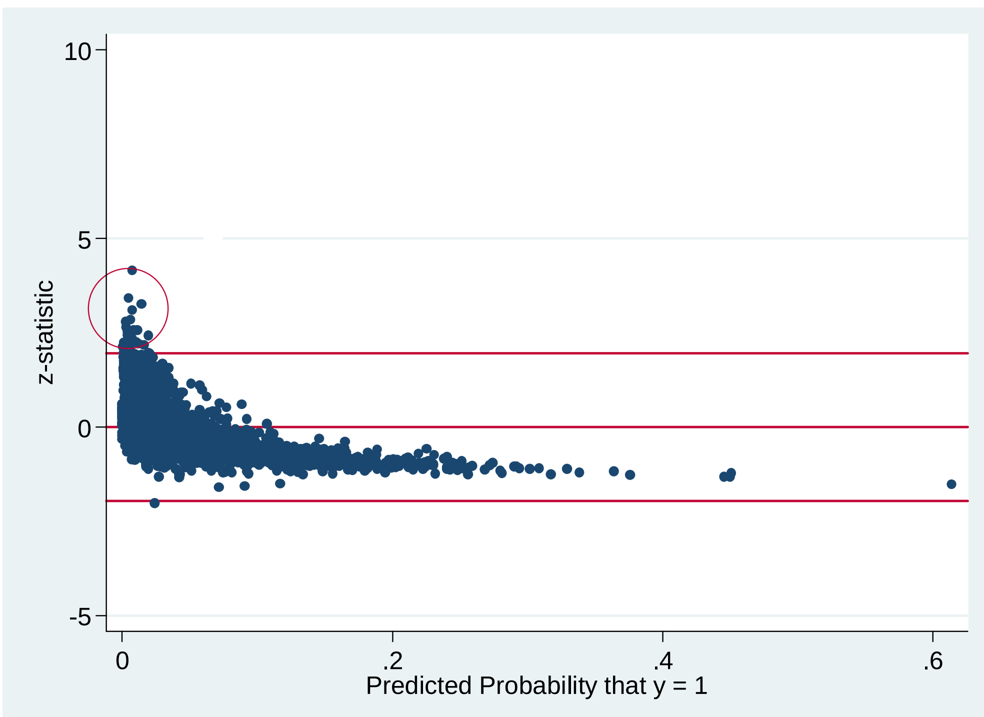

Figure 2a: Interaction Effects
Light industries

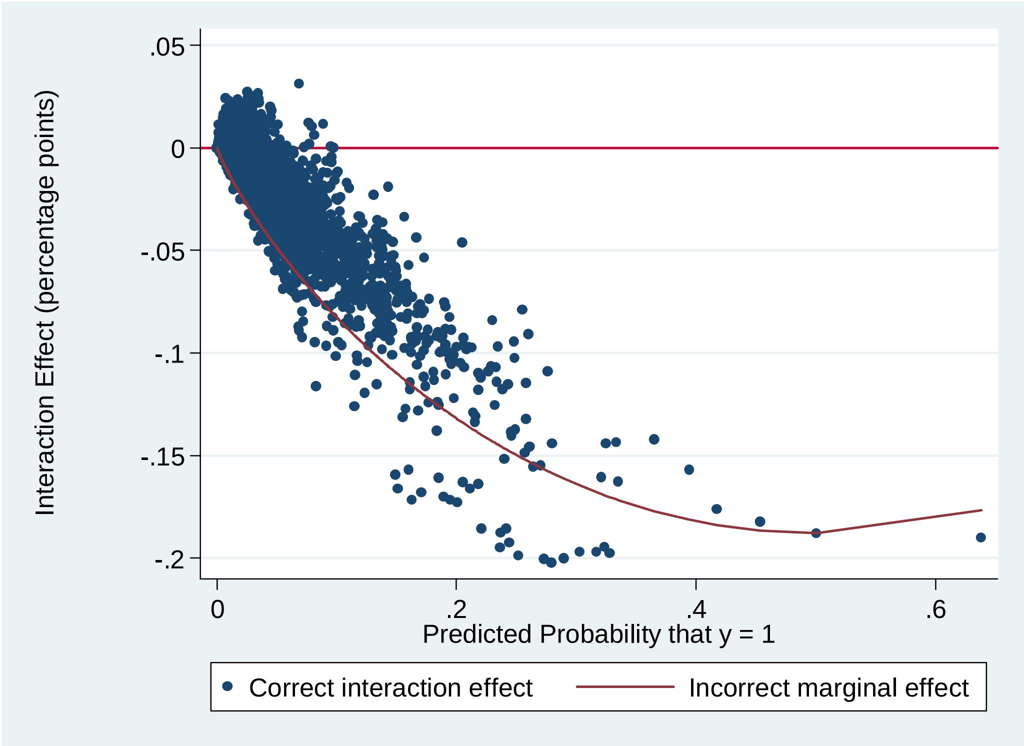

Figure 2b: z-statistics of interaction effects
Light industries

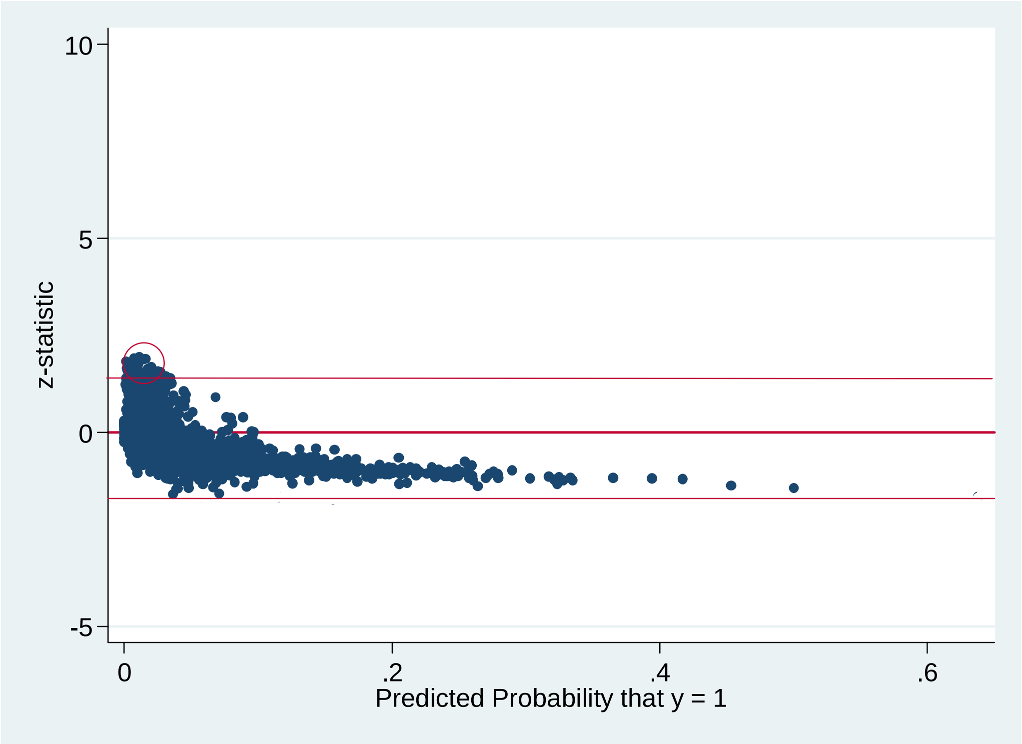

Figure 3a: Interaction Effects
Heavy industries

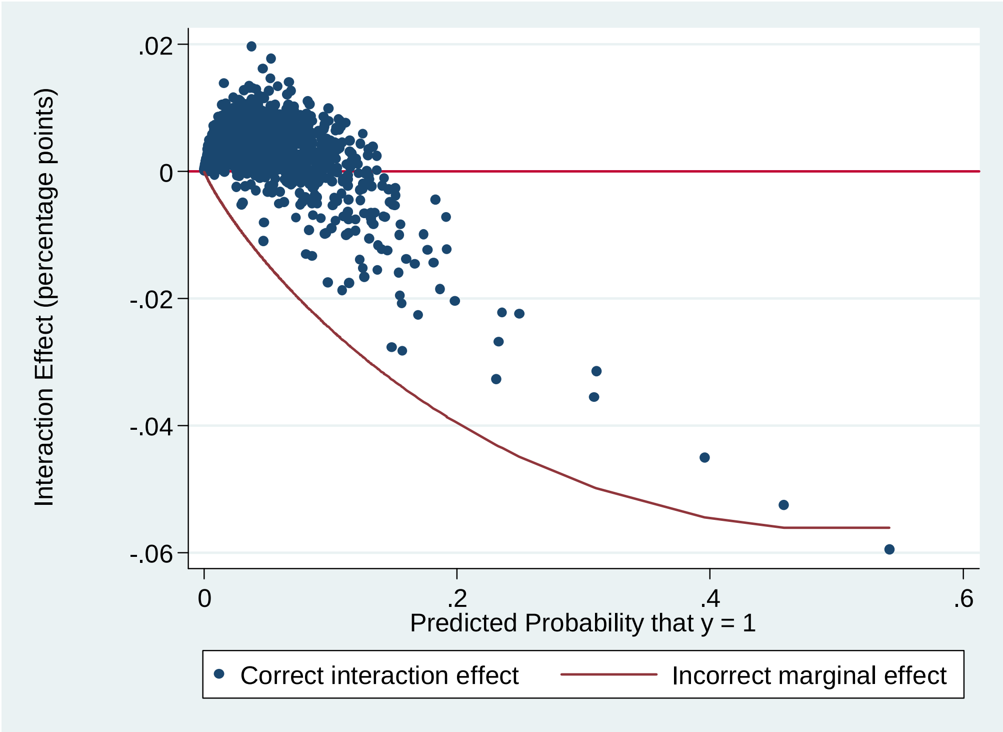

Figure 3b: z-statistics of interaction effects
Heavy industries