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Liberalization and Market Selection: Empirical Evidence from Import Tariff Decrease in Indonesian Manufacturing Sector

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ABSTRACT

The idea that trade liberalization can generate market selection has become an interest for researchers in developing countries. Theoretically, trade liberalization-induced competition can benefit the high-productive firms but lead the low-productive ones out of the market. The implication of the selection is more efficient use of resources. This study examines the firm-level data of productivity and market share from Indonesian Manufacturing Firms Data from the 1998-2013 period and it finds an increased positive correlation between the firms' total factor productivity and their output share after import tariff decreases. However, after classifying samples into a different group based on technological intensity, this study did not find supporting evidence in medium and high technology industries. Using probit model, this study also found evidence that tariff reduction increases the exit probability of low productivity firms. The empirical findings support the benefit from trade liberalization in terms of resource use.

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INTRODUCTION

Empirical evidence from many developing countries found that trade liberalization increased the exit probability of some less productive firm (Pavcnik, 2002; Alvarez and Vergara, 2010; Eslava et al., 2013). According to Eslava et al (2013), higher competition that comes with globalization creates market selection process which determines the number of surviving firms in the market. These findings provide another point of view about alternative channel that gain from trade can be obtained from firm adjustment through technology adaptation and innovation. While former empirical works in this field does not consider the existence of firm heterogeneity and expect all firms to have the same capability in facing technology adaptation and innovation when trade is liberalized, apparently, not all firms gain benefit from trade (Schor, 2004; Eslava et al.,2013; Takii, 2014). In their paper, Eslava et al.(2013) found empirical evidence explaining that the impacts of trade liberalization among many firms in an industry depends on their productivity level. The less efficient firms will exit and leave the survivors to take the market share. As a result, the more efficient the firm, the bigger the market share. Empirically, it can be tested whether trade liberalization affects market selection through increasing covariance between firms' output share and its productivity. The increasing covariance between firms' output share and their productivity indicates more efficient use of resources.

Melitz (2003) explained theoretically that the impact of trade on firms depends on their initial productivity level. Trade liberalization will lead some highly productive firms to penetrate the export market, while some less productive firms will shrink and operate in domestic market only, and the least productive firms will exit the market. Different theoretical model but achieved the same conclusion was explained by Bernard et al. (2003). Using USA manufacturing data, they found empirical support that some domestic non-exporter firms lost market share and exit, most of the domestic firms survived but served domestic market only, and a small fraction of the domestic firms started to export after trade barrier reduction.

This theoretical model explaines gain from trade through market share reallocation towards more productive firms. The fact that some firms expand and some other contract will generate market shares reallocation among firms with different productivity level. In the long run, this reallocation process contributes to sectoral productivity growth. While some less efficient firms exit the market after trade liberalization, industry consists of higher level of productivity firms and aggregate level productivity increases. Before Melitz explored deeply about the reallocation, the proposition was proposed earlier by Robert and Tybout (1991) along with the empirical support. Another empirical work supporting this prediction was conducted by Tybout and Westbrook (1994), Pavcnik (2002), Harrison et al (2012), Eslava et al (2013).

Long before the idea of trade-induced resources reallocation, the concept of resources reallocation was originally proposed in broad structural reform framework (Syrquin, 1988). Without considering specific kind of policy reform, researchers have found empirical evidence about reallocation of resource in some developing countries following any structural policy reform in those countries (Baily et al., 1992; Olley and Pakes, 1996; Foster et al., 2001; Eslava, 2004; Foster, 2008; Petrin, 2011). Using different productivity decomposition method, they found some evidence about positive contribution on aggregate productivity coming from resource reallocation towards more productive plants. Pavcnik (2002) used the same decomposition method proposed by Olley and Pakes (1996) to analyze resource reallocation after trade liberalization in Chile. But this decomposition method did not distinguish the effect of a different kind of structural reform policy. However, Pavcnik (2002) classified her sample in different trade orientation groups (import-competing sector, export-oriented sector, and non-tradable) to analyze the pattern of resources reallocation on various trade orientation firms as a response to trade reform. Pavcnik found a positive contribution from reallocation following trade liberalization in Chile. Bernard, et al (2003) using calibration method to analyze firms' response to trade barrier reduction based on exporting status. The result was similar to Pavcnik, they found that there was a potential channel where gain from trade can be obtained through resources shifting between firms.

Eslava et al. (2013) extended the analysis by identifying the impacts of trade policy reform on the reallocation of resources using linear regression technique in Columbia. The main idea of the Olley and Pakes (1996) decomposition method is the increasing covariance between output shares and total factor productivity as an indication of market share reallocation. Eslava et al (2013) applied this concept to her linear regression model. The model made it possible to perform analysis on firm-level data. While using decomposition method, the reallocation can only be analyzed at sectoral level. Another contribution they made was the possibility to control another structural reform policy. The empirical work result suggested that tariff reduction had increased the

positive covariance between firms' output share and their productivity. They concluded that import tariff liberalization induced higher input demand in highly efficient firm.

Such study conducted using Indonesian manufacturing data is limited. The nearest study found is the study conducted by Takii (2014). Using the various measurement of trade liberalization, Takii (2014) analyzed the existence of heterogeneous response of different firms, in terms of exporting status. Takii (2014) only found that tariff imposed by Indonesia's trading partners on Indonesia's exports has a significant impact on plant size. The study supports the firm heterogeneity, in terms of exporting status, matters. However, using domestic import tariff reduction and import penetration as trade liberalization measurement, Takii found no evidence of heterogeneous response among different exporting status firms.

Referring to the previous finding, this study is conducted on different analysis. The study differs from Takii (2014) in many ways as it adopts Eslava et al. (2013) method with some modifications. First, it focuses on the impact of import tariff on final goods in domestic country to examine the import competition effect. Second, it uses different disaggregation level of import tariff measurement from previous works. While Takii (2014) used 3 digit ISIC level of tariff and Eslava (2013) used 4 digit ISIC level, this study applies Indonesian version of ISIC adaptation (KBLI) at 5 digit disaggregation level of final goods import tariff. This level of disaggregation gives higher variation in tariff data and this study recons only main final product import tariff based on their 5 digit KBLI classification. Third, it uses productivity as the measurement of firms heterogeneity. It also attempts to find heterogenous response among the firms, in terms of total factor productivity as predicted theoretically by Melitz (2003). Fourth, the main focus in this analysis is to identify the heterogenous responses to trade liberalization based on firms' productivity rather than exporting status. Although Takii's evidence can be interpreted as higher resources allocated to exporter firms, as those firms grow faster in liberalized trade, it does not explain market selection process among domestic operating firms with different productivity level. It relies on the export status dummy to distinguish different impact on firms' output. The exporter status can be a poor measurement to represent firms' productivity level as it cannot distinguish the intensity of export orientation. As Bernard, et al (2003) also found, there is heterogeneity in productivity level among exporter. Firms with low export orientation and small fraction of export may have different level of productivity with firms which have high export orientation with 100% exported product. The export status dummy cannot capture the differences. Thus, this study uses the productivity measurement proxied by Total Factor Productivity. It adopts Eslava et al (2013) because it suits more with the main research objective of this study.

However, the difference in nature of data and policy environment motivates us to modify the estimation model. One of the strengths in Eslava et al (2013) empirical works is the ability to control another form of policy reform besides tariff policy reform. Eslava et al (2013) used structural reform index constructed by Lora (2012) to control another form of policy reform. Such index is not available for Indonesia; therefore, this study has to use an alternative approach. Eslava et al (2013) explained the importance of controlling this policy reform because reform in trade policy is usually followed by reform in another policy. It uses a number of firms and concentration ratio to control any changes in market structure. Market structure changes caused by policy reform may drive resource reallocation towards more efficient firms (Olley and Pakes, 1996). Considering the size of the Indonesian economy territory, this study also uses regional GDP per capita to control different policy exposure in each region where firms are located since each region has different trade and industrial policy. Aside from differences in variable control in Eslava's model, further analysis is also conducted by dividing samples into four different groups based on technology intensity (Lall, 2000). Samples are divided into several categories, including resource-based industry, low technology industry, medium technology industry, and high technology industry to identify whether this market selection process has worked the same way in every group.

This study also improves the measurement of firms' exit condition when conducting probit estimation to estimate the exit probability of firms after tariff reduction. In standard exit condition, it takes value 1 if the firms exist in particular year (year t) but do not exist in the following year (t+1). Additional condition is also applied which considers the existence in year t+2 to determine whether the firms truly exit or simply do not respond to the annual census at the year t+1. It is important to apply this rule since the annual manufacturing survey is voluntary, therefore the unavailability of the firms' data in year t+1 does not clearly represent the firms exit decision.

By using Indonesian manufacturing data (IBS) from 1998-2013, this study examines the impact of final goods import tariff reduction on firms output share with different level of productivity by including interaction terms between tariff and firms' Total Factor Productivity. As the result, firms heterogeneity matters, in terms of

TFP, was found out. The reducing import tariff liberalization moves in proportion to the increase of the positive correlation between firms' productivity level and their output shares. By using probit model, it is found that tariff reduction rises the exit probability of low productivity firms. It indicates that Indonesian trade reform policy effectively intensifies market selection effect while increasing resource allocation on higher productivity firms.

There are at least two important points arising from these empirical findings. First, the benefit from trade that arises from the market selection process, which means, some parts will be disadvantaged. Some less efficient firms lose market share, and some more efficient firms gain market share. While this market share reallocation tends to benefit the aggregate productivity, there are some costs arisen by this process. It causes some friction in input market (Eslava et al. 2013). The least efficient firms may not only shrink but also discontinue its operation. This condition yields worker displacement followed by earning losses for some parts. The continuing firm's response is very important to restrain the magnitude of this loss. Whether the displaced labor is quickly rehired by continuing firm, it is beyond this study's scope of analysis and shall be remained for future work.

THEORETICAL CONSIDERATIONS

Discussions about gain from trade through resources reallocation obtain more interest among researchers. Roberts and Tybout (1991) mentioned about this potential channel in their article before Melitz's works. The motivation, based on a former research by Rodrik (1988), which is concluded that one of the sources of the benefit from trade liberalization comes from resource allocation adjustment between plants. Robert and Tybout (1991) then proposed conceptual framework exploring the adjustment occurred after trade liberalization which reduced industry-wide average cost. In their "rationalized industry" framework, the adjustment occurs in two ways: increasing overall firms' output level then reducing industry average fixed costs, or by shifting market share towards the low-cost firms and reducing industry average variable cost. The first will happen when the trade begins to liberalized, the demand elasticity is expected to rise and followed by the falling price, therefore the quantity of goods produced must rise. The second works through increasing market share of the large and low cost plants, followed by reduction in average industry variable cost.

An in depth analysis of the second type of adjustment, namely market share reallocation was developed later by Melitz (2003). Melitz proposed a model explaining the existence of heterogeneous firms' response following trade liberalization. In Melitz's framework, the impact of trade on firms depends on their initial productivity level. In an equilibrium of closed economy, there is a productivity threshold (φ^*) which becomes a cut off point for any firm deciding to stay or exit the market. This productivity cut off point is derived from zero profit condition in free entry market setting where long term profit is equal to zero ($\pi(\varphi^*) = 0$). Firms that are unable to earn positive profit in a market will decide to exit the market. When above the threshold, firms continue to operate. After trade liberalization, average productivity will increase and so will this productivity threshold. Trade opening generates new productivity threshold (φ_x^*) which is higher than φ^*. Firms with productivity level between old threshold and new threshold (φ^* and φ_x^*) will be forced to exit the market as they cannot earn positive profit anymore. On the other side, opening trade provides additional opportunity from better access to international market. Nonetheless , in the existence of fixed export cost, only certain firms that can afford the fixed export cost would able to enter the export market. This will generate another minimum productivity threshold determining firms that gain more from trade opening. Furthermore, this kind of reform will classify firms into those which potentially gain benefit from trade and those which lose from trade. Those that gain more will expand, and those that lose will contract. The contracting firms lose market share, which is taken by expanding firms. Market share reallocate towards more productive firms. The more efficient the firms are, the bigger the market share they get.

Why do the least productive firms exit? In Melitz's model, their mechanism work through market competition factor. As explained in the paper, trade liberalization offers a new opportunity to the more productive firms that are able to cover the trade cost to expand their market. Firms with higher productivity level than the exporting threshold ($\varphi > \varphi_x^*$) will be able to earn positive profit if they expand their market. Profit optimization oriented firms will expand and labor demand for these firms will increase as they proceed their market expansion. This process drives to increase in real wage rate and forces some firms which cannot afford to pay the new wage rate to reduce the cost and lose market share The worst case is their market share fall to zero as they discontinue operation.

In 2008, Melitz and Ottaviano revisited this resource reallocation framework through a different channel. The main idea about the article is about potential welfare increase that comes from trade liberalization, including lower markups and a higher variety of products. But this new framework provides insight about the same reallocation effect. In this model, the increase in exit probability and increase in that of high productivity firms' market share works through importable product market competition. Unlike the 2003 version, this model explains through marginal cost threshold, not productivity threshold. This cost threshold (c_D) will be upper bound determining whether firms to continue their operation. Opening trade will affect the cost threshold. When trade barrier is reduced, abundant imported products compete with domestic products and drive the price lower. All firms with cost $c < c_D$ earn positive profit and remain in the industry. Some firms with cost higher than this new price level (which equal c_D) would earn negative profit and are forced to exit.

This study's empirical works that follow Eslava's (2013) strategy is motivated by this theoretical model. According to those proposed by Robert and Tybout (1991), Melitz (2003), and Melitz (2008), this research is conducted to examine whether trade liberalization will intensify market selection process then followed by market share reallocation towards more productive firms. Based on the theoretical prediction by Melitz, which says the most efficient firms will gain market share, and some of the less efficient firms will lose market share and exit, a hypothesis is developed to be tested in this empirical strategy. Eslava's model is modified particularly for the control variable and the rule of firms' exit. Unlike Eslava, this research casts the existence of the firms up to year t+2 to determine whether they discontinue their operation. It was found that reducing import tariff will increase the positive covariance between firms' productivity and their output share, and also increase the probability of the exit of low productivity firms.

RESEARCH METHODS

Data

This study uses several data set to be implemented in its empirical model. The data sources come from Indonesian Bureau of Statistics (Badan Pusat Statistik), World Trade Organization (WTO), Department of Statistic-Bank of Indonesia, and World Bank. The data consist of firm-specific data from Indonesian Manufacturing Survey Data (IBS), commodity tariff data from World Trade Organization (WTO), Regional GDP per capita and GDP growth from World Development Indicator-World Bank.

The analysis covers all manufacturing sectors from 1998-2013. This dataset consists of the unbalanced panel firms specific variable. The unbalanced structure is caused by three main possibilities that are exiting firms, new entrants, and unsurveyed firms. It is important to notice that the nature of Indonesian Annual Manufacturing Survey by BPS is voluntary so there is a possibility where firms are continuing their operation but do not respond to the survey. The valid information about discontinuing firms does not exists, so it cannot be determined precisely whether the firms exit or they simply does not respond to the survey when the data is missing.

Several procedures were conducted when constructing the panel data. The annual manufacturing survey data uses two kinds of establishment's identifier namely PSID code and NKIP code. This data set uses the PSID codes except for the observation in the year 2002 which uses NKIP and the observation in year 2001 which uses both NKIP dan PSID. Therefore this study constructs a matching table between PSID and NKIP using the year 2001 data and uses it to assign the PSID code in firms' NKIP for observation in year 2002. Many observations were dropped since not all of the observation in 2001 had PSID codes, yet this study saved 85% percent of the observation in particular year.

Average import duties (MFN Tariff) data from World Trade Organization (WTO) is used as a proxy of trade liberalization. These tariff data are available at commodity code (HS code), so the code needs to be converted into 5 digit Indonesian ISIC code (KBLI) using the concordance table released by Indonesian Bureau of Statistics (BPS). The concordance table released by BPS was constructed referring to Central Product Classification (CPC) version 2.1 released by UNSTATS. It correlates the HS12 version to ISIC Rev.4 version or KBLI 2009 in Indonesian version. This study also uses number of firms, foreign ownership status, regional GDP per capita, and GDP growth as the control variable.

EMPIRICAL STRATEGY

Total Factor Productivity Estimation

The analysis in this study is different from Eslava (2013) in estimating production function. In their empirical work, they used demand shock as an instrument for controlling endogeneity issue in estimating production function. Yet data set in this study does not have the information about output price so it cannot follow the procedure. It is widely known when using standard OLS method for estimating production function, it yields biased estimation result. As an alternative, two different kinds of production function estimation are conducted. The fixed-effect method and Levinsohn-Petrin production function estimation are used here. As discussed briefly by Van Beveren (2012), the two methods can be alternatives for getting better coefficient rather than standard OLS method.

Production function is assumed as Cobb Douglas from :

$$Y_{it} = A_{it} K_{it}^{\alpha_k} L_{it}^{\alpha_l} \quad (1)$$

In which Y_{it} is firm's i *value added* at the year t, A_{it} reflects firm's i *Total Factor Productivity* at year t, K_{it} is deflated value of firm's i capital stock at the year t, and L_{it} is labor used in firm's i production activity in year t.

The production function then transformed into log natural so it is able to be estimated using fixed effect. The equation becomes:

$$y_{it} = \alpha_0 + \alpha_e e_{it} + \alpha_l l_{it} + \omega_i + \eta_{it} \quad (2)$$

Unlike standard OLS method, the basic assumption in fixed effect is that of unobserved productivity term constant over time (ω_i). According to Van Beveren (2012) and Ackerberg et al. (2007) this method solves selection bias and endogenous exit problem. However, this method does not solve the simultaneity in input bias. To handle such issues, better approach is available using semi parametric method proposed by Levinsohn and Petrin (2003).

This study also follows Levinsohn and Petrin (2003) production function estimation method to obtain alternatives measurement for TFP. This method is one of many alternatives which is widely used by researchers because of its ability to control for the well-known input simultaneity bias problem in estimating TFP. The unobservable term is controlled using electricity consumption rather than investment as used in Olley&Pakes (1996) estimation procedures. Levinsohn explained why investment proxy might fail in the nature of developing countries data. In developing countries manufacturing data, there are big numbers of 0 (zero) value of investment reported. On the other hand, for some establishment, investment is a more complicated decision rather than as a response of productivity shock. This productivity shock is not always been responded by investment. In data here, it is found that a large number of 0 value investment was reported. According to Levinsohn production function estimation, this study uses electricity consumption as intermediate input to control for an unobservable term which is assumed known by firms but unknown by researchers.

In which Y_{it} is firm's i *value added* at the year t, A_{it} reflects firm's i *Total Factor Productivity* at year t, K_{it} is deflated value of firm's i capital stock at the year t, and L_{it} is labor used in firm's i production activity in year t and by using electricity consumption (e_{it}) as proxy for unobservable term (productivity). The estimation model is transformed into :

$$y_{it} = \alpha_0 + \alpha_k k_{it} + \alpha_l l_{it} + \alpha_\iota e_{it} + \omega_{it} + \eta_{it} \quad (3)$$

In which e_{it} is firm's i electricity consumption in year t. ω_{it} is component of unobserved term known by firms but unkown by researchers that reflects productivity level. In LP estimation, electricity consumption is used as a proxy for unobserved term. The capital measurement used here is deflated value of nett fixed asset. When electricity becomes the proxy for unobserved term, *intermediate input demand function* then could be rewritten as:

$$e_{it} = e_t(\omega_t, k_t) \quad (4)$$

With strong monotonicity assumption, intermediate input demand function could be inverted into :

$$\omega_t = \omega_t(e_{it,}k_{it}) \tag{5}$$

then :

$$\phi_t(e_{it,}, k_{it}) = \alpha_0 + \alpha_k k_{it} + \alpha_\iota e_{it} + \omega_t(e_{it,}k_{it}) \tag{6}$$

And the estimation equation becomes :

$$y_{it} = \alpha_0 + \alpha_l l_{it} + \phi_t(e_{it,}, k_{it}) + \eta_{it} \tag{7}$$

Estimation is conducted using semiparametric method to obtain α_k and α_l which is used in measuring total factor productivity. The total factor productivity value is computed by :

$$TFP_{it} = y_{it} - \hat{\alpha}_k k_{it} - \hat{\alpha}_l l_{it} \tag{8}$$

Estimation is conducted in every 2 digit ISIC code separately. The nominal value of value added and net fixed asset are deflated using Wholesale Price Index (IHPB) for each 2 Digit ISIC category.

The impacts of import tariff liberalization on correlation between firms TFP and output shares

In order to obtain appropriate conclusion about how the trade would induce reshuffling of resources in an industry, Eslava et al. (2013) conducted several steps in her analysis. They evaluated the impacts of tariff reduction on exit probability of less productive plants, incumbent productivity level, and the allocation of activities in the two level analysis (firms level and sectors level). Eslava et al. (2013) argued that increasing exit probability of low productivity plants became one source of improvement in the allocation of activities, but the adjustment from the incumbent and new entrants that were more productive was also very important. Aside from analyzing increasing exit probability of low productivity plants, the analysis in terms of continuing firms' response could explain the same issues. The analysis about resource reallocation should explain how tariff reduction impacts the correlation between firms' output share and their productivity. The estimation model becomes :

$$Output\ Share_{it} = \beta_0 + \beta_1 TFP_{it} + \beta_2 \tau_{jt} + \beta_3 TFP_{it} * \tau_{jt} + \beta_4 DForeign_{it} + \beta_5 Firm_{jt} + \beta_6 CR4_{jt} + \gamma W_t + \varepsilon \tag{9}$$

In which $Output\ Share_{it}$ is firm's i *output share* in its 3 digit KBLI output in year t. TFP_{it} is firm's i *Total Factor Productivity* in year t. τ_{it} is average import tariff imposed on final product in every 5 Digit KBLI. $TFP_{it} * \tau_{it}$ is the interaction term between TFP and tariff. $DForeign$ is dummy variable indicating foreign ownership status. It takes the value 1 if the percentage of foreign ownership > 0, and 0 if otherwise. $Firm$ is the number of firms in every 3 digit KBLI which controls the change in output shares caused by the change in the number of firms. CR4 is concentration ratio based on output shares of four biggest manufacturer in every 3 digit sectors. W is other control variable including regional GDP per capita and GDP growth. This control variable vary annualy as it cannot be disagregated into sectoral variation. For regional GDP per capita, regional variation based on firm locations is applied as every region has different policy. The control variable are used slightly different from Eslava's model.

Estimation methods is using panel analysis. In this model, coefficient of interest is β_3. According to the model, tariff reduction yields different marginal effect value of TFP on output share. The marginal effect becomes :

$$\frac{\partial OutputShare_{it}}{\partial TFP_{it}} = \beta_1 + \beta_3 \tau_{jt} \tag{10}$$

The expected sign of β_1 is positive and β_3 is negative. According to Eslava et al. (2013) the negative value of β_3 shows that lower tariff increases the marginal effect of firms level TFP and output share. If tariff imposed is bigger than 0 ($\tau_{jt} > 0$) and for every increasing value of tariff, it will decrease the marginal effect of TFP on output share. This coefficient is the key to answer two important questions in this study. First, this coefficient answers the question whether firms' heterogeneity (in terms of TFP) is matter. Second, the negative

sign indicates that tariff reduction increases the positive correlation between firms' productivity and their output share. Therefore, it can be concluded that tariff reduction induces resource rellocation in this industry.

This study controls foreign ownership considering theoretical and empirical works have proven that foreign direct investment has a positive effect on firm efficiency. Highly efficient firms tend to have higher market share. It is important to control this foreign ownership status to distinguish the impact of ownership on firms' output share. This study also uses the number of firms in each 3 digit ISIC to control the market structure where each firm operates since the number of firms strongly determine firms' market share. Market concentration ratio is also used to control the changes in market structure as the impact of another policy reforms. Another control variable is regional GDP per capita and GDP growth. Eslava et al (2013) used the GDP growth to control macroeconomics fluctuations. Considering Indonesian large economy territory and the fact that the firms' data used in this study estimation is widely spread in almost all territory, it is important to control the difference in regional economic fluctuations that might come from different policy applied.

Variable Measurement

The main focus of this study analysis is the correlation coefficient between productivity level and firms' market share. It measures the intensity of market selections during the liberalizations periods. The increasing correlation shows that the market selection gets more intensive along with the tariff reductions. Output share is used as the measurement of firms' market share. Output share is measured as the ratio between firms' output and output at 3 digit KBLI in percentage. Total Factor Productivity is log natural value of total factor productivity measured with fixed effect (FE) method and Levinsohn Petrin (LP) method. Tariff data is measured as a percentage of the price (ad valorem tariff). The tariff at 5 digits KLBI is measured with the simple average method. Specific beverage industry such as wine, liquor, and any other fermented alcoholic beverage is excluded since it has extraordinary high tariff, yet it is imposed with a different purpose. The extremely high tariff for this industry is not intended to protect domestic industries, but to reduce the consumption. The foreign ownership dummy takes value 1 if the percentage of foreign ownership is > 1, and 0 if otherwise. The firm variable is the total number of firms in every 3 digit KBLI. CR4 is calculated as the output shares of four largest manufacturers in every 3 digit sector. All nominal variables are deflated using Wholesale Price Index (IHPB) released by BPS.

RESULT & DISCUSSION

Descriptive Statistic

Imperfect information in manufacturing data causes some observation has to be eliminated. The problem may be arisen on missing firms' identity code (PSID) or duplicating firms' identity code within the same year. This problem makes it difficult to declare the data as panel data set. After eliminating such data error, this study obtaines 363.258 number of observation including missing data in any variable.

Table 1 gives an illustration of the change of the mean value of this study variable of interest in different period. The mean value of TFP as productivity measured (Levinsohn and Petrin method) in the 1998-2001 period is the lowest and increased for the later periods. The average tariff imposed on the final product also decreased in the transition from the 1998-2001 period to the 2002-2005 period. However, it increased in the 2006-2009 period before finally decreased in 2010-2013 period. The number of firms in every 3 digit ISIC decreased in the 2002-2005 period and increased in the 2006-2009 period. It decreased significantly in 2010-2013 period after the global financial crisis in 2009. The first period started in 1998 when Indonesia was struck by the detrimental financial crisis. It caused some local private banks be liquidated and disrupted company business cash flow. It also affected productivity growth of manufacturing sectors . Reduction in a number of firms also followed by an increase in concentration ratio.

Table 1 Change in means value of independent variable over period

Variable	1998-2001			2002-2005			2006-2009			2010-2013		
	obs	mean	std. Dev	Obs	mean	std. Dev	obs	mean	std. Dev	obs	mean	std. Dev
Tarif	46114	9,682	5,914	44101	8,628	4,717	61352	9,333	5,254	76724	8,692	4,842
TFP	54556	9,568	1,389	54710	9,905	1,423	61213	9,718	1,351	61521	10,172	1,450
number of firm	83491	2902	3077	78629	2665	2782	106986	3077	3186	93930	1112	821
foreign ownership	83491	6,237	22,249	78629	6,960	23,875	106986	7,029	24,396	93930	8,168	26,239
CR4	82508	25,556	20,308	78620	26,064	20,584	106940	24,192	20,121	93543	31,245	18,025
RGDP per cap	83380	7.678.749	6.664.635	78629	9.132.002	9.702.126	106986	9.596.148	8.633.762	93930	10.900.000	9.063.739
GDPgrowth	83491	-1,056	7,236	78629	5,025	0,439	106986	5,645	0,633	93930	5,994	0,263

Tabel 2 Change in tariff and productivity across sectors.

KBLI2D	**Average Tarif**		**Full Sample**	**Average TFP**		**Full sample**
	1998	**2013**	**Average tariff**	**1998**	**2013**	**Average TFP**
10. Food	4,65	5,36	4,95	9,60	10,20	9,84
11. Beverage	9,38	5,00	9,08	9,60	10,89	10,22
12. Tobaco	11,94	22,38	15,12	8,34	9,63	8,73
13. Textile	12,10	8,63	9,01	9,32	10,27	9,86
14. Garment	17,52	12,57	13,21	9,27	10,36	9,67
15. Leather and Footwear	14,84	14,59	13,26	9,70	10,40	9,99
16. Woods, Rattan, and Bamboo	11,20	4,75	7,45	9,56	9,53	9,58
17.Papers and article of papers	7,58	4,42	4,90	9,42	10,48	9,98
18. Printing and Media reproduction	6,96	4,51	5,10	9,84	10,59	10,43
19. Coal and Petrolium Refinery	4,77	3,36	3,94	11,08	10,85	10,79
20. Chemical Product	6,71	5,03	5,39	10,65	11,30	10,84
21. Pharmacy, Chemical for Medicine and Traditional Medicine	4,15	3,65	3,84	10,62	11,48	11,26
22.Rubber	16,27	9,47	11,51	9,40	10,15	9,77
23.Non metallic quarrying product	7,39	8,87	7,90	9,29	10,19	9,61
24. Metal	7,97	6,54	7,00	9,74	10,68	10,35
25. Metal goods, non machinery	14,38	10,98	11,77	9,92	10,50	10,10
26.Computer, Electronic and Optical	6,97	4,48	4,93	10,73	11,85	11,32
27.Electricity	10,40	7,23	8,03	10,44	11,76	11,08
28.Machinary	2,09	4,51	2,45	10,52	11,61	11,12
29.Vehicle, Trailer dan Semi Trailer	34,43	16,43	18,90	9,52	11,49	10,70
30.Other vehicle	16,87	6,69	8,86	9,03	10,57	9,78
31.Furniture	15,43	10,44	11,21	9,67	10,03	9,73
32.Others	12,75	7,84	9,49	9,48	10,09	9,55

Source: Indonesian Bureau of Statistics (BPS)

The next descriptive analysis is to compare tariff and productivity level among 2 digit industries. Tabel 2 illustrates the change in tariff and productivity level across sectors. According to the table 2, sectors with the lowest tariff tend to have higher level of TFP. The lowest tariff imposed on Machinery sector, with TFP value 11,12 (the third highest TFP). The highest TFP value belongs to computer, electronic and optical sectors with average tariff 4,9% (the third lowest tariff). The pharmacy sector has the second highest TFP and the second lowest tariff imposed. Among the industries with the highest tariff are vehicles, trailers, and semitrailers industries. They have moderate TFP value. The second highest tariff imposed is on tobacco industries and that sector has the lowest value of TFP. According to this descriptive table, it can be seen that lower tariff tends to be imposed on the higher level of productivity firms.

Total Factor Productivity Estimation

As explained by Olley and Pakes (1996), Pavcnik (2002) and Levinsohn and Petrin (2003), estimating TFP with standard OLS method tends to generate upward biased in labor coefficient. The estimation conducted with this study sample has confirmed it. The result indicates that input selection biases matter in production function estimation with the sample. The comparison is presented in the table below :

Tabel 3 Production Function Estimation

Industry	Variable	OLS		FE		LP	
		Coef	SE	Coef	SE	Coef	SE
10. Food	*capital*	0,212	0,002	0,032	0,002	0,047	0,003
	labor	1,067	0,006	0,659	0,009	0,700	0,011
13. Textile	*capital*	0,216	0,004	0,058	0,004	0,063	0,008
	labor	0,990	0,007	0,740	0,013	0,672	0,014
16. Wood	*capital*	0,204	0,004	0,054	0,005	0,059	0,009
	labor	0,992	0,008	0,901	0,015	0,718	0,018
28.Machinary	*capital*	0,160	0,010	0,048	0,010	0,037	0,014
	labor	1,132	0,025	0,922	0,044	0,674	0,052

Source: Indonesian Burau of Statistics (BPS)

According to Olley and Pakes (1996), the higher value of labor coefficient is the result of simultaneity bias in input selection. In their conceptual explanation, unobserved productivity term tends to correlate with variable input usage, particularly labor in the production function. Higher productivity will be followed by higher input demand. By using electricity consumption to control the unobserved term, this study obtaines the lower value of labor coefficient, although the result is not far from the fixed effect method. The fixed effect method also yields a lower coefficient of labor. Two estimations in this study main model are conducted using both measurements of TFP, fixed effect method (FE), and Levinsohn and Petrin (LP) method.

Estimation Result: The impact of trade on reallocation of resources

This study conducts its estimation by using two measurements of TFP (FE and LP method). The Hausman test suggests that fixed effect panel analysis is more appropriate. Both fixed effect and LP measurement of TFP show almost no difference in the main model estimation result. However, using LP method in TFP measurement yields slightly lower standard error value. This study coefficient of interest are the TFP coefficient and the interaction term between TFP and Tariff. The coefficient sign of TFP is positive in both measurement methods. First, the result shows that higher TFP firms have higher output shares. Second, the coefficient of interaction term is significant and negative. Combining those two results confirms the hypotheses. According to Eslava, et al (2013) the negative coefficient value means that tariff reduction will increase the marginal effect of TFP on firms' output share. Higher marginal effect indicates a stronger positive correlation between firms' TFP and its output share. The more productive the firms, the higher their output share. The less productive the firms, the smaller their output share. As in this hypotheses, the increasing positive correlation between firms' TFP and their output share indicates that tariff reduction has market selection effect. It intensifies the selection process in shifting output shares towards more productive firms. Therefore, it can be said that the tariff reductions in Indonesian manufacturing sectors reallocate resources towards higher productivity firms.

The foreign ownership dummy has a significant positive coefficient, confirmed by the fact that foreign-owned firms have higher output share. Numbers of the firms are significant and negative effect indicating that higher number of firms causes lower average firms' output shares. It is used to control the change of output share caused by a change in the number of firms. The CR4 concentration ratio is used to control the market structure. Higher concentration ratio is followed by higher output share. It indicates that higher ratio is equivalent to the smaller number of firms, therefore the average output share will be higher. Regional GDP per capita and GDP growth are used to control macroeconomic fluctuation.

Table 4 Estimation Result

Variable	**Output shares (TFP_FE)**	**Output shares (TFP_LP)**
ln_TFP	0.461***	0.265***
	(0.024)	(0.01)
Tariff	0.055***	0.061***
	(0.014)	(0.009)
*Tariff*ln_TFP*	-0.0067***	-0.0068***
	(0.0014)	(0.0009)
Foreign Ownership	0.312***	0.274***
	(0.042)	(0.042)
Firms	-0.0002***	-0.0002***
	(0.00002)	(0.00002)

Table 4 Cont.

CR 4	0.006***	0.007***
	(0.0003)	(0.0004)
ln_RGDP per capita	-0.297***	-0.425***
	(0.034)	(0.034)
GDP growth	0.004***	0.003**
	(0.001)	(0.001)
R-square	0.0624	0.0624
N	133463	133463

Note: Standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001

Using firms output share in every 3 digit makes it possible for this study to see any resources movement between 4 or even 5 digit ISIC sectors. The movement within every 4 and 5 digits is easier because of the similarity of production process. However, using 3 digit output shares to indicate the movement is acceptable since the technological gap in every 3 digits is not too wide . This study follows the 3 digit disaggregation level as in Eslava's method because it can capture further resource movement outside similar production and business process.

Furthermore, this sample is estimated based on technological intensity classification and resource-based classification. The technology intensity classification refers to UNIDO classification. The resource-based group is constructed based on Lall's industry classification (Lall, 2000). Detail explanation about the classification is presented in the appendix. The estimation result for every group is presented in table 4.

By classifying the sample into different characteristics, variety of result is obtained. The result is consistent with full sample model for resource-based group, low technology group, and medium technology group. However, in medium technology group, different sign of coefficient is obtained. This study does not find significant effect of tariff reduction on the correlation between TFP and output share in the high technology group. This result shows that the change in tariff policy is more effective in the resource-based and low technology group as it drives the market share reallocation towards more productive firms. In the high technology sectors, tariff itself and its interaction do not have significant value. However, productivity level still determines the firms' output share. In high technology industries, almost all policy variable has no significant effect.

Table 5 Estimation based on industrial characteristic

	(Resource Based)	*(Low tech)*	*(Med Tech)*	*(High Tech)*
	OutputShare	*OutputShare*	*OutputShare*	*OutputShare*
lnTFP	0.201***	0.192***	0.168***	0.447***
	(0.00931)	(0.00853)	(0.0201)	(0.0399)
Tariff	0.0933***	0.0770***	-0.022	-0.0835
	(0.00932)	,(0.008)	(0.0172)	(0.0463)
*lnTFP*Tariff*	-0.0103***	-0.00899***	0.00361*	0.00548
	(0.000929)	(0.000803)	(0.00167)	(0.00416)
Foreign Onwership	0.0746	-0.0371	0.172*	0.169
	(0.0526)	(0.0371)	(0.0762)	(0.19)
Firms	-0.000206***	-0.000171***	-0.000231***	-0.00720***
	(0.0000213)	(0.0000144)	(0.0000548)	(0.000658)
CR 4	0.00270***	0.00265***	0.00466***	0.0139***
	(0.000369)	(0.00033)	(0.000625)	(0.00184)
lnRGDP per capita	-0.214***	-0.266***	-0.146*	-0.189
	(0.0359)	(0.0282)	(0.0626)	(0.218)
GDP growth	-0.00147	-0.00019	-0.000549	-0.00054
	(0.00114)	(0.000965)	(0.00194)	(0.00642)
R-square	0.053	0.038	0.068	0.105
N	69188	83292	31401	14670

Note: Standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001

The tariff change does not show much difference between low technology sector and high technology sector. All sectors experience tariff reductions over the observation period. One of Rodrik (1998) conclusion states whether the allocation effects of trade liberalization in developing countries depend on (1) the type of trade barrier (tariff or quota), (2) the nature of oligopolistic interactions, (3) the ease of entry and exit. The different result probably comes from the basic character of the high technology sectors which determines the ease

of entry and exit. One of that character is the very significant role of network externalities in determining the demand for the product in that sector (Krishna, 1988). Network externalities exist when the utility of consuming a product arise while the number of total consumers increases. The bigger the number of consumers, the higher level of utility it makes. Thus, the consumers' expectation about the network externalities strongly determines the demand and output. In the high technology sector, it can be seen from the table that productivity level of the firms and market structure significantly determines the firms' output share. However, change in tariff or any other policy does not have a significant effect. The market characteristic is also segmented in this sector. Again, it can be noted that demand plays important role in determining output in this sectors.

The impact of trade on exit probability of domestic firm

According to Melitz (2003) conceptual framework, every firm has their own threshold point which will determine whether they will continue to operate or leave the market. However, the article explains theoretical background only. Because the reference in operating this threshold concept is very limited, this study follows Eslava's empirical works in considering the existence of this threshold by estimating the probability of firms' exit decision. The threshold level is not calculated, nonetheless the exit status of the firms is used in estimation as this approach is more feasible and reliable rather than approaching the threshold level. The exit decision of the firms is the most reliable measurement which represents that the firms generate profit or have productivity level under the threshold and forced to exit the market.

This study estimates the impacts of tariff reduction on exit probability of low productivity firms following the procedure in Eslava et al. (2013) empirical work. The theoretical prediction says that increase in import competition leads the low productive firms to exit the market, leaving the more productive ones to take the market share and increase aggregate productivity. This study also had already examined the impact of increased competition on the covariance of firms' output share and their productivity for continuing firms. It is interesting to see how the policy change affects the exit decisions of the firms. The empirical strategy follows Eslava et al. (2013) which has the right-hand side component remains the same as in this study main model but different control variable. The main difference is the dependent variable. Exit probability as the dependent variable and pool probit estimation techniques are used.

A dummy variable is added to control the impact of 1998 and 2008 economic recession. Since this study observation is started by the year 199 8, and the condition for exit rule involves the firms' existence in the year 1999 and year 2000, different rules are applied for the dummies. It is tricky to apply the dummy for the year when the crisis hit Indonesian economy in the middle of the year 1998. If standard dummy rule is applied which takes value 1 in the year when the crisis first attacked, it will take value 1 for all observation in the year 1998 since observation of this study is started by the year 1998. However, all those observations in that year are the firms which survived the 1998 crisis, so the dummy will be a bad predictor for 1998 exit because the observation starts to identify the firms that exited in 1999 and 2000, not the firms that exited in 1998. So this study applies a different rule for the dummies. The dummy takes value 1 for the observation in the year 1999, 2000, 2008, and 2009. The dummy crisis is applied for one and two years after the crisis hit the country to consider the long term crisis effect.

This study also applies different rules to the valuation of exit variable. In Eslava's procedure, the exit variable takes value 1 if the firms exit between period t and t+1. However, such simple rule can not just simply taken because the survey for Indonesian manufacturing sectors is voluntary. As explained before, the data set does not provide any information about the operation status of the firms. The inexistence of any firms' data can be explained by two possibilities: they are shut down or temporary stop operating, or the firms do not respond to the survey. Considering the data nature, value 1 is taken for the exit if the firm's data exists in period t and does not exist in period t+1 and t+2. When the firm's data exists in period t and does not exist in period t+1 but reappears in period t+2, it is considered the firm as continuing firm.

This study follows Eslava procedure in using lagged TFP value for productivity measurement. The reason for applying the procedure is the knowledge limitation whether firms do actually stop operating at the end of period t or t+1. If the firms exit at the end of period t then there is a possibility of measurement error in estimating TFP. It also handles the empirical issue of reverse causality when firms' exit decisions correlated with the TFP and vice versa.

Table 6 reports the coefficient of estimation result using pool probit estimation technique. As it is known, the nonlinear estimation technique analysis is different from the linear regression analysis. The coefficient value cannot be interpreted as the magnitude of the effect as in linear regression model. However, it can be relied on

its significance of p-value and the sign of the coefficient. The estimation result indicates that tariff, lagged TFP, and its interactions are statistically significant. The negative value of Tariff coefficient indicates that reduction in tariff increases the probability of firms exit. The negative value of lagged TFP also indicates the inverse correlation between a firms' lagged TFP level with the probability of exit. To interpret the interaction term, the marginal effect is calculated at means values separately. For illustration, the marginal effect of lagged TFP is calculated when the tariff is at 10% and 5%. The calculation yields marginal effect of lagged TFP -0,01687 at tariff level 10%, and -0,0208 at tariff level 5%. The point calculation of marginal effect shows that every 5 points reduction of the tariff will increase the marginal effect of lagged TFP by 0.0039. By using marginal effect contrasting method in STATA the same result is obtained. The coefficient of interaction term has a positive coefficient. It indicates that every reduction in tariff will increase the marginal effect of lagged TFP on exit probability. While lagged TFP itself inversely correlated with the exit probability, the tariff reduction increases its sensitivity. Again, an evidence is found that tariff reduction intensifies market selection process. This result supports the main model analysis. It explains another possible mechanism about efficiency gain from trade.

Table 6 Determinant of firm's exit probability

exit	***Coef.***
laggedTFP	-0.1357***
	(0.0081)
Tarif	-0.0418***
	(0.0077)
*Tarif*laggedTFP*	0.0034***
	(0.00079)
DForeign	-0.0334
	(0.0212)
firm	0.0000235**
	(0.000008)
Dcrisis	0.41146***
	(0.01113)
N	104847
Prob > chi2	0.0000
Pseudo R2	0.0362

Note: Standard errors in parentheses p<0.05, ** p<0.01, *** p<0.001*

CONCLUSION

These empirical works support theoretical prediction about gain from trade, particularly from efficiency improvement through resource reallocation. It also increases the number of empirical evidence in developing economics nature. One characteristic of developing economies is the high rate of any domestic firms protection. Before joining World Trade Organizations (WTO), Indonesia imposed a high rate of import tariff to protect the domestic firms. Since joining the WTO, the import tariff gradually declines except for certain sectors still remains high for some reason. The decision to join WTO, and later to join more regional free trade area also has improved the accessibility for Indonesian firms to export market, proven by increasing numbers of export value. The policy seems to work as expected.

This research gives another point of view as the benefit from trade comes with some consequences. It is found that increasing competition caused by import tariff reduction will increase aggregate productivity by increasing the efficiency of input usage since it will shrink and even eliminate the least efficient firms. By using pool probit estimation in this research, it is confirmed that the tariff reduction increases the exit probability of low productivity firms. Analysis for continuing firm also concludes that tariff reduction increase covariance between firms' output share and their productivity level. Both analyses support the resource reallocation hypotheses. However, this process should receive more attention since there is possibility of worker displacement caused by the firms' closure (Eslava et al., 2013). The proper policy should be implemented. High level of protection has proven to have a negative effect due to its disincentive effect for firms to innovate, so trade liberalization should not be restrained. Nonetheless, some discretion may be needed to minimize the cost arising from the market selection process.

Different result is obtained when classifying the sample into four different industrial characteristics. The sample is classified into resource-based, low technology, medium technology, and high technology industries. The result is robust for resource-based industries and low technology industries. In medium technology, significant effect is discovered but on a different sign of coefficient. In high technology industries, any

significant effect from tariff itself and its interaction is not found. It seems like the policy is more effective in resource-based and low technology industries as it drives the output share towards more productive firms.

There are many limitation in this empirical strategy. This research only uses tariff data at 5 digit KBLI. Recent literature shows that it is possible to construct the tariff data at the firm level. This analysis is limited at this level yet still get the consistent estimation result as in Eslava's work. This research also proves the existence of heterogeneous response on import tariff liberalization in terms of TFP. But this research has not given any explanation about the friction on labor market caused by the firms' closure. Such study is interesting to be considered in the next trade liberalization analysis.

Some enhancement should be taken account especially in controlling other structural reforms. Trade reform is usually followed by another structural reform so it is important to distinguish the impact of each policy. A limited number of the study about market share reallocation and the unavailability of some data in Indonesia has restrained the work of this research in enhancing the model. The other potential structural reform measurement is FDI restrictiveness index. The Indonesian FDI restrictiveness index is available at OECD website. However, the time range is very limited and it does not cover the sample range. Another potential measurement is private sector participation in an infrastructure project. The data is also available for Indonesia but only for a small number of years so it is not used in this estimation. better specification shall yield a better result and hopefully better policy implication.

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APPENDIX

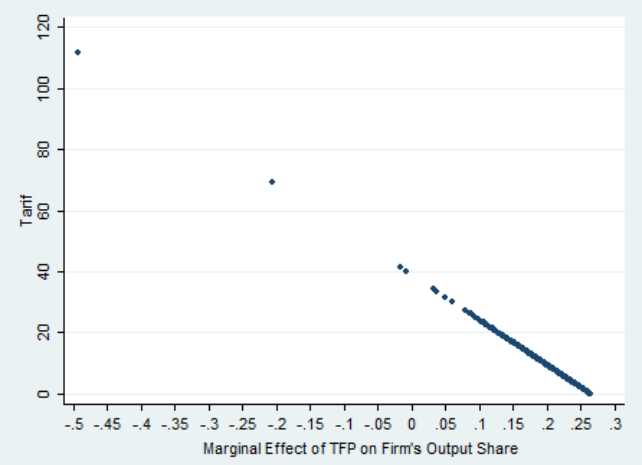
Table 7 Industrial Classification

Industry	Classification
10. Food	Low Technology
11. Beverage	Low Technology
12. Tobacco	Low Technology
13. Textile	Low Technology
14. Garment	Low Technology
15. Leather and Footwear	Low Technology
16. Woods, Rattan, and Bamboo	Low Technology
17.Papers and article of papers	Low Technology
18. Printing and Media reproduction	Low Technology
19. Coal and Petrolium Refinery	Medium Technology
20. Chemical Product	High Technology
21. Pharmacy, Chemical for Medicine and Traditional Medicine	High Technology
22.Rubber	Medium Technology
23.Nonmetallic quarrying product	Medium Technology
24. Metal	Medium Technology
25. Metal goods, nonmachinery	Medium Technology
26.Computer, Electronic, and Optical	High Technology
27.Electricity	High Technology
28.Machinery	High Technology
29.Vehicle, Trailer dan Semi Trailer	High Technology
30.Other vehicle	High Technology
31.Furniture	Low Technology

Table 8 *Resource Based industry*

Resource-Based Industry		
10. Food	16. Woods, Rattan, and Bamboo	22.Rubber
11. Beverage	17.Papers and article of papers	23.Nonmetallic quarrying product
12. Tobacco	19. Coal and Petroleum Refinery	

Marginal Effect of Total Factor Productivity on Firms' Output Share for different level of Tariff



The plot shows the marginal effect of firms' Total Factor Productivity on firms' output share is moderated by import tariff. The picture supports this research main hypotheses whether the marginal effect of firms' TFP on output share is increasing for every reduction on import tariff. It also confirms the non-linearity relationship between firms' TFP and output share.

Main model estimation result using fixed-effect method for TFP estimation :

```
Fixed-effects (within) regression               Number of obs      =    133463
Group variable: PSID                            Number of groups   =     29720

R-sq:  within  = 0.0120                         Obs per group: min =         1
       between = 0.0756                                        avg =       4.5
       overall = 0.0624                                        max =        16

------------------------------------------------------------------------------
     OutputShare |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----------------+------------------------------------------------------------
        TFPFEkap |   .4613651   .0241711    19.09   0.000     .4139902    .5087401
           Tarif |   .0558999   .0144368     3.87   0.000      .027604    .0841958
  c.TFPFE#c.Tarif |  -.0067632   .0014828    -4.56   0.000    -.0096694   -.0038569
        DForeign |    .312202   .0428242     7.29   0.000      .228267    .3961369
            firm |  -.0002276   .0000202   -11.28   0.000    -.0002671    -.000188
             CR4 |   .0066246   .0003773    17.56   0.000      .005885    .0073642
    lnRDGPpercap |  -.2972644   .0349308    -8.51   0.000    -.3657283   -.2288005
       GDPgrowth |    .004268    .001188     3.59   0.000     .0019394    .0065965
           _cons |   .5798992   .5820122     1.00   0.319     -.560837    1.720635
-----------------+------------------------------------------------------------
```

Main model estimation Result using Levinsohn and Petrin method for TFP estimation :

```
Fixed-effects (within) regression               Number of obs      =    133463
Group variable: PSID                            Number of groups   =     29720

R-sq:  within  = 0.0204                         Obs per group: min =         1
       between = 0.0687                                        avg =       4.5
       overall = 0.0603                                        max =        16

------------------------------------------------------------------------------
      OutputShare |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------------+-----------------------------------------------------------------
      lnTFPlevpet |   .2654029   .0100358    26.45   0.000     .2457328     .285073
            Tarif |   .0612775   .0095064     6.45   0.000     .0426451    .0799099
 C.lnTFPLP#c.Tarif|  -.0068704   .0009256    -7.42   0.000    -.0086845   -.0050562
         DForeign |   .2740771   .0426546     6.43   0.000     .1904747    .3576795
             firm |  -.0002222   .0000201   -11.08   0.000    -.0002615   -.0001829
              CR4 |   .0072425   .0003755    19.29   0.000     .0065065    .0079784
     lnRGDPpercap |  -.4254373   .0349536   -12.17   0.000    -.4939459   -.3569286
        GDPgrowth |   .0036806   .0011831     3.11   0.002     .0013619    .0059994
            _cons |   4.378267    .547815     7.99   0.000     3.304557    5.451978
------------------+-----------------------------------------------------------------
```