Trade Liberalization, Heterogeneous Firms, and Lobbying Power: Evidence from Vietnam's Accession to the WTO

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Abstract

A common assumption in international economics and international political economy (IPE) is that interest groups are able to influence trade policies in democratic regimes, whereas authoritarian leaders are fairly insulated from lobbying pressure. This assumption, however, is at odds with an emerging political science literature on authoritarian institutions and economic outcomes. This paper explores the possibility of lobbying in authoritarian regimes by studying trade liberalization in Vietnam, a single-party regime, after its accession to the World Trade Organization (WTO) in 2007. Using firm-level data, we show that the size of private firms has a positive effect on tariff reduction pre- and post-accession and a negative effect on the time periods allowed to phase out tariffs. These findings confirm the predictions of the Melitz (2003) model regarding firm preferences in international trade negotiations. The opposite is true for state-owned firms, however, whose size leads to small tariff reductions and slow trade liberalization. The findings demonstrate that previous IPE work has overlooked the importance of lobbying groups in authoritarian countries.

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1 Introduction

The "New, New Trade Theory (NNTT)" invigorated the study of political economy, because it returned the attention of researchers to firm-level decisions and activities (Melitz 2003, Antras and Helpman 2003, Aghion et al. 2007). The Melitz (2003) insight that firms differ in their capabilities, and only the best firms are capable of export, provided the literature on international trade negotiations with a clear set of expectations for trade policy outcomes. Specifically, only firms successful in their home markets would be capable of competing on international markets. These firms, with clear-eyed visions of their potential success abroad, developed after years of competition and growth in their home-markets, would be the most likely to petition for tariff reductions when it comes to accession to international trading arrangements like the World Trade Organization (WTO).

Reciprocity plays a critical role in this argument - highly competitive firms are willing to concede to tariff reductions in their home market in the hopes that they will be granted access to more lucrative markets abroad. The Most Favored Nation (MFN) status of the WTO is a particular enticing target. Pelc (2011) demonstrates convincingly that the exporting industries of member states will be more likely to mobilize and overcome opposition in granting MFN access to new members when there are large market opportunities available in accession states. Similarly, import-competing industries (those without opportunities abroad) in accession states will mobilize to limit their international exposure by minimizing the de facto depth of tariff cuts in their product lines. In short, how a particular industry expects to fare in international competition motivates its lobbying behavior. Firms expecting success in international markets will lobby for reductions in order to access international markets. Less competitive firms will lobby for protection from their home market.

The focus on lobbying in modeling trade bargaining has led many IPE theorists

to ring-fence their predictions to democratic regimes, where the relationship between lobbying and policy outcomes is most clearly understood. A common assumption is that democracies are more susceptible to interest group pressure in the construction of trade policies than nondemocracies, which are less reliant on the support of industrial lobbies (Pelc 2011, Mansfield et al. 2002, Milner 1997, and Destler and Odell 1987). Because authoritarian leaders can make decisions independent of the underlying competitiveness of particular industries, the argument goes, there is little reason to expect that the NNTT expectations will apply in these settings.

A recent revolution in the literature on comparative authoritarian institutions, however, has led to three important findings that reveal it is time to relax the assumptions regarding authoritarian behavior. First, there is a compelling literature demonstrating that business actors do indeed mobilize and lobby to influence economic policies in authoritarian regimes (Kennedy 2005, Malesky 2008, Dixon 2008). At the extreme, business actors may insert themselves into policy discussions directly by running for office (Gehlbach et al. 2010, Unger and Chan 2005), and benefit economically from those arrangements (Truex 2012).

Secondly, authoritarian regimes have been motivated to create or empower institutions (i.e. parliaments, elections) that allow for limited policy-making ability and discussions with top leaders (Przeworski and Gandhi 2006, Gandhi 2009), negotiations between majority shareholders and minority investors (Jensen et al. 2013), and the threat of collective action if elite power-sharing arrangements are infringed (Wright 2008, Gehlbach and Keefer 2011, 2012, Svolik 2012). Variance in these institutional arrangements has been shown to be associated with property rights protections (Gehlbach and Keefer 2011), better corporate governance and contracting institutions (Jensen et al. 2013), increased domestic investment (Wright 2008), and ultimately economic growth (Gandhi 2009, Wright 2008).

Third, work on authoritarian regimes has demonstrated that leaders can rely

heavily on particular economic sectors to stay in power and therefore are quite responsive to their needs. This was most convincingly demonstrated by Pepinsky (2009), who showed how the Suharto and Mahatir regimes in Indonesia and Malaysia respectively were kept in office by different underlying coalitions of economic actors. In the wake of the Asian Financial Crisis, Suharto found it challenging to design a set of policies that unified the interests of holders of fixed and mobile capital. His economic policies swung back and forth and ultimately he lost the support of the mobile capital holders and fell from office. Mahatir by contrast was under-girded by a more unified coalition of fixed capital holders, allowing him to design a consistent policy, and therefore retain his leadership.

The bottom line is that business actors are active in asserting their economic interests in authoritarian regimes, they have institutions that facilitate their lobbying activities, and their support matters for regime survival. While we may not expect the same level of responsiveness to lobbying in an authoritarian settings (Mansfield et al. 2002), the literature is very clear that it happens, so it is worth asking whether the predictions of NNTT can travel to nondemocratic settings.

This is the challenge that we set for ourselves in this paper. Taking advantage of an enterprise census prior to Vietnam's 2007 accession to the WTO, we test the arguments that the most successful industries prior to international exposure will receive the greatest corresponding reductions in tariff protections and shortest phase-in periods for WTO commitments. Because Vietnam is a single-party, authoritarian regime it provides a useful opportunity to observe whether the predictions about reciprocity and lobby hold in an authoritarian setting.

Anticipating our results, we find compelling evidence that the NNTT predictions hold. Indeed, Vietnam's largest and most productive firms do indeed face the greatest reductions in domestic tariffs and the shortest phase-in periods Nevertheless, there is an important exception. The results are completely reversed for the

uncompetitive, state owned sector. Industries dominated by State Owned Enterprises (SOEs), which we explain operate as independent, but influential actors in Vietnam, receive the smallest reductions and longest transitions periods. Indeed, the NNTT predictions are entirely reversed for SOEs. Consequently, we conclude that although lobbying does take place in authoritarian regimes, the limited number of institutional constraints on authoritarian actors, are more likely to lead to capture (Hellman 2006), leading to bias in favor of particular sectors or ownership types.

The results of this bias are demonstrated in Figure Figure 1, which plots the share of investment accounted for by SOEs (triangles), domestic, private firms (circles), and foreign investors (squares). Bubble size represents billions of US dollars, denominated in constant 1994 dollars to address inflation. The first dashed lines denote the creation of the Vietnamese Enterprise Law in 2000, which created the formal legal basis for the private, corporate sector in Vietnam and eased registration into all non-restricted activities. The second dashed line records Vietnam's entry into the WTO in 2007. Notice how the share of private, sector investment increased between the Enterprise Law and WTO entry, while SOE investment declined. In 2007, however, private firms were exposed to international competition, while SOEs were allowed to operate in protected sectors. The results are striking – the advances of the private sector over the course of the reform period were immediately reversed. SOEs once again began to dominate the post-accession economic landscape. The idea that WTO accession reversed the advance of market reforms in a developing country is startling at odds with the an important finding that states join international organizations to lock in reforms and signal intent (Mansfield et al. 2002, Korememos et al. 2001, Davis and Wilf 2011). In this paper, we suggest that authoritarian bargaining and the role of connected actors provides a critical clue to resolving this important puzzle. Our findings align us with Subramanian and Wei (2007) that WTO entry can have uneven effects on a country's economy. Which products are covered by WTO accession and which actors benefit from the negotiations can play a pivotal role in its ultimate impact.

Figure 1 about here

The paper proceeds as follows. First, we provide a formal model, which adapts the Melitz (2003) model to the authoritarian country framework and specifically allows for the presence of non-competitive SOEs with privileged access to elite decision-makers. This framework can be easily generalized to other authoritarian settings by simply replacing the term SOE with "connected business interests" or "oligarchs." In the second section, we take the predictions of the formal model to our unique firm-level data on pre-accession competitiveness and subsequent tariff reductions in an authoritarian environment. Finally, we explore extensions of our theory into unilateral tariff reductions, value-added production, and industrial concentration.

2 Theory

Our theory has two building blocs, which are formalized using an extension of the Melitz (2003) model. First, when trade liberalization commences, market shares are reallocated from the exiting set of firms to the most productive ones. Consequently, large highly productive firms increase their market size, whereas the small least productive firms see their market shares and profits shrink and, eventually, they exit. As such, entering into the WTO and benefiting from the MFN system is only appealing for the large productive firms, which believe that can profit from trade opportunities. In addition, willingness to reciprocate with the acceptance of tariff reductions is also unequally distributed. If joining the WTO, requires a country like Vietnam to cut tariffs in a number of products, for instance, only large firms will be willing to accept the costs of greater foreign competition in order to access the WTO and reap the benefits from reciprocal trade liberalization.

Second, in our model state-owned enterprises (henceforth SOEs) face lower competition than private firms. In particular, restricted entry in the public sector implies

that the number of firms competing in each product line is lower than in the private sector. Because of restricted entry and low competition, SOEs are able to survive in the market, although their productivity is lower than the private sector productivity. Because their productivity is low, their export propensity is limited. Thus, SOEs do not reap any significant benefits from trade liberalization. In turn, SOEs oppose trade liberalization and they are not willing to make any concession to enter the WTO. The following section describes the model, highlighting these two insights about the demand side of lobbying.

2.1 Model

We introduce SOEs in an oligopolistic economy with heterogeneous firms. The model is similar to Impullitti and Licandro (2010). The distinguishing characteristic of the model is the restricted entry in the public sector in which SOEs operate. That is the original element of the model compare to Melitz (2003).

2.1.1 Economic environment

The economy is populated by a continuum of identical consumers of measure one. Preferences of the representative consumer are

$$U = \ln X + \beta \ln O \tag{1}$$

There are two types of sectors: an homogeneous good sector O, taken as the numeraire, and a differentiated good X. Consumers are endowed with a unit flow of labor, which can be transformed one-to-one into the homogeneous good. This implies that equilibrium wages are equal to one. The amount L of the labor endowment is allocated to homogeneous good production, which enters utility with weight $\beta > 0$. Without loss of generality we set $L = 1$.

The differentiated good sector X is an aggregate of a set of goods produced by

private firms and a set produced by public firms

$$X = G^{\gamma} Y^{1-\gamma} \tag{2}$$

where the public good comes in a continuum of varieties

$$G = \left(\int_0^{M_g} g_j^{\alpha} \, \mathrm{d}j \right)^{\frac{1}{\alpha}} \tag{3}$$

of varieties of mass $M_g \in [0,1]$, where g_j represents variety j, and $1/(1-\alpha)$ is the elasticity of substitution across varieties, with $\alpha \in (0,1)$. Similarly, the private sectors produces a continuum of varieties

$$Y = \left(\int_0^{M_y} y_j^{\alpha} \, \mathrm{d}j \right)^{\frac{1}{\alpha}}, \tag{4}$$

Each variety in G and Y is produced by n_g and n_y identical firms respectively, using labor to cover a fixed production cost $\lambda > 0$ and variable cost.[2]

Assumption 1 *Restricted entry in the public good sector implies that the number of firm competing in each product line is lower than in the private sector:* $n_g < n_y$.

There are four factors that explain why entry is restricted in sector in which SOEs operate. First, certain sectors face formal restrictions due to purported national security reasons. These sectors, known as "Group A" projects, require special approval from the Prime Minister's Office to receive an investment entry license. While provinces can register any investment up to a specified amount locally, Group A projects still require central approval and a Prime Ministerial signature (Malesky

[2]Perfect substitution is implicitly assumed among the n goods belonging to a particular variety. In a more general framework, the degree of substitution across these n goods may be finite even if it must be larger than the degree of substitution across varieties. Introducing another degree of imperfect substitutability across goods would complicate notation without adding any key insights.

et al. 2012). Secondly, previous studies have found that for land use right certificates, private firms face a processing times that is two hundred times greater that the one faced by SOEs (Tenev et al., 2003). "As a result, many private firms have to lease land unofficially from SOEs at inflated prices" (Pincus et al., 2012: 10). Third, work has found that access to credit is large when firms have close connections to the party and government (Malesky and Taussig, 2008). Fourth, market access is easier for SOEs than for private firms (Nguyen and Freeman 2009). "Government agencies and state-owned enterprises prefer to do business with SOEs, which forces private firms to sub-contract to SOEs rather than sell directly" (Pincus et al., 2012: 10).

We also assume that firms are heterogeneous in productivity across product lines in both the public and private sector. In both sectors, a firm with productivity $\tilde{z}$ has the following production technology

$$\tilde{z}^{-1}q + \lambda = l, \tag{5}$$

where y represent inputs and q production (we omit index j and identify the variety with its productivity). Variable costs are assumed to be decreasing in the firm's state of technology $\tilde{z}$.

Irrespective of their productivity, varieties exit the market at rate $\delta > 0$, due to an exogenous death shock, which strikes all firms irrespective of their productivity. Exiting firms are replaced by new firms in order for the mass of operative varieties to remain constant.

2.2 Households

The representative household maximizes utility subject to its budget constraint. The consumer problem can be separated into three problems: 1) The choice between $X$and O, the choice between G and Y, and the allocation of expenditures within

G and Y. Standard utility maximization problems lead to the following equilibrium demand choice

$$
\begin{aligned}
O &= \beta E, && (6)\\
G &= \gamma E/P_g && (7)\\
Y &= (1-\gamma)E/P_y && (8)\\
p_{g,j} &= \frac{\gamma E}{G^{\alpha}}\, g_j^{\alpha-1}, && (9)\\
p_{y,j} &= \frac{(1-\gamma)E}{Y^{\alpha}}\, y_j^{\alpha-1}, && (10)
\end{aligned}
$$

where r is the interest rate and $p_{i,j}$ is the price of good j in sector i, P_i is the price index of sector i, $E = P_g G + P_y Y$ is total expenditure on the differentiated goods sector X.

Because of log preferences, total spending in the homogeneous good is β times total spending in the differentiated good, this is shown in the first condition. The second and third simply show the Cobb-Douglas demand for the public and private aggregate of differentiated goods. The final two conditions show the inverse demand for each differentiated good in the two sectors.

2.2.1 Production

Firms producing the same variety behave non-cooperatively and maximize their net cash flow. A firm public firm producing a particular variety solves

$$
V = \max_{q_g} \sum_{t=0}^{\infty} (1-\delta_g)^t \underbrace{\left[\left(p_g - \frac{1}{\tilde{z}}\right) q_g - \lambda\right]}_{\pi_t} \qquad st. \qquad (11)
$$

$$\begin{aligned} p_g &= \frac{\gamma E}{G^\alpha}\, g^{\alpha-1} \\ g &= \hat{g} + q_g \end{aligned}$$

In a Cournot game a firm takes as given its competitors' production $\hat{g}$, as well as the path of the aggregates E and G, and the exogenous exit rate δ_g. Working out the order condition for this problem and then imposing symmetry between the n oligpolistic firms ($g = nq_g$) we obtain the equilibrium pricing equation

$$\tilde{z}^{-1} = \theta_g \underbrace{\frac{\gamma E}{G^\alpha} g^{\alpha-1}}_{p}. \tag{12}$$

From (12), firms charge a markup over marginal costs, with $\theta_g \equiv (n_g - 1 + \alpha)/n_g$, being the inverse of the markup. This is the well known result in Cournot-type equilibria that the markup depends on the perceived demand elasticity, which is a function of both the demand elasticity and the number of competitors. Similarly the optimal pricing of private firms yields

$$\tilde{z}^{-1} = \theta_y \underbrace{\frac{(1-\gamma)E}{Y^\alpha} y^{\alpha-1}}_{p} \tag{13}$$

with $\theta_y \equiv (n_y - 1 + \alpha)/n_y$. Assumption 1 implies that, due to entry restrictions, the markup in the public sector is higher than in the private sector, $\theta_y > \theta_g$.

Firms producing the same variety are assumed to face the same initial conditions, resulting in a symmetric equilibrium with $x = nq$. As shown in the Appendix, substituting (12) into (3) we obtain the demand for variable inputs

$$\tilde{z}^{-1} q_g = \theta_g \frac{\gamma E}{n_g M_g} \frac{z}{\bar{z}_g} \tag{14}$$

where we use the following normalization $z = \tilde{z}^{\frac{\alpha}{1-\alpha}}$, and

$$\bar{z}_g \equiv \frac{1}{M_g} \int_0^{M_g} z_j \mathrm{d}j$$

is average productivity. Similarly, the demand for variable input (labor) from private firms reads

$$\tilde{z}^{-1} q_y = \theta_y \frac{(1-\gamma)E}{n_y M_y} \frac{z}{\bar{z}_y} \tag{15}$$

Notice that the amount of resources allocated to a firm in (15) is the product of average expenditures per firm, the inverse of the markup and the relative productivity of the variety the firm produces. When the environment becomes more competitive, θ increases, prices lower, produced quantities increase and firms demand more inputs.

2.2.2 Exit

From the previous section, it can be easily shown that the profit is a linear function of the relative productivity $z/\bar{z}$

$$\pi_g(z) = \left(p_g - \frac{1}{\tilde{z}} \right) q_g - \lambda = (1 - \theta_g) \frac{\gamma E}{n_g M_g} \frac{z}{\bar{z}_g} - \lambda. \tag{16}$$

Produced quantities depend on the distance from average productivity $z/\bar{z}$. Since by definition $\theta_g < 1$ (because the markup must be greater than one) profits are increasing in productivity z. Let us denote by z_g^* the cutoff productivity below which profits are negative and public firms exit the market. This cutoff productivity makes firm's profits and firm's value equal to zero, implying

$$\gamma E = \frac{\frac{\lambda}{z_g^*/\bar{z}_g}}{1 - \theta_g} n_g M_g. \tag{17}$$

We refer to it as the exit condition, a negative relation between e and z^*. Similarly for private firms we obtain

$$(1-\gamma)E = \frac{\frac{\lambda}{z_y^*/\bar{z}_y}}{1-\theta_y} n_y M_y. \tag{18}$$

Next, we assume that there is a mass of unit measure of potential varieties of which $M_g \in [0,1]$ are operative in the public sector. Similarly, there is a mass of unit measure of potential varieties of which $M_y \in [0,1]$ are operative in the private sector.

We also assume that at each period non operative varieties in both sectors enter by drawing a productivity z from an initial productivity distribution $\Gamma(z)$, which is assumed to be continuous in $(z_{\min}, \infty)$, with $0 \leq z_{\min} < \infty$. In the benchmark version of the model, we assume that new product enter at zero costs in both sectors, while there is no entry within each product line, implying that the number of oligopolistic firms competing in each product line n_g and n_y is exogenous.

Let us denote by $\mu(z)$ the stationary equilibrium density distribution defined on the z domain. The endogenous exit process related to the cutoff point z^* implies $\mu(z) = 0$ for all $z < z^*$. Since the exogenous exit rate δ is equal for all firms, surviving firms remain always at their initial position in the distribution Γ. Consequently, the stationary equilibrium distribution is $\mu_g(z) = f(z)/(1-\Gamma(z_g^*))$, for $z \geq z_g^*$, and $\mu_y(z) = f(z)/(1-\Gamma(z_y^*))$, for $z \geq z_y^*$, where f is the density associated to the entry distribution Γ.

We can now write $\bar{z}$ as a function of z^*

$$\bar{z}_i(z^*) = \frac{1}{1-\Gamma(z_i^*)} \int_{z_i^*}^{\infty} z f(z)\, \mathrm{d}z = \int_{z_i^*}^{\infty} z \mu_i(z)\, \mathrm{d}z. \tag{19}$$

with $i = g, y$.

Since varieties exit at the rate δ_g in the public sector, stationarity requires

$$(1 - M_g)\left(1 - \Gamma(z_g^*)\right) = \delta_g M_g. \tag{20}$$

This condition states that the exit flow, $\delta_g M_g$, equals the entry flow defined by the number of entrants, $1 - M$, times the probability of surviving, $1 - \Gamma(z^*)$. Consequently, the mass of operative varieties is a function of the productivity cutoff z^*,

$$M_g = \frac{1 - \Gamma(z_g^*)}{1 + \delta_g - \Gamma(z_g^*)}. \tag{OV}$$

It is easy to see that M is decreasing in z^*, going from $1/(1+\delta_g)$ to zero. Similarly we obtain

$$M_y = \frac{1 - \Gamma(z_y^*)}{1 + \delta_y - \Gamma(z_y^*)}.$$

Note that we could also explore a setup without horizontal entry and exit in the public sector, it would simplify matters and probably be closer to reality, the current model though is more general and you can obtain the no exit case setting $\delta_g = 0$.

2.2.3 Stationary Equilibrium

The labor market clearing condition can be written as

$$n_g \int_{0j}^{M_g} l_{g,j}\mathrm{d}j + n_y \int_0^{M_y} l_{y,j}\mathrm{d}j + O = n_g \int_0^{M_g} \left(\tilde{z}_j^{-1} q_{g,j} + \lambda\right) + n_y \int_0^{M_y} \left(\tilde{z}_j^{-1} q_{y,j} + \lambda\right)\ \mathrm{d}j + \beta E = 1,$$

recall that labor endowment is one. The total endowment of the homogeneous good is allocated to production of the composite goods, private and public, and to production of the homogeneous good. The first equality is obtained by substituting labor l from (5) and O from the equilibrium demand (6). Let us change the integration domain from sectors $j \in [0, 1]$ to productivities $z \in [z^*, \infty]$ and use (14) and (15) to rewrite the market clearing condition as

$$n_g \int_{z_g^*}^{\infty} \left(\theta_g \frac{\gamma E}{n_g M_g} \frac{z}{\bar{z}_g} + \lambda \right) \mu_g(z) dz + n_y \int_{z_y^*}^{\infty} \left(\theta_y \frac{(1-\gamma)E}{n_y M_y} \frac{z}{\bar{z}_y} + \lambda \right) \mu_y(z) dz + \beta E = 1.$$

Since $\int_{z^*}^{\infty} \mu(z)\, \mathrm{d}z = \int_{z^*}^{\infty} z/\bar{z}\, \mu(z)\, dz = 1$, after integrating over all sectors we obtain

$$E = \frac{1 - \lambda \left(n_g M_g(z_g^*) + n_y M_y(z_y^*) \right)}{[\gamma\theta_g + (1-\gamma)\theta_y] + \beta}, \tag{21}$$

a positive relationship between E and the cutoffs z_g^* and z_y^*, since the mass of active product lines is decreasing in the cutoffs in both sectors.

Assumption 2 *The productivity distribution (z) is such that $z^*/\bar{z}(z^*)$ is increasing in z^*, and the following parameter restrictions hold*

$$\frac{\lambda \bar{z}_{y|z_{\min}}}{z_{\min}} > \frac{1-\theta_y}{[\gamma\theta_g + (1-\gamma)\theta_y] + \beta} \left[1 - \lambda \left(\frac{n_g}{\delta_g} + \frac{n_y}{\delta_y} \right) \right]$$

Proposition 2.1 *The two cutoff conditions (17) and (18), together with the market clearing condition (21) uniquely determine the equilibrium cutoffs z_g^* and z_y^* and the total expenditure in differentiated goods E.*

Proof Using (14) into (15) we obtain

$$\frac{M_g(z_g^*)\bar{z}_g}{z_g^*} = \frac{(1-\gamma)n_y}{\gamma n_g} \frac{1-\theta_g}{1-\theta_y} \frac{M_y(z_y^*)\bar{z}_y}{z_y^*} \tag{22}$$

since the right hand side is increasing in z_g^* and the left hand side is increasing in z_y^* this equilibrium condition shows a positive relationship between the two cutoffs, which in implicit form can be written as $z_g^* = z_g^*(z_y^*)$. Plugging this into the (21) we obtain a positive relationship between E and z_y^*. If assumption 2 holds, this condition, together with the equilibrium cutoff (18) pin down E and z_y^*, as shown in Figure 1 below. Intuitively, if $z^*/\bar{z}(z^*)$ is increasing in z^* then (EC) is decreasing in the space (z^*, E). This is true for many common distributions: lognormal, exponential, Weibul, truncation on $(0, +\infty)$ of normal logistic, extreme values, or Laplace.

Pareto is a special case (EC) is horizontal. The parameter restriction implies that (EC) cuts (MC) from above.

Figure 2 about here

Next, we provide a first glance at the effects of trade openness by analyzing the effects of an exogenous increase in product market competition in both sectors, a reduction in the markup rate $1/\theta_g$ and $1/\theta_y$which, as $\theta \equiv (n-1+\alpha)/n$, can potentially be produced by either an increase in the substitutability parameter α, or by an increase in the number of firms. This would be a liberalization scenario in which tariff cuts reduce markups for both private and public firms. In the open economy section, we show that the equilibrium structure is similar to the one in closed economy characterized by (17), (18) and (21) with only one difference: the tariff rate in both sectors $\tau_g > 1$ and $\tau_y > 1$ affects the markups $1/\theta_g$ and $1/\theta_y$ respectively, and a reduction in tariffs reduces markups and triggers equilibrium effects in line to those that we now describe for the closed economy.

Proposition 2.2 *An increase in θ_g and θ_y raises the productivity cutoffs z_g^* and z_y^*, and reduces the number of operative varieties $M_g(z^*)$ and $M_y(z^*)$.*

Proof Figure 2 shows the effect of an increase in the degree of competition on the equilibrium values of z_y^* and E. An increase in θ_y shifts both the (EC) and the (MC) curves to the right, thereby increasing the equilibrium productivity cutoff z_y^*. Since from (22) we know the public and private sector cutoffs are positively related, and increase in z_y^* would lead to an increase in z_g^*.

The trade-induced reduction in the markup raises the productivity threshold above which firms can profitably produce, the cutoff z^*, thus forcing the least productive firms to exit the market. As a consequence, market shares are reallocated from exiting to, more productive, surviving firms, thereby increasing their market size. In this symmetric liberalization scenario, small unproductive firms in both the private and sector lose from liberalization, while large more productive firms gain.

Proposition 2.3 *An increase in θ_y keeping θ_g constant, raises the productivity cutoff z_y^*, and has an ambiguous effect on z_g^*.*

Proof Although the EC and MC curves shift exactly as in the universal liberalization scenario in figure 1, from (22) we can see that the increase in θ_y keeping θ_g produce a negative direct effect on the public firms cutoff z_g^* that could offset effect triggered by the increase in z_y^*.

Figure 3 about here

Figure 3 above shows the positive relationship between the two cutoffs $z_g^* = z_g^*(z_y^*)$ found in equation (22), and the effect of increasing θ_y on z_g^*. Since an increase in θ_y raises z_y^* with a similar mechanism as in proposition 2, equation (22) tells us that z_g^* should increase as well; this is represented by the shift to the right of the vertical line in figure 2. But an increase in θ_y also reduces the slope of the link between the two cutoffs in (22). Hence the effect on the public cutoff is ambiguous. Depending on functional forms and parameter values we could obtain two different results.

In the first case, the public cutoff increases together with the private cutoff. The economic mechanism is the following: when the private sector becomes more competitive, market shares are reallocated from the public sector to the more efficient and more competitive private sector. This drainage of resources away from the public sector makes it more selective, forcing its most inefficient firms to exit. This can be seen as a *substitution effect*: the increase in efficiency in the private sector reduces the aggregate price of its goods (the price index P_g), pushing consumers to reallocate their expenditure from the other goods in the economy, public goods and the homogeneous good, toward the private goods.

In the second type of equilibrium we find that more competition in the private sector leads to less selection in the public sector, hence to a lower z_g^*. This can be

interpreted as a *wealth effect*: the increase in efficiency brought about by the reduction in the private sector markup is so high that consumers increase their demand of all goods. Higher demand leads to easier survival for the public firms.

This result is interesting because it shows that even if public firms are such strong lobbies that can prevent liberalization in their sector, trade liberalization in the private sector can affect them as well through a general equilibrium mechanism. When the private sector becomes more competitive because of trade liberalization, market shares are reallocated from the homogeneous good sector and from the public sector to the high efficient private sector. This drainage of resources away from the public sector makes it more selective, forcing its most inefficient firms to exit.

3 Size and Lobbying Power: Hypothesis

Our model offers two main insights on the demand side of lobbying. First, large firms, which are usually the most productive ones (Bernard and Jensen, 1999; Aw et al., 2000), are always in favor of reciprocal trade liberalization and therefore in favor of the WTO accession. Second, although SOEs can survive in the domestic market due to restricted entry in their products, SOE productivity is too low to be able to compete in foreign markets. As such, regardless of their size SOEs should always oppose reciprocal trade liberalization and therefore WTO accession, or at least they would like to obtain concessions for the products in which they compete.

Since we are interested in endogenizing tariff cuts as a result of the WTO accession, we also need to take into account the supply side of lobbying. Indeed, size does not only impact firms' preferences over trade liberalization, but also the firms' ability to lobbying for such preferences. Following previous models in political economy (Masters and Keim, 1985; Bombardini, 2008), we advance the argument

that large firms are more effective than small firms in capturing the local policy-making apparatus, through their lobbying and rent-seeking behavior.[3] Thus, at the end of a multilateral negotiation, we expect that a tariff for a good produced by a large firm is closer to its ideal tariff than a tariff for a good produced by a small firm.

The bankruptcy of the state-owned shipping company, Vinashin, provides an excellent example of how political connections and lobbying on the part of state firms, protected an inefficient SOE long after it proved unable to compete on world markets Vietnamese analysts had long argued that Vinashin, the state ship-building conglomerate, was making political and relationship-based investments that made little sense economically. After a sovereign bond issue in 2006 that provided the company with $750 million in working capital to build 15 ships for which it had contracts, David Dapice (2006) noted that the government's investment in the company, by their own calculations, would not yield significant returns to the shipyard. Government projections of the success of the investment were based on total sales and not return to capital. More worrying still was that Vinashin had an expansion strategy that was extremely rapid, capital intensive, and had very little to do with its core mission of building ships. Scott Cheshier and Jonathan Pincus, the Chief Economist of the United Nations Development Program articulated it vividly: "In 2007 Vinashin established 154 new member companies. Excluding weekends, there are 260 working days in the year. Vinashin therefore created a new subsidiary on average every 1.69 days" (Chesier and Pincus 2010, 192) These included shipyards and construction companies, of course, but also include insurance, real estate, banking, securities, wholesale and retail trade and even beer manufacturing. The subsidiaries were large and regionally diffuse. Some analysts noted the fact that the conglomerate had invested in fourteen different provinces and speculated that either this was a strategy for the firm to buy the support of provincial delegates Central

[3]At the moment, we are agnostic on the exact mechanism that leads to this outcome, since we are unable to test a specific channel in the empirical model. However, we speculate that it has to do with legal or illegal "donations" to the ruling party as well as government's concerns on unemployment and economic growth.

Committee (Pincus and Vu 2008). Most worryingly, according to Cheshier (2008), was that the company possessed its own bank and finance company, allowing it to self-finance a great deal of its follies without needed to appeal to external investors, who might ask for a proper valuation.

Vinashin was certainly not alone in these expansive and uneconomic strategies. Vinalines, a state shipping company, Vinatex, the state textile conglomerate, Petrolimex, the state oil monopoly, and EVN, the state energy giant, have all struggled with similar strategies of domestic expansion and difficulties competing abroad. Vinatex is particularly noteworthy, as despite its size and close connection to top officials, Vietnam remains a net importer of fabrics, as lack of competitiveness with Chinese firms forces the company to focus on ancillary activities (Pincus et al. 2012). Indeed, number of economists have pinned Vietnam's 2007-2008 balance of payment crisis on reckless state investment by all the state conglomerates. Where Vinashin differed was that eventually its lack of a business acumen caught up with it, forcing the conglomerate to announce a $4.4 billion debt at the beginning of the summer 2010, necessitating an emergency government bailout.

The Vietnamese examples of SOE lobbying and lack of competitiveness provide tentative support for our theoretical argument that we should expect two different, partial equilibria for large private firms and large SOEs. On the one hand, large private firms are willing to accept large tariff reductions in the goods that they produce to successfully negotiate the accession to the WTO and reap the benefits from the MFN system. In other words, large private firms are ready to pay the high price of foreign competition in order to get market access in WTO member countries. On the other hand, large SOEs lobby to maintain high tariffs in the goods that they produce to minimize foreign competition and retain shares of the market. In other words, since large SOEs have no incentives to enter the WTO and to gain market access in WTO member countries, they are not willing to pay the price of increased competition by agreeing to tariff reductions.

With these insights, we test the following hypothesis:

H1 : As the number of SOEs producing good i increases, the marginal effect of firm size on tariff reductions in good i is expected to decrease.

Table 1 summarizes firm's preference and firm's lobbying power in relation to multilateral liberalization.

It is important to note that in the Vietnamese case, SOEs are not synonymous with the government. Among the most critical pillars of Vietnam's 1986 *DoiMoi* reforms was the decision to separate SOE business operations from state planning in Decision 217/HDBT (1987). SOEs were given general guidelines as part of the government's ten-year socioeconomic plan, but their decisions were divorced from ministerial planning. They were expected to negotiate the price of inputs with suppliers and set their own prices based on market costs. A few items, such as energy, remain cost controlled and were set by a committee, but the number of these items was low and decreased over time (Ngu 2002). SOE profits were calculated based on the true costs of material inputs (although this figure did not include land and cheap capital), and with the exception of a compulsory tax payment to the central or local government, SOEs were allowed to retain their profits and reinvest as they saw fit. A number of SOEs struggled under these conditions and these low performing operations were soon liquidated by government authorities (Painter 2002). In 1995, the hiving off of SOE business operations was further institutionalized under Decision 1990 and 1991. Decision 90 merged SOEs into 17 large holding companies, which became the monopoly conglomerates that we see today. Decision 91 created another group of 70 central conglomerates (Thanh 2007). The new conglomerates were encouraged to structure themselves in such a way as to provide incentives for enterprises to operate along commercial lines (Vasavakul 1997). SOE managers were

given full autonomy over business decisions. As Ngu (2002, 5) put it shortly afterwards, "They have the rights to decide what, how and for whom to produce and where to source inputs and market their outputs. They are allowed to do business freely with each other and with non-SOEs,including foreign partners in the form of a joint venture or a business contract. They are also allowed to hire and fire employees and set wages, within policy guidelines." At the same time, the reforms removed the oversight role of line ministries, granting them only regulatory power. Line ministries retained the ownership rights of the conglomerates, but the management function was taken over by a Board separately appointed by the Prime Minister The Board makes decisions on production plans and oversees the separate management boards of the enterprises. A separate Board of Inspection was appointed to manage performance (Painter 2002). In 2006, with SOEs now equitizing by selling off shares and even listing shares and on the stock market, the government formed the State Council Investment Corporation (SCIC) to manage state assets held by the newly equitized firms under a single-entity. Once again, the SCIC has decision-making autonomy, and is not subject to state planning considerations. The bottom line is that SOEs act as separate actors from government decision makers in planning their business strategies.

Of course, the distinction is not perfectly clean. SOE managers have a responsibility to preserve the capital entrusted them to them by the state and can be punished for not upholding this responsibility (i.e. Vinashin). Conglomerate managers are appointed by the Prime Minister and hold concurrent Communist Party affiliations that align their career interests with the government. And connections to top officials can ease access to land and capital (Hakkala and Kokko 2006). Nevertheless, to win these favors, SOE managers must engage in the lobbying and attempts to capture decision making that motivate our theory. We simply cannot consider the negotiations between SOE managers and government as the left hand bargaining with the right.

4 Data and Empirical Strategy

In what follows, we test the main propositions of our model using a reduced form approach. The model predicts that tariff reductions resulting from WTO accession should decrease with the level of firm size of private companies in Vietnam, but decrease with the firm size of state-owned companies. We show that this is indeed confirmed by the data. Specifically, we estimate the following model that interacts firm size with the ownerhship of the enterprise:

$$(MFNpre_i - Boundpost_j) = \beta_0 + \beta_1 FirmSize_i + \beta_2 NumberSOE_i + \beta_3 Size_i \times NumberSOE_i + \beta_4 X_i + \eta_j + \epsilon_i$$

Where $(MFNpre_i - MFNpost_j)$ is the dependent variable, whereas $FirmSize_i$, $NumberSOE_i$, and the interaction term between the two variables are the main explanatory variables. X_i is a vector of control variables to address omitted variable bias. Finally, η_j are sector fixed effects, and ϵ_i is the error term. The unit of analysis is the firm, but the WTO treatment enters at the six-digit product level tariff line. As such, we cluster standard errors at the six-digit industrial code level to address bias resulting from the fact that errors within an industrial code may not be independent . Below we describe each variable in detail.

4.1 Dependent Variable

Our dependent variable is the difference between MFN tariff before the accession to the WTO and bound tariffs after the accession to the WTO.[4] This is the de jure tariff depth stemming from multilateral liberalization and is a result of negotiations among the entrant and WTO members (Pelc, 2011). Tariff rates are averaged across a three-year pre-accession and post-accession reference period to maximize

[4]Since tariffs weighted by trade flows are biased downward (Ingco, 1998), we use simple unweighted tariff rates.

data availability. Our dataset is therefore cross-sectional, which is reasonable given our theory specified above. As we highlighted, we are only interested in analyzing tariff reductions which result from the WTO accession when symmetric trade liberalization is at work. This is the point when incentives are created for large private firms to lobby for entering the WTO and benefit from the MFN regime being applied to their products. Data comes from Pelc (2011).

We assemble a dataset comprised of 3,300 products for which tariff and size information was available. These products belong to five aggregate sectors: agriculture, manufacturing, mining, electricity, and others (which is miscellaneous basket). The average MFN tariff pre-accession is 19%, whereas the average bound tariffs is 12%. Pelc (2011) reports that the average prior applied tariff was 10% and the average post applied tariff was 8% for the 18 countries that entered the WTO between 1995 and 2008. These statistics confirm two well-known features of the Vietnamese acession process. First, Vietnam was more protectionist than other countries seeking access to the WTO. Second, Vietnam's accession to the WTO was on average more demanding than for the other 17 entrants in its peer group. In short, Vietnam had to agree to larger tariff cuts than other countries which entered contemporaneously.

4.2 Main Independent Variables

The main independent variables are the average firm size in product i and the number of state-owned firms in product i. Firm size is measured as the net turnover of goods and services in 2006 (i.e., the year before Vietnam entered the WTO). A firm is defined as state-owned if it fits into one of the following categories: (1) Central SOE; (2) Local SOE; (3) Central State Limited Co.; (4) Local State Limited Co.; (5) Joint-stock Co. with state capital larger than 50%; and (6) Collective enterprise (cooperative). We take the natural logarithm of both the size and number of SOE variables to reduce the impact of outliers.[5] Both data comes from the An-

[5]We drop three firms that have a negative value of net turnover.

nual Vietnam Enterprise Survey run by General Statistics Office of Vietnam in 2007.

This is an annual census of all firms with more than 10 employees with an additional random sample of smaller firms. The data includes a wide range of information on firm characteristics including: sector, employees, assets, legal type, performance, source of capital, and investment. The number of enterprises increased rapidly from 42,123 in 2000, to over 250,000 in 2010, reflecting the strong growth in private sector activity over the decade (GSO 2007).

Figures 4 shows the distribution of private firm size versus SOE size across the five sectors. There are two take-away messages from these distributions.. First, state-owned firms are (on average) larger than private ones. This is particularly true in agriculture, manufacturing, and mining. Second, firms operating in manufacturing and mining are (on average) larger than operations in the other sectors.

Figure 4 about here

4.3 Control Variables

To avoid overestimating the impact of our main explanatory variables, we include some control variables that might affect the magnitude of tariff cuts as a result of the accession to the WTO and either the size of an operation or its ownership type. To avoid simultaneity bias, all control variables are from year 2006.

Following Pelc (2011) we include the log of export and import at the six-digit HS level in constant 2000-level USD. Figure 5 shows that exports are larger in products in which only private firms operate than in products in which there is at least one SOE. This is particularly true in agriculture and for US exports. Therefore, our data show that the relationship between Vietnamese firms and exports departs from

Melitz's (2003) predictions, because of the presence of SOEs. Put simply, it is not always the case that large firms export more than small firms. This is true only for private companies.

Figure 5 about here

Moreover, we include the average value added in product i. Value added is the ratio between turnover and number of employees for each firm in our sample. This is a proxy of productivity at the product level. In addition, we include the value of the applied tariff before WTO accession, which is a further proxy for valuable market access. Finally, we use sector and province fixed effects to control for economic and cultural heterogeneity. Univariate statistics of all the variables included in our models are summarized in Table 2.

Table 2 about here

4.4 Econometric Strategy

Since our main independent variable is the interaction term, we need to instrument all three variables to correctly identify our models (Wooldridge, 2000). Since we have a system of three equations in the first stage, we need at least three instruments.[6]

4.4.1 Firm Size and Trade Liberalization

The main threat to correct identification of the effect of size on trade liberalization (i.e. de jure depth) comes from reverse causality. In principle, firms operating in protected markets have greater opportunities to produce the largest quantity of goods or sell goods at higher margins, and therefore have the biggest turnover. Moreover,

[6]For a similar approach, see Pinto and Zhu (2008).

there is the possibility of preemptive liberalization. That would be particularly troublesome if preemptive liberalization was more an issue for SOEs that for private firms.[7] Adding some anecdotes and qualitative evidence would be great.The fact that our analysis is a single snapshot and that we control for the level of applied tariffs before the WTO accession mitigates against this problem, but do not fully eliminate the concern.

To address causality more systematically, we adopt an identification strategy derived from the exogenous effects of global trade disputes. Specifically, we instrument firm size in Vietnam with anti-dumping measures faced by China and the goods that were liberalized by the US-Vietnam bilateral trade agreement (BTA) signed in 2000.

Starting with Chinese anti-dumping measures. We exploit the fact that China and Vietnam export similar products. Indeed, according to Elkins, Guzman, and Simmons' (2006) indicator of export similarity, in the 1990s China and Vietnam both scored .5, which is in the top 90 quantile of similarity. Thus, when Chinese products become less competitive as a result of an anti-dumping measures, which effectively acts as a tax on Chinese goods, Vietnam's products become more competitive, granting them opportunities to replace Chinese ones in foreign countries. In other words, we expect that countries will start importing Vietnamese goods, which are artificially made cheaper than Chinese goods by counterveiling duties. As a result of this increasing demand in foreign markets, the turnover of Vietnamese firms in affected products should increase.

Since China faced several anti-dumping provisions over the past decade, we exploit this rich variation at the product level to instrument Vietnamese firm size.[8] Our instrument is a count variable that captures the number of anti-dumping provisions faced by China in product i in years prior 2006. The correlation between

[7] McCaig (2011, 104) argues that the US-BTA hardly touched manufacturing.
[8] For a similar approach, see Bown and Porto (2008).

Vietnamese firm size in a particular product and Chinese anti-dumping measures is 0.3 and is statistically significant at 1% level. Data comes from the Global Antidumping Database (Bown, 2012).

We believe this variable satisfies the exclusion criterion for two-stage modeling, as it is highly unlikely that anti-dumping measures imposed on Chinese products affect trade liberalization decisions regarding Vietnam accession to the WTO. In fact, Vietnam entered its WTO negotiations knowing it would be considered a non-market economy, like China, for twelve years after accession and therefore would be easier for trading partners to bring anti-dumping cases against its products by using proxy countries for prince benchmarking (MUTRAP 2003). In short, anti-dumping duties imposed on China played no role in influencing its decision to enter or altered its negotiating strategies in particular products.

Second, we instrument firm size using these goods that were liberalized by the US-Vietnam bilateral trade agreement (BTA) signed in 2000. One of the reasons to form this BTA was to prepare Vietnam accession to the WTO (McCaig, 2011). The BTA liberalized 244 products, mainly in the manufacturing sector. We hypothesize that trade liberalization increased competition from US companies in these products and therefore reduced the share of market available to Vietnamese firms. In turn, the net turnover of these firms that were most affected by the trade agreement with the US is expected to decrease. Indeed, the correlation between firm size and a dummy that scores one if product i was liberalized by the BTA is negative and is statistically significant at 1% level.

4.4.2 SOEs and Trade Liberalization

Theoretically, there is also the possibility that the number of SOEs is endogenous to trade liberalization produced by the WTO accession. Put simply, knowing that

tariffs would need to be reduced to enter into the WTO, some SOEs might have been strategically privatized in the years prior the accession. We address this problem of reverse causality in two ways.

Qualitatively, this threat to causal identification seem marginal. The two primary drivers of equitization in the Vietnamese reform process were location and performance. SOEs, which were managed by provincial people's committees (local SOEs or LSOES) were equitized rapidly because they proved to be a tremendous drain on provincial budgets. By the time of WTO entry, roughly 6,000 of these operations had been sold off. In most provinces, the only LSOEs remaining were private utilities (Malesky 2009). Second, as noted above, SOEs which were unable to compete effectively under market pricing were also sold off quickly (Ngu 2002). The remaining SOEs at the time of WTO entry were shockingly similar to the conglomerates and their subordinates that were created by Decision 90 and Decision 91 (Pincus et al. 2012). These were the SOEs that operated in Group A sectors, which benefited from restricted entry due to national security considerations, which was generously interpreted to include such sectors as industrial chemicals, concreate, construction, and even logistics. Although the number of Group A sectors were dropped over time, as Malesky et al. (2012) show, whether or not a Group A restriction was dropped depending on the share of SOEs operating in it. Consequently, the sectors with high SOE participation survived into and even after the WTO accession process.

More systematically, we instrument the number of SOEs with the number of SOEs in 2000. Data come from the GSO. Since we have the SOEs in 2000 variable only at the province level, we implement some data manipulation. First, we merge the GSO firm level dataset with the dataset at the province level. Then, we build a variable, which is the sum of the number of 2000 SOEs for each HS 6-digit product.[9]

[9]In STATA 12 the formula is `egen SOE2000sum = sum(SOE2000), by(HS6)`. We obtain similar results if we use the mean, the median, the min, and the max.

By doing so, we obtain enough variation at the product level.

We note that the correlation between number of SOEs and number of SOEs in 2000 is 0.5 and is statistically significant at 1% level. Once again, we believe this satisfies the exclusion criterion, because formal restrictions in the Vietnamese regulatory market were designed to protect SOE market share, ensuring that the historically SOE-dominant sectors remained that way throughout the Vietnamese reform process, whether or not the companies were actually competitive (Pincus 2009).

4.4.3 The Interaction Term and Trade Liberalization

We instrument the interaction term between firm size and the number of SOEs with the number of bombs dropped in each province during the US-Vietnam war. Data come from Miguel and Roland (2006, 43).

In choosing this as our instrumental variable, we build on a logic introduced by Edward Miguel and Gerard Roland (2006) and followed by a range of other authors interested in Vietnamese development (Kocher et al. 2008, Malesky and Taussig 2009, Dang 2012). These papers argue evidence that damage from war grew as one approached the border that once divided Vietnam, showing specifically that distance to the seventeenth parallel is a strongly significant predictor of bombing intensity during the war. Miguel and Roland, in particular, use the seventeenth parallel as an instrument for the intensity of bombing in an effort to show that bombing had minimal long-term impact on future poverty across Vietnam. Malesky and Taussig (2009) and Dang (2012) further show that the alleviation in poverty was caused by the fact that more heavily bombed states benefitted to a greater extent from transfer and state investment programs that sought to repair the war's damage. Because the heavy state investment after the Vietnamese war, several SOEs grew quite strong in the region, and continue to have a disproportionate influence their today. They

demonstrate that the correlation between bombing damage the number of SOEs in 2000 and the growth of SOEs during the reform era is statistically significant and robust (Malesky and Taussig 2009, 277). In our dataset the correlation between the number of bombs dropped per square kilometer in each province and the interaction term is equal to 0.4.

The use of the number of bombs dropped per square kilometer in each province clearly satisfies the exclusion restriction, as it could not plausibly be related to tariff cuts nearly 40 years late. Because the amount of bombing is measured the province level, it does not perfectly match with our sectoral data. Consequently, follow the same data manipulation strategy, multiplying the sector share in each province by the number of bombs in order to derive a sector-specific measure.

5 Main Results

We begin by running a baseline OLS model with firm size and number of SOEs, but without the interaction term between firm size and number of SOEs. The results demonstrate that firm size has a positive coefficient, as expected, though it is not statistically significant at the conventional level (Table 3 – model (1)). Looking at the substantive effect of the two main explanatory variables for each 1% change in revenue, there is .04% change in tariff size. Moreover, as the number of SOEs moves from zero to its maximum value, de jure depth decreases by about 12%. In line with our theory, there is preliminary evidence of resistance to trade liberalization in the products in which there is a large concentration of SOEs.

Table 3 about here

We then run our main model that includes the interaction term between firm size and number of SOEs (Table 3 – model (2)). The sign of the interaction term

is negative as expected. We graphically show the marginal effect of the number of SOEs on tariff cuts, as firm size increases (Figure 6). The marginal effect of the number of SOEs is positive and statistically significant at the 1% level, but only in the products in which small firms operate. Conversely, the marginal effect of the number of SOEs on de jure depth becomes negative in products in which large firms operate. As firm size moves from the minimum value to the maximum value, the marginal effect of the number of SOEs on de jure depth decreases from about +11% to about -13%. Therefore, not only the interaction term is statistically significant at the conventional level, but the magnitude of its effect is also quite substantive.

Figure 6 about here

It is important to note that for the majority of products in our dataset there are no SOEs represented. Specifically, 3,074 goods are solely produced by private firms, whereas only in 226 goods - mainly in agriculture and manufacturing - there is a presence of at least one SOE. In particular, our analysis identifies 54 products, 80% of which are in manufacturing, with high levels of bound tariffs (post WTO accession) and multiple SOEs (up to 93 SOEs) operating in these industries.

Finally, we run a 2SLS regression in which we instrument firm size, the number of SOEs, and the interaction term using the instruments described above (Table 3 – model (3)). We note that the Cragg-Donald F-statistic is greater than 10 in every equation in the first stage. Moreover, residuals of both firm size and the number of SOEs are orthogonal to the dependent variable in the second stage (i.e. not statistically significant), indicating that the instrument is of reasonable strength to avoid bias in the second stage. Figure 7 further shows that the size of the results are similar to the results achieved in the naïve regressions above – although the positive marginal effect of Number of SOEs on de jure depth disappears for small firms. Therefore, there is no evidence that endogeneity affects our results.

Figure 7 about here

6 Additional Evidence

In this section we provide additional evidence for our main argument.

6.1 Tariff Transition

So far we have tested conditional effect of firm size and the number of SOEs on dejure tariff depth (the difference between applied tariffs pre-WTO accession and bound tariffs post-WTO accession). Nevertheless, there is another measure of trade liberalization, which also provides interesting insights. Specifically, tariff transition captures the length of the phase-in periods (in number of years) before bound tariffs are applied to a particular product i. Indeed, tariff reductions kicked-in at the moment of Vietnam accession to the WTO for only two-thirds of the products. In a third of product-lines, tariff reduction was delayed between one and twelves years after the 2007 accession.

Tariff transition is a device to temporarily shelter sensitive products from foreign competition. It follows the infant industry argument posed by development countries, who argue that they need time to grow national champions before subjecting them to the rigors of international competition. More succinctly, Vietnamese firms that were not competitive tried to buy time from the government by lobbying for a delay in when they faced tariff reductions. In doing so, they could adjust gradually to trade liberalization and spread the costs of joining the WTO over a longer period of time. In line with our argument, we should expect that tariff transition increases, when firm size and the number of SOEs increase. Indeed, large SOEs, which are economically inefficient, but powerful enough politically to capture the government, should be granted a longer tariff transition than private firms.

H2 : As the number of SOEs producing good i increases, the marginal effect of firm size on the length of tariff transition periods in good i is expected to increase.

Using the tariff transition period as dependent variable, we run a tobit model to take into account of left-censored observations (i.e. when tariff transition is equal to zero). To the baseline model described above, we add de jure depth as a control variable, since a long tariff transition is more likely in products that face large tariff reductions.[10] Table 3 (model (4)) reports the results from the tobit model, whereas Figure 3 shows the marginal effect of firm size on the transitions period, as the number of SOEs increases. Such an effect is positive and statistically significant at the 1% level, but only in these products in which when there are a large number of SOEs. As firm size moves from the minimum value to the maximum value, the marginal effect of the number of SOEs on tariff transition increases by about -2% (not statistically significant) to about 3 years. Again, the magnitude of such an effect is substantive, given that 12 years is the longest tariff transition granted to Vietnamese goods. As discussed before, a small number products drive our results.

Figure 8 about here

6.2 De Facto Liberalization

As an extension of our results, we replace de jure depth with de facto depth, which is defined as the the difference between the actual applied tariffs, before and after WTO accession. According to Pelc (2011), bound rates result from negotiations with the working party, while de facto depth is unilaterally decided by the entrant. Thus, de facto depth allow us to test what happens to our model when we relax the assumption of reciprocal and symmetric liberalization. To put this slightly differently, we are interested in how much more liberalization particular firms were willing to endure, above and beyond what was needed to open up international markets for their products. Of course, unilateral trade reductions require a great

[10]De jure depth turns out to be a strong predictor of tariff transition.

deal of altruism and we don't expect many firms to willingly subject themselevs to greater competition than is necessary. Since every firm, small or large, benefits from protectionism and loses from unilateral liberalization (Baldwin, 2005), we expect that the effect of the interaction term between firm size and number of SOEs will lose significance when we substitute de facto depth as the dependent variable.

H3 : No firm will reduce tariffs unilaterally. The size and share of SOEs operating in a particular product will both be uncorrelated with the size of de facto tariff reductions.

Indeed, that is what we observe in Table 4 and in Figures 9 and 10.

The results allows us to conclude that as soon as the bargaining process to enter into the WTO was over, bound tariffs were set, and Vietnam was accepted as member, incentives to lower applied tariffs disappeared and both private firms and SOEs realigned their own interests. This result speaks to the recent literature arguing that "the principle of reciprocity in multilateral trade talks results in the gradual elimination of tariffs" by turning each country's exporters into anti-protectionists at home (Baldwin and Nicoud, 2008: 1). Our results shows that Baldwin and Nicoud's (2008) model might have slightly overestimated the positive impact of multilateral liberalization on the motivation for firms to argue for new tariff reductions at home.

Table 4 and Figures 9 and 10 about here

6.3 Value Added per Worker

As a further robustness check, we replace net turnover with value added per worker, which is a proxy for the competitiveness of firms. Admittedly, value added is not a perfect measure of competitiveness, as it is hard to separate true value-added from mark-up prices. However, we do not have data on all the variables necessaru to

build a firm-level index of total factor productivity. Results are displayed in Table 5 (column 1), whereas 5 (column 1) shows the results of the 2SLS regression. Figure 11 plots the marginal effect of the number of SOEs on de jure depth as value added per worker increases. Similarly, Figure 12 plots the marginal effect of the number of SOEs on de jure depth as value added per worker increases, when we instrument the interaction term as well as value added (pw) and number of SOEs.[11] Findings are similar to the previous ones, adding plausibility to our analysis.

Table 5, Figure 11, and Figure 12 about here

6.4 Firm Size and Collective Action

Our last analysis tackles the collective action problem faced by firms in Vietnam. It might be the case that there are several middle-size, productive, private firms and one very large SOE producing a particular good i. From our theory, we expect tariff reductions in such a good, since private firms would benefit from the reciprocal trade liberalization arising with the WTO accession. However, due to the large number of actors, private firms might face collective action problems, which would prevent them from mobilizing politically. Ultimately, they may find themselves out-lobbied by the large SOE, which have no incentive to reduce tariffs.

This is a likely scenario in the Vietnamese economy. Indeed, many private firms are quite small and labour-intensive in Vietnam (Pincus et al. 2012). Their small size results from aforementioned difficulties of restricted markets and obtaining access to land and credit. Such small firms, which are often not professionally managed, are unable to organize themselves in effective lobbying groups and to capture the government during multilateral negotiations. Nguyen and Stromseth (2002) surveyed business associations in Vietnam prior to WTO entry, finding that while there were 200 business associations in Vietnam, composed of many small firms,

[11] We rely on the same instruments used for firm size.

they faced severe constraints in organizing and advocating on behalf of the small business sector. The most successful associations like the Vietnamese Chamber of Commerce and Industry (VCCI) possessed quas-state status and included SOEs among thier membership. The key constraints to association effectiveness included lack of professionalization, low capacity, and inability to effectively collect dues and organize consistent meetings. In short, their voice was quite limited. The travails of the fish industry accurately reflect this pattern (Tung, Thanh, and Phillips, 2004).

In sum, the combination of firm size and firm concentration is likely to play an important role in explaining tariff reductions, especially in the sectors in which SOEs operate. Specifically, we expect:

H4 : As firm concentration in a product increase, the marginal effect of firm size on de jure depth will decrease.

Since SOEs are usually larger than private firms, we further expect that:

H5 : The marginal impact of firm concentration will be greater in SOE-dominated sectors.

To test this argument, we use a triple interaction term in which we include firm size, number of SOEs, and the standard deviation of firm size in each product i. For the last variable, we follow Bombardini (2008) who uses standard deviation to operationalize the dispersion of the size distribution in firm concentrations. A greater standard deviation implies a bigger fraction of the product output produced by few (at the extreme, 1) large firms.[12] Table 5 (columns 3-5) show the results. In particular, column 3 reports the results when we include the triple interaction term. Conversely, column 4 and 5 show the results when we split the sample in goods produced only by private firms and goods produced also by SOEs.[13]

[12]We replace the standard deviation of firm size with the Herfindal index and we obtain the same results.

[13]To compare standard errors in a meaningful way, we take a random sub-sample of goods produced only by private firms. In doing so, the number of observation in the two estimations is roughly the same.

The results demonstrate that the interaction term between firm size and firm size dispersion is negative and statistically significant at the conventional level in goods in which SOEs operate (Figure 13). This finding reveals the collective action problems faced by private firms in concentrated products. Conversely, we find little evidence that collective action problems are in place in goods produced only by private firms. Indeed, the interaction between firm size and the standard deviation of firm size is never statistically significant at the conventional level.

Figure 13 about here

7 Conclusion

In this paper, we examine a common assumption in international economics and international political economy (IPE) that interest groups are able to influence trade policies in democratic regimes, whereas authoritarian leaders are fairly insulated from lobbying pressure. After demonstrating that the assumption is at odds with an emerging political science literature on authoritarian institutions and economic outcomes, we adapt the Melitz (2003) model of sector-level productivity and trade expectations to the authoritarian setting. In addition, our model explores the role of SOEs (and connected, uncompetitive firms more generally), showing how the expectations regarding firm-size may be reversed under these setting.

Next, the paper explores the possibility of lobbying in authoritarian regimes by studying trade liberalization in Vietnam, a single-party regime, after its accession to the World Trade Organization (WTO) in 2007. Using firm-level data, we show that the size of private firms has a positive effect on tariff reduction pre- and post-accession and a negative effect on the time periods allowed to phase out tariffs. These findings confirm the predictions of the Melitz (2003) model regarding firm

preferences in international trade negotiations. As our model predicts, however, the opposite is true for state-owned firms, whose size leads to small tariff reductions and slow trade liberalization. Endogeneity is a severe concern, so we devise employ a two-stage modeling framework, where we instrument for firm size, ownership type, and their interaction separately. Diagnostics reveal that in each case, the instruments are strong and satisfy the exclusion criterion. Most importantly, the two-stage model reaches almost precisely the same conclusions as naive, OLS modeling.

In addition, our analysis demonstrates an important challenge to the idea that productive actors may act as forces for trade liberalization in their home countries beyond the original period of accession. In fact, we find that there is little evidence of de facto liberalization after WTO accession in any product line. This leads us to conclude that firms are willing to argue for reciprocal privileges in trade negotiations, but there is little evidence of unilateral reductions in protectionist barriers.

Of course, Vietnam is a uniquely open authoritarian regime with political institutions and exposure to international trade and capital flows that are well above its peer group. These facts made our research agenda possible through the provision of a unique firm-level data set and information about tariff barriers. Further research, however, should test whether these conclusions operate in more closed setting and in countries with less national interest in economic liberalization.

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Appendix

Derivation of equation (15)

Rearranging (12), we obtain $x = \tilde{z}^{\frac{1}{1-\alpha}} (\theta E / X^{\alpha})^{\frac{1}{1-\alpha}}$. Substituting it into (3) yields

$$X^{\alpha} = \left(\int_0^M \tilde{z}_j \, \mathrm{d}j \right)^{1-\alpha} (\theta E)^{\alpha} = (M\bar{z})^{1-\alpha} (\theta E)^{\alpha}, \tag{23}$$

recall that we used normalization $z = \tilde{z}^{\frac{\alpha}{1-\alpha}}$ and

$$\bar{z} \equiv \frac{1}{M} \int_0^M z_j \mathrm{d}j.$$

is the average productivity.

Using (23) we can express $x = \tilde{z}^{\frac{1}{1-\alpha}} (\theta E / X^{\alpha})^{\frac{1}{1-\alpha}}$ as

$$x = \theta E \frac{\tilde{z}^{1/(1-\alpha)}}{M\bar{z}}. \tag{24}$$

Substituting these results into (12) we obtain

$$\tilde{z}^{-1} q = \left(\frac{\theta E}{\bar{z} M n} \right)^{1-\alpha} q^{\alpha}$$

where $e = E/(nM)$. Since in symmetric equilibrium $x = nq$ using (24) we obtain

$$q^{\alpha} = \left(\frac{x}{n} \right)^{\alpha} = z \left(\frac{\theta E}{nM\bar{z}} \right)^{\alpha}$$

which substituted into the above equations yields

$$\tilde{z}^{-1} q = \theta e \frac{z}{\bar{z}}$$

where $z = \tilde{z}^{\frac{\alpha}{1-\alpha}}$.

Firm problem in open economy

Each firm solves the following problem

$$\begin{aligned} V &= \max_{q_D^D, q_D^F} \left[\left(p_D - \frac{1}{\tilde{z}_D} \right) q_D^D + \left(p_F - \frac{\tau}{\tilde{z}_D} \right) \right] q_D^F \\ & s.t. \\ & p_D = \frac{E_D}{X_D^\alpha} \, x_D^{\alpha-1} \qquad and \quad p_F = \frac{E_F}{X_F^\alpha} \, x_F^{\alpha-1} \\ & x_D = \hat{x}_D^D + q_D^D + x_F^D \quad and \quad x_F = \hat{x}_D^F + q_D^F + x_F^F \end{aligned}$$

where p_j, E_j and X_j are the domestic price, expenditure and total composite good respectively for country $j = D, F$, and q_i^j is the quantity sold from source country i to destination country j. The first order conditions are

$$\left[(\alpha - 1) \frac{q_D^D}{x_D} + 1 \right] p_D = \frac{1}{\tilde{z}_D} \tag{25}$$

$$\left[(\alpha - 1) \frac{q_D^F}{x_D} + 1 \right] p_F = \frac{\tau}{\tilde{z}_D} \tag{26}$$

Since the two countries are symmetric, $q_D^D = q_F^F \equiv q$, $q_D^F = q_F^D \equiv \breve{q}$, $x_D = x_F \equiv x$, $E_D = E_F$, $X_D = X_F$, $p_D = p_F$. From (25) and (26) and using $q/x + \breve{q}/x = 1/n$ yields

$$\left[(\alpha - 1) \frac{q}{x} + 1 \right] = \frac{2n - 1 + \alpha}{n \, (1 + \tau)} \equiv \theta_D \tag{27}$$

$$\left[(\alpha - 1) \frac{\breve{q}}{x} + 1 \right] = \tau \frac{2n - 1 + \alpha}{n \, (1 + \tau)} \equiv \theta_F = \tau \theta_D \tag{28}$$

which allows us to rewrite (25) and (26) as follows

$$\theta_D \frac{E}{X^\alpha} \, x^{\alpha-1} = \frac{1}{\tilde{z}} \text{ and } \tau \theta_D \frac{E}{X^\alpha} \, x^{\alpha-1} = \frac{\tau}{\tilde{z}}.$$

Multiplying the above equations by q and $\breve{q}$ and summing up we obtain

$$\frac{q + \tau \breve{q}}{\tilde{z}} = n \left[\theta_D \frac{q}{x} + \tau \theta_D \frac{\breve{q}}{x} \right] \frac{E}{n} \left(\frac{x}{X} \right)^\alpha.$$

Using $x = \{[1/\tilde{z}]\,(X^{\alpha}/\theta_D E)\}^{\frac{1}{\alpha-1}}$, it is easy to prove that $(x/X)^{\alpha} = \tilde{z}$. From (27) and using $q/x + \breve{q}/x = 1/n$ we obtain

$$\frac{q+\tau\breve{q}}{\tilde{z}} = \theta_{\tau} e \frac{z}{\bar{z}} \tag{29}$$

where

$$\theta_{\tau} = \frac{2n-1+\alpha}{n\,(1+\tau)^2\,(1-\alpha)}\left[\tau^2\,(1-n-\alpha) + n\,(2\tau-1) + 1 - \alpha\right]$$

is the inverse of the markup in the open economy.

Exit in open economy

The productivity cutoff is determined solving the following equation

$$\pi(z^*) = \left(p - \frac{1}{\tilde{z}^*}\right) q + \left(p - \frac{\tau}{\tilde{z}^*}\right) \breve{q} = 0$$

Using $p = 1/\,(\theta_D z)$ obtained from (25) and (27) yields

$$\frac{1}{\theta_D}\frac{q+\breve{q}}{\tilde{z}^*} - \left(\frac{q+\tau\breve{q}}{\tilde{z}^*}\right) - \lambda = 0.$$

With the same procedure used to derive (29) we obtain

$$\frac{q+\breve{q}}{\tilde{z}^*} = \theta_D e\; z/\bar{z}$$

which, together with (29), yields

$$[1 - (1+1)\,\theta_{\tau}]\, e z^*/\bar{z} - \lambda = 0.$$

This expression is similar to (22) except for the markup $1/\theta_{\tau}$ in the place of $1/\theta$.

Pro-competitive effect

Differentiating θ_τ with respect to τ

$$\frac{\partial \theta_\tau}{\partial \tau} = -\frac{2(\tau-1)\left(2n-1+\alpha\right)^2}{n\left(1+\tau\right)^3\left(1-\alpha\right)} \leq 0,$$

thus trade liberalization reduces the markup. Moreover, taking the absolute value of this derivative and differentiating it with respect to n we find

$$\frac{\partial\left(\left|\partial\theta^T/\partial\tau\right|\right)}{\partial n} = \frac{2(\tau-1)\left(2n-1+\alpha\right)}{n^2\left(1+\tau\right)^3} > 0,$$

which implies that the competition effect of incremental trade liberalization is decreasing in the number of firms n.

Figure 1: Private sector versus public sector pre- and post-WTO accession.

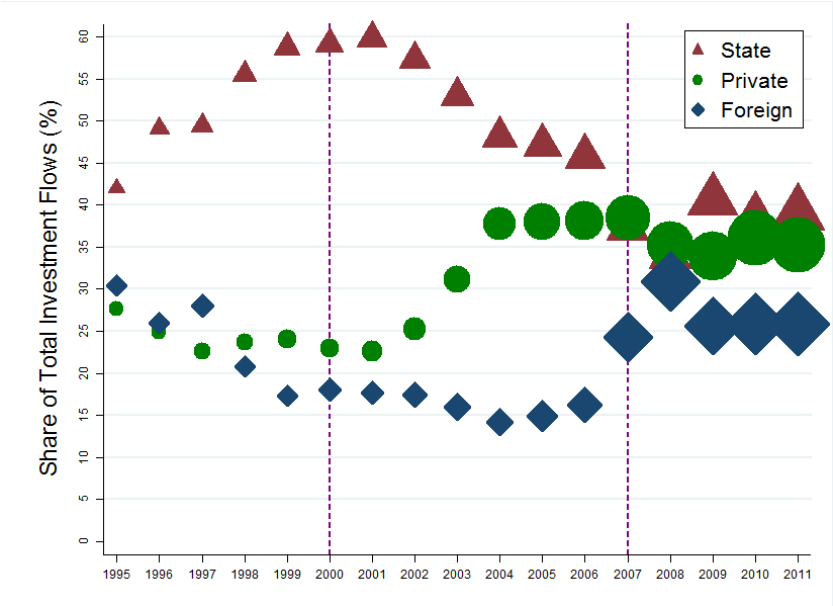

Figure 2: Equilibrium in closed economy.

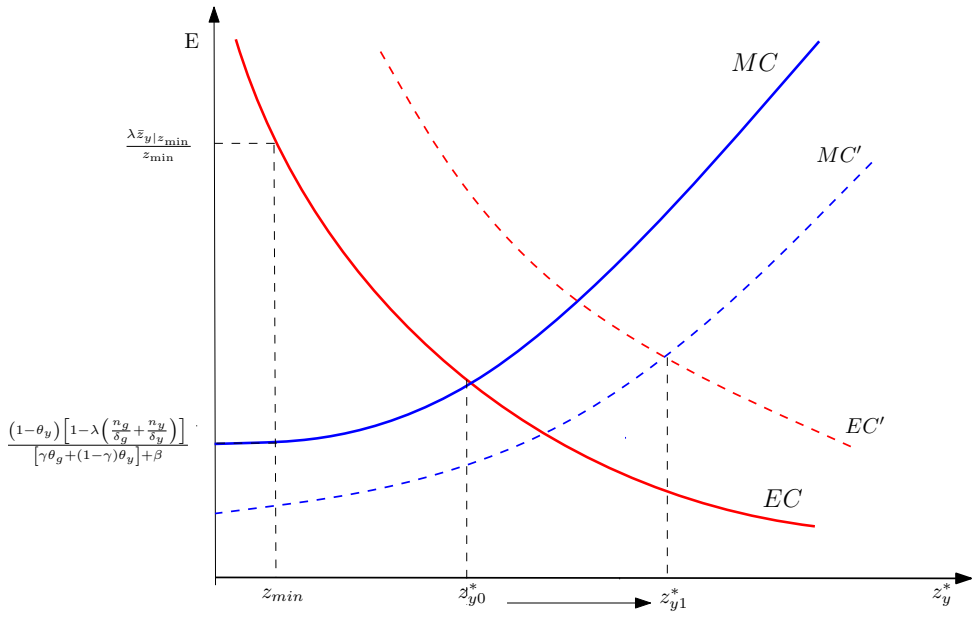

Figure 3: Effect of increasing θ_y on z_g^*.

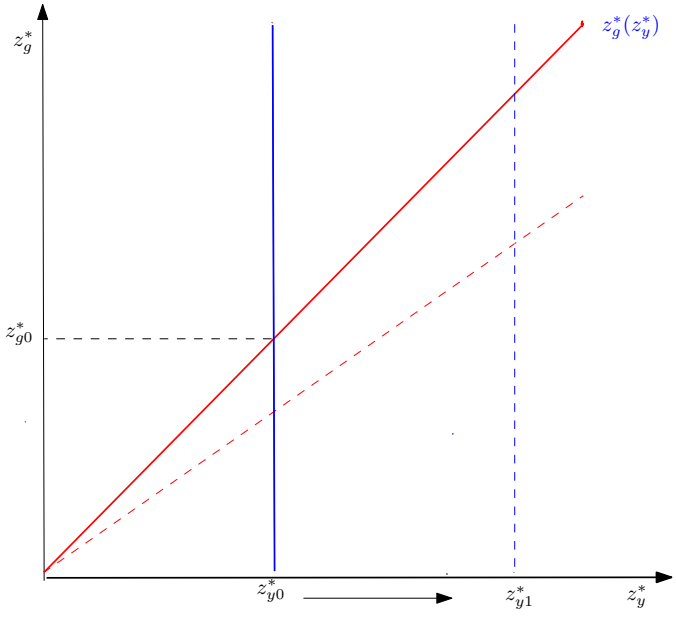

Figure 4: Firm size by sector: private vs. SOE.

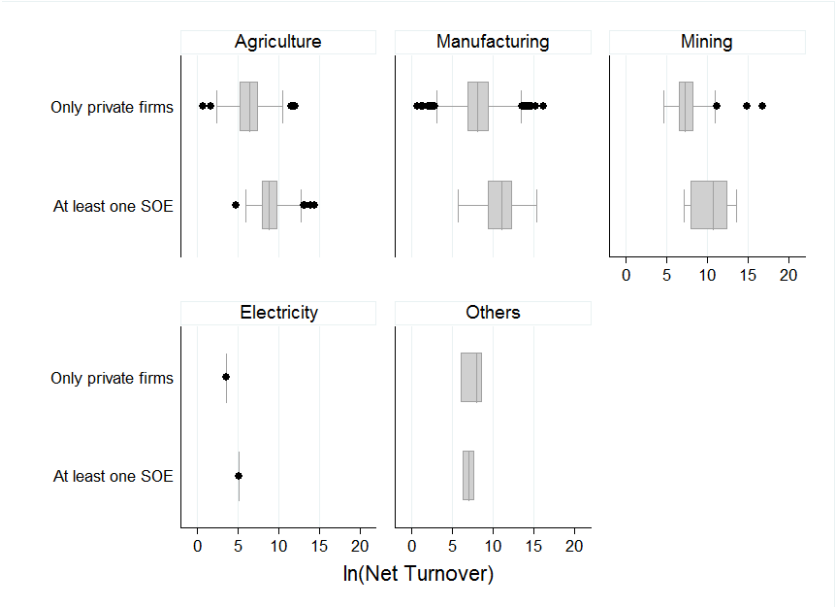

Figure 5: Export to the World and to the US by sector: private vs. SOE.

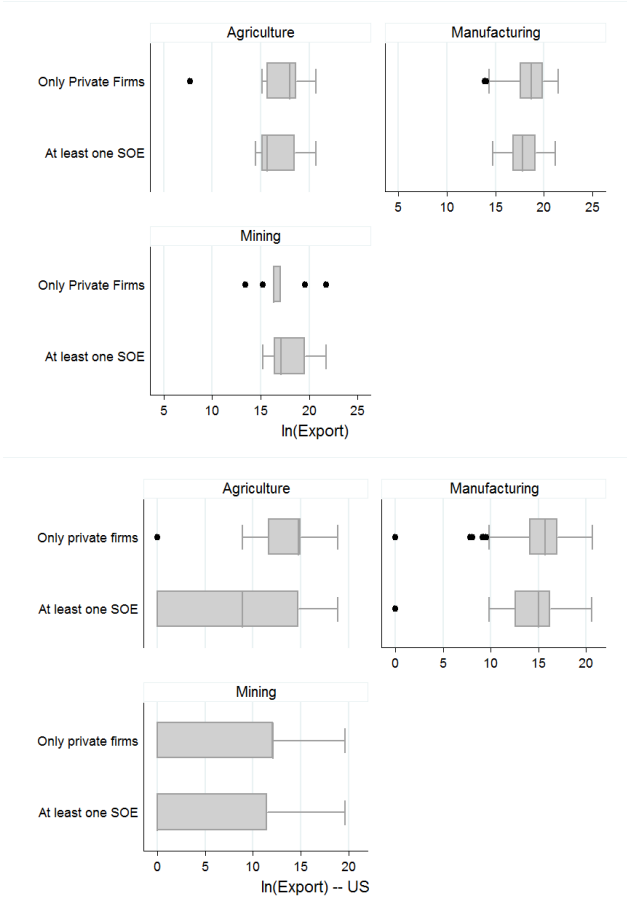

Figure 6: OLS: The effect of firm size and number of SOEs on de jure depth.

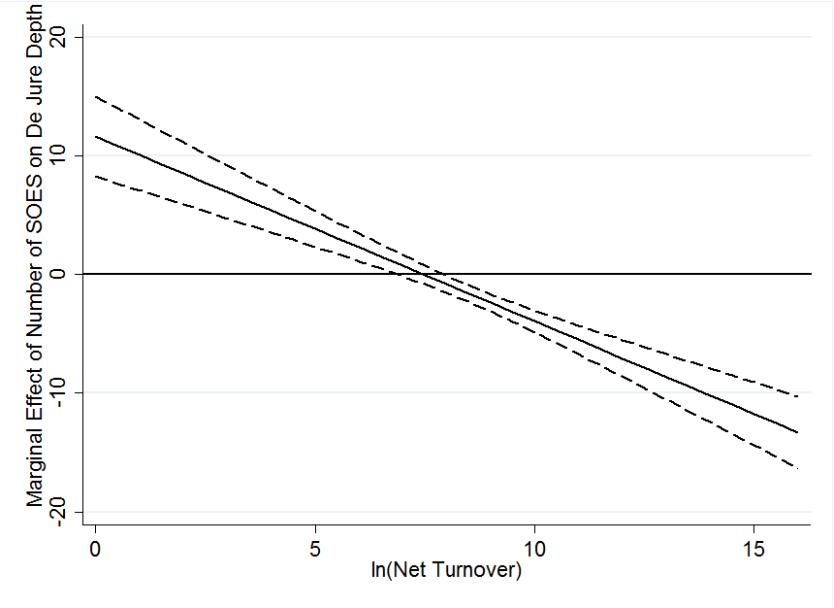

Figure 7: 2SLS: The effect of firm size and number of SOEs on de jure depth.

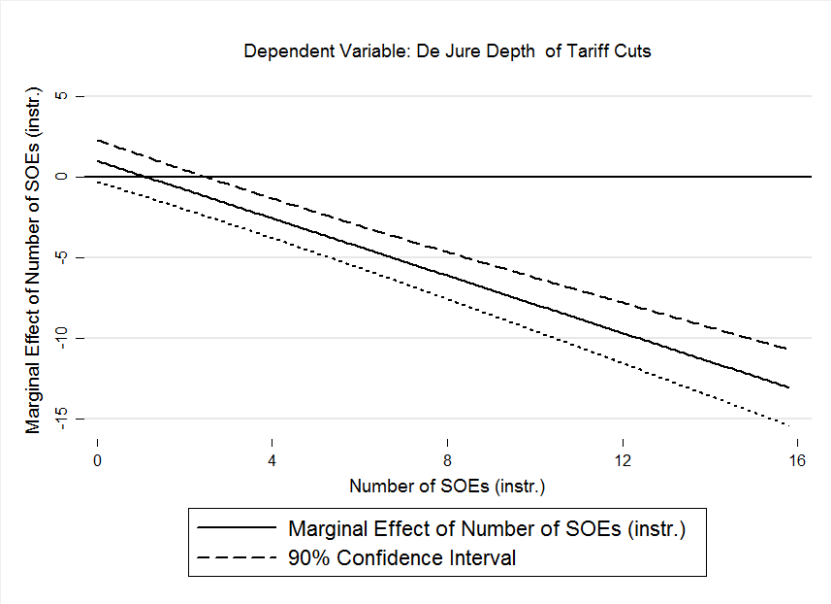

Figure 8: The effect of Firm size and number of SOEs on tariff transition.

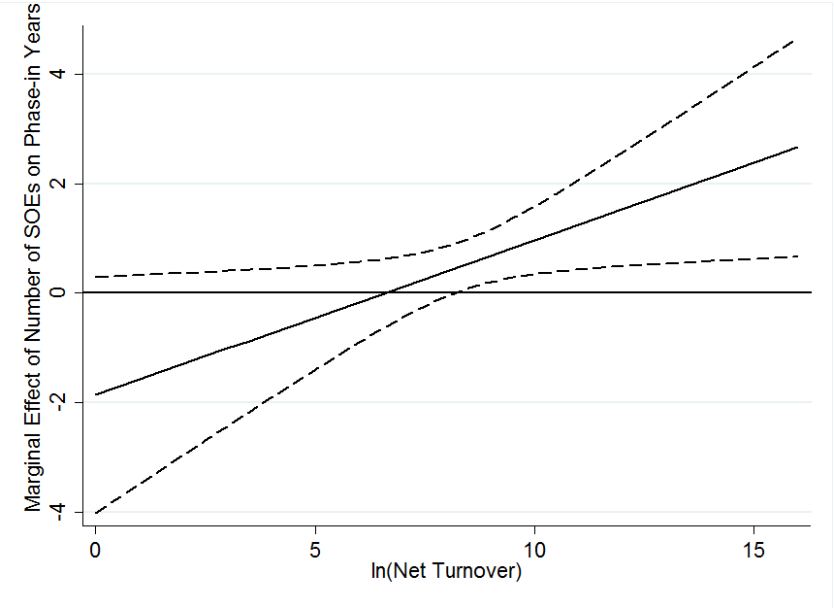

Figure 9: OLS: The effect of Firm size and number of SOEs on de facto depth.

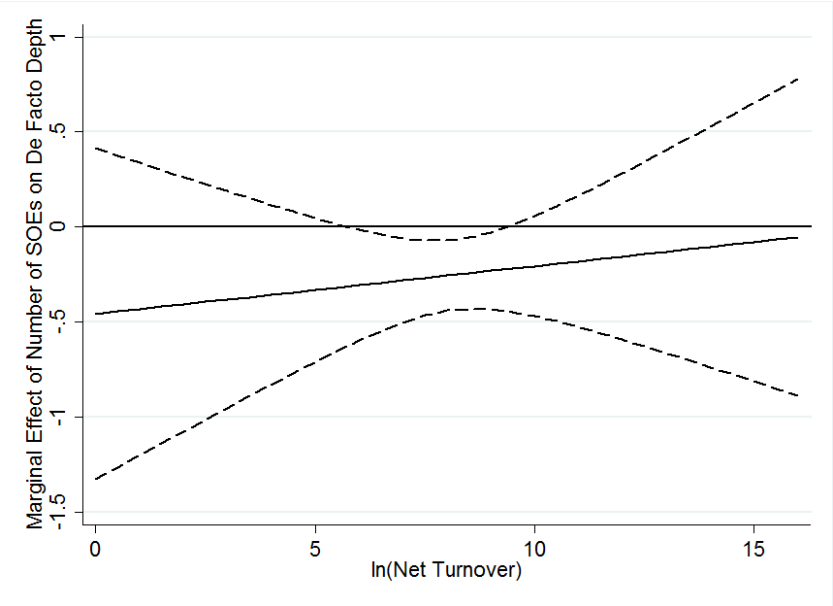

Figure 10: 2SLS: The effect of Firm size and number of SOEs on de facto depth.

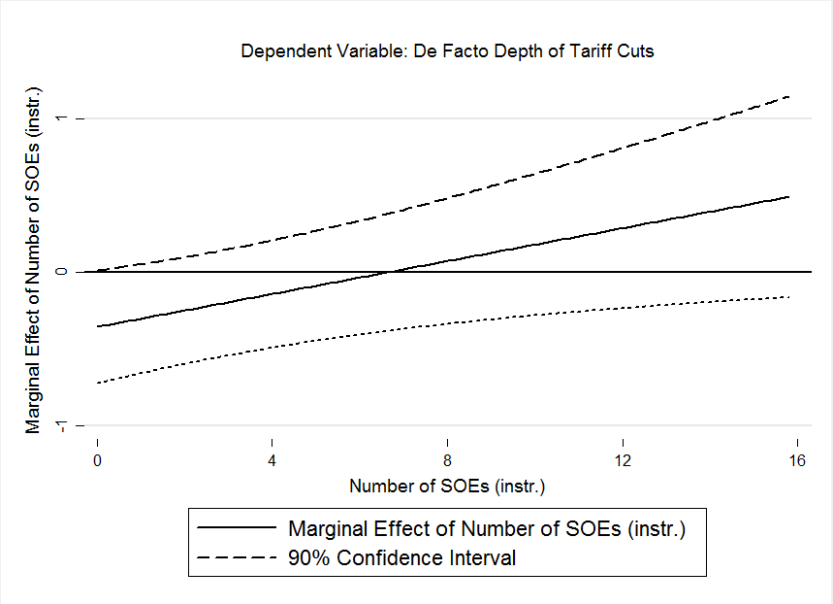

Figure 11: OLS: The effect of value added (pw) and number of SOEs on de jure depth.

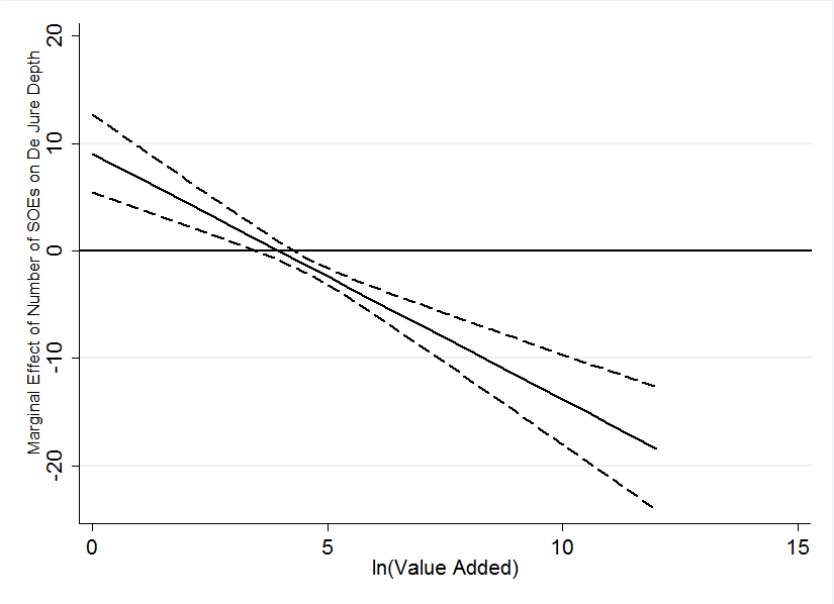

Figure 12: 2SLS: The effect of value added (pw) and number of SOEs on de jure depth.

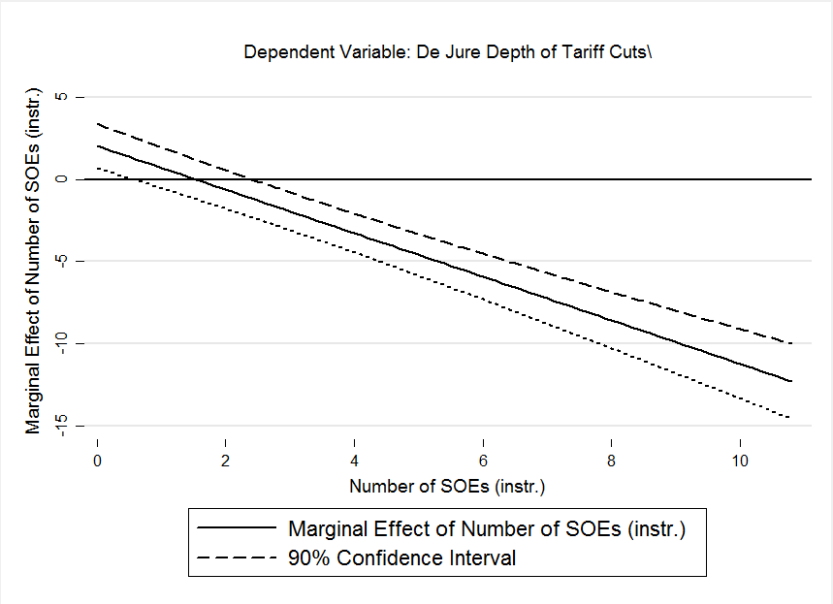

Figure 13: OLS: The effect of firm size (pw) and size dispersion on de jure depth for goods produced only by private firms and goods produced also by SOEs.

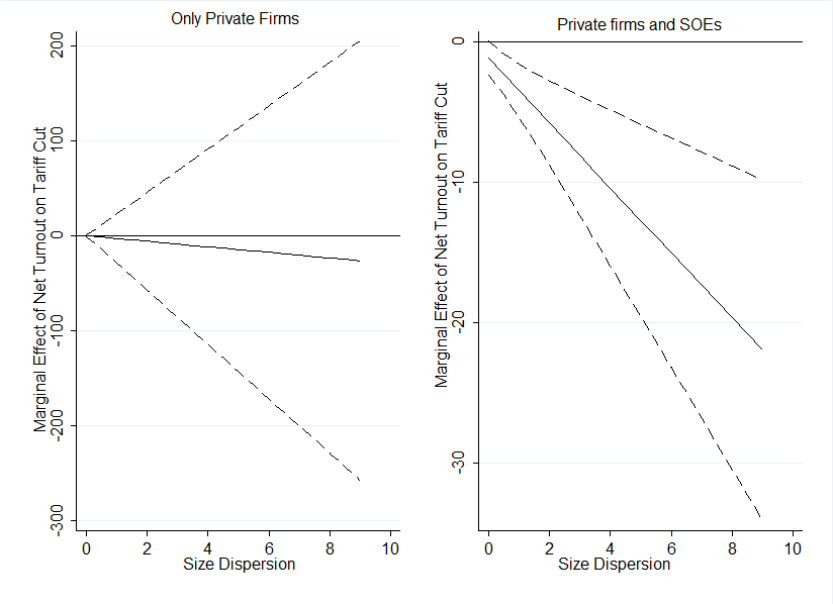

Table 1: Tariff preferences, i.e. $\downarrow$ = reduction and $\uparrow$ = increase, and lobbying power, i.e. $\Uparrow$ = strong and $\uparrow$ = weak, by firm type and firm size in case of reciprocal trade liberalization.

Firm Size	**Private Firm**	**SOE**
Small	$\uparrow$	$\uparrow$
Large	$\Downarrow$	$\Uparrow$

Table 2: Descriptive statistics.

Variables	Mean	Std. Dev.	Min	Max
De Jure Depth	6.57	13.13	-83.33	65
Firm Size	1.07	1.86	0	12.78
Number of SOEs	0.07	0.36	0	7.72
Net Turnover × Number of SOEs	8.28	2.21	0.69	16.8
Export	18.43	1.84	4.26	21.74
Import	18.85	1.65	3.92	21.60
Value Added pw	4.87	1.42	0.06	11.73
MFNpre	18.55	19.53	0	100
Tariff Transition	1.43	2.17	0	12
De Facto Depth	0.13	1.95	-13.33	46.25

Table 3: De Jure Depth.

VARIABLES	(1) De Jure Depth OLS	(2) De Jure Depth OLS	(3) De Jure Depth 2SLS	(4) Tariff Transition Tobit
Net Turnover	0.04	0.23**		-0.11
	(0.09)	(0.09)		(0.07)
Number of SOEs	-1.52***	11.61***		-1.86
	(0.43)	(2.04)		(1.31)
Net Turnover × Number of SOEs		-1.56***		0.28*
		(0.24)		(0.15)
$\widehat{NetTurnover}$			-2.09***	
			(0.22)	
$\widehat{NumberofSOEs}$			0.32	
			(0.21)	
$NetTurnover \times \widehat{NumberofSOEs}$			0.19***	
			(0.03)	
Export	0.34***	0.34***	-0.10***	-0.27***
	(0.09)	(0.08)	(0.03)	(0.06)
Import	0.48***	0.49***	0.06**	-0.19**
	(0.10)	(0.10)	(0.03)	(0.08)
Value Added pw	-0.45***	-0.57***	2.49***	0.26**
	(0.14)	(0.14)	(0.25)	(0.12)
MFNpre	0.54***	0.54***	0.05***	
	(0.01)	(0.01)	(0.00)	
Depth De Jure				0.04***
				(0.01)
Constant	-16.09***	-16.86***	5.68***	-1.85
	(2.01)	(2.00)	(0.66)	(2.03)
Sector FE	yes	yes	yes	yes
Observations	2,988	2,988	2,863	2,847
R-squared	0.67	0.68	0.68	0.15

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: De Facto Depth.

VARIABLES	(1) De Facto Depth	(2) De Facto Depth	(3) De Facto Depth
	OLS	OLS	2SLS
Net Turnover	-0.02	-0.02	
	(0.02)	(0.03)	
Number of SOEs	-0.27**	-0.46	
	(0.12)	(0.53)	
Net Turnover × Number of SOEs		0.03	
		(0.06)	
$\widehat{NetTurnover}$			-0.68***
			(0.22)
$\widehat{NumberofSOEs}$			-0.36
			(0.22)
$NetTurnover \times \widehat{NumberofSOEs}$			0.05**
			(0.03)
Export	-0.01	-0.01	0.02
	(0.02)	(0.02)	(0.03)
Import	0.02	0.02	0.01
	(0.03)	(0.03)	(0.03)
Value Added pw	0.03	0.03	0.79***
	(0.04)	(0.04)	(0.26)
MFNpre	0.01***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)
Constant	0.50	0.04	1.70**
	(0.55)	(0.58)	(0.67)
Sector FE	yes	yes	yes
Observations	2,761	2,761	2,777
R-squared	0.01	0.01	0.01

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Value Added (pw) and Collective Action Problems.

VARIABLES	(1) De Jure Depth OLS	(2) De Jure Depth 2SLS	(3) De Jure Depth OLS	(4) De Jure Depth OLS Also SOEs	(5) De Jure Depth OLS Only Private Firms
Value Added (pw)	-0.41***		-0.54***	-0.05	-0.87
	(0.14)		(0.15)	(1.18)	(0.76)
Number of SOEs	9.06***		7.78**		
	(2.20)		(3.71)		
Value Added (pw) × Number of SOEs	-2.29***				
	(0.47)				
$\widehat{Numberof SOEs}$		2.04**			
		(0.82)			
$\widehat{ValueAdded(pw)}$		-13.22***			
		(1.49)			
$\widehat{ValueAdded(pw)} \times \widehat{Numberof SOEs}$		-1.33***			
		(0.15)			
Size Dispersion			-0.72	17.22***	24.68
			(2.23)	(6.42)	(122.95)
Firm Size	0.08	5.77***	0.18*	-1.15	0.42
	(0.09)	(0.67)	(0.10)	(0.75)	(0.47)
Firm Size × Size Dispersion			0.10	-2.32***	-2.92
			(0.29)	(0.81)	(15.67)
Size Dispersion × Number of SOEs			5.43**		
			(2.26)		
Firm Size × Number of SOEs			-1.10***		
			(0.36)		
Firm Size × Size Dispersion × Number of SOEs			-0.68***		
			(0.25)		
Export	0.34***	-0.41***	0.35***	1.20**	-0.99**
	(0.09)	(0.12)	(0.09)	(0.60)	(0.46)
Import	0.48***	2.03***	0.48***	0.75	1.64***
	(0.10)	(0.21)	(0.10)	(0.70)	(0.54)
MFNpre	0.54***	0.47***	0.55***	0.31***	0.65***
	(0.01)	(0.01)	(0.01)	(0.04)	(0.05)
Constant	-16.86***	12.87***	-16.87***	-20.71	-16.56
	(2.01)	(3.91)	(2.02)	(12.86)	(10.74)
Sector FE	yes	yes	yes	yes	yes
Observations	2,988	3,004	2,988	193	197
R-squared	0.67	0.68	0.68	0.31	0.54

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1