Protection is for sale: but only for very effective sectors

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Abstract

Lobbying effectiveness as an explanation for observed levels of trade protection has proved relatively elusive; and more so for developing countries. The objective of this paper is to examine how differences in lobbying effectiveness and related political economy factors can explain variation in trade protection for Indian manufacturing sectors in the traditional model of Protection for Sale. Therefore, I attempt to answer the following question: **"Is Protection still for sale with Lobbying Effectiveness?"**. I find that *protection is for sale but only for those sectors that are very effective* in lobbying the government via associations. This suggests that sectors with a greater number of firms that lobby by means of their membership to associations are very effective in lobbying and achieve positive trade protection. Including additional political economy factors that reflect the firm-specific strength of a sector appears to be substitute in terms of lobbying strategy.

Keywords: Lobbying Effectiveness, Trade Policy, India
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1 Introduction

Empirical literature has focused attention on different theoretical explanations for observed levels of trade protection. However, lobbying effectiveness has proved relatively elusive[1], and more so for developing countries. The objective of this paper is to examine how differences in lobbying effectiveness and related political factors can explain the variation in trade protection for Indian manufacturing sectors.

To analyze the impact of lobbying effectiveness on trade protection, I adopt an intuitive modification of the standard Grossman and Helpman (1994) (American Economic Review 84: 833–850, GH henceforth) *Protection for Sale* (PFS henceforth) model motivated in Saha (2017). This works on the assumption that there are two factors that can explain lobbying effectiveness, predisposition of the government to supply protection and the ability of sectors to organize and make a case for protection. Based on this model, I examine the following question: **"Is Protection still for sale with Lobbying Effectiveness?"**. I estimate PFS with a direct proxy for lobbying effectiveness as the baseline model.

Trade policy actors in India consists of the apex government body i.e. *Ministry of Commerce and Industry* (MOCI) that oversees trade policy formulation. Industry dealings with the government are often facilitated by associations that include especially the national bodies of *Confederation of Indian Industries* (CII) and *Federation of Indian Chambers of Commerce and Industry* (FICCI). The associations sponsor and participate in general policy debates as emphasized in Kochanek (1996) and have played a significant role in Indian trade policy as argued in Sagar and Madan (2009). This has in turn been accompanied by rising government responsiveness to industry association meetings. I use information on firm membership to these associations, that have close ties to the government and are perceived as a legitimate means of lobbying[2]. This information is taken from the *World Bank Enterprise Survey* (WBES) from 2005 to construct the proxy measure of lobbying effectiveness.

I recognize two qualifications to this that arise. First, membership alone may not fully capture the extent of actual lobbying. Firms can lobby more or less effectively by means of their membership. This implies a sector with lower share of firms as members can be more effective in lobbying than another sector with a higher share of members. If this argument is true, it will lead to a downward bias when examining the impact of lobbying effectiveness on trade protection[3]. Second, there may be additional political economy

[1] See de Figueiredo and Richter (2014) for a review on lobbying effectiveness

[2] The associations developed close ties to the government with detailed information and corresponding awareness of international trade negotiations as discussed in Narlikar (2006).

[3] I recognize that one may further argue that membership to associations may not always imply lobbying only for trade policy influence. Associations can also represent interests for industrial policy. If one believes that the associations lobby more for industrial policy than trade policy, the measure of effectiveness based on membership will suffer from a potential measurement error. This argument is found in the existing literature on PFS for the United States in the context of political organization where political contributions are not always for trade policy influence Gawande and Bandyopadhyay (2000). I have undertaken an additional estimation using an IV for lobbying effectiveness for India. This owes primarily to the fact that the national associations in India engage in major trade lobbying while

factors at work besides interactions by means of membership to associations that can help explain the variation in trade protection. These can be firm-specific strength of a sector; and may be potential substitutes or complements to lobbying by means of membership to associations.

It is a fair argument that membership to associations does not imply actual lobbying that can bias the impact of effectiveness on trade protection downwards. This leads to the first robustness check for the baseline estimation. I take the measures of lobbying effectiveness and use a binary equation to estimate the likelihood of a firm to lobby effectively for trade policy influence using its membership to an association. A set of firm and industry characteristics are used to explain this likelihood with the aim to reduce the bias. This gives a predicted measure of lobbying effectiveness such that the PFS model is estimated using the predicted measure as a robustness check for the qualitative findings of the baseline.

The second qualification to my framework finds discussion in Goldberg and Maggi (1997) who have extended the empirical specification of PFS to include variables that may affect protection but were left out of the model. They include employment size, sectoral unemployment rate, measures of unionization, changes in import penetration, and buyer and seller concentration. The conclusion was that some variables have additional explanatory power that can significantly improve the fit of the model. Following this line of thought, one can contest that there maybe additional political economy factors that can influence the equilibrium level of trade protection specific to developing countries and more so for India that may still be left out of the theoretical model. Thereby, I add another factor that can help explain the variation in trade protection. To achieve this however, I choose to drive the empirics using a theoretically consistent specification derived by another simple alteration to the functional form of the modified PFS framework.

I find that *protection is for sale but only for those sectors that are very effective* in lobbying the government via associations. This suggests that sectors with a greater number of firms that lobby by means of their membership to associations are very effective in lobbying and achieve positive trade protection. Including additional political economy factors that reflect the firm-specific strength of a sector appears to be substitute in terms of lobbying strategy.

The remainder paper is organized as follows. In Section 2, I present a discussion of relevant literature, followed by Section 3 where I will outline the theoretical framework and build the hypothesis for analyzing the data outlined in section 4. Section 4 presents the data and outlines the Methodology. Section 5 summarizes the overall findings and makes concluding remarks.

lobbying for industries is only at the margin.

2 Literature

The literature on PFS has recognized limitations for developing countries. Issues with data availability has made it hard to discern the extent to which lobbying effectiveness and related political economy factors determine trade protection for these countries. This section presents the literature that has attempted to deal with such issues and identifies possible ways forward.

Weymouth (2012) uses the WBES data for 2002-2005 for over 42 developing and transition countries to examine the determinants of lobbying and perceived policy influence. He argues that firm-level heterogeneity explains political behaviour while political institutions shape the incentives of policy-makers to respond to business interests. On the whole, the estimates give support to the hypotheses that lobbying and influence increases with the firm size and market power in these countries. However, India is not included in this study because WBES data for India is not comparable with the global dataset. This warrants a case specific study of India using the WBES data.

Chen (2013) shows firm-level heterogeneity determines the nature of firm engagement with government officials in China. A Chinese firm-director panel dataset is used to examine the matching of heterogeneous firms and politicians using 36,308 detailed observations. The results show that the more productive firms are the ones paired with more powerful politicians. The preference for political capital relative to human capital increases with firm dependence on external financing and the inefficiency of local governments. This provides further evidence on the importance of industry-government interactions and lobbying in developing countries.

Olarreaga et al. (1999) conclude that industrial lobbies had an important influence on the determination of Mexican trade policy. They conduct a survey with Mexican business executives and conclude that only three percent of the executives think that it is useless to attempt and influence government policy. This shows the importance attached to lobbying as a means of influence on trade policy for Mexico. It is shown that foreign firms may in fact have a higher influence than domestic firms in Mexico as the industries with a higher concentration of foreign firms are likely to achieve greater trade protection. The influence of foreign firms versus domestic firms in lobbying for trade policy of a country has emerged as an important element of policy processes for developing countries.

The determinants of association membership have received significant attention in the lobbying literature. One important factor is firm size that is expected to be positively correlated with the likelihood of lobbying as shown in Kerr et al. (2014). One reason cited is that larger firms offer greater potential pay-off to support policy-makers such that firms with more employees provide politicians with a greater pool of potential support. For example, if policy-makers aim to reduce unemployment with a policy outcome, firm expectations of lobbying success will potentially increase with size. While, smaller firms often lack sufficient scale to cover the fixed costs of becoming a member of a lobby association. This proposition is examined in the context of the firm decision to be a member of a lobbying association in India.

Campos and Giovannoni (2007) provide evidence on lobbying and influence for 25 transition countries. Their results suggest that firm size and ownership are amongst the most important determinants of lobby membership even for less developed countries. Further, if a firm is foreign-owned it is more likely to be a member of a lobby group and in turn to attract foreign investment, governments could also be particularly attentive to requests from foreign investors. Foreign firms in India are subject to greater trade regulations than domestic firms such that foreign ownership could imply that they must lobby harder to achieve the same influence. It can also be hypothesized that firms with foreign ownership are also likely to have an advantage in negotiating with foreign partners in international negotiations such that they would leverage this by taking membership in domestic lobbying associations for a better stance at lobbying the policy-makers.

If firms in a given industry are spread across the country, then their influence on the government's decision-making process can potentially be stronger as they would exert their influence through different channels as in Facchini et al. (2006). This can in addition be linked to greater political representation across different locations in the country. At the same time, it has been suggested in earlier literature that it could be harder/expensive for firms that are spread out to organize and lobby. This is based on the idea of a closed group that implies lower costs of organization and correspondingly lower incentive to free-ride. The concentration of firms in geographical locations can have important implications for cooperation in lobbying. To explain effectiveness in terms of membership to associations, this reasoning would imply that firms in sectors with lower geographical concentration would be more likely to achieve effectiveness in lobbying by means of its membership.

To examine the political economy of trade protection in India, the next section presents the structural model to guide the analysis of PFS accounting for differences in lobbying effectiveness and the underlying set up to examine membership of firms to associations.

3 Theoretical Framework

This section outlines the theoretical framework in two steps. First, I present the model that proposes the use of a direct measure to proxy for lobbying effectiveness (baseline). To check for robustness to the concern that membership may not always imply actual lobbying effectiveness, I predict the likelihood of lobbying by means of membership to an association and construct the second proxy measure for effectiveness. Second, I introduce related additional political factors into the PFS framework with lobbying effectiveness.

3.1 PFS and Lobbying Effectiveness

The original PFS model explains the trade policy outcome when the industry is organized and when it is not organized. A heterogeneous measure of lobbying effectiveness γ_i can be introduced to replace this binary identification, that gives the following equation (Saha (2017)).

$$\frac{t_i}{1+t_i} = \frac{\gamma_i - \sum_{j=1}^{n} \gamma_j \alpha_j}{a + \sum_{j=1}^{n} \gamma_j \alpha_j} \frac{z_i}{e_i} \tag{1}$$

t_i is tariff protection; a is weight on welfare; $alpha_j$ is the fraction of sector-specific capital owners across all j sectors; Import penetration ratio z_i equals $\frac{X_i}{M_i}$; e_i is import demand elasticity; γ_i is the lobbying effectiveness that translates into a high valuation of the political contribution in government preferences. Each sector i receive a different weight given by $(a + \gamma_i)$. Assuming $a = 1$, this weight reduces to $1 + \gamma_i$.

Further, assume that the $\sum_{j=1}^{n} \alpha_j \gamma_j$ is given by a constant A that shows the product of the proportion of a country's population that is politically organized and the lobbying effectiveness measure aggregated across the j sectors[4]. The stochastic version of the equation with time-variation is shown below[5].

$$\frac{t_{it}}{1+t_{it}} e_i = (\frac{\gamma_i}{a+A} - \frac{A}{a+A}) z_{it} + u_{it} \tag{2}$$

Separating the two terms, the equation can be re-written as:

$$\frac{t_{it}}{1+t_{it}} e_i = (\frac{1}{a+A}) \gamma_i z_{it} - (\frac{A}{a+A}) z_{it} + u_{it} \tag{3}$$

The literature on collective action has often repeated that trade associations provide a common lobbying organization that can handle the concerns of industries in a more effective manner than if the firms lobbied themselves as argued in Olson (1971). The national associations in India also seem to have a significant say in policy formulation

[4] A is summed over the product of α_j which represents the proportion of of specific factor owners that are organized and the lobbying effectiveness measure for the other j sectors

[5] To deal with the measurement error in the estimates of import demand elasticities, I have taken the elasticities to the left hand side.

of the government. I construct direct measures of lobbying effectiveness γ_i using information about the membership of firms to associations across industries[6]. Industries are able to overcome the free rider-problem to different degrees such that they are more or less effective in lobbying. To test this proposition, I construct γ_i^a that is the proportion of firms that are members of associations in every sector. This measure can potentially account for the extent of cooperation versus free riding in every sector. The specification will constitute the baseline for PFS with heterogeneity in lobbying effectiveness.

Membership may not always imply actual lobbying effectiveness; thereby I construct another measure by introducing a preliminary stage where I examine the determinants of membership to associations. Consider the decision of a firm j in sector i to become a member of an association as $Membership_{ji}$. The trade association lobbies the government on behalf of its members. The members consist of firms within each industry that seek membership to the association. As noted before, lobbying by means of such membership is seen as more legitimate and can provide advantages by way of greater information about the costs and benefits associated to a particular policy. In addition to lobbying for trade policy influence, it is a source of political support for vote-maximizing politicians. Membership with an association may thereby increase the political activity and influence of the firm as emphasized in Weymouth (2012). There is a cost f_{ji} for membership to the lobby association. In turn, a member of an association then derives a benefit b_{ji}. Both the lobbying costs and benefits depend on firm and industry-level characteristics as evidenced in the existing literature. This can be defined as a function of the membership cost and the benefit to be derived from the membership as shown below:

$$Membership_{ji} = f(f_{ji}, b_{ji}) \tag{4}$$

The decision to lobby by means of membership to an association now depends on the benefit outweighing the cost. Let the decision be based as a latent variable formulation such that the unobserved (latent) continuous variable y^* represents the excess utility derived by lobbying as a member compared to not lobbying via membership in the association. The observed decision takes a value of 1 (becomes a member) if the excess utility from lobbying via membership to associations compared to not doing sp (value 0) is positive.

$$Membership_{ji} = \begin{cases} 1 \; if \; y^* > 0 \\ 0 \;\; otherwise \end{cases} \tag{5}$$

This decision to lobby by means of membership to an association is taken by the firm, such that in every sector there are a number of firms that lobby as members of associations. There are however some firms that are members but do not actually use their membership to lobby. Membership brings benefits when firms cooperate in a given sector and lobby the government through the association. If all firms in a given sector lobby the government as members of associations, they have solved the free-rider problem and all firms cooperate to lobby effectively. While, as stated earlier not all membership is to lobby and may in fact be just to serve the purpose of political support. Therefore, if some

[6]It is important to note that there is no existing data on actual lobbying by association members for India.

firms join the association but do not actually lobby as members, this would mean that such firms free-ride and that would make a sector less effective than a sector where all firms are lobbying as members of associations. Thereby, I predict the likelihood of firms to lobby effectively as members of trade associations to achieve influence on trade policy. The predicted probabilities for firms will be collapsed by sectors of the WBES by taking an average across all firms that map to each sector. Therefore, such a predicted measure can be understood as the likelihood of firm lobbying as members of associations in terms of cooperation in lobbying versus free riding which then gives the lobbying effectiveness of the sector.

3.2 Additional Political Factors

There are specific arguments relevant for Indian trade policy that may be left out in the empirical specification for protection in PFS and the modified framework. As mentioned earlier, there is no usable data on lobbying in India such that information on direct industry and government interactions are not available. Direct interactions between the government and industry can take various forms which in the traditional PFS set-up can be attributed to the additional error term in the empirical estimation. I seek to include such interactions by introducing an additional factor in the government objective.

Goldberg and Maggi (1997) introduced such variables into the PFS[7]. This argument was taken forward by Ederington and Minier (2008) who included additional terms into the trade policy equation, arguing that this can actually reverse some of the fundamental predictions of the model[8]. It can be argued that in the traditional PFS, the government maximizes industry contributions and (anonymous) utilitarian social welfare and there are no scope for additional factors. However, there can be other political factors that can influence government maximization. Examples include employment in marginal constituencies and other forms of representation.

In terms of the strict structural interpretation of the model, import-penetration, trade elasticities and a measure for lobbying can explain protection and no other additional variables should be included. Following the explanation in Goldberg and Maggi (1997) and Ederington and Minier (2008), I estimate Model 3 with the additional political economy factor that can potentially affect trade protection in India. The empirical extension derives from a well-specified alternative hypotheses, suggesting the additional regressor and its functional form that enables a further check on the robustness of the findings in the baseline.

To include additional political economy factors, the government objective can be characterized as a sum of the contribution schedules of lobby groups weighted by lobbying

[7]These included employment size, sectoral unemployment rate, measures of unionisation, changes in import penetration, buyer and seller concentration among others.

[8]To the best of my knowledge, while the PFS including additional explanatory variables has been estimated with empirical data, the estimation of a modified framework of PFS with additional factors has not been attempted

effectiveness γ_i, the aggregate voter welfare W (anonymous) weighted by a, and an additional factor. This new factor is introduced as an additional term L_i that could potentially affect the trade policy outcome for the manufacturing industry in India[9]. In my framework, the government attaches a relative weight of b to this additional factor, which implies the government weighs every individual by the weights attached to the overall welfare, their effectiveness in lobbying as producers and any other political factor $(a + \gamma_i + b)$:

$$G = aW + \sum_{i=1} \gamma_i C_i + b \sum_{i=1} L_i \tag{6}$$

In terms of the traditional PFS, the government maximization implied that a change in the contribution schedule equals the change in welfare weighted by a:

$$\frac{\partial C_i}{\partial t_i} = -a \frac{\partial W_i}{\partial p_i} \tag{7}$$

Now, with an additional political economy factor, the government maximization is now given as follows:

$$\frac{\partial C_i}{\partial t_i} = -a \frac{\partial W_i}{\partial p_i} - \frac{\partial L_i}{\partial p_i} \tag{8}$$

Substituting for W and C_i in the government objective, where $C_i = W_i - B_i$ as in PFS, gives:

$$G = a \left[1 + \sum_{i=1}^{n} \pi_i + \sum_{i=1}^{n} (t_i M_i + s_i) \right] + \sum_{i=1}^{n} \gamma_i \left[\pi_i + \alpha_i \left(1 + \sum_{j=1}^{n} (t_j M_j + s_j) \right) - B_i \right] + b \sum_{i=1} L_i \tag{9}$$

Maximizing this government welfare function with respect to trade protection t_i (that is equivalent to differentiating with p_i gives the following:

$$\frac{\partial G}{\partial t_i} = (a + \gamma_i) X_i + \left(a + \sum_{j=1}^{n} \gamma_j \alpha_j \right) (t_i M_i' + M_i - d_i) + b \frac{\partial L_j}{\partial t_i} = 0 \tag{10}$$

I make the simplifying assumption that there are no cross-price effects across the sectors for the additional political factors ($\frac{\partial L_i}{\partial t_j} = 0 \ \forall_{j \neq i}$)[10].

Now, substituting $M_i - d_i = -X_i$ and separating the terms, I get:

[9] Ederington and Minier (2008) discuss two means of integrating such factors into the PFS model. First, by defining the government objective in terms of contributions and non-anonymous social welfare in each industry. Second, they discuss the theoretical model in terms of appending an additional term into the government's welfare function when the industries are either organized or unorganized. However, there is no formal test with empirical data in the paper.

[10] This can also be thought on lines of additional political factors that come into play primarily from the producer end and do not include any consumption externalities (for producers) in relation to price changes in other sectors. This effect is so small that it can be well approximated to zero. The original approach in Grossman and Helpman (1992) article calls such an approximation as *Example* 3 which is employed here.

$$\frac{\partial G}{\partial t_i} = (a + \gamma_i) X_i + \left(a + \sum_{j=1}^{n} \gamma_j \alpha_j \right) t_i M_i' - \left(a + \sum_{j=1}^{n} \gamma_j \alpha_j \right) X_i + b \frac{\partial L_i}{\partial t_i} = 0 \tag{11}$$

Simplifying and re-arranging, I get the following specifications:

$$- \left(a + \sum_{j=1}^{n} \gamma_j \alpha_j \right) t_i M_i' = \gamma_i X_i - \left(\sum_{j=1}^{n} \gamma_j \alpha_j \right) X_i + b \frac{\partial L_i}{\partial t_i} \tag{12}$$

$$t_i = \frac{\gamma_i X_i - \left(\sum_{j=1}^{n} \gamma_j \alpha_j \right) X_i + b \frac{\partial L_i}{\partial t_i}}{\left(a + \sum_{j=1}^{n} \gamma_j \alpha_j \right)} \frac{-1}{M_i'} \tag{13}$$

Assume l_i is the additional political economy factor defined above that is transferred to the government. The marginal effect of the additional political economy factor now enters the structural determination of trade protection.

$$t_i = \frac{\gamma_i - \left(\sum_{j=1}^{n} \gamma_j \alpha_j \right) + b(l_i / X_i)}{\left(a + \sum_{j=1}^{n} \gamma_j \alpha_j \right)} \frac{-X_i}{M_i'} \tag{14}$$

Multiplying on both sides of the equation:

$$\frac{M_i}{p_i} t_i = \frac{\gamma_i - \left(\sum_{j=1}^{n} \gamma_j \alpha_j \right) + b(l_i / X_i)}{\left(a + \sum_{j=1}^{n} \gamma_j \alpha_j \right)} \frac{X_i}{-M_i' \frac{p_i}{M_i}} \tag{15}$$

Let elasticity of import demand e_i equals $-M_i' \frac{p_i}{M_i}$ and $p_i = p_i^* + t_i$ where international prices p_i^* are assumed equal to one. Substitution gives:

$$\frac{t_i}{1 + t_i} = \frac{\gamma_i - \sum_{j=1}^{n} \gamma_j \alpha_j + b(l_i / X_i)}{(a + \sum_{j=1}^{n} \gamma_j \alpha_j)} \frac{z_i}{e_i} \tag{16}$$

A question of importance in terms of the PFS framework is how the interest groups would choose between cooperative lobbying and other factors. For the total offerings forwarded to the government in PFS, firms in an industry could choose to divert resources

from cooperative lobbying to additional political factors[11].

For this specification, note that if $\gamma_i = 1 \forall i$, and l_i is zero, then Equation 16 will collapse to standard PFS that implies the following:

$$\frac{t_i}{1+t_i} = \frac{1-\sum_{j=1}^{n}\alpha_j}{a+\sum_{j=1}^{n}\alpha_j}\frac{z_i}{\epsilon_i} = \frac{1-\alpha_L}{a+\alpha_L}\frac{z_i}{e_i} \tag{17}$$

If γ_i equals 1 such that all sectors are equally effective in lobbying by means of associations and the only differences in lobbying arise from the additional lobbying factor (l_i is not zero), then:

$$\frac{t_i}{1+t_i} = \frac{1-\alpha_L+b(l_i/X_i)}{a+\alpha_L}\frac{z_i}{e_i} \tag{18}$$

4 Data & Methodology

This section presents the data and methodology. A contribution of this paper is to assemble a dataset that combines industry, trade and lobbying data for the Indian manufacturing sector. I use industry data on imports and output from *All India Survey of Industries* (ASI) from 1990-2007. The Indian Industrial Classification is the National Industrial Classification (NIC) developed following the ISIC Revision 3 of classifying data according to the kind of economic activity. The industry sample consists of 98 sectors (i) at the 4-digit of manufacturing industries. Data on MFN tariffs is from WITS TRAINS and WTO IDB. Elasticities are from Kee et al. (2008). Instrumental variables include Workers and Inventories. Summary statistics are attached in Appendix.

The firm-level characteristics are from the WBES data collected for 2005 for $2,286$ firms (j), categorized into 22 sectors (k), and not varying across time. The distribution of firms across the WBES sectors is attached in Table 8 of Appendix. However, there is no standard identifier for firms in the WBES to match to sector identifiers of NIC. To overcome this, the 22 sectors in the WBES are manually matched to the 98 sectors in the ASI by careful examination of product descriptions (available on request).

Using the firm-level data from WBES, measures are constructed across the 22 sectors and then matched with the 98 NIC sectors using product descriptions[12]. To the best of

[11]There are two ways to think about this. First, government may receive this additional political resource such that these are employment in marginal constituencies and there are no associated cost for the firms in every sector. Second, the additional political economy factors in PFS could imply that the lobbies may potentially follow non-truthful strategies. The competition between the firms would no longer be limited to the choice of a scalar amount. The additional factor would in turn depend on the producer returns. It has been shown in Grossman and Helpman (1992) working paper that every lobby can always substitute a truthful strategy for a non-truthful strategy and achieve the same net pay-off after the substitution as in the non-truthful equilibrium.

[12]The selection of sectors in the WBES represent largest manufacturing sectors in India in terms of employment and output shares. The count distribution of firms is presented as a reliable estimate for

my knowledge, this is the first study that attempts to measure the effects of lobbying using the WBES data combined with trade and industry data for India.

4.1 Lobbying Effectiveness γ_i^a

The first proxy measure for lobbying effectiveness is γ_i^a measured as the proportion of firms that are members of associations in each sector. Thereby it is based on collective lobbying. It is constructed using information identified from the WBES, the following question is asked for each firm:

"Is your firm a member of a producer or trade association?"

A positive answer is coded as 1, while the value of 0 was assigned to a negative answer that gives a binary variable termed as *Membership* at the firm-level. Using this identification, I get the number of firms that are members of associations in every sector across the 22 sectors of the WBES. I construct a measure based on the proportion of firms that are members in each sector. The 22 sectors are mapped to the corresponding 98 4-digit sectors of NIC using the concordance developed above. Each 4-digit sector is then allocated this measure shown in Table 3.

Approximately 77 per cent of firms in the WBES sample (2,286 firms) said they were members of an association. The sectors *Textiles* and *Electrical Appliances* are found to have the highest percentage of firms as members of associations. It is important to note that this measure of effectiveness in terms of collective lobbying where firms seek membership to associations for lobbying the government. This definition of lobbying effectiveness identifies sectors in terms of differences in their capability to lobby as an organized group.

4.2 Predicted Lobbying Effectiveness $\widehat{\gamma}_i^b$

The second measure for lobbying effectiveness is denoted by $\widehat{\gamma}_i^b$ that is the predicted probability of firms to lobby for trade policy via their membership to associations. To examine the likelihood of *Membership*, I rely on findings of previous studies discussed above to inform the specification outlining the main variables of interest. It is explained using the following firm-level and sector-level determinants as discussed in the literature above.

Firm Size is measured as the log of average number of workers for each firm from the WBES survey. The information is identified using the following question on the number of permanent workers: *"Average number of workers during fiscal year 2002. Permanent workers are defined as all paid workers that are employed for a term of one or more years and/or have a guaranteed renewal of their employment contract."*

the proportion of firms by sectors. Note that some sectors are populated by fewer firms. However, constructing average measure of lobbying effectiveness should not be affected by this as I attempt to construct the measures using proportion of firms and average time spent by firms in a particular sector. This gives an idea of within sector lobbying dynamics based on the sample of WBES.

A dummy for foreign ownership *Foreign Ownership* is constructed across firms using percentage foreign ownership calculated across sectors using the following question: *"What percentage of your firm is private foreign ownership?"*

Competitors is the number of competitors faced by a firm from the WBES using the question: *"Thinking of your firm's major product line in the domestic market, how many competitors do you face?"*

Finally, the sector level determinants that enter the probit estimation include geographic concentration *Geog. Concentration* from Lall et al. (2003) that provide estimates on concentration across the states of India in a given sector. Output concentration is denoted as *Output Concentration* measured as the share of output produced by the four largest firms in a given sector i using data from the ASI and mapped to the 22 sectors of the WBES.

The firm decision to lobby as a member of an association is directly linked to producer returns and the costs of lobby membership. The dependent variable $Membership_{ji}$ indicates whether or not a firm j in a given sector i is a member of a lobby association. An appropriate econometric methodology to study the likelihood of actual lobbying via this membership is a probit estimation. The unit of observation here is the firm j from the WBES (distributed across the 22 sectors of the WBES matched to the 4-digit sector i. $Membership_{ji}$ is explained by both firm-level and industry characteristics based on the underlying assumption of homogeneity across firms. This can be specified as shown below.

$$P(Membership_{ji}) = \phi(\theta D_{ji} + \pi C_{ji}) \tag{19}$$

Here, D_{ji} represents the main variables of interest that includes $Firm\ Size$ of each firm j, the measure for $Geog.\ Concentration$ for firms in every sector i, and foreign ownership is $Foreign$ for every firm j. C_{ji} is the vector of controls on competition that includes $Concentration$ in a given sector i and $Competition$ which is the number of competitors faced by each firm j. ϕ is the cumulative standard normal distribution function. The predicted values based on the marginal effects is used to construct a lobby effectiveness measure aggregated by each sector i from the following equation:

$$\gamma^{b}_{ji} = \phi(\theta D'_{ji} + \pi C'_{ji}) \tag{20}$$

Table 1 presents the results for the probit estimation on determinants of lobbying via membership to associations. Columns (1)-(4) include controls on competition and output concentration and standard errors are robust and clustered by 22 sectors of WBES. I find evidence that supports the fact that lobbying via association membership is increasing with firm size and foreign ownership, while firms in more concentrated sectors are less likely to lobby via membership to associations. These results are not surprising in terms of firm size and are in line with the existing literature. Lobbying by foreign owned firms seem in confirmation with Olarreaga et al. (1999) for Mexico. Further, this lends support to the hypothesis that if firms are geographically concentrated, the costs of organizing by themselves is lower and they are less likely to join an association for lobbying. The finding

implies that in these sectors, firms may be lobbying using other channels. I attempt to incorporate these as additional political factors that can be used to lobby the government in the following section.

Table 1: Determinants of Effectiveness in Lobbying using Membership

Variables	(1)	(2)	(3)	(4)
Firm Size	0.253***			0.237***
	(0.070)			(0.065)
Foreign Ownership		1.164***		0.787**
		(0.376)		(0.382)
Geog. Concentration			-0.269***	-0.224***
			(0.079)	(0.077)
Controls				
Output Concentration	-0.207	-0.013	-0.046	-0.247
	(0.14198)	(0.057)	(0.062)	(0.160)
Competitors	-0.0001	-0.000	-0.000	-0.000
	(0.00010)	(0.000)	(0.000)	(0.000)
Constant	0.107	0.788***	1.350***	0.583**
	(0.262)	(0.096)	(0.174)	(0.262)
N	892	1,052	1,052	892
Psuedo R-Square	0.039	0.017	0.021	0.057
Log Likelihood	-432.450	-534.582	-528.998	-424.256

*** $p < 0.01$; ** $p < 0.05$; ; *$p < 0.10$

Note: Table 1 examines the determinants of membership to associations for manufacturing firms in India using data from the WBES for 2005. Columns (1)-(4) include control variables on Competition and Output Concentration. Probit coefficients are reported and the marginal effects are used to construct lobby effectiveness. This is undertaken with the underlying intuition that lobbying by means of associations is potentially more effective than any other means in India. Individual correlations are observed in column (1) to (3). Robust standard errors clustered by 22 sectors of WBES in parentheses.

Figure 1 outlines the correlation between lobbying effectiveness measure γ_i^a and the predicted measures $\widehat{\gamma}_i^b$ that exhibits the differences in membership and actual lobbying across sectors. The lobbying effectiveness measures γ_i^a and the predicted estimates $\widehat{\gamma}_i^b$ are compared in Table 2 below. I find only weak correlation between these measures. This aligns with the first qualification made in the introduction regarding membership not being the same as lobbying by means of this membership. Therefore, I check the baseline model to check for robustness to these differences. The predicted measures suggests that the coefficients for the effect on trade protection in the modified PFS framework are expected to change. However, it is important to examine if this changes the overall findings of the model.

Figure 1: Lobbying Effectiveness and Predicted Effectiveness

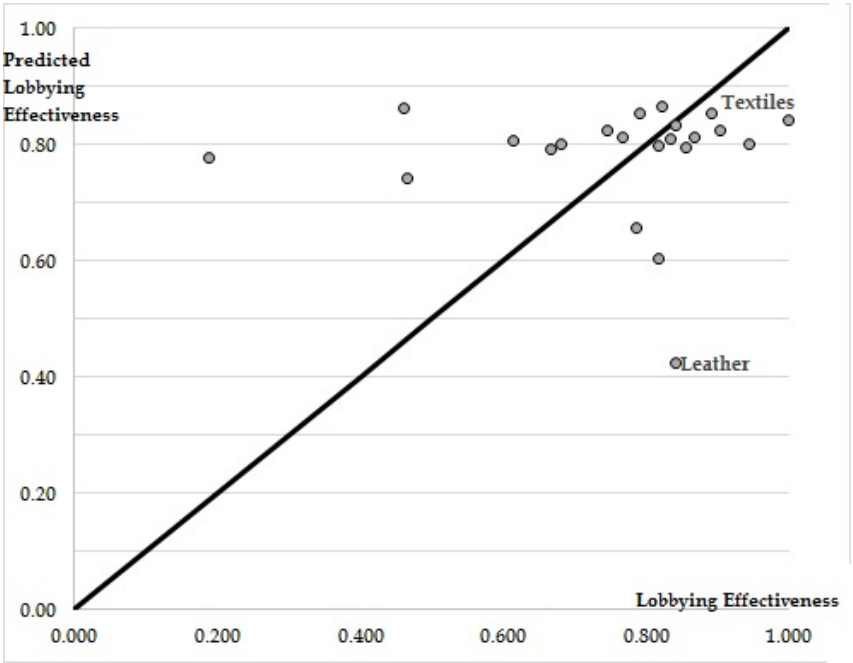

Figure 1 shows lobbying effectiveness and predicted effectiveness across the WBES sectors.

Table 2: Lobbying Effectiveness and Predicted Effectiveness

S. No.	Industry	Firms	γ_i^a	$\widehat{\gamma}_i^b$
1	Textiles	222	1.000	0.843
2	Electrical Appliances inc. white goods	155	0.944	0.799
3	Paper & paper products	24	0.903	0.823
4	Rubber & rubber products	38	0.891	0.852
5	Electronics inc. Consumer Durables	100	0.867	0.813
6	Food Processing	155	0.855	0.793
7	Leather & leather products	74	0.842	0.423
8	Other chemicals	112	0.840	0.832
9	Machine tools inc. Machinery & parts	195	0.833	0.810
10	Drugs & Pharma	165	0.821	0.865
11	Mineral processing	32	0.817	0.797
12	Mining	3	0.816	0.603
13	Marine food processing	14	0.792	0.853
14	Structural metals and metal products	303	0.786	0.656
15	Agro processing	26	0.766	0.811
16	Garments	275	0.745	0.825
17	Paints and varnishes	20	0.680	0.799
18	Plastics & plastics products	122	0.667	0.793
19	Auto Components	218	0.614	0.806
20	Wood and furniture	16	0.466	0.743
21	Sugar	4	0.462	0.863
22	Cosmetics and toiletries	13	0.188	0.776
	Total	2,286		
	Pearson Correlation			-0.017

Note: Table 2 shows the sectors with corresponding measure of lobbying effectiveness and predicted lobbying effectiveness measures.

4.3 Additional Political Factors E_i

Next, I define a measure of additional political economy factors that can affect lobbying effectiveness for Indian trade policy. While γ_i reflects the collective lobbying effectiveness of sectors, there can be firm-specific individual lobbying that may be a substitute for collective lobbying. If additional political factors can be understood as the firm-specific strength of a sector, the measure for such factors can be seen as the opportunity for firms to interact with the government directly. I argue that such interactions do not occur by means of cooperative lobbying via associations but are firm-specific. I measure this using information from the WBES as follows:

"In a typical week over the last year, what percentage of total senior management's time was spent in dealing with requirements imposed by government regulations including dealings with officials, completing forms, etc.?"

This is taken as the mean for each sector across the 22 sectors of the WBES to construct the proxy measure for additional political economy factors E_i that may impact trade protection. Taking the average value per sector allows to interpret the additional factors as an average measure of time spent by the firms in each sector. The measures for the WBES sectors are mapped to the 4-digit sectors where similar to the method to construct γ_i^a, each 4-digit sector is allocated the measure of the corresponding sector of WBES. This measure can be seen as the opportunity to interact with the government directly, shown in Table 3.

Table 3: Lobbying Effectiveness and Additional Political Factors

S. No.	**Industry**	**Firms**	γ_i^a	E_i
1	Textiles	222	1.000	0.159
2	Electrical Appliances inc. white goods	155	0.944	0.129
3	Paper & paper products	24	0.903	0.329
4	Rubber & rubber products	38	0.891	0.320
5	Electronics inc. Cons. Durables	100	0.867	0.178
6	Food Processing	155	0.855	0.178
7	Leather & leather products	74	0.842	0.270
8	Other chemicals	112	0.840	0.192
9	Machine tools, Mach. & parts	195	0.833	0.146
10	Drugs & Pharma	165	0.821	0.149
11	Mineral processing	32	0.817	0.128
12	Mining	3	0.816	0.145
13	Marine food processing	14	0.792	0.180
14	Structural metals and metal products	303	0.786	0.087
15	Agro processing	26	0.766	0.130
16	Garments	275	0.745	0.361
17	Paints and varnishes	20	0.680	0.203
18	Plastics & plastics products	122	0.667	0.175
19	Auto Components	218	0.614	0.143
20	Wood and furniture	16	0.466	0.733
21	Sugar	4	0.462	0.147
22	Cosmetics and toiletries	13	0.188	0.157
	Total	2,286		
	Pearson Correlation			-0.213

E_i is an average measure of how much time firms in a sector spend on direct interactions with the government. The sector of *Garments* and *Wood and Furniture* seem to be spending the most time on average in such interactions. By way of construction of this empirical measure, I believe these are substitutes to the previous lobbying effectiveness measures which are in the nature of lobbying by means of membership to associations.The additional factor is firm-specific such that it represents individual lobbying by firms in a given sector. The correlation between the two measures appear in Table 3 which shows evidence of these being substitutes. However, a natural question here is that if such indi-

vidual lobbying could complement association lobbying.

Figure 2 outlines the correlation between the lobbying effectiveness measure γ_i^a and the additional political factors E_i. *Textiles* is the sector that is most effective in terms of γ_i^a, while the use of additional factors is quite low for that suggests this sector is very effective in lobbying by means of membership to associations and does not resort very much to additional political factors for influence on trade protection. Therefore, these seem to be substitutes. On the other hand, I draw attention to the sector *Wood* for which I find the highest use of additional political factors and correspondingly low lobbying effectiveness in terms of γ_i^a. At the same time, I also find sectors such as *Paper* and *Leather* that are not only very effective in lobbying but also using substantial additional factors. This suggests a weak negative correlation such that this choice needs careful examination at the firm-level both in terms of specific policy instruments and its determinants.

Figure 2: Lobbying Effectiveness and Additional Political Factors

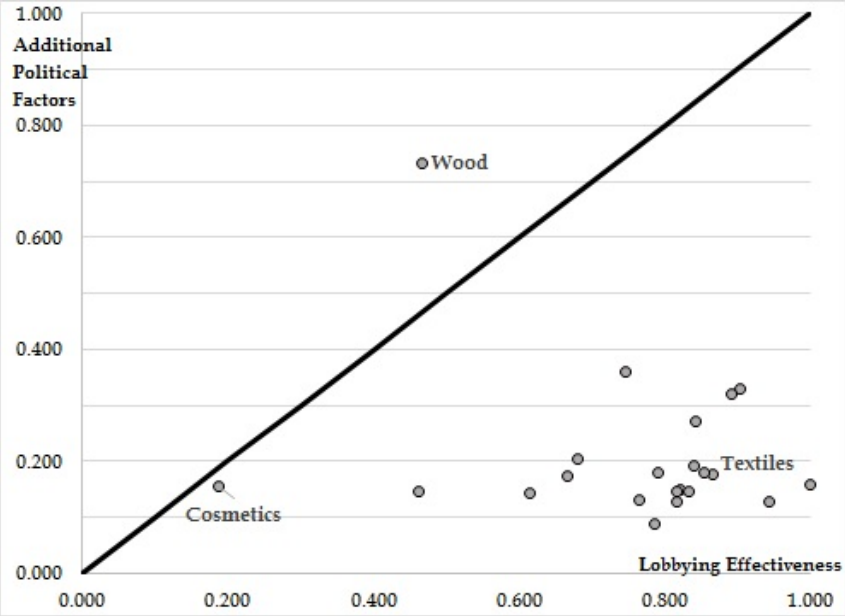

Figure 2 shows lobbying effectiveness and additional political factors across the WBES sectors.

4.4 Methodology

I estimate the model derived from the PFS framework termed as Model 1 using the measure γ_i^a which outlines the baseline result. Additionally, Model 2 tests for robustness by using predicted values of lobbying effectiveness. The results from estimating Models 1 and 2 are outlined in Table 4. Model 3 takes into account related additional political economy factors in PFS.

4.4.1 PFS with Lobbying Effectiveness

Model 1 includes γ_i^a the lobbying effectiveness measure defined as the proportion of firms that are members of associations for each 4-digit level of the NIC[13]. Lobbying effectiveness is interacted with import penetration where the parameter β will test if the relationship between inverse import penetration and trade protection is homogeneous or depends on the lobbying effectiveness of the sector below. Re-writing equation 3 above, I get the following estimable equation[14]:

$$\frac{t_{it}}{1+t_{it}}e_i = \rho z_{it} + \beta(\gamma_i^a.z_{it}) + u_{it} \tag{21}$$

Here ρ and β are defined in terms of the underlying parameters a and A:

$$\rho = \frac{-A}{a+A}$$

$$\beta = \frac{1}{a+A}$$

The partial derivative of trade protection with respect to inverse import penetration is the sum $\rho + \beta\gamma_i^a$. Therefore, the interpretation of the coefficient ρ is the partial derivative of trade protection with respect to inverse import penetration if $\gamma_i^a = 0$. The coefficients ρ and β can be estimated using the variation in z_{it} and its interaction with γ_i^a.
Empirical estimation of equation 21 yields the coefficients ρ and β. The structural parameters a and A can then be derived as point estimates using the non-linear combinations of the parameter estimates. Calculation of point estimates for (possibly) non-linear combinations of parameter estimates after any Stata estimation command are based on the delta method that is an approximation. However, with the modified model the interpretation of the structural findings cannot be compared with the traditional PFS and is not the primary purpose in this paper. I discuss these briefly in section 5.7.

The tariff levels have an effect on import penetration ratios that must be treated as endogenous. I adopt an IV strategy, the instruments used for import penetration include the lagged values of inventories for each sector (as a measure for physical capital) and the square of the number of production workers for every sector (as a measure of the labour intensity across sectors). Following Gawande and Li (2009), the *Limited Information Maximum Likelihood* (LIML) estimator is used to enable inference with weak instruments owing to better small sample properties than *Two Stage Least Squares* (2SLS).

In Model 1, there are two endogenous variables, the inverse import penetration ratio and its interaction term. First, the inverse of the import penetration (X/M) is endogenous with respect to tariff protection that can in turn affect penetration. Second, the

[13]Note that the WBES data is on the number of firms that are members of associations in each of the 22 sectors. This was mapped to the 98 sectors at the 4-digit of NIC.

[14]Note that I do not include lobbying effectiveness as an additional explanatory variable in this specification as it derives from the structural model. To check the robustness of the results, I will examine the findings if lobbying effectiveness enters as an exogenous variable in addition to its interaction term.

interaction of the inverse import penetration with the proportion of members of trade associations ($X/M * \gamma_i^a$) is potentially endogenous as it is an interaction of the endogenous variable with the proxy measure γ_i^a that is assumed exogenous. To instrument for an endogenous variable and its interaction with another exogenous variable, a standard approach suggested is to include the interaction of the instrumental variable with the exogenous variable as another instrument[15].

I instrument for the two endogenous variables using a set of instrumental variables F_i[16] that includes *Lag Inventories* and *Workers Squared* and another instrumental variable *Lag Workers*$*\gamma_i^a$[17]. Therefore, I adopt an approach where the interaction of γ_i^a with the lagged measure of *Workers* is used as an IV. Lobbying effectiveness in terms of the proportion of firms that are members of associations in every sector is assumed exogenous to trade protection where effectiveness depends on the underlying costs and benefits to seek membership for lobbying. Membership to associations enters the structural framework only in its interaction with the endogenous variable.

Therefore, the final set of empirical equations for Model 1 are as shown below:

$$\frac{t_{it}}{1+t_{it}} e_i = \rho z_{it} + \beta(\gamma_i^a z_{it}) + u_{it} \tag{22}$$

$$z_{it} = \zeta_1' F_i + e_{1it} \tag{23}$$

$$\gamma_i^a z_{it} = \zeta_2' F_i + e_{2it} \tag{24}$$

In the earlier specification, I assumed lobbying effectiveness in the PFS model is given exogenously. This was constructed using intra-sector variation of firms. A further step is to account for the issue that membership to associations may not imply actual lobbying that can bias the impact of effectiveness in the resulting model. The results will be compared with the baseline Model 1. I estimate Model 2, where I use a binary equation to estimate the likelihood of firm lobbying via its membership of associations. This is undertaken using the set of firm and industry characteristics (discussed above) to construct a proxy measure for lobbying effectiveness $\widehat{\gamma}_i^b$.

In the original model, the partial derivative of trade protection with respect to inverse import penetration would be ρ for sectors that were politically unorganized (binary

[15]To deal with this endogeneity issue, I find two approaches discussed in the literature. First, given a vector of valid instrumental variables, the interaction term is treated as exogenous and included as part of the instrument set. This can however lead to under identification as shown in Maurice and Teresa (2014). Second, the interaction term is treated as a second endogenous regressor, such that the instrument set should include interactions of the instrumental variables with the exogenous variables in order to satisfy the necessary rank condition for IV estimation. The literature does not agree on one accepted way to deal with this. However, the second approach is suggested as the most natural approach. Some headway in this direction is in Hatice and Bent (2013) that provides empirical observation on the validity of the instruments in this case.

[16]I use lag values of the instruments to further alleviate endogeneity concerns.

[17]When estimating the empirical model, the complete set of three instruments have to be specified for both the endogenous variables such that the set of instruments are identical for both endogenous variables.

measure of political organization being 0) and $\rho + \beta$ for sectors that were fully organized (binary measure being 1). Thereby, if $\rho + \beta$ is positive and significant for $\gamma_i = 1$, the estimates seem to be in line with the findings of the PFS model. Further, in my model the partial derivative of trade protection with respect to the inverse import penetration is the sum $\rho + \beta\gamma_i$, that means this relationship is no longer homogeneous and differs by the value of lobbying effectiveness. This relationship is depicted in Figure 3 for different sectors. It shows an upward sloping relationship for the most effective sector of *Textiles* (Effectiveness=1) that can be said to correspond to full organization as defined in traditional PFS. For the least effective sector of *Cosmetics*, the downward sloping relationship is comparable to being unorganized in traditional PFS.

Figure 3: Traditional PFS versus PFS with γ_i^a

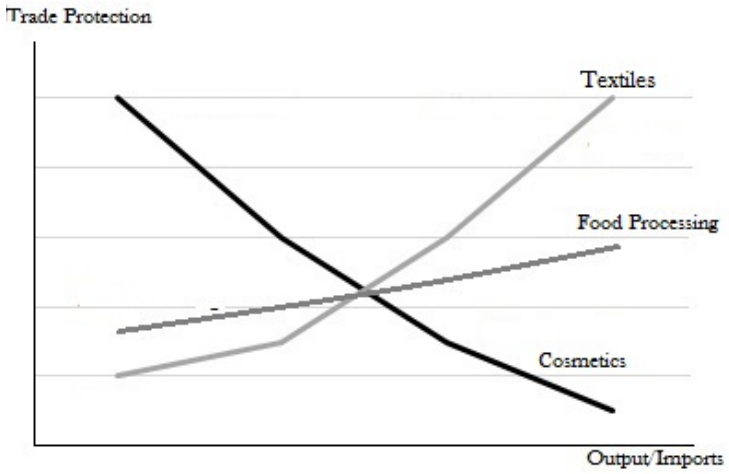

Figure 3 shows the sum $\rho+\beta\gamma_i$, the relationship between trade protection and inverse import penetration is no longer homogeneous and differs by the value of lobbying effectiveness for different sectors. It shows an upward sloping relationship for the most effective sector of *Textiles* (Effectiveness=1) that can be said to correspond to full organization as defined in traditional PFS. For the least effective sector of *Cosmetics*, the downward sloping relationship is comparable to being unorganized in traditional PFS.

Model 1 presents the results of the baseline for PFS with lobbying effectiveness measures γ_i^a. The coefficient for lobbying effectiveness γ_i^a interacted with import penetration shows a positive relationship between tariff protection and inverse import penetration that is found increasing in lobbying effectiveness γ_i^a. To check the robustness of the baseline, I estimate Model 2. The predicted probabilities are used to construct $\widehat{\gamma}_i^b$.

The predicted values are then used to proxy for lobbying effectiveness as $\hat{\gamma}_i^b$, that will enter the structural framework of PFS as an interaction with the endogenous variable X/M. The IV strategy is similar to Model 1, such that I instrument for the two endogenous variables using the set of instrumental variables F_i that includes *Lag Inventories* and *Workers Squared* and the interaction variable *Lag Workers*$^*\widehat{\gamma}_i{}^b$ as another IV. The final set of equations for Model 2 include the following:

$$\frac{t_{it}}{1+t_{it}} e_i = \rho z_{it} + \beta(\widehat{\gamma}_i^b z_{it}) + u_{it} \tag{25}$$

$$z_{it} = \zeta_1' F_i + e_{1it} \tag{26}$$

$$\widehat{\gamma}_i^b z_{it} = \zeta_2' F_i + e_{2it} \tag{27}$$

Predicted probabilities from equation 20 are used in the specifications 25-27.

Table 4 presents the results from estimating Model 1 and Model 2. It is important to note that introducing the heterogeneous measures of lobbying effectiveness changes the interpretation of the coefficients of the traditional PFS model while the overall predictions are preserved[18]. The first stage statistics are attached in Table 9 of Appendix where the F-statistics are heteroskedasticity-robust. The Weak Identification Test examines the null hypothesis that the equation is weakly identified where the Kleibergen-Paap rk Wald F statistic is more than 10 in both Models for each endogenous variable. The Anderson-Rubin Statistics tests the joint significance of endogenous regressors in the main equation such that over-identifying restrictions are valid and in both Models.

Figure 1 outlines the correlation between lobbying effectiveness measure γ_i^a and the predicted measures $\widehat{\gamma}_i^b$ that exhibits the differences in membership and actual lobbying across sectors. The lobbying effectiveness measures γ_i^a and the predicted estimates $\widehat{\gamma}_i^b$ are weakly correlated. This aligns with the first qualification made in the introduction regarding membership not being the same as lobbying by means of this membership. Therefore, I check the baseline model for robustness to these differences. The predicted measures suggests that the coefficients for the effect on trade protection in the modified PFS framework are expected to change. However, it is important to examine if this changes the overall findings of the model.

In Table 4, I observe a negative and significant coefficient of -0.103 for ρ in column (1), that suggests the corresponding inverse relationship for inverse import penetration and tariff protection when the measure of lobbying effectiveness is zero. This relationship turns positive at the value of lobbying effectiveness of 0.745 for the sector *Garments*. For the most effective sector ($\gamma_i = 1$), the sum of the coefficients ρ and β is positive and significant at 0.04 that suggests an overall positive relationship with the inverse of import penetration. The higher the ratio of output to imports, higher is the lobbying effectiveness for positive influence on tariff protection. In Model 1, *Textiles* which is the most effective sector in terms of γ_i^a exhibits a positive relationship with the ratio of output to imports. This is similar to the observed finding for fully organized sectors in traditional PFS. If I pick another sector of *Food Processing* which is effective but has a lower effectiveness than Textiles with $\gamma_i^a = 0.85$, I observe a positive relationship but with a lower marginal effect of 0.02 than the most effective sector as also highlighted in Figure 3 above. Therefore, for the very effective industries, a higher output to import ratio maps to higher trade protection. The relationship between import penetration and trade protection is thereby not homogeneous and depends on the lobbying effectiveness of the sector.

[18]The modified PFS framework is a simple alteration of traditional PFS to incorporate differences in lobbying.

Table 4: Protection for Sale with Lobbying Effectiveness

Variables		**Model 1 Baseline** (I)	**Model 2 Robustness** (II)
X/M		-0.103**	-0.840*
		(0.037)	(0.347)
X/M*γ_i^a		0.143**	
		(0.047)	
X/M*$\widehat{\gamma}_i^b$			1.051*
			(0.432)
Instrumental Variables		Lag Inventories, Workers Squared, γ_i^a.Lag Workers	Lag Inventories, Workers Squared, $\widehat{\gamma}_i^b$.Lag Workers
Weak identification test			
Kleibergen-Paap rk	X/M	10.80	11.86
Wald F statistic	X/M*γ_i	10.20	11.77
Overidentification			
Anderson Rubin Statistics		0.243	0.774
Chi-square P-values		0.62	0.37
N		876	876

*** $p < 0.01$; ** $p < 0.05$; ; *$p < 0.10$

Note: Table 4 shows the results from the estimation of the PFS using LIML as it gives better inference with potentially weak instruments. Robust standard errors in parentheses. First-stage F-statistics are heteroskedasticity-robust. The Weak Identification Test has Ho: equation is weakly identified, gives the Kleibergen-Paap rk Wald F statistic as more than 10 in both Models for each endogenous variable. The Anderson-Rubin Statistics tests the joint significance of endogenous regressors in main equation such that over-identifying restrictions are valid. In both Models, the null cannot be rejected.

Model 2 presents the results for robustness of PFS using the predicted lobbying effectiveness measure $\widehat{\gamma_i^b}$. The signs of the coefficients ρ and β are robust such that I observe that the relationship between trade protection and inverse import penetration is increasing in the predicted probability of lobbying by means of being a member of an association. This reaffirms the finding that the higher the import penetration, the more intense is the association lobbying for positive influence on tariff protection. The marginal effect for X/M (when $\gamma_i^b = 0$) is however lower at -0.084 compared to Model 1, while the overall relationship is more positive (for $\gamma_i^a = 1$). This suggests that even if the qualitative findings of the model are robust, the donward bias in the interaction term is reduced by the predicted measure of effectiveness. Examining the first stage estimates in Table 9 of Appendix, I find that the partial R-square is slightly higher for the interaction term.

However, in terms of the traditional PFS, the findings are preserved in both Models 1

and 2. This suggests that the overall results of the baseline model holds even when I use alternate measures of effectiveness. The overall picture provides evidence that introducing heterogeneity in the PFS model in terms of differences in lobbying effectiveness helps understand the non-homogeneity in the nature of relationship between import penetration and trade protection. In our modification of the PFS model, this relationship is found to depend on the lobbying effectiveness of the sector. Introducing different measures of effectiveness further re-iterates this evidence. The findings also confirm to the overall positive correlations observed between protection and import penetration in Trefler (1993) and Baldwin (1989) across industries. Finally, using the estimated coefficients ρ and β from Model 1, I examine the resulting relationship between trade protection and lobbying effectiveness in terms of the sum of coefficients $\rho + \beta\gamma_i^a$ across various values of lobbying effectiveness in Figure 4.

Figure 4: Sum of Coefficients versus Lobbying Effectiveness

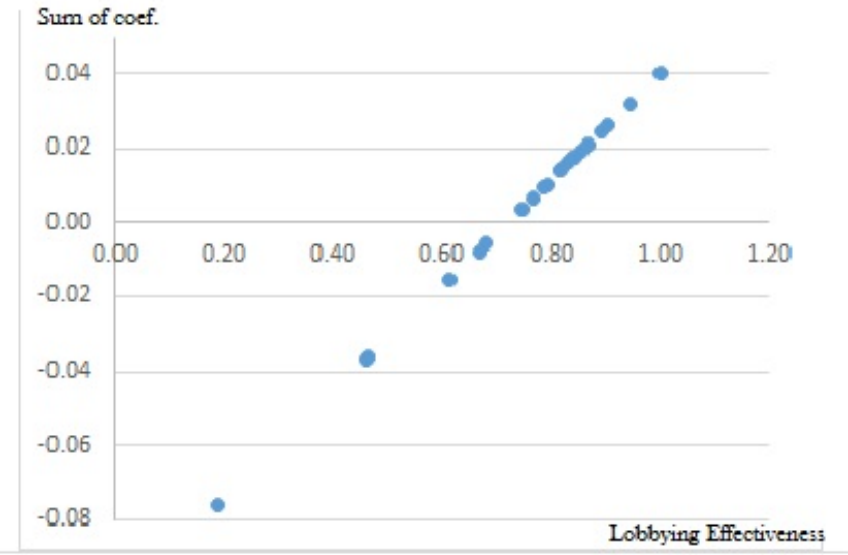

Figure 4 shows the resulting relationship between trade protection and lobbying effectiveness in terms of the sum of coefficients $\rho + \beta\gamma_i^a$ across various values of lobbying effectiveness.

4.4.2 PFS with Lobbying Effectiveness & Additional Political Factors

Now for equation 16, I adopt the earlier assumption of $\sum_{j=1}^{n} \alpha_j \gamma_j$ equals the constant A. Taking elasticities to the left and separating the three terms gives the following equation:

$$\frac{t_i}{1+t_i} e_i = \left(\frac{1}{a+A}\right)\gamma_i z_i - \left(\frac{A}{a+A}\right) z_i + \frac{b(l_i/X_i)}{a+A} z_i \tag{28}$$

Assume that the additional political factor is the opportunity to interact with the government in the structural model given by $E_i = l_i/X_i$ that varies across sectors. E_i can

be interpreted as an additional political economy factor of importance to the trade policy process in India. This enters as an interaction with the inverse import penetration in the final specification that follows from the model. I test the hypothesis that industries with higher import penetration achieving higher protection can be further explained by additional political economy factors that vary by the sector. Re-specifying the equation and introducing time variation, I get the following stochastic version of the estimable equation:

$$\frac{t_{it}}{1+t_{it}}e_i = \rho z_{it} + \beta(\gamma_i z_{it}) + \delta(E_i z_{it}) + u_{it} \tag{29}$$

ρ, β and γ are defined in terms of the underlying terms a, A and b:

$$\rho = \frac{-A}{a+A}$$
$$\beta = \frac{1}{a+A}$$
$$\delta = \frac{b}{a+A}$$

The partial derivative of trade protection with respect to inverse import penetration is now the sum $\rho+\beta\gamma_i^a+\delta E_i$. I have three coefficients ρ, β and δ that are estimated off the variation in z_{it} and its interaction with γ_i and E_i respectively. Note, δ is estimated using the interaction of E_i with z_{it}. Empirical estimation of equation 29 yields the coefficients ρ, β and δ. The structural parameters a, A and b can then be derived as point estimates using the non-linear combinations of the parameter estimates. However, as mentioned above these structural parameters cannot be compared to those from the traditional PFS. I present these later as a means of possible understanding of relative weights in the government objective.

Now, I have three endogenous variables, the inverse import penetration and two interaction terms for import penetration. Again X/M is endogenous with respect to tariff protection and the interaction terms $X/M * \gamma_i^a$ and $X/M * E_i$ are also endogenous as they are interactions of the endogenous variables with proxy measures γ_i^a and E_i that are exogenous by assumption. The instrumental variables include the measure *Lag Inventories*, *Workers Squared* and additionally the interactions γ_i^a * *Lag Workers* and E_i* *Lag Inventories* as two IVs. The opportunity for direct interactions with the government enters the structural set-up of PFS only in its interaction with the endogenous variable.

Therefore, the final set of equations for Model 3 include the following:

$$\frac{t_{it}}{1+t_{it}}e_i = \rho z_{it} + \beta(\gamma_i^a z_{it}) + \delta(E_i z_{it}) + u_{it} \tag{30}$$
$$z_{it} = \zeta_1' F_i + e_{1it} \tag{31}$$
$$\gamma_i^a z_{it} = \zeta_2' F_i + e_{2it} \tag{32}$$
$$E_i z_{it} = \zeta_3' F_i + e_{3it} \tag{33}$$

The results are outlined in Table 5 when E_i is interacted with import penetration. The relationship of trade protection is now defined in terms of the inverse import penetration and two interaction terms. This relationship between tariff protection and the ratio of output to imports now depends on lobbying effectiveness and additional political factors. The first stage results attached in Table 10 in Appendix show the F-statistics that are lower than the baseline model.

The overall positive relationship between tariff protection and inverse import penetration still holds when there are no additional factors such that $E_i = 0$. However, this relationship is reversed when the additional political economy factors are high. This suggests that lobbying effectiveness in terms of association membership and the opportunity for direct interactions with the government may in fact be substitutes as lobbying strategies.

Table 5: PFS with Additional Political Factors

		Model 3
Variables		(I)
X/M		-0.074**
		(0.037)
X/M*γ_i^a		0.142***
		(0.044)
X/M*E_i		-0.132*
		(0.077)
Instrumental Variables		Lag Inventories, Workers Squared, γ_i^a.Lag Workers E_i.Lag Inventories
Weak identification test		
Kleibergen-Paap rk	X/M	8.87
Wald F statistic	X/M*γ_i	8.52
	X/M*E_i	7.67
Overidentification		
Anderson Rubin Statistics		0.001
Chi-square P-values		0.978
N		876

*** $p < 0.01$; ** $p < 0.05$; ; *$p < 0.10$

Note: Table 5 shows results from the estimation of *Protection for Sale* (PFS) using *Limited Information Maximum Likelihood* (LIML) as it gives better inference with potentially weak instruments. Model 3 uses the additional political economy factors in every sector to proxy for lobbying effectiveness in the modified PFS model. The specification derives from the structural model of PFS. Robust standard errors in parentheses. First-stage F-statistics are heteroskedasticity-robust. The Weak Identification Test has Ho: equation is weakly identified, gives the Kleibergen-Paap rk Wald F statistic as more than 10 for each endogenous variable. The Anderson-Rubin Statistics tests the joint significance of endogenous regressors in main equation such that over-identifying restrictions are valid. The null cannot be rejected.

5 Overall Findings & Conclusion

This paper provides new evidence on political economy of protection in India. Lobbying effectiveness is proxied using measures on membership to associations that seem the more effective mechanism to lobby the government. Additional political factors may enter the government objective in explaining trade protection in India.

Table 6 summarizes the marginal effects for the baseline Model 1 and in addition Model 3 from the empirical analysis above. This is interesting as a means of comparison across different kinds of lobbying effectiveness. Given the estimated overall positive relationship between trade protection and inverse import penetration, the evidence suggests that higher lobbying effectiveness is associated with higher trade protection. However, in Model 1 this depends on lobbying effectiveness (in lobbying via associations) while in Model 3 in addition to effectiveness, it depends on related political economy factors.

So, is *"Protection still for Sale with Lobbying Effectiveness?"*. In light of the findings above, I conclude that protection is still for sale with Lobbying Effectiveness, but the traditional findings of the PFS model will differ by the type of lobbying effectiveness.

Table 6: Overall Findings

	Model 1		Model 3	
Industry	γ_i^a	$\rho + \beta\gamma_i^a$	E_i	$\rho + \beta\gamma_i^a + \delta E_i$
Textiles	1.000	0.04	0.159	0.047051
Electrical appliances inc. white goods	0.944	0.032056	0.129	0.043125
Paper & paper products	0.903	0.026161	0.329	0.010881
Rubber & rubber products	0.891	0.0244	0.320	0.010269
Electronics inc. consumer durables	0.867	0.020933	0.178	0.025546
Food processing	0.855	0.0192	0.178	0.023789
Leather & leather products	0.842	0.017421	0.270	0.009939
Other chemicals	0.840	0.01719	0.192	0.019966
Machine tools inc. machinery & parts	0.833	0.016167	0.146	0.02506
Drugs & pharm	0.821	0.01443	0.149	0.022947
Mineral processing	0.817	0.01383	0.128	0.025057
Mining	0.816	0.013735	0.145	0.022773
Marine food processing	0.792	0.010208	0.180	0.014609
Structural metals and metal products	0.786	0.009357	0.087	0.026131
Agro processing	0.766	0.006546	0.130	0.017609
Garments	0.745	0.0036	0.361	-0.01578
Paints and varnishes	0.680	-0.00576	0.203	-0.00424
Plastics & plastic products	0.667	-0.00767	0.175	-0.00245
Auto components	0.614	-0.01522	0.143	-0.00565
Wood and furniture	0.466	-0.0364	0.733	-0.10466
Sugar	0.462	-0.037	0.147	-0.0279
Cosmetics and toiletries	0.188	-0.07619	0.157	-0.06807

Note: Table 6 compares the coefficients across the models.

I find that the traditional PFS hypothesis in terms of the sum of coefficients $\rho + \beta$ for Model 1 and $\rho + \beta + \delta$ for Model 3 is positive for higher values of lobbying effectiveness and in addition the political factor respectively. These estimates seem to confirm to the traditional findings of the PFS model. However, it is interesting to note that for lower values of effectiveness and higher measures of additional political economy factors, the sum of coefficients is no longer positive. For lower values of this measure, the relationship between trade protection and inverse import penetration is found reversed.

In summary, for the PFS model with lobbying effectiveness, *protection is for sale but only for those sectors that are very effective* in lobbying the government via associations. In terms of the empirical measure, this implies that the sectors with a greater number of firms that lobby by means of their membership to associations are very effective in lobbying and are successful in achieving positive trade protection. Controlling for additional political economy factors in this model, further re-instates this finding but factors in a substitute in terms of lobbying strategy.

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6 Appendix

Table 7: Summary Statistics by Years

Variable	1990		1992		1996	
	Mean	SD	Mean	SD	Mean	SD
Tariff	84.61	36.09	59.42	32.29	43.51	31.39
t/1+t	0.441	0.096	0.357	0.088	0.286	0.090
Import Demand Elasticity	15.46	16.33	15.46	16.33	15.46	16.33
Output (X in Rs Lakhs)	265740.00	490250.60	323287.60	546612.10	643002.20	1021357.00
Imports (M in Rs Lakhs)	25479.34	60135.34	35271.05	87494.62	91821.57	230574.70
X/M (Rs Lakhs)	385.35	1251.97	466.16	1744.09	232.91	792.02
Workers	53751.54	113891.00	56509.16	115956.80	61753.63	116945.70
Inventories	36881.09	75337.71	56166.04	97248.94	94672.22	155715.70
Variable	1999		2000		2001	
Tariff	36.16	20.01	36.04	19.00	34.85	19.73
t/1+t	0.257	0.067	0.256	0.068	0.249	0.071
Import Demand Elasticity	15.46	16.33	15.46	16.33	15.46	16.33
Output (X in Rs Lakhs)	862037.30	1301237.00	896164.50	1404715.00	933621.30	1531384.00
Imports (M in Rs Lakhs)	132369.20	326822.10	123997.40	301809.10	137303.30	320044.30
X/M (Rs Lakhs)	115.03	338.26	137.37	469.84	86.41	196.11
Workers	59336.74	107800.60	58185.84	105608.40	56802.05	101885.20
Inventories	162381.40	271251.40	170176.10	314749.40	167874.30	323319.60
Variable	2004		2006		2007	
	Mean	SD	Mean	SD	Mean	SD
Tariff	31.51	18.21	18.40	18.59	19.28	21.36
t/1+t	0.230	0.071	0.142	0.091	0.145	0.097
Import Demand Elasticity	15.46	16.33	15.46	16.33	15.46	16.33
Output (X in Rs Lakhs)	1618978.00	3382978.00	2300029.00	4873125.00	2657099.00	5715065.00
Imports (M in Rs Lakhs)	302604.70	688638.50	506018.70	1071660.00	397520.40	898767.50
X/M (Rs Lakhs)	63.06	159.95	86.96	380.63	103.24	410.77
Workers	62480.14	102477.20	74172.18	116810.40	77405.94	119382.30
Inventories	242219.80	422042.70	346800.20	613800.70	423931.90	752664.60

Table 8: WBES Sample

WBES Sector	**Firms**	**% Firms**	**Members***	**Additional****
Garments	275	12.03	205	255
Textiles	222	9.71	196	207
Drugs & Pharma	165	7.22	137	154
Electronics inc. Consumer Durables	100	4.37	80	92
Electrical Appliances inc. white goods	155	6.78	125	142
Machine tools inc. Machinery & parts	195	8.53	152	183
Auto Components	218	9.54	167	208
Leather & leather products	74	3.24	34	62
Sugar	4	0.17	4	4
Food Processing	155	6.78	124	140
Plastics & plastics products	122	5.34	104	115
Rubber & rubber products	38	1.66	34	35
Paper & paper products	24	1.05	20	20
Structural metals and metal products	303	13.25	186	272
Paints and varnishes	20	0.87	16	19
Cosmetics and toiletries	13	0.57	6	11
Other chemicals	112	4.9	94	109
Mining	3	0.13	2	3
Mineral processing	32	1.4	28	28
Marine food processing	14	0.61	11	12
Agro processing	26	1.14	17	24
Wood and furniture	16	0.7	3	13
Total	2,286	100	1745	2108

Note: Table 8 presents the sampling distribution of the WBES survey. There are 22 sectors in total, with 2,286 firms distributed across the sectors. *% Firms* shows the percentage of firms in each sector. **Members* shows the number of firms that are members of associations in every sector. ***Additional* shows the number of firms that report having direct interactions (additional political factors) with the government.

Table 9: Protection for Sale with Lobbying Effectiveness: First Stage

	Model 1		**Model 2**	
Dependent Variables:	X/M	X/M*γ_i^a	X/M	X/M*γ_i^b
	(I)	(II)	(III)	(IV)
Instrumental Variables				
Lag Inventories	0.009**	0.006**	0.009**	0.008**
	(0.0041)	(0.0032)	(0.0038)	(0.0031)
Workers Squared	-0.003***	-0.003***	-0.004***	-0.003***
	(0.0007)	(0.0006)	(0.0010)	(0.0008)
Lag Workers$*\gamma_i^a$	-0.006*	-0.004*		
	(0.0039)	(0.0030)		
Lag Workers$*\gamma_i^b$			-0.006*	-0.005*
			(0.0035)	(0.0028)
Centered R-Square	0.0386	0.0520	0.0384	0.0438
Shea Partial R-Square	0.0196	0.0223	0.0026	0.0028
N	876	876	876	876

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Note: Table 9 shows the first stage results for the endogenous variable X/M and its interaction term for Models 1 and 2. Model 1 in column (1) uses the percentage members to associations in every sector to proxy for lobbying effectiveness in the modified PFS model. Model 2 uses predicted values of lobbying membership for each sector as another proxy measure of lobby effectiveness. Robust standard errors and first-stage F-statistics are heteroskedasticity-robust.

Table 10: PFS with Additional Political Factors: First Stage

	Model 3		
Dependent Variables:	X/M	X/M*γ_i^a	X/M*E_i
	(I)	(II)	(III)
Instrumental Variables			
Lag Inventories	0.0002	0.0002	0.00003
	(0.0002)	(0.0032)	(0.0038)
Workers Squared	-0.0037***	-0.0031***	-0.0008***
	(0.0001)	(0.0007)	(0.0002)
Lag Workers$*\gamma_i^a$	-0.0003	0.0001	-0.0001
	(0.0012)	(0.0009)	(0.0002)
Lag Inventories$*E_i$	0.0136**	0.0109**	0.0036***
	(0.0047)	(0.0039)	(0.0010)
Shea Partial R-Square	0.0811	0.0302	0.0258
N	876	876	876

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Note: Table 10 shows the first stage results for the endogenous variable X/M and its interaction terms in Model 3. Robust standard errors and first-stage F-statistics are heteroskedasticity-robust.

Table 11: Model 1 and Model 2, Additional Regressions

Variables	(1)	(2)	(3)	(4)	(5)	(6)
X/M	-0.058	-0.103***	-0.063***	-0.200	-0.840**	-0.222***
	(0.049)	(0.037)	(0.014)	(0.139)	(0.347)	(0.055)
X/M*a	0.090	0.143***	0.079***			
	(0.061)	(0.047)	(0.018)			
X/M*y				0.267	1.051**	0.274***
				(0.172)	(0.432)	(0.068)
yr1			7.548***			9.300***
			(1.745)			(2.150)
yr2			6.765***			8.996***
			(1.709)			(2.711)
yr3			6.743***			6.504***
			(1.719)			(1.195)
yr4			4.691***			5.545***
			(0.761)			(1.108)
yr5			4.432***			5.765***
			(0.831)			(1.441)
yr6			4.498***			5.269***
			(0.650)			(0.866)
yr7			4.222***			4.720***
			(0.631)			(0.769)
yr8			2.876***			3.104***
			(0.559)			(0.571)
yr9			2.959***			3.249***
			(0.603)			(0.605)
R^2	-1.54	-3.20	-0.69	-2.78	-32.39	-1.99
N	876	876	876	876	876	876

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$