Optimal Lobbying Behavior and Government Response: Implications for Agriculture

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Abstract

A general equilibrium model with optimal lobbying behavior and endogenous government behavior is solved numerically. It predicts that sectors which are more flexible, larger, and produce commodities with lower income elasticities and higher budget shares tend to be disprotected, explaining the price bias against agriculture in developing countries.

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I. Explaining Trade Distortions for Agriculture

The observed regularity in price distortions, whereby the less developed countries (LDCs) tax their agriculture while the more developed countries (MDCs) subsidize it, has stimulated a considerable amount of work on the political economy of agricultural policy. A number of arguments have been advanced to explain this policy shift including rising lobbying efficiency for agriculture due to checks on free riding permitted by a smaller numbers of producers (Olson), greater willingness of consumers and government to let food prices rise as the importance of food prices on consumer welfare declines, lesser importance of wage costs for industry as it becomes more capital intensive, and early loss in comparative advantages for agriculture (Anderson and Hayami). As these various determinants of protectionism are difficult to separate econometrically, the purpose of this paper is to use a formal model of lobbying behavior and state response to disentangle some of them. While we do not pretend to exhaust the list of valid arguments, the paper follows the lead of Roe and Yeldan in opening the rich field of the numerical analysis of political economy behavior in general equilibrium frameworks. We use the model to explain why the large nontradables (NT) sector of the economy tacitly endorses lobbying for tariff protection by the tradables (T) sectors even though lobbying creates social waste; why there are higher lobbying expenditures in T sectors with a more rigid production structure and a smaller share in production; and also in T sectors that produce commodities with higher income elasticities and lower shares in consumption. These structural features all cumulate in explaining price distortions against agriculture in the LDCs.

II. The Model

2.1. The State's Optimization Problem

The state is assumed to take the level of DUP activity as given and to maximize a social welfare function defined over the utility levels of each special interest group. The weights associated with the utility of each group depends on their level of lobbying. The policy instruments at the disposal of the state are import and export tariffs and subsidies. The government budget deficit or surplus is shared proportionally between all the special interest groups via lump-sum transfers. When maximizing welfare, the state has to satisfy a government budget constraint. General equilibrium conditions in the economy impose a balance-of-trade constraint, equilibrium on the labor market, and equilibrium on the market for nontradables. Because of Walras' Law, one constraint may be dropped. Labor is fully mobile between sectors.

Formally, the state's optimization problem can be written as follows:

$$\text{Max}_{p_a,p_m,p_s,G} \sum_{h\in H} I_h V_h(Y_h, p_a, p_m, p_s, p_l)$$

subject to

$$(1) \qquad Y_h = \frac{1}{N_h}\left(\Pi_h(p_a, p_m, p_s, p_l) + p_l N_h + s_h G - \sum_{j\in A} p_j l_{hj}\right),$$

$$(2) \qquad G = \sum_{i\in T} (1-p_i) \sum_{h\in H} (q_{hi} - N_h c_{hi} - l_{hi}),$$

$$(3) \qquad 0 = \sum_{i\in T} \sum_{h\in H} (q_{hi} - N_h c_{hi} - l_{hi}),$$

$$(4) \qquad 0 = \sum_{h\in H} q_{hs} - N_h c_{hs} - l_{hs},$$

$$(5) \qquad 0 = \sum_{h\in H} N_h + q_{hl} - l_{hl}.$$

Equations 1 through 5 are respectively: the definition of individual income in each group, the government budget constraint, the balance-of-trade equilibrium, the equilibrium conditions for the market of nontradables, and the equilibrium condition for the labor market.

I_h is the welfare weight of sectoral interest group h in the government welfare function. Welfare weights take into account the relative size of the population in each group; and, following Becker, they are normalized to sum to one. $V_h(.)$ is the indirect utility function of households in group h.

The total labor endowment N_h of household in each sector is fixed and proportional to the number of people in that sector. Labor can however move freely across sectors as there is only one labor market. Y_h stands for individual income in group h, made of profits Π_h, labor income $p_l N_h$, and government transfers $s_h G$ (negative or positive). Lobbying expenditures on various goods and services $\sum_j p_j l_{hj}$ are deducted from income. s_h is the share of the government deficit or surplus borne by sector h with $\sum_{h \in H} s_h = 1$. The cost in resource j associated with the DUP activities of sector h (see infra) is captured by the l_{hj} terms. q_{hi} and c_{hi} stand respectively for the input-output vector and the per capita consumption vector of goods and services i by sector h. The wage rate p_l is the numéraire and set equal to 1.

The three sectors are designated as *a, m,* and *s* for agriculture, manufacturing, and services, respectively. *T* is the set of tradable commodities made of *a* and *m*. *s* is assumed nontradable.

2.2. *Tariff Seeking Activity*

The political process whereby sectoral interest groups influence the welfare preferences of the state is summarized, in a stylized fashion, by a reduced form *influence function* that transforms tariff seeking activities into welfare weights in the state's criterion function. Sectoral interest groups have to spend real resources in order to change the sectoral weights that appear in the state's welfare function. Rent seeking activities are assumed either to waste those resources or to transfer them to a bureaucratic class whose utility does not appear in the welfare function of the state.

Formally, the influence function relates the level of tariff seeking activity L_i to the weights of each group in the state's welfare function:

(6) $I_i = f_i(L_a, L_m, L_s; Z)$.

Z are exogenous variables that may affect the welfare weights such as the characteristics of the political system. The cost of the tariff seeking process in terms of real resources is related to the amount of tariff seeking:

(7) $l_{hi} = g(L_h)$.

Each sectoral interest group is assumed to choose its level of tariff seeking activity in order to maximize its utility. When choosing how much to spend on rent seeking, each interest group is assumed to take the level of rent seeking of the other groups as given.

Formally, the optimization problem of sectoral interest groups can be written as:

$\text{Max}_{L_i \in [0,\bar{L}]} V_i(Y_i, p_a, p_m, p_s, p_l)$

subject to equations 1 through 7, to the first-order conditions of the state's optimization problem, and given L_j, $j \neq i$. The upper limit $\bar{L}$ on tariff seeking is such that each interest group cannot spend on DUP activities more resources than it can lay claim to—and certainly not more than all the resources of the economy not already spent by other groups.

2.3. General Equilibrium with Tariff Seeking and Simulation Set-up

Provided that sectoral interest groups are fully rational, a Nash equilibrium of the tariff seeking "game" played between the groups is defined as the point or points at which no group would want to change its level of tariff seeking, given the level of tariff seeking of the others. Given the equilibrium levels of tariff seeking, the weights of each group in the state welfare function can be determined, as well as the amount of resources spent on DUP activities. Solving the optimization problem of the state then determines the trade policies followed by the government and the equilibrium of the economy.

Since the purpose of the model is to examine how the structure of the economy influences the outcome of the tariff seeking game, flexible functional forms were chosen for the profit function (Generalized Leontief) and the indirect utility function (Translog). After

experimenting with various functional forms for the influence function, the following was preferred for its ease of use and flexibility:

$$I_i = \frac{N_i + L_i^{\beta_i} - \alpha_i}{\sum_{h \in H} \left(N_h + L_h^{\beta_h} - \alpha_h\right)} + \kappa_i$$

where L_i is the total amount of tariff seeking activity by sector *i*, and β, α, and κ are parameters. N_i and I_i are as defined earlier. By construction, $\sum_{h \in H} \kappa_h = 0$. Consequently, $\sum_{i \in H} I_i = 1$ always. The κ parameters of the influence function were chosen in all cases so that free trade was an optimal policy in the absence of tariff seeking.

The cost of the tariff seeking process in terms of labor is related to the amount of tariff seeking by a fixed coefficient relationship of the form:

(8) $l_{hi} = a_i L_h$.

III. Simulation Results

3.1. Type of Resources Wasted in Lobbying and Behavior of the Nontradables Sector

We start by analyzing contrasts in sectoral lobbying behavior by using a fully symmetrical economy across sectors, i.e., one where all sectors are of the same size in labor endowments, production, and consumption and have identical elasticities and influence functions. In Table 1, the first column gives the base run which describes the competitive equilibrium of the economy without lobbying. To verify the performance of the model, we start in experiment 1 with the classical formulation where the resource used in lobbying is labor. Lobbying for trade distortions gives the following results:

- The T sectors engage in rent seeking efforts, resulting in a positive resource cost on the economy and in a fall in GDP and in the production of all sectors. Lobbying is thus unavoidable, even in the completely symmetrical economy where lobbying will not produce any differential protection for any sector. This is the classical result of noncooperative rent seeking behavior established by Krueger.

- Through general equilibrium effects, the wastage of labor in lobbying induces an increase in the real wage, seen here through falling prices as the wage is the numeraire. This in turn forces the NT sector to share in the overall negative impact on production.
- The NT sector does not lobby as it is not in its advantage to do so, whatever the level of tariff seeking chosen by the other interest groups.
- There is a significant drop in consumption and utility for the tariff seeking groups, but not for the NT sector. For the NT sector households, falling profits are compensated by gains on the labor market as they export labor to the T sectors of the economy which need labor for lobbying.
- With symmetrical lobbying, there is no net impact on the relative price of the tradables and therefore no change in international trade and in the government budget.

Resources used for lobbying can be of different types: Productive factors such as labor, as has been usually specified, but also final products such as NT goods under the form of bureaucrat and lawyer services or the consumption of NT goods by regulators. In a general equilibrium framework, the type of resource thus used affects equilibrium prices and hence all the other endogenous variables in the model. In experiment 2, we maintain the same symmetry as in experiment 1 but change the composition of the good used in lobbying to services. To make results comparable across these alternatives, the unit resource cost of lobbying is kept constant in terms of the numeraire (wage).

The results show that the levels of rent seeking and the resulting GDP loss are smaller when NT goods are used in lobbying than when labor is used. The first is due to the fact that a rising price of NT goods penalizes households in the T sectors as consumers and discourages lobbying. The second to the fact that these resources have to be produced before they are wasted in lobbying. While GDP falls in terms of consumption, it is unaffected in terms of production. From the point of view of the rent seekers, the utility losses are in the

end similar whether services or labor are used. The NT sector benefits from lobbying when services are used as this increases the demand for its product, and thus its price and production. Without engaging in lobbying itself, the NT sector turns out to be a passive beneficiary of the other sectors' rent seeking efforts.

This result is worth putting in perspective. In most countries, the bureaucracy constitutes a large share of the nontradable sector and the resource cost of rent seeking principally involves excessive red-tape and bureaucratic controls. The model presented here suggests that the bureaucracy, as a group, is likely to welcome rent seeking not only because it means a transfer of resources via fees and corruption, but also because it induces an increase in the relative cost of administrative services, resulting in higher wages and over staffing in the administration. While neutral on the terms of trade for agriculture, this result explains why rent seeking can proceed with such intensity and impunity in spite of its global social cost, thus paving the way to understand the bias against agriculture if, for structural reasons, one lobby is more active than the other or the government biased toward the tariff demands of one sector, conditions which we now explore.

3.2. Production asymmetries: Rigid Industrial Sector

A cause of eventual differences in rent seeking behavior across sectors comes from their technological features, in particular the degree of flexibility in supply response which originates in a higher substitutability between capital and labor in a sector. With capital fixed, this implies a higher ability to mobilize or demobilize labor as prices change. The question raised here is whether a more rigid sector, typically the formal industrial sector in LDCs, will have more or less incentive to lobby and whether the state will be more or less responsive to its demands for tariff protection.

To characterize unequal sectoral flexibilities, we start from a base run which is the outcome of experiment 1, namely a situation where lobbying using labor was occurring in a

symmetrical economy. We then build sectoral asymmetries in the production elasticities by reducing the price elasticity of output in sector m in experiment 3.

Unequal rigidity implies a difference in the impact of lobbying on the profits of the two sectors: An increase in price (relative to wage) benefits more the flexible than the rigid sector while a decrease in price penalizes it less. Clearly, it is to the advantage of a flexible sector to lobby more than a rigid sector. The general equilibrium results in experiment 3 show, however, that the outcome can be the opposite: A more rigid tradable sector can devote significantly higher resources to rent seeking than the flexible sector, turn the relative prices among tradable sectors in its favor, increase labor demand and production, absorb labor from the other sectors of the economy, and capture utility gains in spite of falling GDP created by the waste of resources in lobbying.

The origin of this reversal between direct benefits predicting a higher rent seeking effort by the flexible sector and the general equilibrium result of higher lobbying expenditures by the rigid sector is due to a bias in the state's response to lobbyists which favors the rigid sector. This is due to the facts that government considers the utility and not the income of each sector and that there is imperfect substitutability between the two utilities in the government's criterion function. Both reasons imply a nonlinearity in income gains and losses. Since utility is concave in real income, average utility is lower when there is inequality. For a given total utility level, higher overall welfare is obtained with equity. Thus, the government will try to balance the utility changes of the two sectors by offering a relative price favorable to the rigid sector, making the efficiency of lobbying higher for that sector. General equilibrium effects acting on government behavior can thus overwhelm the sectoral incentives to lobby established on the basis of partial equilibrium direct benefits.

Again, these results are highly suggestive of observed lobbying behavior and state responses across T sectors according to their degrees of rigidity. Protectionism is commonly granted to industrial sectors with large amounts of fixed factors such as steel mills, shipyards, and automobile plants. This opens the door to particularly destructive strategies

whereby sectoral interest groups put themselves deliberately into a very rigid position and then call for trade protection. Oversized investments may thus be a deliberate strategy to retain infant industry protection for extended periods of time, a characteristic of the Latin American deadlock with import substitution industrialization policies and a major source of indirect price distortions against agriculture (Krueger, Schiff, and Valdés).

3.3. Production Asymmetries: Size of the Sector in GNP

Agriculture is typically a large sector of the economy in LDCs compared to industry. In experiment 4, the size of the population in the m sector and the level of output of that sector are reduced while symmetry in consumption is maintained. The result of asymmetry in sector size is to increase considerably the level of lobbying by the smaller sector who thus obtains an import tariff, turns the terms of trade in its favor, and absorbs labor from the other sectors. Since we start with equal consumption of the two T goods, the impact of a higher price implies the same direct income transfer from consumers to producers. An export subsidy to a large sector would require, however, a very large additional income transfer through government, with small per capita benefits in agriculture as it is so large and high costs on taxpayers in the other sectors. An import tariff on a small sector has the advantage of creating public revenues paid by a large number of consumers and redistributed to a small number of producers with no additional tax burden, thus making it both more interesting to lobby for by producers and less worth opposing by consumers. The result is that, even with equal lobbying technology, price distortions are against agriculture

3.4. Consumption Asymmetries: Low Income Elasticity and High Budget Share for Food

The lobbying behavior of a sector depends not only on its production structure but also on the type of good which it produces, in particular on its income elasticity of demand and budget share.

In experiment 5, where the income elasticity of sector m is increased. The direct incentive to lobby more for high income elasticity goods can be understood as follows. If both

sectors do the same level of lobbying and the government responds with no relative price change, the only impact on consumers is a decline in their incomes. With falling income, however, the loss in utility associated with a rise in price is lower for the commodity with the higher income elasticity. This is because the consumption share of that commodity has fallen more. Consequently, the consumer welfare cost associated with an increase in the price of that good is smaller, making lobbying easier for the producers of that good.

This is in turn reinforced by the government's response to lobbying demands. To minimize the utility loss from an unequal increase in prices, the government should choose to raise the price of the more income elastic commodity. This results in a bias in the effectiveness of lobbying in favor of the more elastic tradable. Both the direct sectorial incentive to lobby and the government's favorable bias thus cumulate in more lobbying and more protection for the more income elastic sector, typically industry. The resulting export subsidy further fuels the production and export of luxury goods.

The reasoning on the impact of income elasticities on lobbying behavior applies equally to unequal shares in consumption since, as we have seen it, differential income elasticity effects on lobbying act through their effects on consumption shares. In experiment 6, the share of m in consumption is decreased but its share in production remains identical. Commodity m is thus exported while a is imported. Tariff seeking leads to a relative improvement in the position of the exporting sector: As the share in consumption of a good is smaller, the consumer welfare cost associated with a higher price of that good is smaller, making lobbying easier both in terms of consumer response and consent of the state.

Again, these results are highly suggestive of observed regularities in the structure of protectionism induced by lobbying behavior and state response. Protective tariffs or export subsidies are more easily granted to luxury goods and to commodities of which a smaller share is domestically consumed. This has resulted in one of the well known paradoxes of the structure of protectionism in LDCs: By protecting more the luxury goods, countries induce a bias in their economic structure toward the production of luxuries. Symmetrically, this is a

reason why the agriculture of most LDCs tends to be discriminated against by the tariff structure as it has both a lower income elasticity than industry and a larger share in domestic consumption. As this share in consumption falls with rising per capita income, the pressures for protectionism become easier to accommodate and the agricultural bias is, as we know, eventually reversed.

IV. Conclusion

This paper has, we believe, opened the rich field of the analysis of lobbying behavior and endogenous state response using the numerical tools of general equilibrium. It has allowed to shed light on a number of well known regularities in the behavior of lobbies, the response of regulators, and the resulting structure of protectionism. We have seen, in particular, that, while the large nontradables sector of the economy does not actively engage in lobbying, it frequently benefits from lobbying efforts by the tradables sectors, thus providing its tacit support to these socially destructive activities. This is particularly the case when it is services which are wasted in rent seeking struggles. With license thus given to lobbying, we have found four structural regularities of LDCs that explain price discrimination against agriculture: (1) While more flexible sectors have greater direct incentives to lobby, the state is biased in favoring the rent seeking demands of the more rigid sectors (formal industry) because of the welfare effects that losses of profits in these sectors would entail through general equilibrium effects. As a result, it is these sectors which may end up being the most protected. (2) Smaller sectors (industry) are politically easier to protect because the cost of the distortion is widely distributed while benefits are concentrated. (3) Sectors which produce more luxury goods (industry) and have (4) a lower consumer budget share (industry) can lobby more easily and find the state more receptive to their demands.

Table 1. Symmetric and Asymmetric Rent Seeking Experiments

		Symmetric Experiments			Asymmetric Experiments				
			With different resource costs			Production		Consumption	
		Base run 1[a]	Labor Exp 1	Services Exp 2	Base run 2[a]	Less flexible m Exp 3	Smaller sector m Exp 4	Higher income elasticity m Exp 5	Lower consumption share m Exp 6
Sectoral Effects									
Production	a[b]	9	-1.1%	-0.3%	8.90	-1.4%	48.2%	-1.1%	-0.4%
	m	9	-1.1%	-0.3%	8.90	0.8%	-48.5%	0.7%	0.3%
	s	9	-1.1%	0.5%	8.90	-0.5%	0.6%	-0.2%	-0.1%
Labor demand	a	6	-1.6%	-0.4%	5.90	-2.0%	47.4%	-1.6%	-0.6%
	m	6	-1.6%	-0.4%	5.90	1.1%	-47.6%	1.1%	0.5%
	s	6	-1.6%	0.8%	5.90	-0.7%	0.8%	-0.3%	-0.1%
Labor surplus	a	0	-0.048	0.023	-0.048	0.062	0.231	0.067	-0.002
	m	0	-0.048	0.023	-0.048	-0.201	-0.277	-0.182	-0.100
	s	0	0.095	-0.045	0.095	0.139	0.046	0.115	0.102
Domestic prices[c]	a	1	-2.1%	-0.5%	0.98	-2.6%	-2.3%	-2.0%	-0.8%
(wage is numeraire)	m	1	-2.1%	-0.5%	0.98	0.3%	6.3%	1.4%	0.6%
	s	1	-2.1%	1.0%	0.98	-1.0%	1.1%	-0.4%	-0.2%
Rent Seeking									
Rent seeking effort	a	0	0.36	0.25	0.36	4.9%	-52.5%	-16.4%	-8.3%
	m	0	0.36	0.25	0.36	60.3%	29.6%	49.6%	18.0%
	s	0	0.00	0.00	0.00	0.0%	0.0%	0.0%	0.0%
Utility	a	0.55	-5.0%	-5.1%	0.52	-5.2%	-5.0%	-4.6%	-1.7%
	m	0.55	-5.0%	-5.1%	0.52	1.2%	11.0%	3.1%	1.3%
	s	0.55	0.0%	3.1%	0.55	0.4%	2.2%	-0.3%	-0.2%
Resource cost		0	0.29	0.20	0.29	0.38	0.25	0.33	0.30
Macro Results									
GDP (consumption)		27	-1.1%	-0.7%	26.703	-0.3%	0.1%	-0.2%	-0.0%
GDP (value added)		27	-1.1%	-0.0%					
Relative prices a/m		1	1.000	1.000	1.000	0.971	0.911	0.964	0.986
Real wage		1	1.022	1.000	1.022	1.033	1.006	1.025	1.023
Trade surplus a		0	-0.000	0.000	0.000	-0.224	3.925	-0.257	-1.573
Government budget		0	-0.000	0.000	0.000	-0.006	0.333	-0.009	-0.021

[a]Base run 1 without lobbying. Base run 2 is the outcome of experiment 1.

[b]a = agriculture, m = industry, and s = services (NT).

[c]Wage is the numéraire.

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