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## The Determinants of Protection in Developing Countries: An Extended Interest-Group Approach

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### I. INTRODUCTION

At the beginning of the eighties there was an upsurge in the empirical analysis of the political economy of trade restrictions in industrialized countries. These studies, which have been surveyed by ANDERSON and BALDWIN [1981] as well as FREY [1984], attempted to explain the structure of protection and changes therein by establishing a causal relationship between government intervention and the economic characteristics of firms and industries.

Such empirical approaches built on a number of theoretical models, e.g. KRUEGER [1974], BALDWIN [1982] and MAGEE and BROCK [1983]. The underlying theories have challenged the traditional, main-stream economic analysis based on the PIGOUVIAN assumption about the state acting exogenously as a benevolent despot, thus allowing for a separation of economics and politics<sup>1</sup>. Instead, political action was to be explained by using economic theory. Since individuals do not have to act economically only within the boundaries of economic markets, politicians acting self-interestedly and rationally may serve as suppliers of protection. On the demand side, electorates and interest groups representing firms and industries lobby for protection by offering the government political support<sup>2</sup>.

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1. See McCORMICK and TOLLISON [1981], p. 3.

2. ANDERSON [1980] provides a broader analysis of this political market for government assistance.

Hence, protectionist trade policies and shifts in these policies are determined by political factors that are also of major importance for policy planning in developing countries. The majority of these countries persist to follow a policy of industrialization, while only a very few countries have succeeded in implementing an effective trade liberalization program. The key issue in designing a policy of trade liberalization becomes making the appropriate trade-off between reducing the intensity of income redistribution effects and maintaining the efficiency of the adjustment process<sup>3</sup>. This choice, which is entirely political in nature, requires not only information on the effects of protectionism but also on its origin. Thus, liberalization programs have to take into account the determinants of protection in developing countries. This paper shows to which extent the theoretical and empirical models of trade policy determination, as they have been developed for industrialized countries, can be used for an empirical analysis of protection in developing countries.

In the first section, the focus is on the hypotheses that have been derived from theoretical models on the political economy of protection. It will be shown that these hypotheses are partly well-suited to the policy-making process in developing countries. The second section surveys the empirical approaches which have been tested for developing countries. Finally, section III provides an extension of these empirical models, which is based on the main-stream criticism in the literature. This extension takes account of various coalitions and opposition among industries. The analysis of inter-industry relationships allows for a more careful specification of the protectionist demands on the political market for government assistance. This extended model will be tested empirically for the case of Brazil.

## II. EMPIRICAL MODELS OF TRADE POLICY DETERMINATION

The hypothesized determinants of protectionism have been formulated as complementary models, as they have been assessed by CAVES [1976], BALDWIN [1982] and recently WAGNER [1987]. Following

3. See MUSSA [1986] and SELL [1988] for a broader analysis.

CAVES, three different basic models of trade policy determination can be derived <sup>4</sup>:

- the interest-group model,
- the adding-machine model,
- and the national-policy model.

The *interest-group model* attempts to establish a relationship between the level of protection in a specific industry and its ability to organize effective pressure groups, i. e. industry associations lobbying for protection. Following OLSON [1965] and BECKER [1983], small and exclusive groups are more likely to gain trade protection. There are two reasons for that. Firstly, trade restrictions lead to an alteration of income distribution, as the owner of the scarce factors and producers are favoured compared with consumers and suppliers of the abundant factors. According to BECKER's theory the beneficiaries of protection can more successfully lobby for trade restrictions, when the losses due to protectionism are distributed among a large group, while the gains accrue to a small group, since in this case politicians face less opposition against trade barriers.

Secondly, OLSON's theory of collective action implies that small and exclusive groups have lower costs of organization. Protection has the properties of a public good for group members. They have an incentive to refrain from contributing to the cost of lobbying and organization, while they cannot be excluded from the gains of the protection-seeking interest group. A smaller group is more like to discipline these free-riders, as they face lower costs of information and coordination. Hence, protection can be expected to be high in industries characterized by high concentration indices <sup>5</sup>, small numbers of firms and high average plant size, as these industries are much more likely to form effective industry associations. In addition, the regional concentration of industries may have an impact on the industry's ability to prevail upon the government. An industry located in an underdeveloped region of a country has much more bargaining

4. The classification used in this paper goes back to CAVES [1976]. BALDWIN [1982] and WAGNER [1987] have preferred more specific formulations of hypothesis included in the national-policy model which is further divided into separate models.

5. See also PINCUS [1981].

power against local authorities or even the national government than firms in heavily industrialized regions.

Moreover, the formation of interest groups depends on the group members' incentives to engage in protection-seeking activities. If protection is expected to increase the firm's profits substantially, there is an incentive to form an effective lobby. This holds true for industries facing a low value-added share of output, since in this case manufacturing protection has a higher impact on profitability. Furthermore, export-oriented firms have less or no incentives to lobby for protection on the domestic market. Firstly, because the protection-induced increase of the producer rent is comparatively small in export industries. Hence, for these industries the profitability of rent-seeking activities is relatively low. Secondly, export producers are usually fully competitive and less interested in protection in general, since they are deliberately exposed to the competition on external markets.

The interest-group model, though originally developed for a pluralist-democratic framework, must not be confined to Western type democratic systems. TULLOCK [1986, 1987] found out that under authoritarian rule small and exclusive interest groups become even more effective than under a democratic system because authoritarian rulers are much more dependent on these small groups. Moreover, OLSON [1982] assesses that the uneven income distribution in many developing countries can be attributed to the dominance of small but powerful groups, while large groups are less successful in exerting pressure on politicians. Since protection benefits small groups of producers against large groups of consumers, the interest-group model should be of special relevance for the explanation of protection in developing countries.

The *adding-machine model* refers to DOWNS' [1957] theory of the vote-maximizing government. DOWNS postulated that governments act to maximize the probability of their reelection. This principle superficially indicates that each policy is accepted or rejected on the basis of the number of voters expected to favour or oppose it. Accordingly, the politicians offer more protection to those industries which comprise a large number of electorates. Industries characterized by high levels of employment should be better protected, as the government needs the votes of the employees and their relatives in order to maximize the probability of reelection. When a government's sur-

vival depends on its success in a majority of geographically defined districts, it is also the regional concentration of employment which determines the level of protection in a federal state<sup>6</sup>. The voting-power of industries is particularly effective when the preferences of the electorates are represented by well-organized trade unions, which can exert pressure on the government. In theory, trade unions representing the majority of labour in a developing country are assumed to favour trade liberalization against protection because labour is the more abundant factor benefitting from free trade (STOLPER-SAMUELSEON Lobbying). This behaviour of trade unions has been challenged by MAGEE [1982] who argues that unions do not act as representatives of the entire working class but rather as agents for workers of particular industries. As protection widens the scope for wage increases in the process of collective bargaining, such industry-specific trade unions support the producer's demand for manufacturing protection.

The voting-power of industries is by definition highly dependent on the prevalence of a well-functioning democratic system. Under authoritarian rule large groups of voters lack political power, while small and exclusive interest groups, as they are included in the interest-group model, become politically more important<sup>7</sup>.

Finally, the *national-policy model* takes account of a nationalistic bias determining the government's industrial policies. Nationalistic preferences often call for a 'balanced' economy with all major industries represented, even though this runs counter to the theory of comparative advantage. Many politicians in developing countries have an inclination to inward-oriented industrialization strategies fostered by protectionist policies in order to satisfy ideological demands for modernization and development. JOHNSON [1965] assesses that such nationalistic policies tend to favour producer interests against consumer interest, as import substitution is achieved through high protection for so-called 'infant industries' and 'key sectors'. Following the concept of modernization, infant industries reveal a strong bias for sophisticated technologies, i.e. computer, aircraft and arms production. These industries are characterized by high intensities of

6. See BRETON [1974], pp. 44-51.

7. AMELUNG [1988] shows to what extent the relative power of interest groups and voters depends on the political system determining the decision-making process.

research and development as well as physical and human capital. According to the national-policy model protection is expected to be higher, the more (less) the scarce (abundant) factors are used in the production process.

Moreover, there are inward-oriented key sectors, which are supposed to be the backbone of the domestic manufacturing sector. The protection given to such industries is expected to be positively related to their output.

Due to their size and their relevance in industrial policies the entrepreneurial risks of key industries are partially taken over by government. This holds especially, when import penetration increases or the industry's growth loses momentum. In these cases, governments are usually ready to increase protection for the respective industry. Thus, sectoral protection tends to be higher, the lower the recent growth rates of output and employment and the higher the import share of total demand.

Although these three empirical models have been originally developed for explaining protectionism in industrialized economies, it can be concluded that the theoretical underpinnings of these models are also suited for an application to developing countries. The next section gives an overview of the empirical studies that have been undertaken so far by using multivariate regression analysis.

### III. SURVEY AND DISCUSSION OF EARLIER STUDIES

#### ON THE POLITICAL ECONOMY OF PROTECTION IN DEVELOPING COUNTRIES

While there is a broad literature on the determinants of the structure of protection in industrialized countries, there have been comparatively few studies for newly industrializing and developing countries. *Table 1* gives an overview of the empirical studies analyzing the determinants of the structure of protection for different years and countries. Each column in the table features a linear combination of exogenous variables which have been discussed in the previous section. The first set of variables refers to the interest-group model (IGM), while the other two belong to the adding-machine model (AMM) or the national-policy model (NPM). Most authors run their regressions

using both nominal (NRP) and effective rates of protection (ERP) as a dependent variable. Nevertheless, the effective rate of protection seems to be a more suitable indicator for the degree of overall government assistance, since in many cases protection is granted through subsidized inputs or mandatory prices for intermediate goods. Furthermore, the effective rate of protection shows to what extent the level of nominal protection is outweighed through protection-induced price increases for input goods.

The interest-group model reveals quite low explanatory power. Even though the concentration index shows the hypothesized sign, significant coefficients are only obtained in the case of Malaysia. Other variables, which are supposed to reflect an industry's ability to organize collective action (i. e. number of firms, value of output per firm), do not give significant coefficients. The coefficients of the export to output ratio yield the correct sign, even though they can only be confirmed for the case of Mexico. The value-added share of turnover yields significant though contradictory results for the case of Indonesia. This should be due to the fact that this variable does not only measure the firms' incentive for lobbying but it is also a proxy for the degree of vertical concentration at the firm level. Vertical concentration is likely to be positively correlated with political power and high protection, so that the interpretation of this variable remains unclear.

The adding-machine model yields significant coefficients for the regional concentration of employment (Mexico) and the number of employees (Malaysia). The latter variable, however, does not give a significant coefficient for the case of Mexico. Finally, the national-policy model yields the expected results for the human capital/labour ratio (Korea, Colombia), intensity of research and development (Korea, Colombia) and Pitt's trade classification index, which is a measure of inward orientation of the respective industry. All the other variables do not show significant coefficients or a correct sign.

In spite of the difficulties associated with cross-sector analysis, the estimated equations reveal an overall lack of explanatory power. This can be attributed to two reasons.

Firstly, the direct estimation of instrumental behaviour with respect to various indicators bears a fundamental weakness, which is due to the reduced form of the model. The explicit structural model of



Table 1  
Determinants of Protection Levels in LDCs and NICs

Exogenous variables	Endogenous variables													
	ALIKHANI, HAVRYLYSHYN [1982]				PANGESTU, TAN [1984]			LEE KIONG [1985]		LÄCHLER [1986]				
	Korea		Columbia		Indonesia		Philippines	Malaysia		Mexico				
	NRP	ERP	NRP	ERP	NRP	ERP	ERP	NRP	ERP	NRP	ERP	ERP		
1968	1968	1969	1969	1975	1975	1974	1973	1978	1978	1960	1970	1970	1980	1980
<b>IGM</b>														
(+) Concentration index	+	+	+	+			+	**	+	+	**	+		
(+) Value of output per firm					-	+			-					
(-) Number of firms							+							
(-) Exports to output ratio						-			-				+	-
(-) Value added share of turnover (output)					+	*	-	*					-	+
<b>AMM</b>														
(+) Regional concentration of employment													+	+
(+) Number of employees									+	*	+	+	+	+
<b>NPM</b>														
(+) Physical capital/labor ratio	-	-	-	**	-	*								
(+) Human capital/labor ratio	+	**	+	*										
(-) Natural Resource Intensity														
(+) Research & development	+	**	+	**	+	**	+	**						
(+) Value added per worker	-	-	+	+										
(-) Wages as share of value added in output					-	-	-							
(-) Labor's share of value added									+				+	+
(+) Average wage per worker					+	*	+	*	-				-	*
(+) Import share of total demand (supply)					-	*	-	-	**				+	-
(+/-) Imported inputs to output ratio							+	**					+	+
(+) Pitt's trade classification					+	*	+	*					+	+
(-) Growth rate of output					+	-								
(-) Recent growth in employment									+	+				
(+) Infant dummy	-	*	-	**	-	-								
(+) Output (turnover)	+	+	+	**	+	+								
Adjusted R <sup>2</sup>	0.19	0.20	0.21	0.21	0.63	0.34	0.13	0.31	0.26	0.13	0.07	0.23	0.04	0.35
F-statistic	4.6	4.8	4.5	4.5	n.a.	n.a.	4.5	4.0	3.3	3.8	2.1	n.a.	n.a.	n.a.
Number of observations	67	67	56	56	62	62	119	40	40	79	79	31	29	31

Notes:

ERP (NRP) = effective (nominal) rate of protection; the sign in parentheses indicates the hypothesized sign for the exogenous variables regression coefficient; the + and - signs indicate the sign of the estimated regression coefficients; t-values are shown as \*\*(\*) if significant at 1% (5%) level; IGM = interest-group model, AMM = adding-machine model, NPM = national-policy model.

policy formation is foregone thus not being a part of the estimated model. The lack of an a-priori structure makes it difficult to attach significance to the coefficients<sup>8</sup>.

Secondly, following NICOLAIDES [1986] it may be very inappropriate to consider the protection level of one industry as being a similar instance of government intervention as that of another industry, since the groups which participate in the process determining the protection in one industry may be very different from those involved in the determination of protection of another one. For example, an industry which supplies input goods to another industry is likely to encounter opposition by its consumers. In contrast, an industry's demand for protection may be supported by another industry whose output is a complement to the output of the former. Hence, the structure of protection varies because in each case different political coalitions enter the political process which determines the level of the sought protection. Hence, NICOLAIDES' criticism calls for a more careful specification of the political market for protection, which is part of the interest-group model. An extended version of this model will be presented in the next section.

#### IV. AN EXTENDED INTEREST-GROUP MODEL

As it was discussed in the previous section, the structure of protection can be influenced by the interaction between interest groups representing various industries. This interaction will be proxied by constructing some indices for inter-industry linkages, which will be used as additional variables in the main-stream interest-group model. The forward linkages of an industry are supposed to give some indication as to what extent the demand for protection is responded by the opposition of the consumers and especially industries facing price increases of their input goods. Since private consumers are a large group, they cannot organize an effective lobby against protectionism. Hence, an industry which supplies a high share of its production to private consumers is more likely to achieve high rates of protection than industries producing mainly input goods for other industries.

8. See RAUSSER et al. [1982].

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Their incentive to organize a lobby against protection depends on the share of this input good in production. The higher the coefficient of production, the more opposition is to be expected by the respective industries. Furthermore, the industries using that input good can more effectively prevail upon the government when they encompass a small number of sizeable firms. Then, they can organize a pressure group more easily and form an anti-protectionist lobby. This organizing capacity can be proxied by the concentration index of the various industries. Accordingly, the index of forward linkage opposition for sector  $i$  is:

$$FL_i = \sum_{\substack{j=1 \\ i \neq j}}^n a_{ij} C_j, \quad 0 < FL_i < 1;$$

where  $a_{ij}$  denotes the coefficient of production derived from a  $n \times n$  input-output matrix and  $C_j$  is the concentration index of sector  $j$  using the input goods produced by industry  $i$ .

In addition, the backward linkages are an import factor for an industry's capability to increase its effective protection by lobbying for trade liberalization, preferential import licences or price controls for its input goods. Such measures are challenged by industries producing these inputs, as this group of producers is interested in preventing its consumers to circumvent its protection. Hence, the equivalent proxy for the measurement of backward linkage opposition is:

$$BL_j = \sum_{\substack{i=1 \\ j \neq i}}^n a_{ij} C_i, \quad 0 < BL_j < 1;$$

where the denotation is the same as used before. The concentration index measures the ability of the input-producing industries to organize an effective lobby. The concentration index is weighted with the respective coefficients of production, since the more input goods  $i$  are used in the production of industry  $j$ , the more it is likely to be affected by the political power of the input good producing industries.

The backward and forward indices will be used as additional variables in an interest-group model, which also comprises variables like the concentration index ( $C_{10}$ ), the export ratio ( $EXPR$ ), the share of value-added in production and the regional concentration ( $RC$ ). This model will be tested for the case of Brazil in the period 1973–1975, which is of particular interest, since the Brazilian economy returned

to excessive secondary import substitution in the respective period after it had experienced a period of foreign trade liberalization since 1968. It can be expected that this shift of policies evoked both opposition and support by various interest groups depending on their engagement in supplier and buyer coalitions.

The measuring of the relationship between various industries involves some problems as far as the data are concerned. The analysis of inter-industry linkages does not allow for ownership across industries, since in this case decisions on protectionist demand could be a matter of intra-firm decision-making rather than a political process covering various interest groups.

For this reason, the disaggregation of sectors had to be restricted to the three-digit International Standard of Industrial Classification (ISIC) level, where ownership across sectors is rather exceptional. However, this low degree of disaggregation bears two difficulties. Firstly, there are two industries, namely food and tobacco, which do not allow for a clear separation of agricultural and manufacturing sector processing. As in many developing countries policy makers tend to discriminate the agricultural sector against the manufacturing industry, the resulting policy bias has to be captured by a dummy variable (D 1), which equals unity for these industries. Secondly, the high degree of aggregation reduces the number of observations, so that data for 1973 and 1975 had to be pooled. Structural differences are to be captured by another intercept dummy (D 2) which is unity for 1975.

Furthermore, it has to be noted that the index of regional concentration measures the share of production outside the three industrialized federal states (Rio de Janeiro, Minas Gerais and São Paulo). The larger the share, the more influence can be exerted on local governments, since firms located in these underdeveloped areas generally have a higher share in the industrial output of their region. Finally, the concentration indices (C 10) have been calculated by dividing the production of the 10 largest enterprises in a sector by the total output of the respective industry. The dependent variable features the Cor-den-type effective rate of protection measuring the impact of both the tariff and the non-tariff barriers.

The results of the regression analysis can be obtained from *Table 2*. The coefficients of the concentration index (C 10), the export ratio

(EXPR) and the share of value-added in production seem to confirm earlier results, as they are given in *Table 1*. In addition, the index of regional concentration (RC) has a significant impact on the level of effective protection. However, the explanatory power of the interest-group model improves substantially when one adds the forward and backward linkage indices (FL, BL). This seems to verify the hypothesis that inter-industry opposition and interest group coalitions have a considerable impact on the structure of protection. The coefficients of the intercept dummies remain insignificant, even though the signs prove to be stable.

While the variables of the interest-group model perform very well in the Brazilian case, this does not hold true for the adding-machine model and the national-policy model. The respective t-values for the coefficients of additional variables such as the employment level and the physical capital to output ratio did not exceed 0.5<sup>9</sup>. This gives an indication that the interest-group model seems to perform best in an authoritarian regime, as it had been prevailing in Brazil at that time. Summing up, it can be stated that a more carefully specified model on the interaction of interest groups may give further insights into the political economy of protectionism.

#### V. SUMMARY AND CONCLUSIONS

Earlier studies on the determinants of protection in industrialized countries have isolated three factors which affect the structure and the level of protection, namely organized pressure groups, preferences of the electorates and the ideological bias of the government. Basically, these causes of protection may also prevail in developing countries. However, regression analysis using effective protection as a dependent variable and certain industry characteristics as independent

9. Estimation results using additional variables as they have been introduced in the previous section can be obtained from the author upon request. Yet this extended interest group approach has to be tested for other periods. The major problem, however, is the lack of input-output tables which are needed to calculate the backward and forward linkage indices. Given the speed of structural changes in many developing countries, the input coefficients are subject to fluctuations, so that it is advisable to use protection data and input-output tables of the same year.

Table 2

Determinants of the Structure of Protection in Brazil 1973–1975

C10	EXPR	RC	VAPR	BL	FL	D1	D2	R <sup>2</sup>	$\bar{R}^2$	SEE	Degrees of Freedom
0.75 (2.85)**	-6.59 (-5.05)**	1.05 (3.33)	-1.36 (-3.18)**					0.43	0.36	26.17	35
1.07 (3.58)**	-7.75 (-5.89)**	0.96 (3.25)**	-2.43 (-4.36)**	-3.72 (-2.42)*	-0.96 (-2.07)*			0.54	0.45	24.21	33
1.41 (3.57)**	-6.24 (-3.41)**	0.84 (-2.74)*	-2.20 (-3.70)**	-4.60 (-2.86)**	-1.02 (-2.24)*	-51.03 (-1.24)		0.57	0.48	23.64	32
1.40 (3.49)**	-6.50 (-3.42)**	0.85 (2.76)**	-2.32 (-3.66)**	-4.73 (-2.88)**	-1.08 (-2.29)*	-46.72 (-1.11)	-8.64 (-1.07)	0.58	0.47	23.89	31

Notes:

t-values are shown as \*\*(+ ) if significant at 1 % (5 %)-level; Firm-specific data for the calculation of concentration indices can be obtained from the annual issues of *Visao: Quem e Quem na Economia Brasileira*. The linkage indices were derived from an input-output table for 1970 as given in IBGE (1979). Effective rates are obtained from Carvalho (1984). Other variables have been obtained from national statistical yearbooks and industrial statistics.

Sources:

Instituto Brasileira de Geografia e Estatística, *Pesquisa Industrial 1973, 1975*; *Matriz de Relações Intersetórias, Brasil 1970, 1979*. – *Visao*, August 1976 – José Carvalho, *Liberalisation of Trade Restrictions in Brazil*. Draft not for publication, October 1984.

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variables have been of poor explanatory power. This can be mainly attributed to an insufficient specification of the underlying theory, since the interaction between various interest groups is not taken into account. The extended interest-group approach, as it was presented in this paper, attempts to proxy the opposition and coalitions among industry groups by using backward and forward linkage indices which show the extent to which various industry groups support or oppose an industry's demand for protection. As the empirical evidence for the case of Brazil shows, these linkage indices improve the explanatory power of the interest-group model. However, this approach should be rather considered as a first step on the way to develop testable models of the political behaviour of industry groups. Further research is needed in order to find out which constellation among interacting interest groups facilitates extensive trade liberalization policies.

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### SUMMARY

The political economy of protection attributes the erection of trade barriers to interest group activities, preferences of the electorates and nationalist ideologies on part of the politicians. The respective empirical models, which have already been confirmed for a number of industrialized countries, are also applicable for developing and newly industrializing countries. However, as the survey of empirical studies on these countries shows, the explanatory power of these models is quite low. For this reason, this paper develops an extended interest-group approach, which also includes suppliers and purchasers which might form an opposition against the increasing protection. The empirical evidence for the case of Brazil shows that this extended interest group model substantially improves the results of the estimations.

### ZUSAMMENFASSUNG

Die politische Ökonomie der Protektion erklärt die Einrichtung von Handelsbarrieren durch Interessengruppenaktivitäten, Wählerpräferenzen und nationalistische Ideologien der Politiker. Die empirischen Modelle, die bereits für viele Industrieländer bestätigt worden sind, lassen sich grundsätzlich auch auf Entwicklungs- und Schwellenländer anwenden. Wie der Überblick in diesem Aufsatz zeigt, ist der Erklärungswert der für diese Länder durchgeführten empirischen Untersuchungen als sehr gering einzustufen. Aus diesem Grund wird in diesem Papier der Interessengruppenansatz dahingehend erweitert, dass Zulieferer und Abnehmer, die einer