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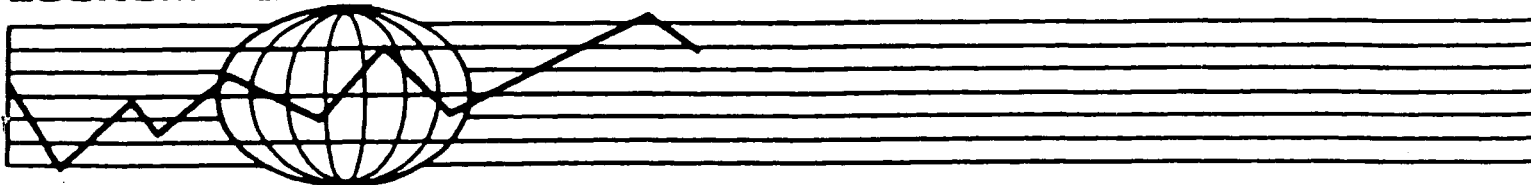
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**POLITICAL ECONOMY OF STRUCTURAL ADJUSTMENT:  
A General Equilibrium - Interest Group Perspective**

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(Revised)

Terry Roe \*

Abstract

Economic policy, policy reform and sustainability are viewed as a political- collective action process. The challenge is to provide incentives for collective action that yield an efficient allocation of a country's resources and to prevent the reemergence of the old policy regime once a crisis is resolved. A modified Ricardo-Viner model with rent seeking households is used to provide insights into the factors that cause action to be misdirected, and into how policy reform might be induced and sustained. The analysis suggests the use of instruments that decrease the scope for rent seeking, provide resources - in the form of public goods - to the less influential, and compensatory payments to those disadvantaged by reform. Several recent IBRD and IMF country programs include these types of payments.

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# POLITICAL ECONOMY OF STRUCTURAL ADJUSTMENT:

## A General Equilibrium - Interest Group Perspective

Terry Roe

### I. Introduction

Numerous country studies and their syntheses<sup>1</sup> have essentially reaffirmed the generally accepted neo-classical paradigm that amelioration of market failures, technological change and capital accumulation, broadly defined, combined with the efficient allocation of resources to meet final demand are the keys to economic growth. Trade policy is important because it influences the degree to which international markets for final goods and services, information, and technology interact to yield a growth path along which patterns of production, investment and capacity creation are determined.

However, few countries have pursued reform on their own volition, i.e., without facing or experiencing an economic collapse, except those (such as Korea) that have tended to generally pursue outward oriented policies. Many, e.g., Turkey during the 1970s and Mexico during the 1980s, have undergone policy reform and structural adjustment programs a number of times<sup>2</sup>. Reform in many countries included in the Corden, and Krueger et al. directed studies was forestalled when rising world prices for exportables increased liquidity.

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<sup>1</sup>Since the studies of Balassa, and Mitra, these include a 17 country study discussed by Corden, and 21 country study directed by Lal and Myint and discussed by Lal, and another synthesis by Krueger et al. (1988) of an 18 country study of the political economy of agricultural price policy. See Krueger et. al (1991) for the synthesis of that Latin American component.

<sup>2</sup>Turan provides an interesting account of the politics of Turkish reform efforts.

Experiences with inward oriented policies and attempts at reform reinforces the notion that there are forces for both economic and political equilibria. An extraordinarily large economic adjustment to bring an economy into balance with world markets may so threaten or realign the balance of political influence that individuals, including those holding entitlements granted by policy instruments, perceive increased risks to their income streams and to political stability. These perceptions induce them to allocate time, and other resources to resist policy change. Both the Lal and Myint, and the Krueger et al. synthesis found strong evidence to suggest that constituencies supporting the inward oriented policies become entrenched. When adjustment of domestic policies to external shocks was needed to avert a crises, negotiations between various groups either proceeded slowly or did not occur in time to alleviate a liquidity crises. The result for many countries was an externally devised liberalization program that likely would not have come about from a realignment of interest groups alone<sup>3</sup>.

While the accumulated evidence over the recent decades appears to reinforce the neo-classical paradigm as a characteristic of economic growth, far less insight has been provided into the motivation for governments to intervene in their economies, nor how to induce and sustain policy reform. The amelioration of market failure typically entails some form of collective action by groups of individuals, producer and community organizations, to induce government support, for example, the provision of agricultural technology, rural infrastructure, education, information, basic health and other public goods including protection of individual property rights and privately negotiated contracts, all of which serve to lower market transactions costs. However, the socially desirable process of collective

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<sup>3</sup>The case studies of the Dominican Republic (Greene and Roe) and Egypt (Holt and Roe) found that when pressures on foreign exchange requirements eased, even temporarily, their commitment to policy reform also slackened.

action to redress market failure often becomes directed toward interventions in areas where markets are typically efficient in the allocation of resources.

Hence, what is the nature of economic endowments, institutional structures, and access to political and public authority that assures collective action yields interventions that are directed toward areas where markets fail as opposed to intervention in markets that otherwise are efficient in allocating resources? What mechanism assures that collective action directed to redistribute income utilizes policy instruments that minimally distort markets in contrast to the control of market prices, or quantitative restrictions on trade and payment regimes? What mechanism assures that after countries have undergone structural adjustment and stabilization programs to resolve an economic crisis, that collective action does not, once again, induce policy that drives a country to another economic collapse?

Insights into these questions are provided by drawing upon the central themes of the fairly recent but burgeoning body of literature referred to by some as the New Political Economy (Meier). Rather than reviewing the contributions from the various schools<sup>4</sup> for the insights they provide to the questions posed, the approach employed here is to provide an overview of a simple model of rent seeking that encompasses many of the key themes that are otherwise found in disparate parts of the literature.

The main body of the paper is divided into five parts. The structure of the economy and the government is posited in the first part. The government - economy linkage provides the scope for rent seeking and embodies, in a "black box," the institutions, rules, regulations and norms of behavior by

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<sup>4</sup>See Rowely et al. for a review of the contributions from public choice, Ruttan, for a review of some of the key views from political science, and Srinivasan, and Bhagwati 1991 for recent contributions from international trade.

which households seek to obtain from the state that which they cannot obtain from the market alone. Implications to government choice of policy instruments, and incentives for households to rent seek are presented in the next two parts. Then, the nature and policy implications of a political - economic equilibrium, if it exists, is discussed. The last major section focuses on the insights provided by this approach to questions of obtaining and sustaining policy reform. Summary, qualifications and a discussion of future directions conclude the paper.

## II. Conceptual Framework: An Overview

The essential features include a depiction of the economy, how households in the economy differ, and the linkage of the government to the choices of households. Fundamental to this approach is the assumption that households act rationally by lobbying<sup>5</sup> government to choose the level of policy instruments to alter income streams in their favor.

### The Economy

The economy is described by a Ricardo-Viner type of model that contains three sectors, index  $i = r(\text{rural}), h(\text{home}), u(\text{urban})$ . Households consume the three goods  $q_r^i, q_h^i$  and  $q_u^i$ . Sectors  $r$  and  $u$  produce traded goods  $y_i$  and the other a home good  $y_h$ . Each sector employs a factor ( $l_i$ ) that is mobile across the economy (labor), a sector specific factor  $\bar{x}_i$  that can only be traded within the sector, and a sector specific public factor  $G_i$ .<sup>6</sup> Technology is assumed to be homogeneous in  $l_i$  and  $\bar{x}_i$ . Public factors are produced by the government using only labor,  $l_i^g$ .

Sector specific factors of production are used to capture the effects of

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<sup>5</sup>Lobbying can be viewed as a surrogate for household resources allocated to influence public authority.

<sup>6</sup>Public factors are hence forth referred to as public goods.



policy on household income since the effects of policy often become embodied in the value of sector specific assets. These affects on income motivate households to lobby on their behalf. Public goods are included for the same reason, but also to illustrate the beneficial nature of lobbying behavior since the market process fails to optimally allocate them. The result is that trade protection and the allocation of public goods will depend on the distribution of factor endowments, preferences for goods and political influence.

Assuming a solution within the economy's cone of diversification, market clearing conditions are given by

$$(1.a) \quad f_i(w, c_i; G_i^0) = p_i,$$

$$(1.b) \quad \Sigma_i \partial \pi^i / \partial w = - \Sigma_i (\bar{l}_i - \ell_i^0 - l_i^g)$$

$$(1.c) \quad \Sigma_i q_h^i - \partial \pi^i / \partial p_h = 0,$$

where each sector's total cost function,  $f_i(w, c_i; G_i^0)y_i$ , is separable in  $y_i$  due to the homogeneity in the sector's technology over the input choices of labor  $L_i$  and the sector specific factor  $\bar{x}_i$ . Consequently, a sector's profit function  $\pi^i = \pi_i(p_i, w; G_i)\bar{x}_i$  is also separable in  $\bar{x}_i$ <sup>7</sup>. Variable  $c_i$  is the rental rate to the  $i$ -th sector's specific factor,  $\bar{x}_i$ . Note that  $c_i = \pi_i(p_i, w; G_i)$ .  $\ell_i^0$  denotes the quantity of labor allocated to lobbying by the  $i$ -th household, and  $q_h^i$  is the  $i$ -th household's demand for the home good. The "o" notation indicates that these variables, for the time being, are held fixed. Equations (1.a) set marginal cost equal to price  $p_i$ , (1.b) is the labor market clearing condition, and (1.c) is the demand - supply balance for home goods. This is a system of five equations in the unknowns  $(w, c_r, c_h, c_u, p_h)$ .

Expressing (1) in proportional change from equilibrium, the

<sup>7</sup>Jones appears to be the first to make use of this property, and more recently, Chambers and Paarlberg in a study of export subsidies.

system can be stated as<sup>8</sup>

$$(2.a) \quad A(\hat{w}, \hat{c}_r, \hat{c}_u, \hat{c}_h, \hat{p}_h)^T = (\hat{p}_r + \tau_r \hat{l}_r^g, \tau_u \hat{l}_u^g, \tau_h \hat{l}_h^g, x, z)^T$$

where A is a 5x5 matrix of parameters. The rows of A correspond to converting each equation in (1) to proportional change in all variables where ( $\hat{\cdot}$ ) denotes proportional change, e.g.,  $\hat{w} = dw/w$ . Exogenous variables include:

$$x = - \sum_i \hat{l}_i + \sum_i \hat{l}_i^g (1^g + \phi_i l_i^*) / \sum_i \bar{l}_i + (1/\alpha) (l_r^* / \sum_i \bar{l}_i) \hat{p}_r + \sum_i (l_i^* / \sum_i \bar{l}_i) \hat{x}_i,$$

and

$$z = - \sum_i r_i \hat{l}_i - s_r \hat{x}_r + (1 - s_h) \hat{x}_h - s_u \hat{x}_u + \phi_h \hat{l}_h^g$$

where  $(\phi_r, \phi_h, \phi_u) = (\tau_r/\alpha, \tau_h/\eta, \tau_u/\beta)$ ,  $r_i = w l_i / \sum_i \Pi_i^1$ , and  $s_i = c_i \bar{x}_i / \sum_i \Pi_i^1$ . The coefficients  $\tau_i$  are public good production elasticities. The  $\alpha$ ,  $\eta$  and  $\beta$  are factor shares in sector costs for the rural, home and urban good households, respectively. The lobby variables  $\ell_i^0$  are held constant.

Comparative statics of the model are given by

$$(2.b) \quad (\hat{w}, \hat{c}_r, \hat{c}_u, \hat{c}_h, \hat{p}_h)^T = A^{-1}(\hat{p}_r + \tau_r \hat{l}_r^g, \tau_u \hat{l}_u^g, \tau_h \hat{l}_h^g, x, z)^T$$

The nature of the matrix A and its inverse  $A^{-1}$  are well-known for the basic Ricardo-Viner model.<sup>9</sup> Since the comparative static analysis of this modified version only departs marginally from the basic model, the results are simply stated in Table 1 (See Appendix A for the derivation of  $A^{-1}$ ).

<sup>8</sup>See Woodland p 227-228 for an illustration of this procedure.

<sup>9</sup>see Dixit and Norman, p 38.

Table 1: Comparative Static Results of Modified Ricardo-Viner Model

Endog. Var.	Exogenous Variables								
	$\hat{\partial p}_r$	$\hat{\partial \Sigma}_i \hat{l}_i$	$\hat{\partial \bar{x}}_r$	$\hat{\partial \bar{x}}_u$	$\hat{\partial \bar{x}}_h$	$\hat{\partial l}_r^g$	$\hat{\partial l}_u^g$	$\hat{\partial l}_h^g$	
$\hat{\partial \bar{w}}/$	+	-	+	+	?	+	+	?	
$\hat{\partial \bar{c}}_r/$	+	+	-	-	?	?	-	?	
$\hat{\partial \bar{c}}_u/$	-	+	-	-	?	-	?	?	
$\hat{\partial \bar{c}}_h/$	?	+	?	?	?	?	?	?	
$\hat{\partial \bar{p}}_h/$	?	?	?	?	?	?	?	?	

Based on (2.b).

### The Government

While various approaches depict government behavior differently, their common feature is the derivation of policy decision rules that depict how policy instrument levels respond to lobbying and/or voting behavior<sup>10</sup>. One approach is to posit a political authority that acts as though it forms preferences over the utility of households in the economy, and then chooses policy instruments to maximize the weighted sum of these utilities subject to the condition that it cannot incur a fiscal, and hence a trade deficit<sup>11</sup>. Given the policy instruments  $p_r$  and  $l_i^g$ , the government is assumed to solve

$$(3) \quad \begin{aligned} \text{Max}_X \quad & U^g = \sum_i I_i(l_r, l_h, l_u) V^i(p_r, p_h; \Pi^i) \\ \text{X}_s \quad & - \{(p_r, l_r^g, l_h^g, l_u^g) \in \mathbb{R}_+ \mid G_i = G_i(l_i^g), T=C\}. \end{aligned}$$

The  $i$ -th household's indirect utility function,  $V^i(\cdot)$ , depends on prices

<sup>10</sup>Young and Magee employ both lobbying and voting in their model of endogenous Protection, but they exclude public goods and returns to sector specific factors.

<sup>11</sup>This structure is surely a gross simplification of the political process. Still, owing to the paucity of models of the political process and the need to posit special voter preferences or institutional structures in order to obtain predictive power, the specification used should suit our purposes here. An alternative would be to simply choose a policy rule, as in Mayer and Riezman, and in Coggins et al. and avoid this step entirely.

and total household income

$$\Pi^i = \pi_i(p_i, w; G_i) \bar{x}_i + w[\bar{l}_i - \ell_i^0] + \gamma_i T.$$

where  $\gamma_i$  denotes the  $i$ -th household's share of total taxes  $T$ . The  $G_i(l_i^G)$  are technologies for producing the public goods for each sector  $i$ . Maximization requires that fiscal expenditures<sup>12</sup>

$$(4.a) \quad C = -w \sum_i l_i^G + (p_r - p^w) E_r$$

equal the lump sum income transfers to households,  $(T - C)$ , where excess demand is

$$(4.b) \quad E_r = \sum_i q_r^i - \partial \pi^i / \partial p_r,$$

and  $p_r^w$  denotes world price. Tax shares  $\gamma_i$  are not treated as a policy instruments; focus is on the level of the price and public good instruments. Equation (4.a) is used to close the model.

The values  $I_i$  are weights that define the government's preference ordering. They are conceptualized as the influence functions initially posited by Becker. As suggested by Becker, the influence functions represent the end product of pressure generated by interest groups. Institutional, cultural and other differences among countries give rise to different ways in which the interests of the polity are reflected in the policy choices of the state. A fundamental characteristic of virtually all political systems is that some groups have more influence than others. Hence, households lobby for purposes of generating political pressure ( $\rho_i$ ) that yields influence  $I_i$ ; i.e., households lobby in order to alter the parameters  $I_i$  of the government preference function, and hence the choice of instrument levels in  $X_s$ <sup>13</sup>.

<sup>12</sup>The price of the urban good is the numeraire. In this case, fiscal effects of trade are  $(p_r - p_r^w) E_r = (P_r/P_u - P_r^w/P_u^w) E_r$ .

<sup>13</sup>An alternative approach is to specify a fourth sector that specializes in the production of political influence as a function of the resources required to produce it and the willingness of the households to pay. This would typify the activities of firms that lobby on the behalf of their clients. While useful for some questions, this approach tends to complicate the analysis without adding significant insights beyond the model posited here.

This structure is very much a political black box or "reduced form" approach. Details of the institutions for establishing laws, politicians, political parties, mechanisms for enacting and administering laws and defining policy instruments from a set of possible instruments receive no particular attention. The basic result is that policy instruments can be used to raise the welfare of the more influential groups.

Unlike the rent seeking literature in which, absent of other distortions in the economy, rent seeking reduces efficiency (Bhagwati, 1982), it is now possible for lobbying to increase an economy's production possibilities by the production of public goods  $G_i$ . The cost to the economy is the labor employed in public good production plus the labor lost from redirecting it to lobbying activities.

Following Becker, political pressure is produced in an environment of rules and institutions that map lobbying into pressure, i.e., a pressure production function,

$$(5.a) \quad \rho_i = \rho_i(l_i, z_i)$$

Similar to a technology,  $\rho_i$  is positive, continuous and quasi-concave, in the amount of labor  $l_i$  allocated to lobbying. For the moment,  $z_i$  is a vector of exogenous variables that summarize the state of the political economy; they affect the efficiency of converting lobbying into pressure. This function represents a political technology, perhaps from a set of possible technologies, that are available to households. Even though (3) suggests a central planner type government, a Ministry that favors the interests of a group can be viewed as increasing the efficiency of the group's lobbying technology, (5.a), or the efficiency of converting pressure into influence, (5.b).

The end result of lobbying is a set of weights

$$(5.b) \quad I_i = I_i(l_r, l_h, l_u) = \bar{I}_i(\rho_r, \rho_h, \rho_u)$$

that the government takes as given. It follows from the linearity of (3) in  $I_i$  that it is relative changes in  $I_i$ , and not their absolute magnitudes, that matter. The  $I_i$  are assumed to be continuous, positive, concave and increasing (resp. convex and decreasing) in  $\rho_i$  (resp.  $\rho_j$ ,  $i \neq j = r, h, u$ ). Since  $\partial^2 I_i / \partial \rho_i \partial \rho_j = \partial^2 I_i / \partial \rho_j \partial \rho_i$ , if  $\partial^2 I_i / \partial \rho_i \partial \rho_j$  is positive at  $\rho_i^*$ ,  $\rho_j^*$ , then in the neighborhood of this point, an increase in  $\rho_j$  increases the marginal product of  $\rho_i$  so that an increase in  $\rho_i$  decreases the absolute effect of  $\rho_j$  on  $I_i$ <sup>14</sup>. These conditions imply that an increase in the political efficiency of the  $i$ -th household, e.g.,  $\partial \rho_i / \partial z_i > 0$ , can decrease the relative influence of the  $j$ -th household and induce the latter to counteract the increased efficiency of  $i$  with more labor allocated to lobbying, all else constant<sup>15</sup>.

### III The Government's Decision Rules

The first task is to establish that the model does not preclude, by construction, a free market - Samuelsonian efficiency result, i.e., that the model satisfies the Negishi conditions. Then, the implications to instrument choices are investigated when these conditions are not satisfied.

Proposition 1: If the Negishi condition holds, i.e.,  $I_i = 1/(\partial V^i / \partial \Pi^i)$  and if  $dE_r / dp_r$  is non zero, then a maximum to (3) is characterized by  $p_r = p_r^w$  and  $(\partial \pi^i / \partial G_i) \partial G_i / \partial l_i^g = w$ . See the Appendix B for a sketch of the proof.

Under these conditions, the government chooses a price that would also prevail under free trade. As well, labor is allocated to the production of public goods to the point where the product of the marginal physical product of labor in producing the public good for the  $i$ -th sector,  $\partial G_i / \partial l_i^g$ , and the marginal value product of the public good,  $\partial \pi^i / \partial G_i$ , equals the wage. If each

<sup>14</sup>If the cross derivatives are negative at the point  $\rho_r^*$ ,  $\rho_h^*$ ,  $\rho_u^*$ , then an increase in  $\rho_u$  decreases the marginal product of  $\rho_r$  on  $I$ .

<sup>15</sup>The coalition free rider problem is ignored here. It is partially dealt with in Mohtadi and Roe using quasi-public goods.

sector has several agents,  $G_i$  is a pure public good in the sector. In this case, under the conditions of proposition 1, public goods supply satisfies the Samuelsonian efficiency condition in each sector (sum of marginal values of the public good equals marginal cost) as well as being efficiently allocated between sectors.

While it is not necessarily true that (3) is concave for any positive value of  $I_i$ , concavity is assumed to hold in the neighborhood of the Negishi weights. Thus, for the case of an interior solution to (3), let the government's policy decision rules be denoted by:

$$(6.a) \quad p_r = p(l_r, l_h, l_u, \vec{e})$$

and

$$(6.b) \quad l_i^g = l_i^g(l_r, l_h, l_u, \vec{e}).$$

where the exogenous variables are  $\vec{e} = (p_r^v, \bar{l}_r, \bar{l}_h, \bar{l}_u, \bar{x}_r, \bar{x}_h, \bar{x}_u, z_r, z_h, z_u)$ .

Equation (6.a) is the government's price policy rule and (6.b) are its public good rules.

By analogy to an economic market, the decision rules (6) can be viewed as the "supply functions" of the instrument levels provided by the state. In this context, important questions relate to the signs of  $\partial p_r / \partial l_i$  and the importance of labor and sector specific endowments on increasing the "efficiency" with which an incremental change in the level of lobbying will impact on the government's choice of instrument levels, e.g.,  $\partial^2 p_r / \partial l_i \partial \bar{x}_i$ . In other words, will the government be more responsive to a given level of lobbying if the sector is relatively well endowed with sector specific resources?

To proceed with this analysis, attention is focused separately on each household type as follows. Let the *weighted* preference weights  $I_i (\partial V^i / \partial \Pi^i)$ , for the two households  $i = h, u$ , be equal, i.e., define  $I = I_h (\partial V^h / \partial \Pi^h) = I_u (\partial V^u / \partial \Pi^u)$ . Then, let  $1 + \alpha_r = I_r (\partial V^r / \partial \Pi^r) / I$ . Hence, if  $\alpha_r > 0$ ,

preference favors the rural household. The weights  $I_i$  are weighted by their respective marginal utility of incomes  $(\partial V^i/\partial \Pi^i)$  to abstract from this effect on the government's choice. The weighting is unnecessary if household preferences are identical and homothetic. Then, they are independent of income level and can be omitted.

Proposition 2: If the tax burden is borne by home good and urban households,

$\gamma_r = 0$ , price distortion for the rural household is determined by:

$$(p_r - p_r^w) = \frac{-\alpha_r}{\partial E_r} [(y_r - q_r^r) - q_h^r \partial p_h / \partial p_r + (\bar{l}_r - \ell_r^o - L_r) \partial w / \partial p_r],$$

and, for  $\gamma_r = 1$ , it is determined by

$$(p_r - p_r^w) = \frac{-\alpha_r}{(1 + \alpha_r) \partial E_r} [(y_r - q_r^r) - q_h^r \partial p_h / \partial p_r + (\bar{l}_r - \ell_r^o - L_r) \partial w / \partial p_r - (\partial w / \partial p_r) \sum_i l_i^g + E_r].$$

The home good household, define  $I = I_r (\partial V^r / \partial \Pi^r) - I_u (\partial V^u / \partial \Pi^u)$  and

$1 + \alpha_h = I_h (\partial V^h / \partial \Pi^h) / I$ . Let  $\gamma_h = 0$ . Then,

$$(p_r - p_r^w) = \frac{-\alpha_h}{\partial E_r} [(y_h - q_h^h) \partial p_h / \partial p_r - q_r^h + (\bar{l}_h - \ell_h^o - L_h) \partial w / \partial p_r].$$

If  $\gamma_h = 1$ , then,

$$(p_r - p_r^w) = \frac{-\alpha_h}{(1 + \alpha_h) \partial E_r} [(y_h - q_h^h) \partial p_h / \partial p_r - q_r^h + (\bar{l}_h - \ell_h^o - L_h) \partial w / \partial p_r - (\partial w / \partial p_r) \sum_i l_i^g + E_r].$$

The urban household, define  $I = I_r (\partial V^r / \partial \Pi^r) - I_h (\partial V^h / \partial \Pi^h)$  and

$1 + \alpha_u = I_u (\partial V^u / \partial \Pi^u) / I$ . Let  $\gamma_u = 0$ . Then,

$$(p_r - p_r^w) = \frac{-\alpha_u}{\partial E_r} [-q_h^u \partial p_h / \partial p_r - q_r^u + (\bar{l}_u - \ell_u^o - L_u) \partial w / \partial p_r].$$

If  $\gamma_u = 1$ , then,

$$(p_r - p_r^w) = \frac{-\alpha_u}{(1 + \alpha_u) \partial E_r} [-q_h^u \partial p_h / \partial p_r - q_r^u + (\bar{l}_u - \ell_u^o - L_u) \partial w / \partial p_r - (\partial w / \partial p_r) \sum_i l_i^g + E_r].$$

where  $\partial E_r$  is defined in Appendix B, following equation (B.1). For the case of



a normal good,  $dE_r/dp_r$  is negative<sup>16</sup>. See Appendix B for derivations.

In general, these results indicate that instrument levels depend on the household's level of production  $y_i$ , consumption  $q_i^i$ , and its net labor market position, i.e., whether households hire labor,  $(\bar{l}_i - \ell_i^o - L_i) < 0$ , or earn income from working outside the household,  $(\bar{l}_i - \ell_i^o - L_i) > 0$ , and changes in expenditures to incremental changes in instrument levels, e.g.,  $\partial p_h/\partial p_r$ ,  $\partial w/\partial p_r$ . Consider first the case where relative influence favors the rural household.

For an incremental increase in lobby level  $\ell_r$  that yields relative influence  $\alpha_r$ , protection is likely to be larger if the increase in expenditures on home goods,  $q_h^r \partial p_h/\partial p_r$ , is small, market surplus  $(y_r - q_r^r)$  is large and the household earns wage income. This result seems consistent with the stylized facts of U.S. and European farm programs. However, the result does not follow in all circumstances. At another though unlikely extreme, disprotection ( $p_r < p_r^w$ ) is possible if the market surplus of the rural household is small, the proportion of their income spent on home goods is relatively high, and the household hires labor. Since it is unlikely that a household with a small market surplus would also hire labor, this is an extreme outcome.

Another result is that, all else constant, protection tends to be proportional to the household's endowment of the sector specific factor  $\bar{x}_r$ , i.e.,  $\partial^2 p_r/\partial \ell_r \partial \bar{x}_r > 0$ . It follows from the technology assumed that supply can be expressed as  $y_r = y_r(p_r, w; G_r) \bar{x}_r$ . A large endowment  $\bar{x}_r$  causes an increase

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<sup>16</sup>If another freely mobile input were specified, then the sign of  $\partial w/\partial p_r$  would depend on the Stolper-Samuelson condition. If  $E_r$  positive, (the rural is good imported) then for a normal good  $\partial E_r/\partial p_r < 0$ . If  $E_r$  negative, the sign of  $\partial E_r/\partial p_r$  is indeterminate unless the income effect is "small" (Woodlnd, p.153).

in  $y_r$  and in market surplus. Effectively, the government is motivated to "supply" an incremental increase in protection,  $p_r$ , for a given lobbying level since a higher return to the household's welfare is earned if, all else constant, it is relatively endowed with the sector specific factor  $\bar{x}_r$ . Since  $\partial y_r / \partial G_r > 0$ , this same result applies to the provision of public goods. This rather strong prediction appears consistent with the empirical evidence provided by Torsten and Tabellini in their time series cross section study of nine countries. They find that policies tend to favor those endowed with relatively more resources. Effectively, marginal returns to an incremental increase in  $p_r$  is higher, all else constant, if  $\bar{x}_r$  is large.

Incentives for protection also depend on the direct price elasticity of supply<sup>17</sup>. As supply becomes more inelastic,  $\partial E_r$  becomes a smaller absolute value. Hence, for a given  $\alpha_i$ , the ratio  $-\alpha_i / \partial E_r$  for  $i = r, h, u$  becomes a larger positive value the more inelastic is supply, and hence, all else constant, the more incentive to protect (or less incentive to disprotect) the rural good. Effectively, given constant returns to scale, rents to the sector specific factor  $\bar{x}_r$  increase as labor's share falls (and hence supply becomes more inelastic) and land's share rises. In this case, an incremental increase in protection yields a larger increase in rents to  $\bar{x}_r$  than if supply were more elastic.

Finally, the level of protection also depends on whether the rural good is exported. If the rural good is exported,  $E_r < 0$ , inspection of the second condition suggests that incentives for protection are decreased, all else constant, and increased if the rural good is imported. This result is to be expected since protection yields a fiscal deficit if the commodity is exported and a surplus if imported. Taken together, these results suggest that

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<sup>17</sup>The effect of an inelastic supply on incentives for protection has been noted earlier by Honma and Hayami.

$\partial p_r / \partial \ell_r > 0$  is most likely.

Price policy is less clear for households producing home goods. When influence favors these households,  $\alpha_h > 0$ , disprotection of the rural sector is likely if the home good households spend a larger portion of their income on the rural good, if the gain in income from the sales (market surplus) of the home good is small and if a relatively small amount of income is earned in the labor market. Then,  $\partial p_r / \partial \ell_h < 0$  is likely. Otherwise, the home good household is less affected by price policy, as would likely be the case if it were wealthy with a larger portion of income spent on the urban as opposed to rural goods.

The results are more clear for urban households. When influence favors urban good producing households,  $\alpha_u > 0$ , the model suggests that government policy will tend to disprotect the rural good. If  $\partial p_h / \partial p_r > 0$ , then the only incentive for protection depends on whether the urban household is labor surplus ( $\bar{l}_u - \ell_u^0 - l_u$ )  $> 0$ . Otherwise, the terms on the RHS of the urban equation are negative. If the urban household bears the tax burden,  $\gamma_u = 1$ , then, incentives for disprotection are further strengthened if the rural good is exported since  $E_r$  is also negative. Hence,  $\partial p_r / \partial \ell_u < 0$  is likely under most circumstances, although incentives for disprotection would tend to decline as the share of the rural good consumed declines with income growth.

Together, these results suggest that if government preferences favor the urban and possibly the home good producing households, the price of the rural good is likely to be less than its boarder price. They also suggest that, in terms of price policy alone, the home and urban households may both gain from disprotection of the rural good. In this case, their individual lobbying reinforces policy to discriminates against rural households; it may also imply that one of these households will free ride on the lobbying efforts of the other. Further, if Engle effects are linear, then for given  $\alpha_h$ ,  $\alpha_u$ ,

disprotection of the rural good will tend to be in proportion to the home and urban household's level of public goods  $G_i$  and sector specific factors  $\bar{x}_i$ . However, empirical evidence suggests that these effects are not linear, so that wealthier households are likely to decrease the proportion of income spent on the rural good. In this case, the level of disprotection for given  $\alpha_h$ ,  $\alpha_u$  will tend to decline as the home and urban good households become wealthier.

Bias in the provision of the public goods is shown by the departure of its marginal product  $(\partial\pi^i/\partial G_i)\partial G_i/\partial l_i^g$ , from equality among sectors. There is both a level and a bias affect. Consider the case where preference favors the urban household, i.e., as in the case of price policy, let  $1 + \alpha_u = I_u$  and assume  $\gamma_u = 0$ . Then

$$\begin{aligned} \partial U^g/\partial l_u^g = & (1 + \alpha_u) [-q_h^u \partial_u p_h + (\partial\pi^u/\partial G_u)\partial G_u/\partial l_u^g + \partial_u w(\bar{l}_u - \ell_u^o - l_u)] - \\ & q_h^h \partial_u p_h + (y_h)\partial_u p_h + \partial_u w(\bar{l}_h - \ell_h^o - l_h) - q_h^r \partial_u p_h + \\ & \partial_u w(\bar{l}_r - \ell_r^o - l_r) - \partial_u w \sum_i l_i^g - w + (p_r - p_r^w)\partial_u E_r = 0, \end{aligned}$$

Collecting terms and expressing the result in terms of the marginal value product of the urban sector public good, yields:

$$(7.a) \quad (\partial\pi^u/\partial G_u)\partial G_u/\partial l_u^g = \frac{1}{(1 + \alpha_u)} (w + \alpha_u [q_h^u \partial_u p_h - \partial_u w(\bar{l}_u - \ell_u^o - l_u)]) - (p_r - p_r^w)(\partial_u E_r).$$

Proceeding likewise for  $\partial U^g/\partial l_r^g$  and  $\partial U^g/\partial l_h^g$ ,

$$(7.b) \quad (\partial\pi^r/\partial G_r)\partial G_r/\partial l_r^g = w + \alpha_u [q_h^u (\partial_r p_h) - (\partial_r w)(\bar{l}_u - \ell_u^o - l_u)] - (p_r - p_r^w)(\partial_r E_r),$$

$$(7.c) \quad (\partial\pi^h/\partial G_h)\partial G_h/\partial l_h^g = w + \alpha_u [q_h^u (\partial_h p_h) - (\partial_h w)(\bar{l}_u - \ell_u^o - l_u)] - (p_r - p_r^w)(\partial_h E_r),$$

where  $\partial_i p_h = \partial p_h/\partial l_i^g$ ,  $\partial_i w = \partial w/\partial l_i^g$  and  $\partial_i E_r = (\partial E_r/\partial p_h)\partial p_h/\partial l_i^g + (\partial E_r/\partial w)\partial w/\partial l_i^g + \partial E_r/\partial l_i^g$ .

If  $\alpha_u = 0$ , then Proposition 1 results. Otherwise, the level of investment bias depends on changes in the urban household's level of

expenditures on home goods,  $q_h^u(\partial_i p_h)$ , changes in wage income or expenses,  $(\partial_i w)(\bar{l}_u - \ell_u^o - L_u)$ , and the product of price bias and shifts in net trade,  $(p_r - p_r^w)(\partial_i E_r)$ . In terms of  $w$  alone, for  $\alpha_u > 0$  in (7.a), the urban marginal value product of labor allocated to the production of the urban public good is less than labor wage. If the sum of the terms in  $[\cdot]$  is positive, this bias is reduced. Hence, investment bias is less if urban households are labor deficit,  $(\bar{l}_u - \ell_u^o - L_u) < 0$ , since  $\partial_u w > 0$ , and their expenditures on home goods are increased, i.e.,  $\partial_u p_h > 0$ . If the rural sector is disprotected for reasons mentioned in Proposition 2, and  $\partial_u E_r > 0$  (i.e., the increase in the demand for the rural good due to the income effect from increased production of the urban public good exceeds any supply increase in the rural good) then, accounting for the negative sign preceding this product, the value is positive, which of course, further decreases the bias. Thus, as disprotection of the rural good increases, all else constant, urban investment bias tends to decrease. This result suggests that  $p_r$  and  $l_u^g$  can be substitutes within certain ranges of these instruments<sup>18</sup>.

Conditions (7.b) and (7.c) indicate that influence favoring a sector also affects the level of public good investment in other sectors. Consider (7.b). A positive value for the sum in  $[\cdot]$ , (which of course corresponds to changes in welfare of urban good producing households to an incremental increase in the allocation of labor  $l_r^g$  to produce rural public goods), tends to decrease government investment in the production of the rural public good. The last term in (7.b) is positive for  $p_r < p_r^w$ . Accounting for the negative sign, disprotection would, at first, appear to lessen the rural good investment bias. However,  $p_r$  and  $w$  are arguments of  $\partial \pi^r / \partial G_r$  so that the marginal product of the rural public good is lowered by the direct effects of disprotection.

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<sup>18</sup>de Gorter et al. discuss similar linkages for the case of U.S. agricultural policy.

Hence, for disprotection to lessen the investment bias in rural public goods requires that  $\partial E_r$  exceed the depressing effect of disprotection on  $\partial \pi^r / \partial G_r$ .

Now, consider (7.c). While the same factors determine the direction of investment bias, the effect of disprotection of the rural good on investment bias is similar to (7.b) because the arguments  $p_h$  and  $w$  of  $(\partial \pi^h / \partial G_h)$  are functions of  $p_r$ . An additional complication occurs because  $\partial p_h / \partial l_h^g$  cannot be signed. Hence, public good bias in home goods may be either increased or decreased when the rural good is disprotected.

Since the traded good households can increase their welfare from investment in their public good, they have an incentive to lobby government, i.e.,  $\partial l_i^g / \partial \ell_i \geq 0$ ,  $i = r, u$ . This is not the case for home good households because an expansion of their production capacity can be immiserizing. Finally, for a given level of influence, the sector relatively more endowed with the sector specific factor tends to be favored in the allocation of the public good since  $\partial^2 \pi^i / \partial G \partial \bar{x}_i \geq 0$ . The analysis for the cases  $\alpha_r$  and  $\alpha_h$  are similar.

#### IV. The Household's Decision Rules

Households are assumed to know the government's decision rules (6) and, taking other household lobbying levels as given, to behave as though they solve the problem<sup>19</sup>:

$$(8) \quad \text{Max}_{\ell_i} V^i(p_r, p_h; \Pi^i), \ell_i \in \mathbb{R}_+$$

Substituting rules (6) into (8), the FOC for an interior solution suggests the following proposition.

Proposition 3: Behaving as Nash, households equate the marginal cost to

<sup>19</sup>The choice of  $\ell_i$  can be viewed as being simultaneous with production and consumption choices.

marginal return from an incremental change in the labor allocated to lobbying<sup>20</sup>; for the rural good producing household,

$$(9.a) \left\{ (y_r - q_r^r) \partial p_r / \partial l_r - q_h^r [dp_h / dl_r] \right\} + (\partial \pi^r / \partial G_r) (\partial G_r / \partial l_r^g) \partial l_r^g / \partial l_r + (\bar{l}_r - l_r - L_r) [dw / dl_r] + \gamma_r [dT / dl_r] - w$$

the home good producing household,

$$(9.b) \left\{ (y_h - q_h^h) [dp_h / dl_h] - q_r^h \partial p_r / \partial l_h \right\} + (\partial \pi^h / \partial G_h) (\partial G_h / \partial l_h^g) \partial l_h^g / \partial l_h + (\bar{l}_h - l_h - L_h) [dw / dl_h] + \gamma_h [dT / dl_h] - w$$

and the urban good producing household,

$$(9.c) \left\{ -q_r^u \partial p_r / \partial l_u - q_h^u [dp_h / dl_u] \right\} + (\partial \pi^u / \partial G_u) (\partial G_u / \partial l_u^g) \partial l_u^g / \partial l_u + (\bar{l}_u - l_u - L_u) [dw / dl_u] + \gamma_u [dT / dl_u] - w$$

where  $\gamma_i$  is the share of taxes paid, and  $dp_h / dl_i$ ,  $dw / dl_i$  and  $dT / dl_i$  are changes in home good prices, wages and taxes to changes in lobby levels  $l_i$ , respectively. These terms are lengthy, see Appendix B for derivations.

These result suggests that households are concerned with the optimal allocation of their lobbying resources so that, at the margin, they are indifferent to the provision of public goods over policies that distort prices. In other words, the marginal cost - return to the household's lobbying resources can favor price distortions as opposed to the provision of public goods depending on which policy instrument yields the highest returns to the household's resources. This marginal cost - return calculus is the typical rent seeking result (Bhagwati 1982, Srinivasan) that the allocation of resources to influence prices (or tariffs) can decrease a country's production possibilities.

The results reinforce many of the findings in the synthesis studies mentioned, particularly Krueger et al. They are also supportive of the now

<sup>20</sup>The coalition free rider problem is partially dealt with due to the presence of the sector specific factors. See Mohtadi and Roe for an alternative specification.

familiar explanations by Bates, Honma and Hayami and others<sup>21</sup> of low (resp. high) income countries' tendency to tax (resp. subsidize) agriculture relative to the non agricultural sector of the economy.

Starting with (9.a), consider only the terms in ( $\cdot$ ); they show changes in income and expenditures from production  $y_r$  and consumption  $q_r^r, q_h^r$  due to lobbying. If, for reasons mentioned  $\partial p_r / \partial \ell_r > 0$ , and the sum in ( $\cdot$ ) is positive, (i.e. the increase in the value of market surplus exceeds the increase in expenditures on home goods) then the household will *anticipate* a gain from lobbying<sup>22</sup>. Under these circumstances, the larger is the scale of production,  $G_r$  and  $\bar{x}_r$  large, all else constant, the greater is the household's incentive to increasing its lobbying activities to influence the government's choice of  $p_r$ . The household may incur some cost in addition to the opportunity cost of labor; this depends on the sign of  $dp_h / d\ell_r$  and the level of home goods it consumes. Thus, this result alone suggests that, all else constant, rural households in low income countries have less incentive to seek protection than do rural households in wealthy countries where market surplus tends to be large.

What is the effect on other households from the lobbying activity of the rural household? The cost to other households is given by  $\partial V^i / \partial p_r, i = h, u$ . But, these affects appear in the discussion to Proposition 2 so they are not repeated here.

Next, consider households' position in the labor market, i.e., the products  $(\bar{l}_i - \ell_i - L_i)[dw/d\ell_i]$ . In low income economies, production in the rural sector tends to be labor intensive, and capital intensive in developed

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<sup>21</sup>See for example, Roe and Pardey.

<sup>22</sup>Since Nash behavior is assumed, whether the price actually increases depends on the actions of the other households, and hence the sign of  $\alpha_i$ .



economies. In this case, the Ricardo-Viner model predicts that an increase in  $p_r$  would yield a larger increase in wages in a low income economy than in a high income economy<sup>23</sup>. If, for low income economies, urban good producing households are labor deficit, higher rural good prices would appear to increase their wage bill to a greater extent than will higher urban good prices<sup>24</sup>. If home producing households are labor surplus, the net effect of rising wages depends on the sign of  $\partial p_h / \partial p_r$ , which is indeterminate. Thus, it is possible for home and urban good households to have an additional incentive, due to the labor market, to form a coalition (though not necessarily explicit and formally organized) to lobby for lower rural good prices. In advanced stages of development the production of the rural good tends to be capital intensive, and hence this incentive declines.

Thus, inferences drawn from this simple framework can be consistent with the observation that in countries where food accounts for a relatively large share of disposable income, political pressures tend to favor cheap food policies because urban and possibly home good households experience welfare gains from cheap food. Typically, in the process of development, the market surplus of rural households increases as scale and specialization occur while the proportion of income spent on food decreases. Then, rural households are more willing to influence policy that favors the rural good<sup>25</sup>. At the same time, urban households tend to be less willing to influence rural good policy

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<sup>23</sup> See Dixit and Norman, p. 102.

<sup>24</sup> A two or more mobile factor model would enrich this analysis since appeal could then be made to the Stolper-Samuelson theorem.

<sup>25</sup> Omitted from this analysis is Mancur Olson's view that the costs of forming and managing a coalition decreases as specialization occurs. Hirschman suggests that the least cost alternative for many is to evade taxes and engage in capital flight rather than participating in collective action. This reasoning would also imply that the integration of world capital markets lessens the influence of groups to distort an economy to the extent it lowers the cost of capital flight.

since less of their income will be affected by the lobby resources allocated for this purpose. Since a greater proportion of a country's GNP is accounted for by foreign trade as development occurs, it is no longer profitable for the home good producing households to counteract the lobbying efforts of the rural households for higher priced food. Consequently, in developed countries, where food is a small component of expenditures and  $y_r$  is large, pressures tend to favor policies that subsidize food production.

Consider the social good side of the lobbying process, i.e., the provision of public goods and its effect on income through the marginal value product,  $(\partial\pi^i/\partial G_i)(\partial G_i/\partial l_i^G)$ . The more efficient the government is in producing the public good,  $(\partial G_i/\partial l_i^G)$  large, and the more important is the public good to increasing the production of  $y_i$ ,  $(\partial\pi^i/\partial G_i)$  large, for  $i = r, u$ , all else constant, the more willing is the rural and urban household to lobby on its behalf. Although, since  $\partial w/\partial l_i^G > 0$ , for  $i = r, u$ , the incentive to lobby is conditioned by whether the household is labor surplus or deficit. Since the sign of  $\partial p_h/\partial l_h^G$  is indeterminate, the result is less clear for the home good producing households. Note that the marginal product of the public good also depends on the household's endowment of the sector specific factor  $\bar{x}_i$ . Thus, the value of economic policy gets built into the value of these factors. Had the model accounted for a skewed distribution of the sector specific factors among households within a sector, then the willingness to lobby for policies that increase the rents to these factors would depend, in part, on whether a household is a surplus or deficit user of the factor.

Now, let's go a bit beyond the bounds of this simple model. Policies that have an adverse impact on the rental value of the sector specific resources also have an adverse impact on the sector's capacity to invest when these factors meet collateral requirements. Policies that discriminate

against agriculture can implicitly decrease its capacity to obtain credit relative to protected sectors, and hence, its capacity for capital deepening, wealth creation, and in turn, its incentives to lobby. Further, just as protection gets built into the value of sector specific assets, so too do the affects on sectoral rental rates attributable to capital market distortions of the nature mentioned. If  $\bar{x}_i$  were plant and equipment of a sector protected using capital market controls (e.g., over valued exchange rates for imported intermediate goods, subsidized credit), then liberalization can imply a decline in wealth of large magnitudes. If the household correctly perceives this possibility, then, as (9) suggests, it may be willing to significantly increase its lobbying commitment to preclude such an eventuality, thus providing insights into why a crises may be required to induce change, and why reform may become incomplete or blocked.

Finally, an important question is whether households behave atomistically toward the effects of their lobbying on the terms in  $[\cdot]$ , i.e., the price of home goods, wages and taxes. The premise here is that households can influence the price and production of public goods, but, as pointed out by Mancur Olson, they may perceive themselves to be such a small component of the national economy that they do not take into account the effects of their actions on the price of these endogenous, economy determined variables. If these effects are not taken into account, their perception of the marginal cost - return calculus would only include the direct effects of lobbying as depicted by  $\partial p_i / \partial \ell_i$  and  $\partial l_i^E / \partial \ell_i$ . That is, the sum of the two products,  $(\bar{l}_i - \ell_i - l_i)[dw/d\ell_i] + \gamma_i[dT/d\ell_i]$  in (9) are then dropped from the analysis while Proposition 2 remains unchanged since it depicts the actions of government<sup>26</sup>. In this case, households can over estimate the returns to their

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<sup>26</sup>The result is an externality of the form discussed by Mothadi and Roe.

lobbying activities and commit resources to lobbying activity they would otherwise not appear to be in their self interest.

The efficiency with which lobbying activity is converted into influence is revealed by the partial derivatives  $\partial p/\partial l_i$  and  $\partial l_i^E/\partial l_i$  in (9). Changes in ideology (North, 1981, p.49), changes in the formal rules as in passage of new statutes, judicial changes as a result of court decisions altering the common law, property rights and changes in social norms, education, and personal standards of honesty, and so on alter the parameters of (6) and hence these derivatives.<sup>27</sup> Households are likely aware that these changes can alter their relative political influence. An analysis of these issues are left to another paper.

#### V. The Economic - Political Equilibrium

In the previous discussion, the  $i$ -th household chose its lobbying level given choices of other households. In this section, we discuss the nature of a political equilibrium and its implications to a country's response to economic shocks. The simplest approach at this level is to posit a one-shot game with Nash behavior. Even with this simple setup, the existence of a Nash equilibrium is not trivial, although it is shown to exist in a simpler model by Coggins et al.

Assuming strict concavity of (8) in  $l_i$ , let

$$(10.a) \quad l_i = l_i(l_j^0, l_k^0, \vec{e}), \quad i \neq j, \quad k = r, h, u.$$

denote the household's lobbying rule obtained as a solution to (9.a), (9.b) and (9.c), respectively. Equations (10.a) are the  $i$ -th household's best response to the households' action  $(l_j^0, l_k^0)$ . Then  $l_i^0$  are a Nash solution if,

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<sup>27</sup> See North (1991) for a recent paper on institutional innovation and its implications for development. Surely, lobbying also occurs to alter institutions. Except in the case of revolution or perhaps an economic collapse, the change in institutions is likely to occur over a longer period of time than the concerns addressed here. A dynamic framework may best address this dimension of political economy.

and only if, (6) hold simultaneously, i.e.,

$$(10.b) \quad \partial v^i / \partial \ell_i \Big|_{\ell_j(\ell_i^0, \ell_k^0, \vec{e}); \ell_k(\ell_i^0, \ell_j^0, \vec{e})} = 0, i \neq j, k = r, h, u.$$

Suppose, a solution exists, although it may not be unique. Then, and only then, can an equilibrium  $(w, p_h, c_r, c_h, c_u)$  exist in the economic market, as described by (2.b), since the exogenous variables  $(\hat{p}_r, \hat{l}_i^g)$  in (2.b) are functions of lobbying levels. The "political market," is defined by (10.a). Hence, in this framework, forces for both an economic and a political equilibria exist. If an equilibrium does not exist, then the model would seem even more incomplete since budget constraints would unlikely by satisfied.

It is clear that changes in exogenous variables (elements of  $\vec{e}$ ) can induce a change in both the economic and the political market. Or, put another way, within this framework, an extraordinarily large shock could force changes in instrument levels (as in the case of IMF and IBRD negotiations with economies facing an eminent collapse) that may so threaten or realign the balance of political influence that a political equilibria may not exist within the confines of existing institutions embodied in the government's policy decision rules (6). Moreover, once the crises is resolved, what prevents the interest groups from once again lobbying to induce policy the precipitates yet another collapse?

At the very least,  $p_r$ ,  $l_i^g$  and  $w$ ,  $p_h$  will be subject to variation and, while outside the confines of this simple model, a country may need the capacity to accumulate debt in the short run in order to limit extra ordinarily large adjustments if political stability is to be attained<sup>28</sup>. More realistically, it is likely that the economic variables will tend to adjust more rapidly, while the political variables, namely the  $\ell_i$ , will adjust more slowly. In the Krueger et al. synthesis, it was noted that when adjustment

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<sup>28</sup>A similar point has been made by Dornbusch.

was needed to accommodate exogenous shocks, negotiations between various interest groups either preceded slowly or did not occur in time to alleviate a liquidity crises. The result for many countries was an externally devised liberalization program that likely would not have come about from a realignment of interest groups alone. Along the same lines, reform in many countries included in the synthesis was forestalled when rising world prices for exportables increased liquidity, and in some case led to spending sprees that delayed and worsened the country's eventual adjustment process.<sup>29</sup>

In the next section, the line of reasoning suggested by this framework is used to infer how reform might be sustained without intervention in a country's political process.

#### VI. Elements to Obtaining and Sustaining Policy Reform

Attention is focused first on limiting the direct and adverse effects of a country's institutions on sustaining reform, and then on individual incentives. Discussion proceeds in the spirit of the framework presented above.

##### Institutional Components of Reform

Clearly, institutions are important since they are a component of the political technology available to respective households, the black box behind equations (3) and (6). Institutions "consist of the structure that humans impose on their dealing with each other," North (p. 4, 1991). They influence access to information and the process, rules and constraints that permit the polity to access political authority. Note the knowledge and information requirements of the household, the prerequisites for informed - rational choice that knowledge of equations (6) imply. A competitive market model with no government is informationally efficient since households only need to

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<sup>29</sup>See Corden for a discussion of specific countries.

respond to the information provided by price signals. However, in the "political market," the household's decision making problem is more complex since it is dependent on (a) knowledge of the political process, equations (6), (b) the effects of lobbying on market determined variables,  $w$ ,  $p_h$  and by implication,  $c_r$ ,  $c_h$ ,  $c_u$ , and taxes  $T$ , and (c) the counteracting lobbying of adversely affected households.

As noted by others, e.g., Krueger (1990.b, p. 21), when the costs of a policy are obscure, government can manipulate instruments to the advantage of special interests without incurring the wrath of other interests and their political supporters<sup>30</sup>. Unequal access to public authority, and informational asymmetries regarding the effects of policy instruments on income streams allows the advantaged groups to obtain preferential benefits from the state at lower resource (lobbying) cost. Drawing heavily from North (1991, p. 12-13, 1991) in the context here, an efficient political market, like an economic market, is one in which households accurately evaluate the policies pursued by competing households in terms of the net effect on their well being. Ignorance, incomplete information and the prevalence of ideological stereotypes that individuals develop to explain their environment and make choices result in political markets that can perpetuate economic policy of interventions in areas where markets function well in resource allocation and at the cost of not intervening in areas where markets fail<sup>31</sup>.

Clearly, political markets are far more obscure in revealing information than are economic markets. Political markets tend to more easily allow information to be privately held and signals privately received than in the case of economic markets. If lobbying levels of other households are not

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<sup>30</sup>Magee et al. refer to obscurity as the "optimal obfuscation principle."

<sup>31</sup>These beliefs are captured in part by the parameters of the influence functions  $I_i(\cdot)$  in (3).

observable, then some information is privately held. Further, the provision of public goods  $G_i$  may not be of a form that is publicly observable. Presumably, the government knows the lobby levels  $l_i$ . The revealing of this information to some and not other households can change the nature of the game posited (7) and hence the nature of equilibrium in the political market. Education and a free and informed press should assist to inform rational agents of the consequences of their lobbying activity. This information assists individuals in performing the imputations implied by the derivatives  $dp_h/dl_i$ ,  $dw/dl_i$  and  $dT/dl_i$  in equations (9), and in discerning the nature of the political market, equations (10).

However, this source of information supply may not be sufficient. Since information markets typically fail to supply the optimal amount of information, information supply would seem to fall into the government domain. But, this may be a trap. To the extent the simple model posited above depicts elements of reality, equations (7) predict that the government does not have the incentive to optimally allocate information as a public good<sup>32</sup>. Given preference weights, government behavior that optimizes (3) may allocate more of the public good - information - to those with the highest relative influence or withhold information that would otherwise permit less influential groups to better compete in the political market. The bias in the provision of information may only be resolved by the presence of an international agency or some other institution outside the control of interest groups that can make available this type of information to all groups.

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<sup>32</sup>Moreover, the government may be motivated to make policy pronouncements that appear credible to the uninformed if the relatively more influential and informed groups gain from such "negative" public goods. An example is the case of Egypt's failed attempt at reform in 1987. Like many other countries, special interests, and some with government support, supplied information discrediting the motivation for the reform packages advanced by the international agencies (see Holt and Roe).



Four additional implications follow from this discussion. First, policy reform should reorient government so that policies and instruments are chosen that provide the least scope for rent seeking. As mentioned, this involves excluding from government control instruments associated with direct intervention in markets that are efficient in allocating resources. The government also may need to signal its credibility to resist returning to instruments over which agents are motivated to rent seek. A clear example of this was Salinas' strategy of leading Mexico's membership in the GATT (Shane). Effectively, membership signals to special interests that they will face increased costs to rent seek over market instruments covered by the treaty.

The scope for rent seeking should also be lowered in the provision of public services or the regulation of natural monopolies. The intent is to force the decision on tradeoffs over the consumption of government services and regulated activities to be made at the household level. Mechanisms for direct income transfers to impoverished households that have minimal effects on economic incentives and the provision of education, training and other means of increasing their productivity are likely preferred alternatives to the direct subsidization of service.

Second, if due to inadequate public infrastructure, market intervention is required to generate public revenues, the scope for rent seeking can still be lowered by the choice of policy instruments. For example, while tariffs invite rent seeking, they are probably less open to rent seeking than are quantitative restrictions, such as licenses which allocate rent from the policy instrument directly to the holder of the license. Another example is income taxes. A schedule of tax rates that apply universally to income categories regardless of household location, status or other distinguishing characteristics is likely more rent and distortion free than are market

instruments. The level of the income transfer is more transparent and the tax incidence is clear to all lobby groups. Sales and value added taxes are another example of an instrument that is reasonably free from the differential effects of rent seeking. A market determined currency exchange rate is not only efficient at allocating foreign exchange to its most profitable alternative, it also prevents the rent seeking that comes about under fixed exchange regimes when ministries and committees must administratively allocate exchange.

Third, rent seeking can be reduced by the choice of public agency participating in the design and implementation of policy. If units of government having discretion over policy have a constituency, then their actions are likely to favor this group, effectively altering the political technology embodied in the policy decision rules, equations (6), in the groups favor. Krueger (1990.b) suggests choosing institutional arrangements that will force tradeoffs to be faced in the administration and execution of policy. For example, a tariff commission would tend to be more protectionist than would a ministry of trade. A ministry of agriculture may be more concerned with rural households than a Ministry of Supply (the case of Egypt). Along the same lines of reasoning, requiring that programs be funded out of government revenue rather than off budget tends to lower the information requirements regarding the gains and losses to various interest groups<sup>33</sup>.

Finally, suppose the political equilibrium (10.b) depicts a prisoner's dilemma or multiple equilibria. Institutional mechanisms need to be invented to resolve the problems this dilemma presents to policy reform, other than waiting and trusting in the political entrepreneur championed by political

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<sup>33</sup>U.S. sugar and dairy are examples of off budget programs.

scientists<sup>34</sup>. Granted, some mechanisms are currently in use. For instance, the conditionality of World Bank and IMF programs designed to lower the cost and period of time required to redirect resources to more productive alternatives are much like compensatory payments. In the case of Egypt, "compensatory like" payments have been used to induce price policy reform in agriculture (Holt and Roe). A component of the country's 1991 structural adjustment loan is to make resources available for a Social Fund. This fund will provide income support to deal with the adverse social impact and hardships that low income segments of the population are likely to experience in the process of reform, and hence lower the perceived risks of social disturbances. Clearly, social inventions in this area are desperately needed.

If policy reform does not address these types of inequities, is it likely that a post crises policy will once again steer a country toward an inward orientation? Is political reform a likely necessary condition, as appears to be happening in many of the centrally planned economies, to prevent a return to an inward orientation? I conjecture, for reasons below, a qualified negative answer to both of these questions.

#### Inducing Disadvantaged Households to Lobby in Their Self Interest

The lobbying behavior described by (9) suggests that an economic shock, crises, or the mentioned changes in the scope of rent seeking, can induce the household to alter its lobbying levels, that is, to re-equilibrate their marginal return - marginal cost to lobbying conditions. In inward oriented economies, policy reform typically provides incentives to households associated with the traded sector to expand production and, for reasons mentioned, to also induce them to increase their lobbying efforts. At the same time, households associated with protected industries and home goods

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<sup>34</sup>See North, 1991 for a discussion of the role of the political entrepreneur.

typically experience a decreased incentive to produce, and to lobby for policy to increase their income streams from these sources. Thus, policy reform alone can potentially alter the political equilibria implied by (10.b) in a manner that produces political resistance to returning to the previous state once the crises that precipitated reform is resolved.

Second, as mentioned, the provision of public goods (education, information, health services, roads and infrastructure, agricultural research, etc) increases the productivity of private sector resources,  $-\partial^2 \pi^1 / \partial w_1 \partial G_1 > 0$ , and the willingness of households to invest in quasi-fixed factors of production<sup>35</sup>. Effectively, rents increase and, all else constant, conditions (9.a) and (9.b) suggest that incentives should motivate the traded good households to allocate more lobbying resources on their behalf. Thus, policy reform that focuses on areas where markets fail, will tend to induce an additional source of counteracting "political will" to redress the disprotection commonly imposed on the rural sector.

This argument could be taken to an additional extreme. In environments where political influence strongly favors the urban sector, it may be socially profitable for an international agency to induce a rural bias in public good provision. This bias will tend to motivate the rural sector to allocate more resources to counteract the lobbying of other sectors and lead to a more competitive balance of political influence between the sectors, thus reducing pressures for a return to inward oriented policies.

A third point relates to the functioning of capital markets and the diversification of household assets. Even though capital markets do not appear in the model, it can be seen that current and capital account linkages that affect relative prices of commodities or factors, can induce households

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<sup>35</sup>Binswanger provides empirical evidence of this linkage in agriculture.

to alter their lobbying levels depending on their preferences, distribution of endowments and the competitiveness of one sector relative to the other. Since capital market distortions in inward oriented economies almost always decrease the rural sector's capacity to collateralize its sector specific assets, reform of these markets can be expected to also increase incentives for rural households to lobby in their behalf. Further, since these markets are prone to failure, interventions that lower the cost of transacting rural sector loans, and costs associated with problems of moral hazard and adverse selection, establishment of property rights and so on should, through profit affects, provide an additional lobbying stimulus for rural households.

Furthermore, it can be seen from (6) that if households hold shares in both sector's sector specific assets, then the household would have less incentive to seek its differential advantage since lobbying that benefited one sector at some cost to the other would be borne by both households. Households would have a greater incentive to cooperate, i.e., to lobby in ways that benefit both. Hence, capital market reform will not only ease capital deepening and the associated willingness for the rural sector to lobby on its behalf, it will also induce a household to diversify its asset portfolio. Then, lobbying focused on market interventions are likely to be less rewarding than lobbying focused on increasing the provision of public goods. Effectively, coalitions would tend to become broader based<sup>36</sup>. This point is merely an elaboration of Mancur Olson's suggestion that broad based coalitions tend to take into account the macro economic effects of their lobbying efforts so that the adverse effects of the differential advantage

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<sup>36</sup> Along the same lines, if sector specific factors  $\bar{x}_i$  can be freely traded and labor is permitted to freely migrate between countries at low cost, much as in the case of countries within the European community, then models of the type posited here indicate that returns to lobbying in a particular country that tax some resources relative to others tends to decline.

they seek tends to be less than those of narrow based coalitions.

For households (urban, and possibly home) that suffer losses associated with reform<sup>37</sup>, compensatory payments in lieu of current policy may be used to alleviate their tendency to resist reform and the tendency to become entrenched. For example, since income is partially dependent on sector specific factors, structural adjustment programs that lower the cost of reallocating sector specific factors to more productive activities within a sector should lower the resistance to reform. Resistance to reform posed by home good households, many of which tend to be employed in government activities that are typically targets for retrenchment, may be lowered by special arrangements that entail redirecting their activities to areas where markets fail, training to ease their entry into the labor market and expansion of employment opportunities by encouraging the entry of foreign firms into the domestic economy. Generally speaking, activities that create income alternatives to a distorted policy regime should serve to lower the lobbying incentives of those opposed to reform. Hence, education, training and other assistance to broaden participation in markets would seem to be reasonable measures of reform programs.

These adjustments may so alter the nature of the equilibria implied by (9) for inward oriented economies, that incentives are created to prevent the return to the old policy regime without meddling in a country's political process.

## VII Summary Remarks

The central theme is that economic policy, policy reform and sustaining policies to obtain economic growth in the longer term is a political process. Collective action of some form exists in all countries; the challenge is to

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<sup>37</sup> Losses accrue from the decline in the values of their sector specific factors of production, increases in wage expenditures and in expenditures on goods.

design structures that channel this action in ways that yields an efficient allocation of a country's resources and prevents it from returning to the old policy regime once a crises is resolved. The approach employed was to posit a simple model of rent seeking from which insights could be obtained into the factors that induce collective action to be misdirected, and into how policy reform might be induced and sustained.

Models of this type have a large number of shortcomings. For example, voting was not explicitly considered, as it is in Young and Magee. However, the addition of voting to the model only alters the insights provided in the marginal sense that a majority voting process can constrain the power of lobbyists to influence public authority. But, voting models suggest that in the absence of single peaked preferences, the outcome of a voting process is heavily dependent on the conditions and rules under which voting takes place, i.e., the outcome is likely to be unique to each country<sup>38</sup>. Hence, these approaches are perhaps best viewed in the spirit of Aumanns (p. 37) when, in his discussion of game theory, he remarks that "we cannot ask, is it right or is it wrong? Rather, we must ask, how often has it been useful? how useful has it been?"

The point is made that the linkages between collective action and the market need to be considered in a general equilibrium context, and particularly so since recent economic history has clearly shown that the major effects of interventions tend to be indirect. That is, a subsidy to one sector has been used to extract resources from another, while at the same time, biasing and under investing in areas where markets fail to optimally allocate society's resources.

The view expressed here is that it is unlikely that political reform is

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<sup>38</sup>See Mueller, p179-226 for a review of voting models.

a prerequisite for economic reform. However, this entails using policy instruments that decrease the scope for rent seeking, provide resources - in the form of public goods - to the less influential so that they are more willing to participate in the political process on their behalf, possible compensatory payments to those disadvantaged by reform, and reorienting government intervention so that focus is placed on areas where markets fail. This is not to conclude that modest institutional reform may not be required to redress those institutional structures that, in developing countries tend to lower the costs of urban based relative to rural based coalitions to influence public authority. Nevertheless, reforms of the nature discussed in this paper would likely set in motion those forces that would seek to redress these institutional biases in any case.



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APPENDIX A

$$A = \begin{bmatrix} a & \alpha & & & \\ b & & \beta & & \\ h & & & \eta & -1 \\ \Omega & & & & \sigma \\ \pi & s_r & s_u & s_h & \mu \end{bmatrix}; \quad \begin{aligned} \pi &= (\sum_i r_i + h \sum_i s_i) / \eta \\ \Omega &= (1 / \sum_i \bar{l}_i) (L_r^* / \alpha + L_u^* / \beta + L_h^* / \eta) \\ \mu &= - (\sum_i r_i + \sum_i s_i) / \eta \\ \sigma &= - (L_h^* / \eta \sum_i \bar{l}_i) \end{aligned}$$

The generalized inverse can be expressed as:

$$A^{-1} = \begin{bmatrix} -s_r \sigma \eta \beta & -s_u \sigma \eta \alpha & -s_h \sigma \beta \alpha & -(\sigma \mu + s_h) \beta \alpha & \sigma \eta \beta \alpha \\ N_{21} & a s_u \sigma \eta & a s_h \sigma \beta & a(\eta \mu s_h) \beta & -a \sigma \eta \beta \\ \frac{1}{d} b s_r \sigma \eta & N_{32} & b s_h \sigma \alpha & b(\eta \mu + s_h) \alpha & -b \sigma \eta \alpha \\ s_r (h \sigma + \Omega) \beta & s_u (h \sigma + \Omega) \alpha & N_{43} & N_{44} & -(h \sigma + \Omega) \beta \alpha \\ s_r \Omega \eta \beta & s_u \Omega \eta \alpha & s_h \Omega \beta \alpha & N_{54} & -\Omega \eta \beta \alpha \end{bmatrix}^{-1}$$

$$d = \pi \alpha \beta \eta \sigma - a \sigma s_r \eta \beta - \alpha (b \sigma s_u \eta + \beta (s_h (h \sigma + \Omega) - \mu \Omega \eta))$$

$$N_{21} = \pi \beta \eta \sigma - b \eta \sigma s_u - \beta (s_h (h \sigma + \Omega) + \eta \mu \Omega)$$

$$N_{32} = \pi \sigma \eta \alpha - a \sigma s_r \eta - \alpha (s_h (h \sigma + \Omega) + \mu \Omega \eta)$$

$$N_{43} = \pi \sigma \beta \alpha - a \sigma s_r \beta - \alpha (b \sigma s_u + \mu \Omega \beta)$$

$$N_{44} = \pi \beta \alpha - a s_r \beta - \alpha (b s_u - h \mu \beta)$$

$$N_{54} = \pi \eta \beta \alpha - a s_r \eta \beta - \alpha (b s_u \eta + h s_h \beta)$$

The first three rows are factor shares associated with the rural, urban and home good households, respectively. The columns correspond to labor (the mobile factor), each sectors fixed factor, and the last column is corresponds to the price of the home good. The fourth row are industry shares in the factors of production. The last row corresponds to equation (1.c).

APPENDIX B

Preliminaries: The first order conditions for an interior solution to (3) are:

$$\begin{aligned}
 (A.1) \quad \partial U^g / \partial p_r &= I_r [\partial v^r / \partial p_r + (\partial v^r / \partial p_h) \partial p_h / \partial p_r + (\partial v^r / \partial \Pi^r) \{ \partial \pi^r / \partial p_r + \\
 &\quad (\partial \pi^r / \partial w) \partial w / \partial p_r + (\partial w / \partial p_r) (\bar{l}_r - \ell_r^0) + \gamma_r [- (\partial w / \partial p_r) \Sigma_i l_i^g + E_r + \\
 &\quad (p_r - p_r^w) \partial E_r \}] \\
 &+ I_h [\partial v^h / \partial p_r + (\partial v^h / \partial p_h) \partial p_h / \partial p_r + (\partial v^h / \partial \Pi^h) \{ (\partial \pi^h / \partial p_h) \partial p_h / \partial p_r + \\
 &\quad (\partial \pi^h / \partial w) \partial w / \partial p_r + (\partial w / \partial p_r) (\bar{l}_h - \ell_h^0) + \gamma_h [- (\partial w / \partial p_r) \Sigma_i l_i^g + E_r + \\
 &\quad (p_r - p_r^w) \partial E_r \}] \\
 &+ I_u [\partial v^u / \partial p_r + (\partial v^u / \partial p_h) \partial p_h / \partial p_r + (\partial v^u / \partial \Pi^u) \{ (\partial \pi^u / \partial w) \partial w / \partial p_r + \\
 &\quad (\partial w / \partial p_r) (\bar{l}_u - \ell_u^0) + \gamma_u [- (\partial w / \partial p_r) \Sigma_i l_i^g + E_r + (p_r - p_r^w) \partial E_r \}] - 0,
 \end{aligned}$$

where  $\partial E_r = dE_r / dp_r = \partial E_r / \partial p_r + (\partial E_r / \partial p_h) \partial p_h / \partial p_r + (\partial E_r / \partial w) \partial w / \partial p_r$ , and

$$\begin{aligned}
 (A.2) \quad \partial U^g / \partial l_r^g &= I_r [(\partial v^r / \partial p_h) \partial_r p_h + \partial v^r / \partial \Pi^r \{ (\partial \pi^r / \partial G_r) \partial G_r / \partial l_r^g + (\partial \pi^r / \partial w) \partial_r w + \\
 &\quad \partial_r w (\bar{l}_r - \ell_r^0) + \gamma_r [- \partial_r w \Sigma_i l_i^g - w + (p_r - p_r^w) \partial_r E_r \}] \\
 &+ I_h [(\partial v^h / \partial p_h) \partial p_h + \partial v^h / \partial \Pi^h \{ (\partial \pi^h / \partial p_h) \partial_r p_h + (\partial \pi^h / \partial w) \partial_r w + \partial_r w (\bar{l}_h - \ell_h^0) + \\
 &\quad \gamma_h [- \partial_r w \Sigma_i l_i^g - w + (p_r - p_r^w) \partial_r E_r \}] \\
 &+ I_u [(\partial v^u / \partial p_h) \partial p_h + \partial v^u / \partial \Pi^u \{ (\partial \pi^u / \partial w) \partial_r w + \partial_r w (\bar{l}_u - \ell_u^0) + \\
 &\quad \gamma_u [- \partial_r w \Sigma_i l_i^g - w + (p_r - p_r^w) \partial_r E_r \}] - 0,
 \end{aligned}$$

where  $\partial_r p_h = \partial p_h / \partial l_r^g$ ,  $\partial_r w = \partial w / \partial l_r^g$  and  $\partial_r E_r = (\partial E_r / \partial p_h) \partial p_h / \partial l_r^g + (\partial E_r / \partial w) \partial w / \partial l_r^g + \partial E_r / \partial l_r^g$ . The first order condition for  $\partial U^g / \partial l_h^g$  and  $\partial U^g / \partial l_u^g$  is similar.

Proposition 1: Proof:

If the Negishi condition holds, i.e.,  $I_i = 1 / (\partial v^i / \partial \Pi^i)$ , then making use of the market clearing conditions, (1.b) to (1.c), (4.b) and the following dual relationships  $\partial v^j / \partial p_i = - (\partial v^j / \partial \Pi^j) q_i^j$ ;  $\partial \pi^j / \partial p_i = y_i$ ;  $\partial \pi^j / \partial w = - l_i$ ;  $i, j = r, h, u$  the above conditions reduce to:

$$\partial U^G / \partial p_r = (p_r - p_r^w) \partial E_r - (y_r - \sum_i q_r^i) + (y_h - \sum_i q_h^i) \partial p_h / \partial p_r + (\sum_i (\bar{l}_i - \ell_r^o) - \sum_i (L_i + l_i^G)) \partial w / \partial p_r + E_r + (p_r - p_r^w) \partial E_r = 0$$

If  $\partial E_r$  is non-zero, then  $p_r = p_r^w$ .

For  $\partial U^G / \partial l_i^G$ ,  $i = r, h, u$ , we obtain

$$\partial U^G / \partial l_i^G = (y_h - \sum_i q_h^i) \partial_i p_h + (\sum_i (\bar{l}_r - \ell_r^o) - \sum_i (L_i + l_i^G)) \partial_i w + (\partial \pi^i / \partial G_i) \partial G_i / \partial l_i^G - w + (p_r - p_r^w) \partial_i E_r = 0,$$

Since  $\partial U^G / \partial p_r$  implies  $p_r = p_r^w$ , these conditions indicate that the government sets the respective sector's marginal value product of the public factor to the marginal cost (wages) of producing it, i.e.,  $(\partial \pi^i / \partial G_i) \partial G_i / \partial l_i^G = w$ .

Proposition 2: Proof

Define  $I = I_u (\partial V^u / \partial \Pi^u) - I_h (\partial V^h / \partial \Pi^h)$  and  $I_r (\partial V^r / \partial \Pi^r) / I = 1 + \alpha$ , where  $\alpha$  a real valued scalar. Let  $\gamma_r = 0$ , i.e., the home good and urban household bear the entire tax burden. Then, using the same conditions employed in Proposition 1, A.1 implies

$$\partial U^G / \partial p_r = (1 + \alpha) dV^r / dp_r + dV^h / dp_r + dV^u / dp_r - \alpha [(y_r - q_r^r) - q_h^r \partial p_h / \partial p_r + (\bar{l}_r - \ell_r^o - L_r) \partial w / \partial p_r] + (p_r - p_r^w) \partial E_r = 0.$$

Hence,

$$(p_r - p_r^w) = \frac{-\alpha}{\partial E_r} [(y_r - q_r^r) - q_h^r \partial p_h / \partial p_r + (\bar{l}_r - \ell_r^o - L_r) \partial w / \partial p_r].$$

If the tax burden is borne by rural households,  $\gamma_r = 1$ , then

$$\partial U^G / \partial p_r = \alpha [(y_r - q_r^r) - q_h^r \partial p_h / \partial p_r + (\bar{l}_r - \ell_r^o - L_r) \partial w / \partial p_r - (\partial w / \partial p_r) \sum_i l_i^G + E_r + (p_r - p_r^w) \partial E_r] + (p_r - p_r^w) \partial E_r = 0.$$

Hence,

$$(p_r - p_r^w) = \frac{-\alpha}{(1 + \alpha) \partial E_r} [(y_r - q_r^r) + E_r - q_h^r \partial p_h / \partial p_r + (\bar{l}_r - \ell_r^o - L_r) \partial w / \partial p_r - (\partial w / \partial p_r) \sum_i l_i^G].$$

The case of home good households. Define  $I = I_r (\partial V^r / \partial \Pi^r) - I_u (\partial V^u / \partial \Pi^u)$  and  $I_h (\partial V^h / \partial \Pi^h) / I = 1 + \alpha$ . Let  $\gamma_h = 0$ . Then,

$$\partial U^G / \partial p_r = \alpha [(y_h - q_h^h) \partial p_h / \partial p_r - q_r^h + (\bar{l}_h - \ell_h^o - L_h) \partial w / \partial p_r] + (p_r - p_r^w) \partial E_r = 0.$$

Hence,

$$(p_r - p_r^w) = \frac{-\alpha}{\partial E_r} [(y_h - q_h^h) \partial p_h / \partial p_r - q_r^h + (\bar{l}_h - \ell_h^o - L_h) \partial w / \partial p_r].$$

If  $\gamma_h = 1$ , then,

$$\begin{aligned} \partial U^G / \partial p_r = \alpha [(y_h - q_h^h) \partial p_h / \partial p_r - q_r^h + (\bar{l}_h - \ell_h^o - L_h) \partial w / \partial p_r - (\partial w / \partial p_r) \sum_i l_i^G + \\ E_r + (p_r - p_r^w) \partial E_r] + (p_r - p_r^w) \partial E_r = 0. \end{aligned}$$

Hence,

$$(p_r - p_r^w) = \frac{-\alpha}{(1 + \alpha) \partial E_r} [(y_h - q_h^h) \partial p_h / \partial p_r - q_r^h + (\bar{l}_h - \ell_h^o - L_h) \partial w / \partial p_r - (\partial w / \partial p_r) \sum_i l_i^G + E_r]$$

The case of urban good producing households. Define  $I = I_r (\partial v^r / \partial \Pi^r) - I_h (\partial v^h / \partial \Pi^h)$  and  $I_u (\partial v^u / \partial \Pi^u) / I = 1 + \alpha$ . Let  $\gamma_u = 0$ . Then,

$$\partial U^G / \partial p_r = \alpha [-q_h^u \partial p_h / \partial p_r - q_r^u + (\bar{l}_u - \ell_u^o - L_u) \partial w / \partial p_r] + (p_r - p_r^w) \partial E_r = 0.$$

Hence,

$$(p_r - p_r^w) = \frac{-\alpha}{\partial E_r} [-q_h^u \partial p_h / \partial p_r - q_r^u + (\bar{l}_u - \ell_u^o - L_u) \partial w / \partial p_r].$$

If  $\gamma_h = 1$ , then,

$$\begin{aligned} \partial U^G / \partial p_r = \alpha [-q_h^u \partial p_h / \partial p_r - q_r^u + (\bar{l}_u - \ell_u^o - L_u) \partial w / \partial p_r - (\partial w / \partial p_r) \sum_i l_i^G + \\ E_r + (p_r - p_r^w) \partial E_r] + (p_r - p_r^w) \partial E_r = 0. \end{aligned}$$

Hence,

$$(p_r - p_r^w) = \frac{-\alpha}{(1 + \alpha) \partial E_r} [-q_h^u \partial p_h / \partial p_r - q_r^u + (\bar{l}_u - \ell_u^o - L_u) \partial w / \partial p_r - (\partial w / \partial p_r) \sum_i l_i^G + E_r].$$

Derivation of (9)

The differentiation of (8) can be stated as:

$$dV^i/dl_i = (\partial V^i/\partial p_r)\partial p_r/\partial l_i + (\partial V^i/\partial p_h)dp_h/dl_i +$$

$$(\partial V^i/\partial \Pi^i)[(\partial \pi^i/\partial p_i)\partial p_i/\partial l_i + (\partial \pi^i/\partial w)dw/dl_i +$$

$$(\partial \pi^i/\partial G_i)(\partial G_i/\partial l_i^G)\partial l_i^G/\partial l_i + dw/dl_i(\bar{l}_i - l_i) + \gamma_i dT/dl_i],$$

for  $i = r, h$ , and and for the urban good producing households,

$$dV^u/dl_u = (\partial V^u/\partial p_r)\partial p_r/\partial l_u + (\partial V^u/\partial p_h)dp_h/dl_u +$$

$$(\partial V^u/\partial \Pi^u)[(\partial \pi^u/\partial w)dw/dl_u +$$

$$(\partial \pi^u/\partial G_u)(\partial G_u/\partial l_u^G)\partial l_u^G/\partial l_u + dw/dl_u(\bar{l}_u - l_u) + \gamma_u dT/dl_u].$$

where  $dp_h/dl_i = (\partial p_h/\partial p_r)\partial p_r/\partial l_i + \sum_j (\partial p_h/\partial l_j^G)\partial l_j^G/\partial l_i$ ,  $dw/dl_i =$

$$(\partial w/\partial p_r)\partial p_r/\partial l_i + \sum_j (\partial w/\partial l_j^G)\partial l_j^G/\partial l_i$$
, and  $dT/dl_i = -\partial^i w \sum_i l_i^G - w \sum_j \partial l_j^G/\partial l_i +$ 

$$(\partial E/\partial p_r)\partial p_r/\partial l_i + (\partial E_r/\partial p_h)\partial^i p_h + (\partial E_r/\partial w)\partial^i w + \sum_j (\partial E_r/\partial l_j^G)\partial l_j^G/\partial l_i.$$

Substituting the dual conditions mentioned, yields (9).





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