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ABSTRACT

This paper considers a specific factor model with two sectors in which agents are altruistic towards domestic residents. I show that, even if the degree of altruism is small, direct democracy leads to commercial policies that are biased against trade as long as the mobile factor is unbiased in the sense of Jones and Ruffin (1977) and the income of the owners of the factor which is specific to the import competing sector is lower than the income of the owners of the other specific factor. Tariffs may be preferred to subsidies by the median voter if subsidies require that beneficiaries spend a fixed cost to demonstrate that they are entitled to these subsidies and there is heterogeneity in the size of producers. Lastly, I construct a model of indirect democracy where legislators can receive campaign contributions from potential lobbyists. Even if campaign contributions are positive in equilibrium, the tariffs that emerge from votes taken after lobbying can represent the wishes of the median voter. In this model, campaign contributions do not buy votes. Instead, consistent with what is claimed in the qualitative literature, they buy access to legislators' time. The model is also consistent with the evidence showing that campaign contributions and lobbying activity are directed mainly at legislators who already agree with their contributors and their lobbyists.

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This paper shows that extremely small degrees of altruism on the part of voters can explain the ubiquitousness of anti-trade commercial policies designed to protect inefficient sectors. Many sectors that receive protection are neither infant-industries nor monopolistic sectors whose protection may lead nations to garner rents. Rather, they are "traditional" sectors whose members suffer from free trade. In my model, altruistic voters increase their own utility by averting this suffering.[1]

The happiness of altruists depend on what I term the "material payoffs" of others,[2] presumably because they experience vicariously the pleasure and pain of others. If altruists care equally about the material payoffs of all domestic residents, they want to transfer resources from individuals whose marginal material payoff from income is low to those whose marginal material payoff from income is high. I show that this can easily rationalize a desire to transfer resources from exporting to import-competing sectors so that tariffs emerge if this policy is put to a vote of the whole population.

This model is far from the first model where political processes lead to the protection of relatively inefficient sectors. Indeed, Rodrik's (1995) survey shows that this literature is vast. The key difference between the literature surveyed in Rodrik (1995) and the model I present here is that I suppose that politicians carry out the wishes of altruistic voters, rather than assuming that they deal exclusively with selfish individuals. This serves several purposes. First, it provides a link between the existing political economy literature and the older tradition of deriving tariffs from the maximization of a "social welfare function" (as in Corden 1974, p. 106). The utility of altruistic voters has some common elements with a social welfare function since it depends on the payoffs of all other agents. On the other hand, it is reasonable to imagine that even individuals who are altruistic place more weight on their own satisfaction than on that of others. Thus, just as in the case of models with individualistic voters, people's preferences differ and a model of the political process is needed to determine policy outcomes.

In addition, the incorporation of altruism into political economy models can help resolve the

[1] Altruistic voters have been used to explain other government policies, particularly those associated with transfers to the poor and the elderly (see Hochman and Rogers (1969), Hansson and Stuart (1989), Coate (1995) and the references cited therein). As has been repeatedly emphasized, the act of voting itself may well be altruistic in nature as the direct private benefits from voting seem small relative to the direct private costs.

[2] I use this term to avoid the apparent circularity that stems from saying that an altruists' utility function depends on others' utility levels.

two key puzzles that, as stressed by Rodrik (1995), political economy models have encountered as positive theories of commercial policy. First, models of political economy based on selfish agents do not find it easy to explain why trade barriers tend to be strongest against goods whose import penetration is high. They cannot even explain why commercial policy is biased against trade (i.e. tends to protect import-competing firms) rather than for trade (by subsidizing exports). Levy (1999), for example, shows that the well known Grossman-Helpman (1994) model of protection based on political contributions by individual sectors implies that export subsidies will exceed import tariffs so that the bias of commercial policy will be favorable to trade.

The reason for this is straightforward. In addition to being concerned with contributions from lobbyists, the Grossman-Helpman model assumes that policy makers also care about general welfare. Suppose, as they do, that tariffs and subsidies are offset by lump sum taxes and transfers. Then, an x percent import tax on a good whose domestic consumption represents y percent of domestic income has welfare effects that are comparable to the effects of an x percent export subsidy on a good whose domestic consumption also represents y percent of domestic income. However, such an export good can be expected to have a larger total volume of production than this "equivalent" import competing good (which is why it is exported). This means that the relevant producers gain larger rents from the export subsidy than from the import tax. Exporters are thus more likely to win the lobbying competition by offering politicians larger contributions.[3]

Altruism can explain anti-trade policies if the individual income of those who are stuck in the protected import-competing sector is smaller than the income of those who are stuck in the export sector. I show this in the context of the two sector specific factors model of Jones (1971). Each sector produces output with specific (immobile) capital and mobile labor. I let labor be unbiased in the sense of Jones and Ruffin (1977) so that it neither gains nor loses from a small tariff. Since

[3]This conclusion hinges on the standard assumption that tariff proceeds are redistributed in lump-sum fashion. Maggi and Rodriguez-Clare (2000) show that, if the proceeds are kept by the government or are assigned either to domestic importers (as in the case of certain quotas) of foreign exporters (as in the case of voluntary export agreements), and the government puts sufficient weight on these uses of funds, it is possible to rationalize the government's preference for making tariffs highest on goods whose import penetration is high. The reason is that, if these funds are valued highly, the government prefers to levy tariffs on goods that generate large amounts of these funds.

The political process can also yield tariffs with selfish voters if, as in the first model of Mayer (1984), the majority of the population gains from such tariffs. As Mayer (1984) himself notes, however, this approach is not very attractive as most tariffs benefit only a small minority of the population.

such a tariff has no effect on aggregate income, it simply redistributes income from the owners of the capital that is used in the export sector to those whose capital is used in the import-competing sector. At the same time, the forces that lead one sector to export in one country while the other sector exports from another tend to imply that owners of export-sector-specific factors are richer than owners of import-sector-specific factors. This means that the losses in vicarious utility experienced by workers when the the income of exporters falls as a results of a tariff tend to be smaller than the gains they obtain from the increased income of import-competing factors.

The empirical relevance of the theory then turns on whether protection is indeed more common in sectors where the income of immobile factors is low. There is an extensive literature which studies the characteristics of industries that tend to receive protection. This literature is surveyed in Anderson and Baldwin (1987) and its key results are also discussed in Rodrik (1995). One common finding in this literature is that protection is more common in labor-intensive sectors as well as in sectors with low wages. This fits well with the model I develop as long as one regards the workers earning these low wages as immobile, which seems plausible. The empirical literature has also tended to find that protection is positively correlated with both the level and the change in import penetration. A high import penetration in a sector implies that the value of the domestic production of the good is relatively low so that this too is consistent with a low level of income for the immobile factors that work in the sector. Immobility of these factors is particularly likely to lead to a loss of income when import penetration rises so that the connection between this variable and protection is particularly natural in my model.

A tariff can always be thought of as a combination of a production subsidy and a consumption tax of equal magnitude. As stressed by Mayer and Riezman (1987), the existing political economy models provide a logical explanation for the existence of production subsidies (namely that the producers who benefit offer contributions in exchange for these subsidies) but provide no direct reason why this producer subsidy ought to be coupled with a consumer tax of the same magnitude. Even if one accepts that such subsidies cannot be financed by lump sum taxes this particular combination is not easy to rationalize in the context of these models, particularly as the consumer tax actually raises more revenues than are needed to pay for the production subsidy.

The model with altruism can explain this coupling under some conditions. What is required is that producers be heterogeneous in size and they be required to incur a fixed cost to demonstrate that they qualify for a production subsidy. Governments that wish to grant production subsidies must naturally verify that applicants have actually produced the relevant goods. It is reasonable to imagine that this verification also requires some effort on the part of the producer and that this effort is not a great deal bigger for large firms, which tend to have well established reputations, than for small firms. If the cost to the producer of proving his production is independent of the size of his output, linear production subsidies must be quite high in percentage terms if they are to help the smallest producers significantly. This, in turn, entails significant production distortions. By contrast, tariffs help small producers even if the tariffs are small. Thus tariffs can make up for the consumption distortions they introduce by reducing the size of production distortions that are needed to help small producers.

The argument is not that tariffs involve smaller total administrative costs.[4] I show tariffs can remain more desirable to altruistic voters than subsidies even if the total administrative costs of the tariff are as large as the administrative costs of a subsidy that is claimed by all producers. Rather, the difference between tariffs and subsidies that I am stressing involves the distribution of administrative costs across agents. Subsidies, I suppose, require that some of these costs be borne by the individuals that the subsidy is meant to help and this can make such subsidies less attractive to voters than import taxes.

The voting patterns of legislators are sometimes viewed as containing evidence suggesting that protectionist legislation is passed because politicians are captured by self-interested industries (see Baldwin 1985, for example). In this paper I show that many aspects of campaign contributions, lobbying activities, and legislative voting are quite consistent with altruism being the basis of protection. For this purpose I construct a model of indirect democracy that tries to capture some key aspects of the way commercial policy is changed in the United States. In particular, the model tries to rationalize the fact that campaign contributions and lobbying for commercial policy tend to be directed at legislators that are already on the same side as those who contribute and lobby. The

[4]Corden (1974) points out that tariffs would be superior to subsidies if their total administrative costs were lower.

extensive study of trade policy by Bauer, Pool and Dexter's (1963) stresses this aspect of lobbying behavior. In addition, the concordance of the views of contributors to campaigns with the views of the recipients of these contributions is documented in Kau, Keenan and Rubin (1982) and Baldwin and Magee (1998).

My model rationalizes these observations by supposing that it is costly for a legislator to learn the relevant facts on an issue, even if he has strong *a priori* views on it and even if he has access to interested lobbies. I thus equate listening to lobbyists with the costly acquisition of information. One reason legislators have for acquiring this information is that some of the facts they learn may be crucial for convincing uncommitted legislators. I show that, if legislators find it relatively costless to transmit a small amount of credible information to their colleagues, it makes sense for lobbyists to talk mainly to legislators on their side. The reason is that these legislators are more willing to listen and thus, effectively require smaller campaign contributions in exchange for providing "access". My model thus fits well with Bauer, Pool and Dexter's (1963, p. 442) observation that "The tactical basis of pressure group activities seemed to be to assist men already on their side to do the job of persuading fellow legislators."

The concerns of my model of indirect democracy are related to those of Austen-Smith (1990, 1995), though my model differs from his in several respects. Austen-Smith (1990) considers the transmission of information from one legislator to another. He studies the case where this information is "soft" so that the model is one of "cheap-talk."[5] By contrast, I consider the case where the information that legislators provide to each other is "hard." Austen-Smith (1995) considers a formal model where campaign contributions buys access to legislators. In his model, this access has no indirect effects on other legislators, it only allows the lobbyist to convince the legislator who is listening to him. I suppose instead that the legislator who listens to the lobbyist acquires information that he can use to convince other legislators.

While he does not consider information transmission at all, the logic of my argument is much closer to Stratmann's (1992) informal explanation for the fact that legislators who are staunch supporters of farmers (because they represent districts with very high farm populations) receive

[5]The result is that such information exchange has relatively small effects on outcomes.

large contributions from farm lobbies. He suggests this comes about because these legislators require smaller payments to make the effort necessary to get pro-farm legislation passed than do legislators who are less favorable to farmers. In my model, the nature of this effort is made explicit, and it takes the form of absorbing and transmitting credible information to relatively neutral legislators. One advantage of this approach is that it rationalizes simultaneously the lobbying activities of contributors.

The paper proceeds as follows. In the first two sections of this paper, I let tariffs be determined by direct democracy as in Mayer (1984), so that the desires of the median voter determine trade policy. Section 2 presents the specific factors model and shows how arbitrarily small levels of altruism can lead the median voter, who tends to be an owner of the mobile factor, to vote for import taxes rather than export subsidies. Section 3 compares tariffs to production subsidies assuming that producers of import-competing goods face individual costs of demonstrating that they are entitled to the subsidy. Section 4 presents my a model of indirect democracy and Section 5 concludes.

1 Altruistic voters' preference for anti-trade policies

I consider the two-sector specific-factor model of Jones (1971).[6] The capital stocks K_1 and K_2 can only be used in sectors 1 and 2 respectively while labor is mobile across sectors. There are $\bar{L}$ workers and each worker supplies one unit of labor inelastically. In addition, the population includes N_1 individuals who own some units of K_1 and an additional N_2 individuals who own some units of K_2. I assume at first that the two capital stocks are evenly distributed among the individuals who own them. Denoting by K_j^i the individual holdings of K_j for j equal 1 or 2, K_j^i is equal to K_j/N_j.

Given fixed international prices P_1^* and P_2^*, the effect on workers of a tariff on good 1 is generally ambiguous. The increase in the price of good 1 makes them worse off as consumers but it increases sector 1's demand for labor and this raises their real wage. To focus on the effect of altruism, I consider a production structure such that, using the terminology of Ruffin and Jones (1977), labor is "unbiased" so that it neither gains nor loses from a small tariff whose revenues are rebated in

[6] Jones (1975) extends the model to n goods and n specific factors.

lump sum fashion.

This requires that the ratio of the elasticity of substitution to the share of labor compensation in total revenue be the same in all sectors and that the fraction of labor employed in each sector be equal to the fraction of national income produced in that sector. It is possible to satisfy these two conditions for any vector of prices if both production functions take the Cobb-Douglas form with the same exponent on labor. I thus suppose that output of good j, X_j satisfies

$$X_j = L_j^{\alpha} K_j^{1-\alpha} \tag{1}$$

where L_j is the amount of labor employed in sector j and I am normalizing goods so as to avoid multiplying the function on the right hand side by a constant.

I suppose that perfectly competitive firms have access to these production functions so that the demand for labor in sector j is given by

$$L_j = \left(\frac{\alpha \tilde{P}_j}{W} \right)^{\frac{1}{1-\alpha}} K_i \tag{2}$$

where $\tilde{P}_j$ is the price received by firms when they sell good j and W is the wage. Since $(L_1 + L_2)$ must equal $\bar{L}$ in equilibrium, the market clearing wage satisfies

$$W = \alpha \left(\frac{\sum_j \tilde{P}_j^{\frac{1}{1-\alpha}} K_j}{\bar{L}} \right)^{1-\alpha} \tag{3}$$

Using this equation to substitute for W in (2) and then substituting the resulting L_j in (1), equilibrium output of good j equals

$$X_j = \tilde{P}_j^{\frac{\alpha}{1-\alpha}} \bar{L}^{\alpha} K_j \left(\sum_k \tilde{P}_k^{\frac{1}{1-\alpha}} K_k \right)^{-\alpha} \tag{4}$$

Ignoring the interdependence of preferences for one moment, I let all consumers' "material payoffs" be represented by the same homothetic function. The relevant function for consumer i is

$$U(C_1^i, C_2^i) \tag{5}$$

where C_1^i and C_2^i are individual consumption levels. If the level of altruism is small enough, no individual offers any voluntary transfers. Individual i then chooses C_1^i and C_2^i to maximize (5)

subject to the usual budget constraint

$$\sum_j \hat{P}_j C_j^i \leq I^i$$

where I^i is the individual's income and the $\hat{P}_j$'s are the prices paid by all consumers. The homotheticity of U then implies that all consumers spend the same share of their income on good 1 and this helps ensure that labor is unbiased.

I write the maximized value of the "material payoff" function U as

$$V^i = f(g(\hat{P}_1, \hat{P}_2)I^i)$$

where f is an increasing function and g is both non-increasing in its two elements and homogeneous of degree -1. I write it in this way because the function g captures all the effects of U on demand while the function f plays a crucial role when individuals use their preferences to determine optimal redistribution programs.

I capture altruism by supposing individual i's utility (or "psychological payoff"), Ω^i equals

$$\Omega^i = V^i + \gamma \sum_{k \neq i} V^k \qquad 0 < \gamma < 1 \tag{6}$$

Thus each person experiences vicariously the welfare of others, at least to a limited extent.[7] Supposing that people care about others' own subjective assessments of material payoffs, rather than about the components of other individuals' consumption bundles seems like a reasonable starting point for this type of analysis, even though it is obviously restrictive.

Equation (4) implies that production levels depend only on the relative price received by domestic producers. The homotheticity of preferences ensures that the ratio of total consumption of good 1 to total consumption of good 2 depends only on the relative price paid by domestic consumers. Since the value of production at international prices must equal the value of consumption at these prices, consumption levels depend only on the two domestic and the international relative price. I now consider policies that keep the two domestic relative prices equal to each other but let this relative price depart from its international counterpart. Without loss of generality, I focus on

[7]Nothing would be changed if I followed Starks (1993) and let individual utility be the sum of their own "material payoffs" (which he calls "felicity") and other agents' utilities.

policies that raise the domestic price of good 1 P_1 while assuming that $P_1 = \hat{P}_1 = \tilde{P}_1$. If, in the voting equilibrium that raises this price good 1 is exported, this distortion can be thought of as constituting an export subsidy, otherwise it can be thought of as a tariff.

I suppose that tariff revenues, or export subsidy costs are offset by taxes or transfers that are proportional to individual income. Because factors are supplied inelastically, this is the same as assuming that these revenues (or costs) are offset by lump sum taxes or subsidies which are proportional to (the equilibrium value of) pre-tax income. The purpose of this assumption is to focus on the redistributive effects of the tariff or export subsidy while not introducing additional redistribution through the policies that keep the government budget balanced. This assumption implies that workers, who are paid a fraction α of all revenues from sales, also receive a fraction α of all tariff proceeds (or pay this fraction of the cost of export subsidies). Thus, recognizing that producers of good 1 are paid $\hat{P}_1$ for their output, the income of individual workers, I^w is

$$\begin{aligned} I^w &= \frac{\alpha}{\bar{L}}[P_1X_1 + P_2^*X_2 + (P_1 - P_1^*)(C_1 - X_1)] \\ &= \frac{\alpha}{\bar{L}}[P_1^*X_1 + P_2^*X_2 + (P_1 - P_1^*)C_1] \end{aligned} \tag{7}$$

where C_1 is the aggregate consumption of good 1. Differentiating this expression, the change in individual labor income when P_1 changes is

$$\frac{dI^w}{dP_1} = \frac{\alpha}{\bar{L}}\left(\frac{d(P_1^*X_1 + P_2^*X_2)}{dP_1} + C_1 + (P_1 - P_1^*)\frac{dC_1}{dP_1}\right) \tag{8}$$

Moreover, using (4).

$$P_1^*X_1 + P_2^*X_2 = \bar{L}^\alpha\Big(P_1^*\tilde{P}_1^{\frac{\alpha}{1-\alpha}}K_1 + P_2^{*\frac{1}{1-\alpha}}K_2\Big)\Big(\tilde{P}_1^{\frac{1}{1-\alpha}}K_1 + P_2^{*\frac{1}{1-\alpha}}K_2\Big)^{-\alpha}.$$

Differentiating this expression with respect to $\tilde{P}_1$

$$\begin{aligned} \frac{d(P_1^*X_1 + P_2^*X_2)}{P_1^*X_1 + P_2^*X_2} &= \frac{\alpha}{1-\alpha}\,\frac{P_2^{*\frac{1}{1-\alpha}}K_2}{\tilde{P}_1^{\frac{1}{1-\alpha}}K_1 + P_2^{*\frac{1}{1-\alpha}}K_2}\,\frac{(P_1^*\tilde{P}_1^{\frac{\alpha}{1-\alpha}} - \tilde{P}_1^{\frac{1}{1-\alpha}})K_1}{P_1^*\tilde{P}_1^{\frac{\alpha}{1-\alpha}}K_1 + P_2^{*\frac{1}{1-\alpha}}K_2}\,\frac{d\tilde{P}_1}{\tilde{P}_1} \\ &= \frac{-\alpha}{1-\alpha}\,\frac{P_2^*X_2}{\tilde{P}_1X_1 + P_2^*X_2}\,\frac{P_1^*X_1}{P_1^*X_1 + P_2^*X_2}\,\frac{\tilde{P}_1 - P_1^*}{P_1^*}\,\frac{d\tilde{P}_1}{\tilde{P}_1}. \end{aligned} \tag{9}$$

With $P_1 = \tilde{P}_1$ and P_1 close to P_1^*, the change in $(P_1^*X_1 + P_2^*X_2)$ is zero because, evaluated at the original equilibrium prices, the value of the increase in X_1 when workers change sectors is equal

to the corresponding reduction in X_2. Since the last term in (8) is zero as well when $(P_1 - P_1^*)$ is small, the change in workers material payoffs V^w from a small tariff is

$$\frac{dV^w}{dP_1} = f'^w g \left[\frac{g_1 I^w}{g} + \frac{\alpha C_1}{\bar{L}} \right] = 0$$

where f'^w denotes the derivative of f with respect to its argument evaluated at gI^w and g_1 denotes the partial derivative of g with respect to its first argument. The last equality follows from the fact that $\alpha C_1/\bar{L}$ equals the worker's consumption of good 1, C_1^w, and from Roy's identity which implies that $g_1 I^w/g$ is equal to $-C_1^w$. This establishes that my assumptions on tastes and technology are is indeed sufficient to ensure that workers material payoffs neither rise nor fall from a small tariff.

Now consider the income of owners of capital of type 1, which I label I^1. This equals

$$I^1 = \frac{1-\alpha}{N_1} P_1 X_1 \left(\frac{P_1 X_1 + P_2^* X_2 + (P_1 - P_1^*)(C_1 - X_1)}{P_1 X_1 + P_2^* X_2} \right) \tag{10}$$

Differentiating this expression after simplifying

$$\frac{dI^1}{I^1} = \frac{d\frac{P_1 X_1}{P_1 X_1 + P_2^* X_2}}{\frac{P_1 X_1}{P_1 X_1 + P_2^* X_2}} + \frac{d(P_1^* X_1 + P_2^* X_2) + C_1 dP_1 + (P_1 - P_1^*) dC_1}{P_1^* X_1 + P_2^* X_2 + (P_1 - P_1^*) C_1}.$$

Using (4),

$$\frac{d\frac{P_1 X_1}{P_1 X_1 + P_2^* X_2}}{\frac{P_1 X_1}{P_1 X_1 + P_2^* X_2}} = \frac{1}{1-\alpha} \frac{P_2^* X_2}{P_1 X_1 + P_2^* X_2} \frac{dP_1}{P_1}. \tag{11}$$

This means that, using Roy's identity and letting C_1^1 denote these individuals' consumption of good 1, the change in their material payoffs V^1 evaluated at $P_1 = P_1^*$ is

$$\frac{dV^1}{dP_1} = \frac{f'^1 g I^1}{P_1} \left(-\frac{P_1 C_1^1}{I^1} + \frac{1}{1-\alpha} \frac{P_2^* X_2}{P_1 X_1 + P_2^* X_2} + \frac{P_1 C_1}{P_1 X_1 + P_2^* X_2} \right) = \frac{f'^1 g I^1}{(1-\alpha) P_1} \frac{P_2^* X_2}{P_1 X_1 + P_2^* X_2}$$

where the second equality follows from the fact that, with homothetic preferences, $P_1 C_1/(P_1 X_1 + P_2^* X_2)$ is equal to $P_1 C_1^1/I^1$.

Lastly, the income of owners of capital of type 2, I^2, equals

$$I^2 = \frac{1-\alpha}{N_2} P_2 X_2 \left(\frac{P_1 X_1 + P_2^* X_2 + (P_1 - P_1^*)(C_1 - X_1)}{P_1 X_1 + P_2^* X_2} \right). \tag{12}$$

This means that, evaluated at $P_1 = P_1^*$, the change in their material payoffs V^2 when P_1 changes is

$$\frac{dV^2}{dP_1} = \frac{f'^2 g I^2}{P_1} \left(-\frac{P_1 C_1^2}{I^2} - \frac{1}{1-\alpha} \frac{P_1 X_1}{P_1 X_1 + P_2^* X_2} + \frac{P_1 C_1}{P_1 X_1 + P_2^* X_2} \right) = -\frac{f'^2 g I^2}{(1-\alpha) P_1} \frac{P_1 X_1}{P_1 X_1 + P_2^* X_2}.$$

The effect on the material payoffs of workers of an increase in P_1 is intermediate between the effect on owners of capital of type 1 and the effect on owners of capital of type 2. Since the utility obtained as a result of altruism is the same for all agents, this means that the median voter on proposals of this type is a worker as long as both N_1 and N_2 are smallers than one half of the total population $N_1 + N_2 + \bar{L}$. This requires that $L > |N_1 - N_2|$.

Equation (6) implies that the utility of workers is

$$\Omega^w = [1 + \gamma(\bar{L} - 1)]V^w + \gamma N_1 V^1 + \gamma N_2 V^2. \tag{13}$$

Thus, the effect of a change in P_1 on Ω^w, evaluated at $P_1 = P_1^*$ is

$$\frac{d\Omega^w}{dP_1} = \frac{\gamma g X_1 P_2^* X_2 (f'^1 - f'^2)}{(1-\alpha)(P_1^* X_1 + P_2^* X_2)}.$$

In the case where material payoffs are linear in income so that the derivative of f with respect to its argument is constant, $f'^1 = f'^2$, so this expression equals zero. In this case, pure redistribution holds no attraction to workers since all agents have the same marginal utility of income. Since a small tariff neither increases nor reduces total income, it is neither beneficial or detrimental. As usual, tariffs that are strictly greater than zero reduce welfare.

The case of diminishing marginal utility of income is more plausible, however. Then, if the level of altruism as measured by γ is arbitrarily small, workers prefer a small increase in P_1 to free trade if and only if I^1 is smaller than I^2 or when

$$\frac{P_1^* X_1}{N_1} < \frac{P_2^* X_2}{N_2}. \tag{14}$$

Thus, with the same number of owners of type 1 capital as owners of type 2 capital, the good whose relative price is increased by the median voter is the one which has a smaller value of output. Tariffs will be imposed on imports if the value of production of the import competing good is smaller than the value of production of the export good. More generally, tariffs will be imposed if individuals who own capital that is used in the import competing sector are poorer than individuals who own capital in the export sector. The level of altruism itself determines the level of the optimal tariff but does not determine whether having a small tariff is attractive or not. This result hinges on the fact that a small tariff provides essentially costless redistribution. When (14)

is satisfied, workers support tariffs because they take from owners of type 2 capital and give to owners of type 1 capital.[8] In the case of small tariffs, this "Robin Hood" policy costs the workers nothing. The desirability of the policy for workers does not even hinge on whether owners of type 1 capital are poorer than the median voter. It hinges only on such owners being poorer than owners of type 2 capital.

Given the ubiquitousness of protection, this raises the question of whether factors specific to export sectors earn generally more than factors that produce import-competing goods. Because the specificity of factors is hard to gauge, this question is not easy to answer. However, it is common to observe (see Gaston and Trefler 1994, for example) that workers in export sectors tend to earn more than those employed in import-competing sectors. This suggests that, indeed, the factors specific to the import sector have lower incomes.

There also exist an *a priori* argument suggesting that, typically, import competing factors ought to be relatively poor. To see this, consider a two country version in which, as in the Heckscher-Ohlin model, endowments of the three factors are exogenous. It follows from (4) that the relative outputs of the two goods at common international prices are independent of the labor endowments and are simply proportional to the relative endowments of the specific factors. Thus, countries tend to export the good which uses the specific factor that they have in relative abundance.

The country that has a relatively high value of $K_1/K2$ must either have a high value of N_1/N_2 or its owners of K_1 must have relatively high endowments relative to its owners of K_2. The latter can be thought of as capturing international differences in the knowledge that specific factors have about how to produce their goods. Consistent with this interpretation, suppose that, within each country all owners of specific factors are equally wealthy. Imagine then that countries draw both their N_1/N_2 and their residents' individual endowments of specific factors from a set of common distributions. It then follows that one can expect the country with the higher value of K_1/K_2 to have residents whose individual endowments of K_1 are relatively high in comparison to its residents' individual endowments of K_2. This means that the relative income of the owners of the factor which

[8]This approach to justifying redistributive policies with altruistic voters is thus somewhat different from that pursued in Miller (1988) and Coate (1995) who are interested in understanding the conditions under which altruists would vote to tax themselves in order to finance a welfare state.

is specific to good 1 can be expected to be relatively high in the country that produces relatively more of good 1. Therefore, if the median voter in the country that exports good 1 wishes to raise the domestic price of good 1, the same can be expected of the other country. Moreover, if the difference in individual endowments is large, each country will wish to protect its import-competing sector.

Since this is only a statistical argument, it does not exclude situations where the main difference between countries whose K_1/K_2 differ is a difference between their N_1/N_2. In this case, one would expect both countries to try to raise the same domestic price so that one country would offer an export subsidy for this good while the other would institute a corresponding tariff. In practice, this might correspond to what takes place in certain agricultural products.

The evidence on the connection between import penetration and protection is somewhat mixed (see Maggi and Rodriguez-Clare (2000) for references) though much of it indicates that sectors with higher import penetration have more protection.[9] If one continues to regard the country-specific individual endowments as being drawn from a common distribution, a high level of import penetration suggests the presence of particularly small individual endowments and this can be expected to lead to protection. Given the immobility of specific factors, an increase in import penetration is particularly likely to lead to a reduction in the income of the factors that are specific to the import competing sector. Thus the model is particularly consistent with the fact that such increases seem to be associated with increased protection. Indeed, U.S. law contained for a long time a procedure that made it relatively easy for industries whose import penetration rose significantly to obtain protection.[10]

Lastly, it is worth mentioning that the tendency of wages to be low in protected sectors would seem to fit the model if these wages reflect payments to immobile factors.[11] Since low wages are at least somewhat indicative of immobility, this fact seems broadly consistent with the model. It would be desirable, however, to study in more detail a model where both a subset of the labor

[9] Goldberg and Maggi (1999), for example find an insignificant negative relation between import penetration and protection for sectors that make large campaign contributions and a strong positive relationship for the others.

[10] Section 201 of the U.S. 1974 Trade Act allowed the International Trade Commission to impose tariffs and quotas when imports of a product rose substantially as long as the domestic producers of this product could demonstrate that this caused them "substantial injury". While the President could reject the commission recommendations for protection, this triggered a vote in Congress in which a simple majority could override the President.

[11] Gaston and Trefler (1994) interpret this correlation as suggesting that protection causes low wages. However, it seems difficult to rule out the opposite direction of causation.

input and capital are immobile so as to learn the conditions under which tariffs are particularly desirable because they help low-paid workers.

Returning to the theory, it is worth noting is that the policy of raising P_1^* can be attractive to workers even if they would be unwilling to make any voluntary contributions to owners of capital of type 1. A voluntary contribution of this sort would increase the worker's utility by

$$-g[f'^w - \gamma f'^1]$$

Even if owners of capital of type 1 are poorer than workers (something that is not required for workers to favor tariffs on good 1), workers would be unwilling to make voluntary contributions to these owners unless the marginal utility of income of these owners exceeded that of workers by a factor $(1/\gamma)$, which is greater than one.

Even in cases where the redistribution induced by tariffs is more costly, tariffs can be attractive to workers. To see this, consider the case where tariff revenues are simply lost, as they would be if altruism did not extend to foreigners and the country signed a voluntary restraint agreement that gave the quota revenues to foreign producers and governments. This implies that the income of workers, owners of capital of type 1 and owners of capital of type 2 does not include the last terms of (7), (10) and (12) respectively.

Differentiating the resulting expression for V^w with respect to P_1 and evaluating at P_1^*, one obtains

$$\frac{dV^w}{dP_1} = f'^w g(-C_1^w + \alpha X_1/\bar{L}) = -f'^w g I^w \frac{m}{P_1^*} \qquad \text{where} \qquad m = \frac{P_1^*(C_1 - X_1)}{P_1^* X_1 + P_2^* X_2}.$$

Similarly, the changes in V^1 and V^2 can be written as

$$\frac{dV^1}{dP_1} = \frac{f'^1 g I^1}{P_1^*}\left(-m + \frac{1}{1-\alpha}\frac{P_2^* X_2}{P_1^* X_1 + P_2^* X_2}\right)$$

$$\frac{dV^2}{dP_1} = -\frac{f'^2 g I^2}{P_1^*}\left(-m - \frac{1}{1-\alpha}\frac{P_1^* X_1}{P_1^* X_1 + P_2^* X_2}\right).$$

This means that the change in worker utility from a small tariff is

$$d\Omega^w = g\left\{\left(\frac{\gamma P_1^* X_1 P_2^* X_2 (f'^1 - f'^2)}{(1-\alpha)(P_1^* X_1 + P_2^* X_2)} - \Big(f'^w I^w [1 + \gamma(\bar{L} - 1)] + \gamma[f'^1 I^1 N_1 + f'^2 I^2 N_2]\Big)m\right\}\frac{dP_1}{P_1^*}.$$

This takes a particularly simple form when f is logarithmic so that $f'^j g I^j = 1$ for all j. In this case, the change in worker utility is

$$d\Omega^w = \left\{ \frac{\gamma(N_1 P_2^* X_2 - N_2 P_1^* X_1)}{(1-\alpha)(P_1^* X_1 + P_2^* X_2)} - [1 + \gamma(N_1 + N_2 + \bar{L} - 1)]m \right\} \frac{dP_1}{P_1^*}.$$

In this logarithmic case, the number of owners of capital of type 1 plays a crucial role. If this is large enough, workers benefit from tariffs even if γ is arbitrarily small. The reason is that, with N_1 sufficiently large, the term in brackets has the same sign as

$$\gamma \left(\frac{P_2^* X_2}{P_1^* X_1 + P_2^* X_2} - (1-\alpha)m \right).$$

This is necessarily positive because the ratio of imports to national income m must be less than the ratio of the output of all exportables to national income $P_2^* X_2/(P_1^* X_1 + P_2^* X_2)$.

So far I have only showed that altruistic workers may prefer tariffs to free trade as a means of redistribution when no other method of redistribution is available. In many ways this parallels the argument for tariffs that is based on maximizing a social welfare function. The most important difference is that the social welfare function that leads to tariffs here is not the result of an arbitrary aggregation procedure but represents the tastes of the median voter. Interestingly, this focus on the median voter can lead to relatively high tariffs because this tax has a relatively minor effect on the median voter's material payoffs. Still, my approach to tariffs seems vulnerable to a criticism that is usually applied to rationalizations of tariffs that are based on social welfare functions. This criticism is that there are better ways to redistribute income than via tariffs. This criticism may well be empirically valid. However, tariffs do have some attractive features relative to other methods of redistribution and I show this next.

2 Personal costs of claiming subsidies

In this section I show that linear subsidies to production may be less attractive to workers than tariffs when there are personal costs associated with claiming one's entitlement to subsidies. One central problem with schemes that redistribute income is that they are subject to fraud and abuse. Individuals and firms seek to benefit from redistributive programs whether they are originally

intended to benefit from them or not. Thus, safeguards must often be taken to ensure that only those agents which satisfy certain requirements gain access to these programs. One advantage of tariffs as a redistribution program is that such safeguards are unnecessary, the benefits go automatically to those who gain from an increase in the price of imported goods. This does not mean that tariffs involve no administrative costs - indeed they require that borders be patrolled and that individuals stand ready to inspect cross-border shipments. The difference between tariffs and direct redistribution is that the intended beneficiaries do not have to incur administrative expenses in the case of tariffs.

My formal analysis considers only tariffs and linear subsidies, in part because such comparisons are carried out in both standard textbooks and in Mayer and Riezman (1987). Before I carry out this analysis, however, I give some reasons why other types of subsidies may be even more problematic than linear production subsidies.

The least distortionary method for increasing the income of owners of capital of type 1 is to give these individuals a transfer that is independent of their actions. In some cases, this may be feasible.[12] Often, however, it is very difficult to determine how much capital of type 1 an individual possesses. This is likely to be particularly true when the relevant capital is human capital which is difficult to employ in alternate activities. It is hard to establish whether an individual who claims to be unable to produce anything other than goods of a certain type is telling the truth or not.[13]

This means that transfers to owners of capital of type 1 must be contingent on having these agents demonstrate that they are indeed producing goods of type 1. If it is difficult to distinguish between those agents engaged in the production of good 1 that are mobile and those that are not, all producers have to be treated symmetrically so that the relevant subsidy must be a subsidy to all those involved in the production of the good.

[12]This may be particularly true in the case of agricultural land. However, it is often nontrivial to ascertain the extent to which a piece of land can be used for certain crops without information on past yields of these crops so that land subsidies end up depending on the actual use of the land.

[13]A related difficulty can reduce the desirability of transferring resources from individuals whose total income is high to individuals whose income is low. In the simple model I consider, any increase in the income of individuals with low income automatically gives a high vicarious marginal utility to altruists. But one can imagine an extension where this vicarious marginal utility is low when the individuals whose income is increased are perceived as "lazy" *i.e.,* are regarded as having low income because of their own choices rather than because their endowment is low. In such an extension, altruists might well prefer to transfer resources to individuals who demonstrate that they are stuck in low-paying industries rather than transferring resources to all individuals whose income is low,

Now suppose that there is an additional difficulty in offering such subsidies. This is that any owner of type 1 capital that wishes to demonstrate his involvement in the production of good 1 must incur a cost θ. This cost is most easily thought of as the absorption of θ/P_2^* units of good 2. In addition, let each firm be associated with one (and no more than one) owner of capital of type 1 while, on the other hand, there is no limit to the number of "firms" that an owner of type 1 capital can establish. Regardless of the number of firms he runs, the total cost he incurs to obtain subsidies remains θ. This captures the idea that there are exogenous reasons why certain firms producing import-competing goods are small but that firms can break themselves up into subsidiaries and still take advantage of their knowledge of the procedure one must follow to collect the government's subsidy.

Under these conditions, the government can effectively only offer incentives that are linear in the amount produced. To see this, suppose that the government tries to offer a transfer of S to a small firm and seeks to offer a transfer smaller than nS to a firm that has n times as much capital of type 1. Then the owner of the larger firm can break his firm up into n firms of equal size and receive nS. Thus the government has nothing to gain by making the subsidy nonlinear.[14]

What is essential in the argument above is that there are economies of scale in demonstrating that one qualifies for a subsidy. Large firms find it relatively easy to establish systems that demonstrate their production whereas small firms must make special efforts to distinguish themselves from agents who seek subsidies by fraudulent means. At the same time, it may well be difficult for the government to offset this disadvantage of small firms by offering such firms significantly larger subsidies relative to their sales. The reason is that this encourages larger firms to break themselves up. The result is that it is impossible to transfer resources to small firms without transferring large resources to bigger firms. If, instead, one seeks to keep subsidies small, only large firms go through

[14]Feenstra and Lewis (1994) also consider a model where the government has limited information about producers. Relative to my model, the information they endow the government with is ampler in some respects and more limited in others. On the one hand, they suppose the government can condition its transfer to an individual on that individual's net trade. Thus individuals cannot decompose their trades into trades carried out by two "firms". The result is that the optimal policy they derive differs from a standard (linear) tariff because the marginal price paid or received by an individual varies with his total purchases. On the other hand, they do not let the government know the endowment of individuals (which corresponds to a firm's total output in my model). This second requirement means they do not really consider conventional production subsidies as an alternative to the policies that they do study. Even so, their optimal policy has some elements of a subsidy because the marginal subsidy per unit sold for those who sell the good in question is larger than the marginal tax per unit bought for those who are net buyers.

the trouble of collecting these subsidies.

I now show this more formally by considering linear subsidies explicitly. With such subsidies, the price received by firms in sector 1, $\tilde{P}_1$, differs from the price $\hat{P}_1$ paid by consumers. Absent other policies, the latter is simply equal to the international price P_1^*.

In this section I suppose that N_1^ℓ individuals own K_1^ℓ units of capital of type 1 while N_1^h own K_1^h units. Further, I let

$$K_1^\ell < K_1^h$$

so that owners of K_1^ℓ are relatively poor.

Given a fixed cost θ of claiming the subsidy, no producer claims it if $(\tilde{P}_1 - P_1^*)$ is sufficiently small. For a firm owned by an individual who owns K_1^i to claim the subsidy, it must satisfy

$$\max_z[\tilde{P}_1 z^\alpha (K_1^i)^{1-\alpha} - Wz] - \theta \geq \max_z[P_1^* z^\alpha (K_1^i)^{1-\alpha} - Wz]$$

or

$$(1-\alpha)K_1^i \left(\frac{\alpha}{W}\right)^{\frac{\alpha}{1-\alpha}} \left(\tilde{P}_1^{\frac{1}{1-\alpha}} - P_1^{*\frac{1}{1-\alpha}}\right) \geq \theta. \tag{15}$$

Suppose for a moment that $\tilde{K}_1$ represents the total amount of capital of type 1 which is associated with firms that do obtain the subsidy. Then, the amount of labor demanded by these firms is given by (2) with $\tilde{K}_1$ substituted for K_j and $\tilde{P}_1$ substituted for the price. Meanwhile, the amount of labor demanded by firms producing good 1 that do not apply for the subsidy is given by (2) with K_j replaced by $(K_1 - \tilde{K}_1)$ and P_1^* substituted for the price. Thus, the wage is given by

$$W = \alpha \left(\frac{\tilde{P}_1^{\frac{1}{1-\alpha}} \tilde{K}_1 + P_1^{*\frac{1}{1-\alpha}} (K_1 - \tilde{K}_1) + P_2^{*\frac{1}{1-\alpha}} K_2}{\bar{L}} \right)^{1-\alpha}. \tag{16}$$

As a result, the output of good 1 by firms who claim the subsidy, which I denote by $\tilde{X}_1$, is

$$\tilde{X}_1 = \tilde{P}_1^{\frac{\alpha}{1-\alpha}} \bar{L}^\alpha \tilde{K}_1 \left(\tilde{P}_1^{\frac{1}{1-\alpha}} \tilde{K}_1 + P_1^{*\frac{1}{1-\alpha}} (K_1 - \tilde{K}_1) + P_2^{*\frac{1}{1-\alpha}} K_2 \right)^{-\alpha}. \tag{17}$$

and analogously for both the amount of good 2 produced and the amount of good 1 produced by firms that do not claim the subsidy $(X_1 - \tilde{X}_1)$.

Inequality (15) makes it clear that owners of large amounts of K_1 apply for the subsidy even in cases where the subsidy is too small to be attractive to owners of smaller amounts of K_1. Thus,

as the subsidy is increased from zero, the first ones to apply are firms whose owners have an endowment of K_1^h. As more of these owners claim their subsidy, (16) implies that the wage rises and this hurts all owners of capital. As can be seen from (15) this also tends to discourage further owners of capital of type 1 from applying for the subsidy. The reason is that firms that collect the subsidy increase their output but, with higher wages, this increase in output is less profitable.[15]

The minimum subsidy such that all owners of K_1^h apply for the subsidy ensures that (15) holds with equality when the wage W satisfies (16) with $\tilde{K}_1$ equal to $N_1^h K_1^h$. Denoting this minimum subsidy by ξ^h, it is defined implicitly by

$$(P_1^* + \xi^h)^{\frac{1}{1-\alpha}} - P_1^{*\frac{1}{1-\alpha}} = \frac{\theta}{(1-\alpha)K_1^h}\left(\frac{[(P_1^* + \xi^h)^{\frac{1}{1-\alpha}} - P_1^{*\frac{1}{1-\alpha}}]N_1^h K_1^h + P_1^{*\frac{1}{1-\alpha}}K_1 + P_2^{*\frac{1}{1-\alpha}}K_2}{\alpha \bar{L}}\right)^{\alpha}. \tag{18}$$

Note that an increase in ξ^h that raises the left hand side by one percent raises the right hand side by less than α percent. Thus, increases in the right hand side due to changes in other parameters raise ξ^h. In particular, ξ^h is zero for θ equal to zero and rises continuously with θ. For much of the analysis I will consider values of θ that are quite small so that they correspond to small values of ξ^h.

Even if the subsidy is increased slightly beyond ξ^h, it is still claimed only by owners of K_1^h. There does exist a strictly higher level of subsidy, which I call $\bar{\xi}^\ell$ such that owners of K_1^ℓ start requesting the subsidy because they are indifferent between doing so and not doing so. When these firms start requesting the subsidy, the wage rises (because $\tilde{K}_1$ rises) and other owners of K_1^ℓ are discouraged from requesting the subsidy. Thus, there is a range of subsidy levels such that some but not all owners of K_1^ℓ request the subsidy. Using the logic above, the minimum subsidy at which all such owners do so, which I denote by ξ^ℓ satisfies

$$(P_1^* + \xi^\ell)^{\frac{1}{1-\alpha}} - P_1^{*\frac{1}{1-\alpha}} = \frac{\theta}{(1-\alpha)K_1^\ell}\left(\frac{(P_1^* + \xi^\ell)^{\frac{1}{1-\alpha}}K_1 + P_2^{*\frac{1}{1-\alpha}}K_2}{\alpha \bar{L}}\right)^{\alpha}. \tag{19}$$

It is worth noting that ξ^ℓ can be large even with θ arbitrarily small as long as K_1^ℓ is sufficiently small that θ/K_1^ℓ is large.

[15] This effect would presumably continue to be present if some of the workers in the industry were immobile across industries as well. Thus, workers who are mobile across firms but immobile across sectors might well gain relatively little from small subsidies.

To understand the effects of production subsidies on welfare, I suppose that, as in the case of export subsidies, these are financed by taxes which are levied in proportion to each agent's income. As before, these taxes are non-distortionary in this model. Thus, the income of workers is

$$I^w = \frac{\alpha}{\bar{L}}[\tilde{P}_1\tilde{X}_1 + P_1^*(X_1 - \tilde{X}_1) + P_2^*X_2 - (\tilde{P}_1 - P_1^*)\tilde{X}_1] = \frac{\alpha}{\bar{L}}[P_1^*X_1 + P_2^*X_2]. \tag{20}$$

This implies immediately that a subsidy of ξ^h must reduce the utility of workers relative to a zero subsidy. The reason is that workers do not gain any material welfare from such a change. Moreover, all owners of capital lose because such a subsidy raises wages. This loss due to high wages is experienced even by those who are indifferent between claiming and not claiming the subsidy, namely the owners of K_1^h. Thus, only subsidies above ξ^h have the potential for increasing worker utility.

If θ is sufficiently small, ξ^h is small as well which means that the derivative of worker's material welfare with respect to $\tilde{P}_1$ remains close to zero when the subsidy equals ξ^h. I now consider the effect on the owners of capital. The income of owners of K_2 equals

$$\begin{aligned} I^2 &= \frac{1-\alpha}{N_2}P_2^*X_2\left(1 - \frac{(\tilde{P}_1 - P_1^*)\tilde{X}_1}{\tilde{P}_1\tilde{X}_1 + P_1^*(X_1 - \tilde{X}_1) + P_2^*X_2}\right) \\ &= \frac{1-\alpha}{N_2}\frac{P_2^*X_2}{\tilde{P}_1\tilde{X}_1 + P_1^*(X_1 - \tilde{X}_1) + P_2^*X_2}[P_1^*X_1 + P_2^*X_2]. \end{aligned} \tag{21}$$

Let X_1^h and X_1^ℓ denote the aggregate amounts of good 1 produced by owners of K_1^h and K_1^ℓ respectively. For subsidies between ξ^h and $\bar{\xi}^\ell$, $\tilde{X}_1$ is equal to X_1^h. Thus, the income of those who own K_1^ℓ units of capital of type 1 is

$$I^\ell = \frac{1-\alpha}{N_1^\ell}\,\frac{P_1^*X_1^\ell}{\tilde{P}_1X_1^h + P_1^*X_1^\ell + P_2^*X_2}[P_1^*X_1 + P_2^*X_2], \tag{22}$$

while that of owners of K_1^h is

$$I^h = \frac{1-\alpha}{N_1^h}\,\frac{\tilde{P}_1X_1^h}{\tilde{P}_1X_1^h + P_1^*X_1^\ell + P_2^*X_2}[P_1^*X_1 + P_2^*X_2] - \theta. \tag{23}$$

If, instead, the subsidy is above ξ^ℓ, $\tilde{X}_1$ is equal to X_1 and the incomes of owners of K_1^h and K_1^ℓ are, respectively.

$$I^h = \frac{1-\alpha}{N_1^h}\,\frac{\tilde{P}_1X_1^h}{\tilde{P}_1X_1 + P_2^*X_2}[P_1^*X_1 + P_2^*X_2] - \theta \tag{24}$$

$$I^\ell = \frac{1-\alpha}{N_1^\ell} \frac{\tilde{P}_1 X_1^\ell}{\tilde{P}_1 X_1 + P_2^* X_2} [P_1^* X_1 + P_2^* X_2] - \theta. \tag{25}$$

When the subsidy is between ξ^h and $\bar{\xi}^\ell$, equations (22) and (23) together with (17) imply that the changes in income for the three types of owners of capital are

$$\frac{dI^2}{I^2} = \frac{dI^\ell}{I^\ell} = -\frac{1}{1-\alpha} \frac{\tilde{P}_1 X_1^h}{\tilde{P}_1 X_1^h + P_1^* X_1^\ell + P_2^* X_2} \frac{d\tilde{P}_1}{\tilde{P}_1} + \frac{d(P_1^* X_1 + P_2^* X_2)}{P_1^* X_1 + P_2^* X_2}$$

$$\frac{dI^h}{I^h + \theta} = \frac{1}{1-\alpha} \frac{P_1^* X_1^\ell + P_2^* X_2}{\tilde{P}_1 X_1^h + P_1^* X_1^\ell + P_2^* X_2} \frac{d\tilde{P}_1}{\tilde{P}_1} + \frac{d(P_1^* X_1 + P_2^* X_2)}{P_1^* X_1 + P_2^* X_2}.$$

If θ is small (so ξ^h is too) one can approximate these changes in income by evaluating these derivatives at the point where $\tilde{P}_1$ is equal to P_1^* and θ is zero. This means that the last term in both equations can be ignored. The (right) derivative of worker utility at ξ^h can then be approximated as

$$d\Omega^w \approx \frac{\gamma g}{1-\alpha} \frac{P_1^* X_1^h P_1^* X_1^\ell (f'^h - f'^\ell) + P_1^* X_1^h P_2^* X_2 (f'^h - f'^2)}{P_1^* X_1 + P_2^* X_2} \frac{d\tilde{P}_1}{P_1^*}. \tag{26}$$

For this to be positive, the marginal utility of income of owners of K_1^h must be higher than at least one of the other capital owners' marginal utility of income. Thus (26) is negative for K_1^h sufficiently high even if good 1 is imported and the total value of its output is significantly lower than the value of the production of good 2. If good 1 is produced by a few large producers and a great many small producers, a small subsidy is not attractive to workers. The importance of the number of small producers becomes even clearer in the case where f is logarithmic. The change in worker utility from an increase in $\tilde{P}_1$ evaluated at P_1^* is then

$$d\Omega^w = \frac{\gamma}{1-\alpha} \frac{N_1^h (P_1^* X_1^\ell + P_2^* X_2) - (N_1^\ell + N_2) P_1^* X_1^h}{P_1^* X_1 + P_2^* X_2} \frac{d\tilde{P}_1}{P_1^*} \tag{27}$$

which is negative if N_1^ℓ is large enough.

If $d\Omega^w / d\tilde{P}_1 < 0$ for small $\tilde{P}_1$, a higher value of $\tilde{P}_1^*$ cannot make the expression on the right hand side of (26) positive since it reduces f'^h relative to f'^ℓ and f'^2. Moreover, with a higher value of $\tilde{P}_1$, increases in the subsidy also lower the value of national output evaluated at world prices $(P_1^* X_1 + P_2^* X_2)$. This has the effect of reducing the material payoffs of all agents. It follows that, if the parameters are such that small increase in the subsidy above ξ^h lowers worker utility, increases in the subsidy until it equals $\bar{\xi}^\ell$ are also unattractive to workers.

The same is true for increases in the subsidy from $\bar{\xi}^{\ell}$ to ξ^{ℓ}. These may be good for owners of K_1^h units of capital but make owners of K_1^{ℓ} worse off. These are now indifferent between claiming and not claiming the subsidy but the increase wage that results from the fact that some of these owners claim the subsidy makes all such owners worse off.

I now turn to the effects of raising the subsidy beyond ξ^{ℓ}. When the subsidy is so large that all owners of capital of type 1 claim it, $\tilde{X}_1$ is equal to X_1 and $\tilde{K}_1$ is equal to K_1. Thus, differentiating (21), (24) and (25), one obtains

$$\frac{dI^2}{I^2} = \frac{1}{1-\alpha}\ \frac{\tilde{P}_1 X_1}{\tilde{P}_1 X_1 + P_2^* X_2}\ \frac{d\tilde{P}_1}{\tilde{P}_1} + \frac{d(P_1^* X_1 + P_2^* X_2)}{P_1^* X_1 + P_2^* X_2}$$

$$\frac{dI^h}{I^h + \theta} = \frac{dI^{\ell}}{I^{\ell} + \theta} = \frac{1}{1-\alpha}\ \frac{P_2^* X_2}{\tilde{P}_1 X_1 + P_2^* X_2}\ \frac{d\tilde{P}_1}{\tilde{P}_1} + \frac{d(P_1^* X_1 + P_2^* X_2)}{P_1^* X_1 + P_2^* X_2}. \tag{28}$$

Substituting (9) into (28)

$$\frac{dI^h}{I^h + \theta} = \frac{dI^{\ell}}{I^{\ell} + \theta} = \frac{1}{1-\alpha}\frac{P_2^* X_2}{\tilde{P}_1 X_1 + P_2^* X_2}\left\{1 - \frac{\alpha P_1^* X_1}{P_1^* X_1 + P_2^* X_2}\ \frac{\tilde{P}_1 - P_1^*}{P_1^*}\right\}\frac{d\tilde{P}_1}{\tilde{P}_1}. \tag{29}$$

The expression $\frac{\tilde{P}_1 - P_1^*}{P_1^*}$ is at least equal to ξ^{ℓ}/P_1^*. This means that, the material payoffs of owners of capital of type 1 decline when the subsidy is increased beyond ξ^{ℓ} if ξ^{ℓ} is sufficiently large. A sufficient condition for this to occur is

$$\xi^{\ell} > \frac{1}{\alpha}\left(1 + \frac{P_2^* X_2}{P_1^* X_1}\right) \tag{30}$$

where the quantities on the right hand side are those that would prevail at international prices. The reason (30) is sufficient to ensure that the bracketed expression in (29) is negative is that increases in $\tilde{P}_1$ raise X_1 relative to X_2 thereby lowering the value of the expression in brackets. Increases in subsidies can actually hurt owners of capital of type 1 because, when subsidies are already very high, further increases lead to such large declines in the value of output measured at international prices that these offset the gain in the share of income that goes to owners of capital of type 1. If the income of all owners of type 1 capital declines with increased subsidies, workers would not favor such subsidies. So, high values of K_1^h and ξ^{ℓ} are sufficient for both small and large subsidies to be politically unattractive.

I now turn to the question of whether tariffs would be equally unattractive if they were subject to the same overall administrative costs. To study this question I assume that any nonzero tariff requires the expenditure of $N_1\theta$ in administrative costs. Again, this is most easily thought of as involving the absorption of $N_1\theta/P_2^*$ units of good 2. Unlike in the case of subsidies, these costs need not impinge disproportionately on those who are being favored by the policy. Rather, they can be thought of as involving expenditure by the government which is financed with tariff revenue or by lump sum taxes. In the presence of such expenditures, and supposing that tariffs are strictly positive so that $P_1 > P_1^*$, (7), (10) and (12) become

$$I^w = \frac{\alpha}{\bar{L}}[P_1^*X_1 + P_2^*X_2 + (P_1 - P_1^*)C_1 - N_1\theta] \tag{31}$$

$$I^h = \frac{(1-\alpha)K_1^h}{K_1}\frac{P_1X_1}{P_1X_1 + P_2^*X_2}[P_1^*X_1 + P_2^*X_2 + (P_1 - P_1^*)C_1 - N_1\theta] \tag{32}$$

$$I^\ell = \frac{(1-\alpha)K_1^\ell}{K_1}\frac{P_1X_1}{P_1X_1 + P_2^*X_2}[P_1^*X_1 + P_2^*X_2 + (P_1 - P_1^*)C_1 - N_1\theta] \tag{33}$$

$$I^2 = \frac{1-\alpha}{N_2}\frac{P_2^*X_2}{P_1X_1 + P_2^*X_2}[P_1^*X_1 + P_2^*X_2 + (P_1 - P_1^*)C_1 - N_1\theta]. \tag{34}$$

The levels of X_1 and X_2 can be computed, once again, from (4). Assuming $N_1\theta$ and $(P_1 - P_1^*)$ are both small, and using (11), the changes in these income levels when a small tariff is imposed are thus

$$\frac{dI^w}{I^w} = \frac{-N_1\theta}{P_1^*X_1 + P_2^*X_2} + \frac{P_1^*C_1}{P_1^*X_1 + P_2^*X_2}\frac{dP_1}{P_1} \tag{35}$$

$$\frac{dI^h}{I^h} = \frac{dI^\ell}{I^\ell} = \frac{-N_1\theta}{P_1^*X_1 + P_2^*X_2} + \frac{1}{1-\alpha}\,\frac{P_2^*X_2 + (1-\alpha)P_1^*C_1}{P_1^*X_1 + P_2^*X_2}\,\frac{d\hat{P}_1}{P_1} \tag{36}$$

$$\frac{dI^2}{I^2} = \frac{-N_1\theta}{P_1^*X_1 + P_2^*X_2} - \frac{1}{1-\alpha}\,\frac{P_1^*X_1 + (1-\alpha)P_1^*C_1}{P_1^*X_1 + P_2^*X_2}\,\frac{dP_1}{P_1}. \tag{37}$$

Thus, the change in worker utility from introducing a small tariff is

$$\begin{aligned} d\Omega^w = &-\frac{[1+\gamma(\bar{L}-1)]I^w f'^w + \gamma[N_1^h I^h f'^h + N_1^\ell I^\ell f'^\ell + N_2 I^h f'^2]}{P_1^*X_1 + P_2^*X_2} gN_1\theta + \\ &\frac{\gamma g P_1^*X_1 P_2^*X_2[zf'^h + (1-z)f'^\ell - f'^2]}{(1-\alpha)(P_1^*X_1 + P_2^*X_2)}\,\frac{dP_1}{P_1} \end{aligned} \tag{38}$$

where $z = K_1^h/K_1$. Thus tariffs remain attractive as long as a weighted average of the marginal utilities of producers of good 1 is higher than the marginal utility of producers of good 2. It should

be clear that if f'^{ℓ} and ξ^{ℓ} are sufficiently high, tariffs can be attractive to workers even when small subsidies are not. The reason is that small tariffs transfer resources to small producers of good 1 while small subsidies do not. What is more, the same force that makes f'^{ℓ} high, namely the poverty of the small producers of good 1, also makes ξ^{ℓ} high because it implies that the fixed costs of claiming a subsidy loom large for these producers. Thus, a key force that makes tariffs attractive, renders subsidies unattractive.

The limiting cases where one can be sure that tariffs dominate subsidies are particularly clear when f is logarithmic. In this case, the workers' utility gain from small tariffs is

$$d\Omega^w = -\frac{N_1\theta[1+\gamma(\bar{L}-1)+\gamma(N_1+N_2)]}{P_1^*X_1+P_2^*X_2}+\frac{\gamma(N_1P_2^*X_2-N_2P_1^*X_1)}{(1-\alpha)(P_1^*X_1+P_2^*X_2)}\frac{dP_1}{P_1^*}. \tag{39}$$

Fix N_1^{ℓ} to a large positive value so that the second term in (39) is positive while (27) is negative. There is then a value of θ low enough so that workers gain utility from a strictly positive tariff while they gain nothing from small subsidies if owners of K_1^{ℓ} do not take advantage of them. For this θ, a low enough value of K_1^{ℓ} (and a correspondingly high value of K_1^h) ensures that ξ^{ℓ} is arbitrarily large, so that it satisfies (30). This means not only that owners of K_1^{ℓ} do not claim small subsidies but that the only subsidies that these owners claim are high enough that increases in subsidies beyond ξ^{ℓ} actually reduce their income. It is worth noting that, as one reduces K_1^{ℓ} to raise the value of ξ^{ℓ}, the number of owners of K_1^{ℓ} rises so that (27) implies that one is also reducing the extent to which workers find small subsidies desirable.

So far I have presented sufficient conditions for voter to prefer tariffs to subsidies. These sufficient conditions are far from necessary, however. In particular, comparing (26) and (38) it is apparent that once the costs θN_1 have been paid for, small increases in tariffs are actually better for workers than small increases in partial subsidies. Thus, it is possible that positive tariffs are simply more desirable than the best possible partial subsidy even under conditions that make this partial subsidy better than free trade. Similarly, the globally most preferred tariff can be more attractive to workers than the globally most preferred subsidy even if small increases in subsidies beyond ξ^{ℓ} make workers better off. The reason is that the subsidy of ξ^{ℓ} can itself be quite costly and the marginal benefits of increasing subsidies beyond ξ^{ℓ} can be quite low even if they are positive.

Carrying out such a global analysis is difficult in general and I have thus pursued some numerical experiments under the assumption that f is logarithmic while

$$g(\hat{P}_1, \hat{P}_2) = \hat{P}_1^{-\beta}\hat{P}_2^{\beta-1}$$

so that the demand functions are the same as those from a Cobb-Douglas utility function. The advantage of focusing on this case is that it leads to very simple expressions for income even in the case of tariffs. In particular, aggregate consumption of good 1 is then

$$\begin{aligned}\hat{P}_1 C_1 &= \beta[\hat{P}_1 X_1 + P_2^* X_2 - (\hat{P}_1 - P_1^*)(C_1 - X_1)] \\ &= \beta(P_1^* X_1 + P_2^* X_2)\frac{\hat{P}_1}{\beta P_1^* + (1-\beta)\hat{P}_1}. \end{aligned} \tag{40}$$

This expression can be plugged into (31), (32), (33) and (12) to obtain the incomes of all four types of agents once one knows X_1^h, X_1^ℓ and X_2 as a function of $\hat{P}_1$. Since these output levels can be computed from (4), computing the level of utility of workers is straightforward. In the case of subsidies, the outputs can be obtained from (17) after using the cutoffs (18) and (19) to determine which agents collect subsidies. The income levels I^w, I^h, I^ℓ and I^2 can then be obtained directly from (20), (23) or (24), (22) or (25) and (21).

Consider then a situation where $\alpha = \beta = .5$ while $P_1^* = P_2^* = 1$. There are 20 workers and 10 owners of capital of type 2, each of which owns 3 units of capital. The total endowment of K_1 is only 6 but 2 individuals have 2.1 units each while an additional 18 individuals each have an endowment of $K_1^\ell = .1$. Finally, I let the altruism parameter γ equal .01 and θ equal .05. This means that the owners of K_1^ℓ do not collect subsidies until $\tilde{P}_1$ equals 1.56. Because there are so few owners of K_1^h, lower subsidies actually provide less utility to workers than free trade (which gives them a utility of -.9851). As subsidies are increased beyond 60%, utility rises, but even the best such subsidy (which is around 122%) is worse than free trade. By contrast, the best possible tariff for workers equals a more modest 46% and this increases worker utility above its free trade level (to -.9750).

If all other parameters are kept constant but θ is lowered to .04, the optimal tariff for workers remains the same but total utility at this tariff is now -.9648. Owners of K_1^ℓ start applying for the

subsidy when it equals 48%, though of course they don't benefit from the subsidy program until subsidies are somewhat higher. The best production subsidy from the point of view of workers equals 114% and gives them a utility of -.9662. This is larger than the utility under free trade but is not as high as the utility under the best tariff. Further reductions in θ ultimately lead subsidies to dominate tariffs, as one would expect. In particular, if θ is lowered to .03, the best subsidy (124%) actually gives workers more utility than the 46% tariff.

3 Lobbying and Campaign Contribution

I now present an extremely simplified and incomplete model of representative voting for trade policy in which tariffs play the same role as they do in the previous sections. While the model is crude, it fits with some of the most interesting observations concerning lobbying for changes in the commercial policy of the United States. In their extensive study on the subject, Bauer, Pool and Dexter (1963) report that lobbyists who favor protection mostly lobby those representatives who already favor protection in the first place. On p. 442 they say, for example, "... lobbyists tended to establish liaison only with the congressmen and senators on their own side."[16]

The evidence also suggests that campaign contributions tend to flow to representatives whose ideological positions are close to those of donor individuals and political action committees. This evidence can be found, for example in Kau, Keenan and Rubin (1982) and Baldwin and Magee (1998). This does not mean that contributors expect nothing in return for their contribution. On the contrary, Snyder (1992) provides compelling indirect evidence that many contributors invest in politicians with the expectation of receiving services from them. In particular, it is often claimed that contributors buy "access", *i.e.,* the opportunity to make presentations on particular policies. Sabato (1985, p. 127) for example says "PAC officials are adamant that all they get for their

[16]Several other studies have reached similar conclusions. By contrast, Austen-Smith and Wright (1994) report that, in the case of the Judge Bork's nomination for the Supreme Court, lobbying was more even-handed with a great deal of lobbying activity directed at representatives who help opposite prior positions than the lobbyists. They also provide an interesting model of this type of lobbying. The question of why these different settings elicit different lobbying activities seems quite interesting in its own right. One difference may be that, in the case of trade, the opponents of protection are not generally experts in the industry in question so that they prefer not to engage in arguments having to do with the plight of those employed in import-competing sectors. Rather they prefer to champion free trade by pointing to the benefits that it brings. By contrast, the factual knowledge of proponents and opponents of a particular judicial nomination may be much more similar.

investment is access to congressmen - a chance to 'tell their story'. Political analysts have long agreed that access is the principal goal of most interest groups, and lobbyists have always recognized that access is the key to persuasion."

An alternative view is that contributors buy more not only access but also votes so that protection is "for sale." It might be thought that this hypothesis is particularly plausible given that Baldwin and Magee (1998) show that legislators tend to vote in the direction desired by those individuals from whom they receive substantial contributions. Nonetheless, I now show that the association of contributions, lobbying activity and legislative votes is consistent with a quite benign interpretation. For this purpose, I construct a very stylized model of incomplete information.

I suppose that all legislators are uncertain about the parameter Z such that the total number of owners of capital of type 1 equals $(1+Z)$. In particular, they are unsure whether Z equals Z^H or Z^L with $Z^H > Z^L$. Legislators do know the parameters of the model including the administrative costs of tariffs (which I treat as independent of Z)[17], the total amount produced of both goods and also the aggregate amount of K_1 and K_2. They also know that one owner of K_1 owns K_1^s which is much higher than the endowment of all other owners of capital of type 1. The other Z owners all own $(K_1 - K_1^s)/Z$ so that uncertainty about Z translates also into uncertainty about the wealth of the other owners of K_1.

I suppose that there are three legislators who differ in their tastes. One legislator has an expected utility function which, under certainty, is identical to the utility of workers (13). Under uncertainty about Z, this utility function is

$$\Omega^n = [1 + \gamma(\bar{L} - 1)]V^w + \gamma\{V^s + Q^n Z^H V^H + (1 - Q^n)Z^L V^L + N_2 V^2\} \tag{41}$$

where Q^n is this legislator's subjective probability that Z equals Z^H, V^s represents the material payoffs of the individual with endowment K_1^s while V^H and V^L represent the material payoffs of the other owners of good 1 if their endowment equals $(K_1 - K_1^s)/Z^H$ and $(K_1 - K_1^s)/Z^L$ respectively.

The other two legislators are either more or less favorable to the protection of producers of good

[17]This is intuitively appealing as the administrative costs involve border controls which are independent of the number of producers affected. It does mean that, notationally, I am holding $N_1\theta$ constant in this section.

1. In particular, I suppose that there is a liberalization-biased legislator whose utility is given by

$$\Omega^a = [1+\gamma(\bar{L}-1)]V^w + \gamma\{V^{1s} + Q^a Z^H V^H + (1-Q^a)Z^L V^L + [1+B]N_2 V^2\} \tag{42}$$

and a protection-biased legislator with utility

$$\Omega^b = [1+\gamma(\bar{L}-1)]V^w + \gamma\{V^{1s} + [1+B][Q^b Z^H V^H + (1-Q^b)Z^L V^L] + N_2 V^2\} \tag{43}$$

where the bias B is strictly positive while Q^a and Q^b represent, respectively, the liberalization and the protection-biased legislator's subjective probabilities that Z equals Z^H.

This is a simple way of capturing differences in legislative tastes. In a more complete model, one might be able to derive this heterogeneity in the desires of legislators from heterogeneity in the composition of voters. For example, the more extreme legislators might be representing districts with either a disproportionately large or a disproportionately small number of producers of good 1. This fits with Baldwin's (1985) evidence that legislators from districts with disproportionately high employment in "import-sensitive" sectors are more predisposed to vote against trade liberalization. While Baldwin (1985 p. 176) sees this as evidence that "political pressures exerted on government officials by common-interest groups affect political behavior on trade policy issues" it might also be the result of "local altruism" in which voters care more about the welfare of their near neighbors than they care about the welfare of people who live farther away.

In this section I only consider tariffs so that $P_1 = \hat{P}_1 = \tilde{P}_1$. Thus, for fixed model parameters and total levels of the two endowments, the welfare of legislator i depends only on P_1 and his assessment of the likelihood of Z^h, Q^i. I therefore write these welfare levels as functions $\Omega^i(P_1, Q^i)$.

The results from section 2 imply that, if P_1 is slightly above P_1^* and administrative costs are small,

$$\Omega^b(P_1,Q) - \Omega^b(P_1^*,Q) \;>\; \Omega^n(P_1,Q) - \Omega^n(P_1^*,Q) \;>\; \Omega^a(P_1,Q) - \Omega^a(P_1^*,Q). \tag{44}$$

This follows directly from the fact that the material welfare of owners of capital of type 1 increases with P_1 so that putting increased weight on this material welfare makes tariffs more attractive.

The analysis of section 3 implies that if, in addition $Q' > Q''$ and the administrative costs are small

$$\Omega^i(P_1,Q') - \Omega^i(P_1^*,Q') \;>\; \Omega^i(P_1,Q'') - \Omega^i(P_1^*,Q'') \qquad\qquad i = a, b.n \tag{45}$$

To see this, it must be noted first that, for P_1 close to P_1^*, (35) and (37) continue to describe the percentage changes in the income of workers and of owners of K_2. Similarly, (36) continues to give the percentage change in the income of owners of capital of type 1, whether they hold K_1^s, $(K_1 - K_1^s)/Z^H$ or $(K_1 - K_1^s)/Z^L$. This means that, ignoring the administrative costs, the analysis that gives (38) now gives

$$d\Omega^n = \frac{\gamma g P_1^* X_1 P_2^* X_2}{(1-\alpha)(P_1^* X_1 + P_2^* X_2)} \Big(z f'^s + (1-z)[Q^n f'^H + (1-Q^n) f'^L] - f'^2 \Big) \frac{dP_1}{P_1} \qquad (46)$$

where f'^s, f'^H and f'^L represent, respectively, the derivatives of f with respect to its argument for owners of K_1^s, for owners of $(K_1 - K_1^s)/Z^H$ and for owners of $(K_1 - K_1^s)/Z^L$. Because $Z^H > Z^L$, $f'^H > f'^L$ so that increases in Q^n raises the expression in (46). The analysis for Ω^b and Ω^a is identical. Intuitively, the reason (45) holds is that a higher level of Z^H means that there are more owners of capital of type 1 so that their typical holding is smaller. This means that they are poorer and that the altruistic legislators gains more utility from transferring resources to them.

I now suppose that the owner of K_1^s units of K_1 can try to lobby legislators. Lobbying involves the transmission of verifiable information about τ binary variables. The assumption that the information is verifiable is critical for what follows. Examples of verifiable information can include information that is contained in documents produced by third parties or testimony by credible witnesses.

I suppose that, in addition, the transmission of any one of these variables requires time and that, as is often stated in the qualitative literature, legislators' time is extremely valuable to them. A legislator who receives information about τ variables thus incurs a cost of $c\tau$. As stressed in Bauer, Pool and Dexter (1963) this opportunity cost of the time of legislators arises because legislators can also use their time either to raise funds directly or to acquire other kinds of information, including information on how to get reelected. To simplify, I suppose that these costs are in the same units as both the income of the legislators and the welfare functions (41), (42) and (43).

While I suppose that it is costly for legislators to acquire information, I assume they can costlessly transmit a subset of this information to other legislators. In particular, I imagine that, when legislators make speeches in their legislative chambers, they can costlessly and credibly transmit

the information they have received from lobbyists on one binary variable. This captures the idea that legislators who worry about an issue by discussing it with lobbyists learn a great deal more about the issue than those who do not, even though the latter do learn something from listening to their colleagues.

Thus, legislators can be thought of as filters of information: they receive a large numbers of bits of information from lobbyists and let one through. The social value of this filtering function stems from its ability to reduce the resources that legislative bodies require to absorb information. I capture this value by focusing on an extreme example, though this value would obviously remain under much weaker assumptions. In the extreme example I consider, only one of the τ binary variables has any chance of being informative to all legislators. Legislators recognize an informative realization of a variable when they hear it but lobbyists do not know which, if any, realization of the variables they transmit will prove informative (either because they do not know what legislators know or because they do not know the "model" that legislators use to process the data they receive).[18]

What lobbyists do know is that there is a probability λ that one of the τ variables they transmit raises the subjective Q^i of the legislator who learns about it from Q to Q_1. This means that the hearing of the τ variables has a probability $(1-\lambda)$ of lowering the Q^i of the legislator who hears them from Q to Q_0 where

$$\lambda Q_1 + (1-\lambda)Q_0 = Q.$$

It does not matter for the analysis whether this reduction in Q^i results from the existence of a single variable that lowers this subjective probability or whether the absence of any variable that raises Q^i to Q_1 is sufficient to lower the legislator's assessment to Q_0.

I now consider an extensive form game with the following sequence of moves. First, the owner of K_1^s decides whether to offer a contribution of size r (which he chooses) to a particular legislator

[18]One can imagine that lobbyists have already suppressed information that they regard as obviously unfavorable to their cause so they transmit only information that has a chance to be favorable. What they do not know, however, is the extent to which the favorable data points they transmit are in fact persuasive. An alternative interpretation is that, once lobbyists visit legislators, the latter are allowed to ask questions that expose further credible information. One can then interpret the binary signals I consider as combinations of bits of information such that the lobbyist is unsure how legislators will react to the particular combinations that he finds in practice.

in exchange for hearing out his information on the τ binary variables.[19] The legislator then accepts or rejects this offer. If he rejects it, the game proceeds to the voting stage. If he accepts it, the legislator then has the opportunity of transmitting one of these bits of information to the other legislators. The voting stage with which the game ends involves a vote among the three legislators between setting P_1 to the free trade level of P_1^* or setting it to a higher level $P_1^* + t$.[20]

The most important property of the equilibrium of this game is that, under certain circumstances, the owner of K_1^s does find it profitable to spend resources lobbying. When he does so, he lobbies the legislator most favorable to protection and this can indeed result in an increase in tariffs. While this combination of contributions, lobbying and voting for protection may seem suspicious, workers desire this tariff increase.

For the setting to be interesting, it must be the case that,

$$\Omega^n(P_1^*, Q) \; > \; \Omega^n(P_1^* + t, Q) \qquad \text{and} \qquad \Omega^n(P_1^*, Q_1) \; < \; \Omega^n(P_1^* + t, Q_1)$$

so that the neutral legislator prefers free trade with no information while he prefers the positive tariff when he receives information that raises his assessment of the likelihood of Z^H.

I solve the game backwards starting with the voting stage. If, at this stage Q^n and Q^b equal Q_1, both the neutral and the protection-biased legislator vote for setting P_1 equal to $P_1^* + t$ and the tariff passes regardless of the views of the legislator biased against tariffs. If Q^a and Q^n remain equal to Q because no information is revealed to them, or if one or more of these probabilities becomes equal to Q_0, the neutral and the anti-protection-biased legislators vote for free trade and this passes regardless of the information available to the protection-biased legislator.

I now turn to the stage where a legislator with information chooses whether to reveal this information to others. If either the neutral or the protection-biased legislator have information that raises their Q^i to Q_1, they reveal it because they both prefer the outcome with positive tariffs in this case and they ensure this outcome by revealing the information. If the liberalization-biased

[19] An obvious variant of this model would be to allow the number of binary variables that are transmitted to vary. It might be attractive, for example, to stop transmitting variables as soon as the lobbyist has transmitted the one variable which is informative. This raises the complication of modeling the process by which it becomes common knowledge that a variable that the lobbyist has transmitted is indeed informative.

[20] One could also consider an agenda setting stage where the tariff is chosen optimally but this does not seem central to the issues considered here.

legislator has this information, he may or may not reveal it depending on whether $\Omega^a(P_1^* + t, Q_1) > \Omega^a(P_1^*, Q_1)$. If either the neutral or the protection-biased legislator has information that lowers their Q^i to Q_0, it does not matter whether they reveal it or not, as free trade passes in equilibrium.

Given this pattern of information revelation, one can ask for the value to each legislator of hearing the N bits of information from the owner of K_1^s under the assumption that, if he does not listen to this information himself, no other legislator will. Using the same superscripts as for Ω, I denote these values by ψ^i. Consider first the neutral and the protection-biased legislators. If hearing the lobbyist leads them to update their Q^i so that it equals Q_0, the outcome does not change. Thus, the only benefit of hearing the lobbyist arises when this leads Q^i to be equal to Q_1. Hence,

$$\psi^i = \lambda[\Omega^i(P_1^* + t, Q_1) - \Omega^i(P_1^*, Q_1)] - c\tau \qquad i = n, b.$$

If i is replaced by a, the first term in this expression would be negative if the liberalization-biased legislator prefers free trade even when $Q^a = Q_1$. He would then withhold this information from the other legislators. Thus

$$\psi^a = \max\{0, \lambda[\Omega^a(P_1^* + t, Q_1) - \Omega^a(P_1^*, Q_1)]\} - c\tau$$

The inequalities in (44) then imply immediately that

$$\psi^b > \psi^n > \psi^a \tag{47}$$

Now consider the owner of K_1^s. His income I^s is given by the formula for I^h in (32) with K_1^h replaced by K_1^s. This income depends on P_1 both directly as well as through the dependence of X_1, X_2 and C_1 on P_1. I thus use the function $I^s(P_1)$ to describe how this income varies when, holding constant the total endowments of K_1 and K_2 and keeping the price of good 2 equal to P_2^*, P_1 varies together with the production and consumption of both goods. This means that the gains to this individual from raising the domestic price from P_1^* to $P_1^* + t$ equal G^s where

$$G^s = V(g(P_1^* + t, P_2^*)I^s(P_1^* + t)) - V(g(P_1^*, P_2^*)I^s(P_1^*))$$

Since the percentage change in I^s for a small tariff is given by (36), G^s is positive if θ and t are small.

This owner's actions depend on the levels of ψ^b and ψ^n as well as on the relationship between G^s and ψ^b. Take first the case where $\psi^b < -G^s < 0$. The lobbyist is then unwilling to make the smallest contribution that gets a legislator to hear his τ variables. He thus makes no contribution and free trade passes in equilibrium.

Now suppose $G^s > -\psi^b > 0$. Then, the owner of K_1^s makes a contribution of $r = -\psi^b$ to the legislator who is biased for protection in exchange for having him listen to his τ informational variables. By doing so he gains $G^s + \psi^b$ relative to not lobbying at all and this is positive. The neutral legislator requires a larger campaign contribution to listen to these informational variables and this makes him a less attractive lobbying target.

Third, consider the case where $\psi^b > 0 > \psi^n$. In this case, the legislator who is biased towards protection is willing to listen to the τ informational variables even if the owner of K_1^s makes no campaign contributions. By contrast, the neutral legislator would require a campaign contribution to do so. Thus, the owner of K_1^s chooses to make no campaign contribution and lobbies the legislator most favorable to his case. The existence of this case is consistent with the fact that a great deal of lobbying involves no campaign contributions even when it is directed at legislators who are favorably predisposed towards the policy outcomes desired by those who lobby them.

Lastly, in the case where ψ^n is positive as well, even the neutral legislator is willing to listen to the owner of K_1^s. Therefore the model makes no prediction as to which legislator is lobbied in this case. The strongest prediction of the model is thus that, when campaign contributions are coupled with lobbying (so that they buy access), they are directed at favorable legislators.

What is missing from the model is a rationale for why many different representatives would receive contributions from the same self-interested constituencies. One extension of the model that might account for this is to suppose that representatives only succeed in transmitting information to other representatives with a probability that is smaller than than one. Contributors might then make payments to several representatives to increase the likelihood that the relevant information reaches undecided legislators.

It is not clear, however, that such a model can explain the rather large fraction of representatives that appear to receive substantial contributions from farm lobbies in Stratmann (1992). In

his statistical study, large contributions are predicted to flow (in about equal magnitude) to all representatives whose rural population is above some cutoff proportion of the population. Somewhat less than 50% of legislators are predicted to receive these large contributions in his study, and this suggests that there is a role for the sort of persuasion that I consider in my model. More importantly, his study amalgamates the contributions of all farm PAC's into a single variable. It is thus possible that substantially fewer representatives are receiving contributions from the constituency for any particular type of farm legislation.

4 Conclusions

This paper has presented a benign theory to explain the existence of policies that are biased against international trade. In this theory, commercial policy arises because it is exactly what the altruistic median voter wants. This voter takes into account the relevant efficiency losses but simply puts more weight on the distributional gains. This is to be contrasted with the more standard, and more pessimistic, view expressed for example in Mayer (1984) and Grossman and Helpman (1994). In this view, tariffs would be opposed by the majority if the majority bothered to cast a vote so that tariffs emerge only because interested minorities are able to capture the political process.

One reason to be interested in the more optimistic view I present is that it ought to lead to sharper tests of the more standard view by providing an alternative that fits at least some of the known facts about commercial policy. A second advantage of the theory is that it provides an explanation for the kinds of arguments that are used in lobbying for protection. A common argument that is used for this purpose is that there exist some individuals who would suffer greatly if the tariff were not imposed. Interestingly, this argument is used even when it can be demonstrated that the vast majority of the benefits of protection flow to a few relatively rich individuals (as Johnson (1974) shows to be true in the case of the U.S. sugar program). My paper shows that the argument can be compelling nonetheless since tariffs that generate such uneven benefits may be better than subsidies at redistributing income in ways that the median voter desires.

An issue that deserves further work is the evolution of tariffs in dynamic versions of this model. This is particularly interesting in light of the analyses of Mayer (1974) and Mussa (1974). They

treat the specific factors model I consider as a short run model and suggest, quite plausibly, that the specific factors reallocate themselves in the long run in response to differences in factor rewards. The endogenous tariffs that I analyze presumably slow down this adjustment, as they raise the rewards to the specific factor whose income is lower. On the other hand, these endogenous tariffs do not in general equalize rewards across sectors. This means that factors may continue to reallocate themselves even in the presence of altruistic voters and that the long run equilibrium may be the same with and without endogenous protection.

5 References

Austen-Smith, David, "Information Transmission in Debate," *American Journal of Political Science,* 34, February 1990, 124-52.

—, "Campaign Contributions and Access," *American Political Science Review,* 89, September 1995.

Austen-Smith, David and John R. Wright "Counteractive Lobbying," *American Journal of Political Science*, 38, February 1994, 25-44.

Baldwin, Robert E. The Political Economy of U.S. Import Policy, Cambridge MA: MIT Press, 1985.

Baldwin, Robert E. and Christopher S. Magee "Is Trade Policy for Sale? Congressional Voting on Recent Trade Bills" *NBER Working Paper 6376*, January 1998.

Bauer, Raymond A., Ithiel de Sola Pool and Lewis Anthony Dexter, *American Business and Public Policy: The Politics of Foreign Trade*, New York: Atherton, 1963.

Coate, Stephen, "Altruism, the Samaritan's Dilemma and Government Transfer Policy," *American Economic Review*, 88, March 1995, pp. 46-57.

Corden, W.M. *Trade Policy and Economic Welfare*, London: Oxford University Press, 1974.

Feenstra, Robert C. and Tracy R. Lewis, "Distributing the Gains from Trade with Incomplete Information," *Economics and Politics*, 3, March 1991, 21-

Gaston, Noel and Daniel Trefler, "Protection, Trade and Wages: Evidence from U.S. Manufacturing," *Industrial & Labor Relations Review*, 47, July 1994, 574-93.

Goldberg, Pinelopi K. and Giovanni Maggi, "Protection for Sale: An Empirical Investigation," *American Economic Review*, 89, December 1999, 1135-55.

Grossman, Gene M. and Elhanan Helpman, "Protection for Sale: ," *American Economic Review*, 84, 1994, 833-850.

Hansson, Ingemar and Charles Stuart, "Social Security as Trade Among Living Generations," *American Economic Review*, 79, December 1989, pp. 1192-95.

Hochman, Harold M. and James D. Rodgers, "Pareto Optimal Redistribution," *American Economic Review*, 59, September 1969, pp. 542-57.

Johnson, D. Gale, *The Sugar Program; Large Costs and Small Benefits*, Washington DC: AEI Pres, 1974.

Jones, Ronald W., "A Three-factor Model in Theory, Trade and History," in Jagdish N. Bhagwati et al., eds. *Trade, Balance of Payments and Growth*, Amsterdam: North-Holland, 1971.

— , "Income Distribution and Effective Protection in a Multicommodity Trade Model," *Journal of Economic Theory*, 11, 1975, pp. 1-15.

Levy, Philip I., "Lobbying and International Cooperation in Tariff Setting," *Journal of International Economics*, 47, 1999, pp. 345-370.

Mayer, Wolfgang, "Short-Run and Long-Run Equilibrium for a Small Open Economy," *Journal of Political Economy*, 82, Sept.- Oct. 1974, pp. 955-967.

— , "Endogenous Tariff Formation," *American Economic Review*, 74, 1984, pp. 970-985.

Mayer, Wolfgang and Raymond G. Riezman, "Endogenous Choice of Trade Policy Instruments," *Journal of International Economics*, 23, 1987, pp. 377-81.

Miller, David, "Altruism and the Welfare State," ch 7 of Donald Moon ed. *Responsibility, Rights and Welfare: The Theory of the Welfare State*, Boulder and London: Westview Press, 1988, 163-88.

Mussa, Michael, "Tariffs and the Distribution of Income: The Importance of Factor Specificity, Substitutability, and Intensity in the Short and Long Run," *Journal of Political Economy*, 82, Nov.-Dec. 1974

Rodrik, Dani, "Political Economy of Trade Policy," in Gene M. Grossman and Keneth Rogoff, eds. *Handbook of International Economics vol. III*, Amsterdam: Elsevier Science, 1995, pp. 1457-1494.

Ruffin, Roy and Ronald Jones, "Protection and Real Wages: The Neoclassical Ambiguity," *Journal of Economic Theory*, 14, 1977, pp. 337-348.

Sabato, Larry, *PAC Power*, 2 ed, New York: Norton, 1985.

Schattschneider, Elmer E. *Politics, Pressures and the Tariff*, Englewood Cliffs NJ: Prentice Hall, 1935.

Snyder, James M. Jr., "Long-Term Investing in Politicians; or Give Early, Give Often," *Journal of Law & Economics*, 35, April 1992, pp. 15-43.

Stark, Oded, "Nonmarket Transfers and Altruism," *European Economic Review*, 37, 1993, pp. 1413-1424.

Stratmann, Thomas, "Are Contributors Rational? Untangling Strategies of Political Action Committees," *Journal of Political Economy*, 100, June 1992, pp. 647-64.