Why is there an Anti-trade Bias in Trade Policy?

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Abstract

Small economies rarely embrace free trade, a fact that is commonly explained as a consequence of the government's use of trade policy to redistribute income. But why is this redistribution typically biased in favor of import-competing sectors and is consequently trade restricting rather than trade promoting? This remains an important puzzle in trade policy. Most models assume the puzzle away by restricting the government set of policies or else generate the opposite, and empirically counterfactual, prediction--that trade policy has a pro-trade bias (e.g. Grossman-Helpman AER 1994). We show that if the government's objective reflects a concern for inequality, or diminishing marginal political support from factor owners, then trade policy exhibits anti-trade bias. Importantly the mechanism that we analyze generates the anti-trade bias independently of whether factors are specific or mobile across sectors. The mechanism also generates an anti-trade bias between large countries even after they sign reciprocal trade agreements that eliminate any terms-of-trade motivation for the use of trade protection.

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1 Introduction

The welfare maximizing policy for a small economy is free trade. Yet, small economies rarely embrace it. A common explanation economists offer for this observation is that trade policy is chosen to achieve objectives other than welfare maximization. Positive tariffs in formal models are typically the result of interplay of special interests and/or the government's desire to redistribute income in favor of specific groups including itself.

Nevertheless, as Rodrik (1995) points out, an important puzzle remains: why is trade policy typically biased in favor of import-competing sectors and is consequently trade restricting rather than trade promoting?[1] The question is particularly relevant in the context of small economies since they lack the power to redistribute income in their favor through the optimum tariff. Despite a substantial body of literature on the endogenous determination of trade policy, to-date, we lack a systematic analysis of the anti-trade bias in it. Indeed, as Levy (1999) demonstrates, if certain neutrality assumptions are made, the current leading political economy model, due to Grossman and Helpman (1994) (henceforth GH), predicts a pro-trade bias in trade policy.[2]

It is tempting to conjecture that the anti-trade bias in trade policy may be the result of the General Agreement on Tariffs and Trade (GATT), which tolerates tariffs more readily than export subsidies. A

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[1] The anti-trade bias in developing countries is apparent from the observation that trade reform by them has been followed by a sizable expansion of the volume of trade. It is also illustrated by the focus of the GATT/WTO negotiations on the removal of trade *barriers* rather than trade stimuli. Agriculture in industrial countries, which receives large subsides, offers a potential exception to the general trend but even here it is perhaps fair to say that the net bias of the policy is against trade in the sense that the removal of all interventions will lead to an expansion of trade. Taking industrial goods separately, rough estimates of tariffs and subsidies in the United States do point to an anti-trade bias. Thus, the estimated total ad valorem equivalent of the main tax incentives for US exporters, such as the Foreign Sales Corporation Tax, was approximately 1% in 1996 (Desai and Hines 2000, p.34) whereas the ad valorem equivalent tariff was 2.2% <www.usitc.gov>.

[2] A closely related question, not discussed in this paper explicitly, concerns the relationship between import penetration and the level of import protection. Helpman (1997) demonstrates that when imbedded in the "almost-partial-equilibrium" version of the specific factors model used in GH, a variety of political economy models lead to the conclusion that import protection *declines* with import penetration. Maggi and

moment's reflection shows, however, that this explanation is flawed. For one thing, anti-trade bias in policy predates GATT; indeed, one of the key original objectives of the latter was to eliminate this bias through successive rounds of tariff-reduction negotiations among member countries. Moreover, the rules against export subsidies could have at most prevented the emergence of a pro-trade bias in trade policy and supported a free-trade regime; they could not have resulted in a net anti-trade bias. In order for the latter to emerge, on net, political pressures had to favor protectionist policies.

In this paper, we offer a systematic formal analysis of the anti-trade bias in trade policy. We depart from the current dominant practice in the literature in two important respects. First, instead of the GH "almost-partial-equilibrium" model, we employ the more conventional general-equilibrium model. This switch has important implications. In the almost-partial-equilibrium model, also called the "quasi-linear" model, the numeraire good uses a generic factor of production, labor, and exhibits constant marginal utility in consumption. All non-numeraire goods, on the other hand, use labor and a sector-specific factor and exhibit diminishing marginal utility in consumption. These features imply that *all* substitution in production and consumption following a change in relative prices takes place between the numeraire and non-numeraire goods and *none* between any pair of non-numeraire goods. This outcome makes the model unsuitable for analyzing policies that involve redistribution including trade policy.[3] In contrast, in the conventional general-equilibrium model we employ, substitution properties between two or more non-numeraire goods are no different from those between the numeraire and non-numeraire goods.

Our second point of departure is to incorporate equity considerations into the government's decision-making process. We assume that ceteris paribus, the government values greater equity in income distribution and uses trade policy to achieve this objective. Even though trade policy is not the first-best

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Rodriguez-Clare (2000) demonstrate that allowing for quotas and voluntary export restraints in addition to trade taxes or assuming a positive cost of raising funds, it is possible to obtain the opposite result.

[3] Thus, two of the authors who popularized this approach, Grossman and Helpman, themselves state, "In models of economic policy, whether normative or positive, the most important drawback of quasi-linearity is that it gives incomplete or implausible answers to distributional questions (…) In short, the assumption of quasi-linearity makes the model unsuitable for analyzing distribution and transfer policies that are of the essence in public finance and political economy." Dixit, Grossman, Helpman (1997, p.754)

instrument of achieving income equality, in the opinion polls, it continues to receive substantial public approval at least in the United States [Freeman (2002)]. Provisions for adjustment assistance due to dislocation following trade liberalization offer additional indirect evidence that income distribution considerations influence trade policy.

The importance of the concern for inequality in developed countries is further supported by the observation that import protection favors sectors with a large share of low-skill, low-wage workers.[4] Of course, by itself, this evidence is also consistent with the alternative hypothesis offered by Magee et al (1989): unskilled workers have a lower opportunity cost of lobbying and therefore demand higher protection. Therefore, to conclude in favor of the equity hypothesis, we must show that unskilled workers demand no more protection than skilled workers. The estimates of Goldberg and Maggi (1999, p.1152) show that in the US unskilled workers demand less, not more, protection than skilled workers. Therefore the positive relationship between the share of low-skill low-wage workers and the level of protection is likely to reflect the motive for redistribution/equity that we model.[5]

The benchmark against which we compare our results is the trade-promoting bias in trade policy that arises in the symmetric case in GH model as noted by Levy (1999). To explain precisely the nature of this bias, suppose there are two non-numeraire goods in the GH model. Denoting them by 1 and 2, begin with complete symmetry between them in consumption as well as production and assume their autarky prices coincide with their respective world prices fixed at unity by the choice of units. Next, adjust the

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[4] See for example Baldwin (1985) for evidence on the US and Ray (1981) for the US, Canada, UK, Germany, Belgium, Italy, France and Japan and Lee and Swagel (1997) for a broader set of countries. This and other evidence for the US lead Baldwin to conclude that "models that include behavior based either on long-run self-interest or concern for the welfare of other groups and the state are also necessary to account for the actions of voters and public officials." (1985, p.174) Dutt and Mitra (2002) find that lagged inequality has a positive and significant effect on the tariff level for capital-abundant countries in a cross-section. They find the opposite for labor-abundant ones.

[5] More specifically Goldberg-Maggi regress a lobby organization variable, equal to one if the industry has large political contributions and zero otherwise, on a number of industry characteristics including capital stock, buyer and seller concentration and unionization. Even if we argue that unskilled workers are more likely to be organized so that we should add the union and unskilled coefficients, 2.16 +2.59, and then compare to the skilled labor coefficient, 22.34 we could still not reject the hypothesis that skilled labor demands at least as much or more protection than unskilled unionized labor.

endowments of factors specific to the goods in such a way that the output of good 1 contracts by 1 percent and that of good 2 expands by the same percent. This turns good 1 into an import good and good 2 into an export good with net trade balance between them being zero at the free-trade equilibrium. The numeraire good remains non-traded. Invoke now the GH lobbying model, which predicts a tariff on good 1 and export subsidy to good 2. Additionally, given the symmetry, the *rate* of import duty is lower than that of export subsidy because the export sector is larger and the equilibrium level of protection is proportional to industry output. Therefore, exports of good 2 expand more than imports of good 1 contract. In the new equilibrium, the numeraire good is imported. Thus, the volume of trade in the political equilibrium is larger than at the free trade equilibrium. [6]

In the first part of this paper we show that the pro-trade bias in GH does not arise once we replace the almost partial equilibrium framework by the conventional general equilibrium model. In fact we show that even under perfect symmetry an anti-trade bias can arise in our general equilibrium framework. Moreover, if we assign the equity motive the central role in the determination of trade policy, we can show that there is a quite general presumption in favor of the anti-trade bias in both the symmetric and asymmetric equilibriums. These results hold for specific-factors as well as Heckscher-Ohlin versions of the general equilibrium model.

Some flavor for the mechanism underlying our results can be given as follows. Consider first the conventional sector-specific model within the GH political economy framework. The first point to note is that the symmetric equilibrium in this model can be constructed with just one numeraire and one (rather than two) non-numeraire sector since each sector uses a sector-specific factor capable of lobbying for itself. Moreover, by replacing the quasi-linear utility function by the conventional homothetic utility function, we can also introduce symmetry on the demand side.

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[6] We alert the reader that in general the GH model does not rule out anti-trade bias in trade policy. For instance, if there is only one non-numeraire good, the only factor that lobbies is the one specific to this sector. Then the bias is pro-trade if this sector produces an exportable and anti-trade if it produces an importable.

Denoting the two sectors by 1 and 2 then, begin with complete symmetry across sectors. This makes the relative price of good 1 equal to 1 under autarky. Assuming the initial world relative price to be 1 as well, the country has no incentive to trade. Given the GH political economy setup, trade policy is used to redistribute income away from labor towards specific factors. At the margin, this is achieved by moving labor out of the sector where it enjoys a higher share in income to the one where it enjoys a lower share. Given symmetry, under autarky, labor's share in income is the same in the two sectors so that the government has no incentive to move labor in either direction.

Now consider a small reduction in the price of good 1. Assuming a free trade policy for now, the change leads the country to import good 1 and export good 2. Moreover, if the elasticity of substitution between the factors (which is the same in the two sectors due to the assumed symmetry) is larger than 1, the reduction in the relative price of good 1 lowers the share of labor in income in sector 1 and raises it in sector 2. Therefore, at the free trade equilibrium, labor's income share in sector 1 is lower than that in sector 2. To redistribute income away from labor and towards specific factors, the government has an incentive to move labor out of sector 2 into sector 1. The outcome is a protectionist policy. Of course, if the elasticity of substitution is smaller than unity, we obtain the opposite result: the government opts for an export subsidy. In the knife-edge, Cobb-Douglas case, the policy is free trade.

Now introduce the equity objective. Specifically, assume that ceteris paribus the government always prefers a more equitable distribution among labor and owners of sector-specific factors to less equitable distributions. Again, begin with a fully symmetric equilibrium together with the assumption that the autarky distribution of income among the three factors is entirely equal. As in the previous example, let the world price be the same as the autarky price in the country so that there is no incentive to trade. Given the equal distribution across factors, the government has no incentive to reallocate labor either way for redistributive purposes.

Next, consider a small reduction in the world price of good 1. The country now imports good 1 and exports good 2. In the absence of any intervention, the change is also accompanied by a decline in the share of K_1 (factor specific to sector 1) in the GDP and a rise in the share of K_2 (the factor specific to sector 2) in

GDP. The share of labor in GDP may rise or fall; if it rises the proportionate increase in it is less than the increase in the share of K_2 and if it falls, the proportionate decline in it is less than the decline in the share of K_1. As a result, in the free trade equilibrium, K_2 ends up with the highest share, followed by labor and K_1 in sector 1 in that order. The introduction of a tariff reverses some this loss in equity regardless of the elasticity of substitution. Therefore, the policy outcome is anti-trade regardless of the elasticity of substitution.

We demonstrate that with minor qualifications, alternative shocks such as a Hick-neutral technical progress in sector 1 and a rise in the endowment of the factor specific to sector 2, which lead the country to import good 1, are also accompanied by the adoption of a protectionist policy. The results extend to a two-country context even after we neutralize for the terms-of-trade motive for protection. They also extend to the Heckscher-Ohlin set-up as long as we maintain the assumption of symmetry and initial equal distribution.

In the general case when the initial distribution of income is unequal, either pro- or anti-trade bias may exist in trade policy. Under the equity objective, we are able to establish a likelihood result, however. Specifically, we show that the probability of a pro-trade bias in trade policy is necessarily lower than that of an anti-trade bias in it.

In the remainder of this introduction, we offer a summary of the literature having a bearing on the central question posed in this paper. Olson (1983) argues heuristically that lobbies are more likely to organize in the presence of negative shocks since these make the entry into the industry less attractive and thus the investment in lobbying less prone to free riding. In so far as import-competing sectors are subject to more frequent and larger negative shocks, this introduces a bias in favor of lobbying for tariffs. The argument raises two questions, however. First, it is not obvious why import-competing sectors should be subject to more frequent and larger negative shocks than export sectors. Second, even if this is true, such shocks make exit from the industry more likely as well and, thus, lower the expected value of the investment in the lobbying activity.

A second set of explanations for the bias in favor of import protection can be given by first observing that in the early stages of development, countries impose tariffs for revenue reasons or infant industry

protection. If governments then rely on a conservative social welfare function a la Corden (1974), which places a negative weight on deviations from the status quo welfare of different agents, the bias in favor of tariffs persists even if the need for tariffs as the instrument of revenue vanishes. Alternatively, following Fernandez and Rodrik (1991), tariffs may persist despite the availability of alternative revenue-raising instruments due to uncertainty about the identity of beneficiaries of trade liberalization. Even though liberalization is expected to benefit the majority, if the identity of some of the potential winners is not known, liberalization may fail to materialize. Yet another reason why welfare-enhancing liberalization may fail to occur is that benefits may be concentrated and costs diffused so that the majority-voting rule results in the defeat of liberalization. While these approaches are undoubtedly illuminating, they are incomplete in that they take the initial tariff itself as resulting from an exogenous constraint.[7]

A final explanation is provided by Eaton and Grossman (1985) who use a combination of analytical and numerical methods to demonstrate that an anti-trade bias is present when a government uses trade policy as insurance to maximize expected welfare across two states of nature for the terms-of-trade (TOT). The role for trade policy arises due to the absence of perfect insurance markets and ex-post differences in individual welfare resulting from the irreversible allocation of capital between the two sectors based on ex ante TOT. After the realization of the TOT, the capital owners in one sector are better off and, if they have diminishing marginal utility of income, the government has an incentive to redistribute from them towards the capital owners with the higher marginal utility. The insurance motive in Eaton-Grossman disappears if capital is costlessly mobile, so the anti-trade bias suggested by their model would disappear in the long run. We view the insurance motive for protection as more appropriate for explaining short-term contingent protection, e.g. safeguards, rather than the long-term bias of trade policy towards import protection. As such the driving mechanism in our model is motivated by redistribution and a concern for inequality rather than the insurance motive. To make the distinction sharply our model has no uncertainty and the factor owners have constant

[7] Strictly speaking, the last of these explanations can be applied to generate an anti-trade bias in trade policy, as we will demonstrate below.

marginal utility of income. Moreover, we allow the government to be influenced by both welfare and political economy motives and show the anti-trade bias is present in the long-run, i.e. even if capital is costlessly mobile across sectors.

The paper is organized as follows. In Section 2, we outline the broad framework of our analysis. In Section 3, we illustrate how the general equilibrium approach can reverse the pro-trade bias in the almost-partial-equilibrium approach even if the political model is the same as that in GH. In Section 4, we switch to an objective function of the government that is strictly concave in the utilities of factor owners and demonstrate that this leads to an anti-trade bias under a broad set of circumstances. In Section 5, we conclude the paper.

2 The Model

Bhagwati (1990) distinguishes two sets of forces that may make the choice of policy endogenous. First, rather than being a "puppet" in the hands of a welfare maximizing economist, the government may be "self-willed" with its own objective function and power to determine policy. In the models that follow this route, there is no active feedback from the economic system to the government. The models in the Niskanen (1968) tradition in which bureaucrats maximize revenue for their own benefit and the Leviathan writings of Brennan and Buchanan (1977) fall in this category.

Second, the government itself may be entirely passive, with the outcome determined by policy-influencing games played by agents within a pluralistic political regime. A good example of this approach is the Findlay-Wellisz (1982) model of tariff seeking. In their two-sector, specific-factors model, the specific factor in the import-competing sector lobbies for tariff and that in the exportable sector against it. Acting purely as a clearinghouse, the government then supplies the tariff determined by the equilibrium of this game. Other contributions in this tradition include Rodrik (1986) and Panagariya and Rodrik (1993).

Bhagwati (1990) goes on to note that a realistic analysis of political economy must draw upon both of these approaches. On the one hand, governments have objectives that go beyond welfare maximization in the traditional sense while, on the other, they respond to the attempts by economic agents to influence policy

in their own interest within a "pluralist" political setting. A good example in this class of models is the GH political-economy model of tariff determination. In their model, political agents maximize a weighted sum of social welfare and political contributions using trade policy as an instrument while economic agents lobby for tariff policies that would maximize their own welfare.

We consider two political-economy models of trade policy. Both incorporate features of the "self-willed" and "pluralist politics" models of policy determination. Our first model resembles the GH model with individual utilities entering linearly in the objective function of the incumbent politician. Our second model gives some play to the equity objective on the part of the government with individual utilities entering log linearly into its objective function. In both cases, economic agents are allowed to exert influence in tilting the outcome in their favor.

In the interest of simplicity, we minimize the structure on the underlying lobbying game and rely, instead, on reduced-form objective functions of government to represent the political economy side of the model. Among other virtues, this allows us to focus more fully on the structure of the trade model. Thus, we derive the necessary and sufficient conditions for the government to choose an import tariff versus an export subsidy under alternative government objective functions and production structures.

We employ the standard specific factors model with two goods i = 1, 2. Each good is produced using a sector-specific factor, K_i, and a common factor, L_i, called capital and labor, respectively. Technology exhibits constant returns to scale. By appropriate choice of units, we set the world price of each good equal to unity. Trade policy takes the form of a trade tax or subsidy on good 1 at rate t so that the domestic price of good 1 equals 1+t. If good 1 is imported, a positive t implies a tariff and a negative t an export subsidy.[8] Under the usual assumptions of perfect competition and constant returns, the production decisions can be summarized by the standard revenue function, $R(1+t, 1; L, K_1, K_2)$, which is convex in the prices, concave in factor endowments and linear homogeneous in each set of variables. The partial derivatives of R(.) with

[8] Strictly speaking, this is an import subsidy. But by the Lerner Symmetry theorem, an import subsidy is identical to an export subsidy.

respect to price arguments give respective outputs and those with respect to endowments yield respective factor prices as functions of goods prices and factor endowments.

There is specialization in the ownership of factors such that workers and owners of each specific factor define distinct groups. The level of utility of group j (j = L, 1, 2) is represented by $U^j = U(C_1^j, C_2^j)$ where C_1^j and C_2^j respectively denote the quantities of goods 1 and 2 consumed by group j. The functional form for U(.) is common to all groups and linear homogeneous in its arguments.

Given the above specification, we can summarize the consumption decisions of the jth group via the expenditure function $e(1+t, 1)U^j$, where e(.) is concave and linear homogeneous in its arguments. Total demand for each good in the economy can be obtained by summing across individual demands of different factor owners.

A key issue concerns the disposal of tariff revenue. It is evident that the rule governing this disposal can have determining impact on the outcome. In order to make this source of results as neutral as possible, we will assume that tariff revenue is redistributed among factor owners in exact proportion to their earned factor incomes.[9] We can then represent the expenditure-revenue equality for jth factor owners by

$$(1)\quad e(.)U^j = \theta^j \left[R(.) + t\left(e_1(.)\sum_j U^j - R_1(.) \right) \right] \qquad j = L, 1, 2,$$

where $e_1(.)$ and $R_1(.)$ represent the first partials of e(.) and R(.) with respect to the price of good 1. It is then immediate that $e_1(.)U^j$ represents the demand for good 1 by group j and therefore $e_1(.)\sum U^j$ is the economy-wide demand for the same good. Moreover, since $R_1(.)$ is the economy-wide supply of good 1, the term in parentheses on the right-hand side represents the import demand for good 1 (or export supply if negative). Multiplying this term by the tariff rate t gives the total tariff revenue (export subsidy if good 1 is exported). The term in square brackets, thus, represents the total income or GDP. We use θ^j to denote the share of

[9] Symmetrically, if the outcome is a subsidy, each factor owner bears a burden in proportion to its earned income.

factor j in earned income. For example, $\theta^L = [R_L(.)L]/R$, where $R_L(.)$ is the partial derivative of R(.) with respect to L and equals the wage rate.

Given the tariff rate t, we can solve the three equations embedded in (1) for the three utility levels. Straightforward manipulations allow us to obtain

$$(2)\ U^j = \frac{R(.) - t.R_1(.)}{e(.) - t.e_1(.)}\ \theta^j \qquad\qquad j = L, 1, 2.$$

Given U^j, we can calculate the consumption quantities, which can be combined with the information on outputs to calculate imports and exports. The key question we address next, therefore, is how t is determined. For this purpose, we represent the government's objective function by

$$(3)\ G = G(U^L, U^1, U^2),$$

where G(.) is concave and non-decreasing in its arguments. In general, G(.) can be interpreted as a political support function (Hillman 1982 and Long and Vousden 1991) resulting from the interaction of a self-willed government and self-interested lobbies. The tariff rate is then determined by maximizing G(.) with respect to t subject to the three constraints embedded in (2). Doing so and evaluating the resulting derivative at t = 0, we obtain

$$(4)\left[\frac{dG}{dt}\right]_{t=0} = \left[\sum_j G_j(.)\ \theta_t^j\right]_{t=0}$$

where θ_t^j denotes the partial derivative of θ^j with respect to t. That is to say, the government can improve upon the free-trade outcome by choosing a positive t provided the sum of the change in the factor share weighted by the marginal contribution of the utility of the factor to the objective function is positive. Note, however, that the validity of this condition by itself does not guarantee positive protection and hence an anti-trade bias in trade policy. For a positive t implies an anti-trade outcome if and only if good 1 is the import good. In general, there is no guarantee that good 1 is the import good--an issue we address later in the paper.

Presently, we note that since the shares of different factors in the total income must sum to unity, equation (4) is equivalent to

$$(5)\left[\frac{dG}{dt}\right]_{t=0} = \left[(G_1 - G_L)\,\theta_t^1 + (G_2 - G_L)\,\theta_t^2\right]_{t=0}$$

If the marginal contribution of the utility of each factor to the government's objective function is the same, the right-hand side of (5) reduces to zero. We immediately obtain the standard result that free trade maximizes the government's objective, which is equivalent to maximizing welfare in this case.

3 Linear Objective Function: No a priori Pro-trade Bias

Let us begin with the orthodox assumption that G is linear in the utilities of factor owners.

$$(6)\ G = \sum_j \gamma^j U^j$$

In view of (5), the government sets a positive tariff if the following expression is positive:

$$(7)\left[\frac{dG}{dt}\right]_{t=0} = \left[(\gamma^1 - \gamma^L)\,\theta_t^1 + (\gamma^2 - \gamma^L)\,\theta_t^2\right]_{t=0}$$

If no lobbies were present and the government itself did not weigh the utility of a specific group more heavily than others, the γ^j would be identical and the optimal policy will be non-intervention (i.e. free trade) as noted at the end of the previous section.

As a benchmark, consider a special case where the effect of the tariff on the specific factor shares are exactly offsetting, $\theta_t^1 = -\,\theta_t^2 > 0$. In this case, the tariff will be zero if the government places a similar weight on specific factor owners, independently of whether it is higher or lower than the weight placed on labor since its share is constant. Trade policy has neither an anti nor a pro-trade bias. The government sets a positive tariff if and only if good 1 is imported and $\gamma^1 > \gamma^2$: a hardly surprising outcome. So the question for any specific model where the weights, γ, are endogenous and (6) is the reduced form government objective is whether it can predict $\gamma^1 > \gamma^2$.

We now demonstrate that in general we do not require $\gamma^1 > \gamma^2$ to explain the observed anti-trade bias in the policy. Thus, consider the more general case when the labor share is not independent of the tariff. For expositional simplicity, focus on the case where lobbying pressure leads to a larger weight on the utility of

the specific factors over labor as, for example, in GH. The extension of the results to the general case is straightforward as shown below. Setting $\gamma^L = 1$ and $\gamma^1 = \gamma^2 = \gamma > 1$, (7) reduces to

$$(8)\quad \left[\frac{dG}{dt}\right]_{t=0} = (\gamma\text{-}1)\,(\theta_t^1+\theta_t^2)_{t=0} = -\,(\gamma\text{-}1)\,(\theta_t^L)_{t=0}$$

Thus, a positive t is chosen if and only if it increases the combined income share of specific factors or, equivalently, reduces the income share of labor.

To proceed, we let w stand for the wage rate, p_1 (= 1+t) for the price of good 1 and use a circumflex over a variable to denote the proportionate change in that variable. In addition, we denote by λ_{Li} (= L_i/L) the allocative share of labor in sector i, σ_i the elasticity of substitution between factors in sector i, θ^{ii} the share of specific factor i in the income generated in sector i, e_{Li} (= σ_i/θ^{ii}) the elasticity of demand for labor in sector i, Δ (= $\lambda_{L1}e_{L1} + \lambda_{L2}e_{L2}$) the economy-wide elasticity of demand for labor and μ (= p_1R_1/R) the share of sector 1 in national income. We can then establish the following Lemma.

Lemma 1: *Suppose the government's objective is* $\Sigma\gamma^jU^j$ and $\gamma^1 = \gamma^2 > \gamma^L$. *The government sets* t > 0 *if and only if*

$$(11)\qquad \mu > \frac{\hat{w}}{\hat{p}_1} = \frac{\lambda_{L1}e_{L1}}{\Delta}$$

To prove, note that according to (8), a positive t is chosen provided $(\theta_t^L)_{t=0} < 0$. The share of labor in national income is given by

$$(14)\qquad \theta^L = \frac{wL}{R}$$

Differentiating both sides with respect to t and remembering that $p_1 = 1+t$, we obtain

$$(15)\qquad \theta_t^L = \frac{\theta^L}{p_1}\left[\frac{\hat{w}}{\hat{p}_1} - \frac{p_1R_1}{R}\right] \equiv \frac{\theta^L}{p_1}\left[\frac{\hat{w}}{\hat{p}_1} - \mu\right]$$

The last of these equalities immediately yields first part of Lemma 1. The remaining part follows from the standard expression for the effect of the price change on the wage rate in the specific-factors model.[10]

Intuitively, the rise in the tariff rate alters labor's share in income by increasing the wage income and national income in terms of the numeraire good. The proportionate increase in the wage income equals the proportionate increase in the wage rate. The proportionate increase in the national income due to a one percent increase in the price of good 1 equals the initial share of good 1 in the national income. If the former increase is less than the latter, labor's share in the national income declines. This is precisely what Lemma 1 tells us.[11]

We can now state the following proposition:

Proposition 1: *Suppose that the government's objective is* $\Sigma\gamma^j U^j$ and $\gamma^1 = \gamma^2 > \gamma^L$. *The government sets* $t > 0$ *if and only if*

$$(16) \qquad \frac{\theta^{L1}}{\theta^{11}}\sigma_1 < \frac{\theta^{L2}}{\theta^{22}}\sigma_2$$

To prove, we use the inequality involving the first and last terms in (11). Substitute $\mu = p_1R_1/R$, $R = p_1R_1 + p_2R_2$, $\Delta = \lambda_{L1}e_{L1} + \lambda_{L2}e_{L2}$ in these terms. After cross multiplying, we have,

$$p_1R_1(\lambda_{L1}e_{L1}+\lambda_{L2}e_{L2})>\lambda_{L1}e_{L1}(p_1R_1+p_2R_2)$$

The first terms on each side is the same and therefore drops out. Furthermore, since $\lambda_{Li} = L_i/L$ and $e_{Li} = \sigma_i/\theta^{ji}$, the inequality reduces to

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[10] See for example Bhagwati, Panagariya and Srinivasan (1998, p. 156).

[11] Lemma 1 can be readily related to the result on the neoclassical ambiguity. According to Ruffin and Jones (1977) the neoclassical ambiguity is ruled out if and only if the proportionate increase in the wage due to a 1 percent increase in the price of a good exceeds the share of that good in labor's total expenditure, say, ψ. If labor's expenditure share of good 1 is representative of the rest of the economy then under no trade it must equal the share of good 1 in output, μ. If good 1 is imported, we have $\psi > \mu$. Thus a *sufficient* though not necessary condition for the sum of the specific factor shares to fall after a tariff is for the real wage to increase in terms of the imported good, i.e. $\hat{w}/\hat{p}_1 > \psi\ (> \mu)$.

$$\frac{wL_2}{p_2R_2}\frac{\sigma_2}{\theta^{22}} > \frac{wL_1}{p_1R_1}\frac{\sigma_1}{\theta^{11}}$$

Defining $wL_i/p_iR_i \equiv \theta^{Li}$ (i = 1, 2), and rearranging, we obtain condition (16).

Proposition 1 provides the condition under which the government sets t >0. The intervention favors the sector with the lower ratio of income share of labor to that of the specific factor weighted by the elasticity of substitution in the sector. If the elasticities of substitution are identical across sectors, the condition simply says that the sector with the lower income share of labor receives protection. That is to say, given identical elasticities of substitution, trade policy has the anti-trade bias provided labor's income share in the import-competing sector is less than that in the export sector.

When (16) holds the condition in (7) is strictly positive so we can find some $\gamma^2 > \gamma^1$ such that the government still sets a positive tariff. That is the government may set a positive tariff even if it weights the owners of capital in the export sector more highly than those in the import sector. The converse is also true when (16) does not hold.

We now argue that in our general equilibrium setup there is no a priori pro-trade bias, unlike the "almost-partial-equilibrium" setup in GH. In the latter model all organized specific factor owners receive protection, both the ones in the import and export sectors (as long as all voters are not organized into lobbies, p.845). The level of the tariff or export subsidy in GH is proportional to the level of production relative to net imports. Specialization according to comparative advantage then implies that this level is likely to be higher in the export sector and thus the model predicts that lobbying promotes trade, i.e. there is a pro-trade bias.

To understand the role of the "almost-partial-equilibrium" setup and contrast it to ours, consider the following. In the GH setup, when the ownership of factors is highly concentrated the benefit of a given subsidy for a factor owner in the export sector is much higher than the cost of a comparable tariff in an import good consumed by that factor owner. In our general equilibrium setup without a numeraire good entering linearly in utility any increase in the protection of the import sector has the exact same effect as a decrease in the protection of the export sector. So either one or the other will be protected. Which one gets

the protection does *not* depend on industry size relative to net imports, as is clear from (16). It depends on which good has the lower share of labor to specific factor income weighted by the elasticity of substitution. The following two corollaries show that (16) implies no a priori pro-trade bias even in the symmetric case, unlike GH. That is (16) can lead to a tariff or subsidy independently of the sector's output relative to net imports. This suggests that the "almost-partial-equilibrium" setup is important in generating the pro-trade bias.

Corollary 1 (Cobb-Douglas): *Suppose that the government's objective is* $\Sigma\gamma^j U^j$, $\gamma^1 = \gamma^2 > \gamma^L$ *and the production functions are of the Cobb-Douglas type*. *A country's trade policy has an anti-trade bias if and only if the income share of labor in the import sector is lower than in the export sector. The converse is true if* $\gamma^1 = \gamma^2 < \gamma^L$.

The corollary follows directly from proposition 1 after imposing the constant production shares. The intuition is straightforward. The objective is to increase the combined income of specific factors beyond that under free trade. This is accomplished by shifting labor into the sector with higher income share of the specific factor. A tariff accomplishes this if the import good is associated with a higher income share of the specific factor than the export good.

The strength of this prediction is its simplicity -- a tariff is implemented when the specific factors in the import-competing sectors have higher income shares than in the exporting sectors. This result is readily translated in terms of factor endowments. Thus, suppose that all countries have identical homothetic preferences. Then holding the labor endowment fixed, countries with smaller relative endowment of the specific factor with higher income share (K_1 in the case assumed in Corollary 1) than the rest of the world will import the good using that factor and therefore exhibit anti-trade bias in their trade policies.

The income shares in the Cobb-Douglas case are determined entirely by technology. If we assume complete neutrality between sectors, we would have identical technologies across the sectors and the model would predict zero tariff and thus neither pro- nor anti-trade bias in the policy. More generally, allowing the technologies to differ across sectors but constraining them to be similar across countries (up to some Hicks-

neutral technology parameter) the corollary predicts that one set of countries will exhibit anti-trade bias and the other set pro-trade bias.

Corollary 2 (CES): *Suppose that the government's objective is* $\Sigma\gamma^j U^j$, $\gamma^1 = \gamma^2 > \gamma^L$ *and the two sectors are initially symmetric in preferences, endowments and CES production technology. After any endowment shock that induces this small economy to import good 1 the government will set (i) t=0 if* $p^w=1$ and $\sigma>0$; (ii) *t>0 if* $p^w<1$ and $\sigma>1$ or $p^w>1$ and $\sigma<1$; and (iii) *t <0 otherwise.*

To prove, observe that symmetry implies that the autarky price is unity and the (sectoral) income shares of specific factors, θ^{11} and θ^{22}, are equal. If the world price is also unity there is no motive to trade. Moreover, since $\theta^{11} = \theta^{22}$ and $\sigma^1 = \sigma^2$ the government sets a tariff of zero, according to (16). Now suppose that $K_2 = sK_1$ and $s>1$ so the country imports good 1 and exports 2. For the CES technology, the capital share in sector i is $K_i^{\varepsilon}/(K_i^{\varepsilon} + L_i^{\varepsilon})$, where $\sigma=1/(1-\varepsilon)$ and $-\infty < \varepsilon <1$. Therefore, we can rewrite (16) as $(L_1/K_1)^{\varepsilon}< (L_2/K_2)^{\varepsilon}$. The government sets a positive tariff if and only if $\text{sign}(\varepsilon)\ (L_1/K_1) < \text{sign}(\varepsilon)\ (L_2/K_2)$. When the world price is one labor moves to the sector with the higher capital-labor ratio until the capital-labor ratios, and factor shares, are equalized. In this case the government sets t=0 for all $\sigma >0$.

Suppose now that the world price falls just below unity after the increase in K_2. The country continues to import good 1 and export good 2. Moreover, when $\sigma > 1$, the lower price of good 1 raises the income share of production for K_1 and lowers that for K_2 as labor moves to the export sector. Given proposition 1, this implies a tariff on good 1 to raise the joint share of specific factors in the total income. Similarly we can show that a tariff also results if $\sigma<1$ and the world price exceeds unity, but not by enough to reverse the pattern of trade that results from the increase in K_2.[12]

The results in corollary 2 are summarized in figure 1, which depicts the case where home's autarky price of good 1 relative to 2 exceeds unity reflecting the fact that home is relatively abundant in K_2. Again, for the most neutral of cases, similar technologies and world price normalized to one, there is no a priori bias

[12] The results reverse if $\gamma^1= \gamma^2<\gamma^L$.

in trade policy in either direction. For the more general cases whether the government sets a positive tariff depends crucially on the elasticity of substitution, not in any way on the size of the industry relative to net imports. The bottom line is that the pro-trade bias in policy predicted by the "almost-partial-equilibrium" models does not generalize once we move to the more general model. If in addition we consider a non-linear government objective we can go further and actually offer an explanation for the observed anti-trade bias.

4 Non-linear Political Support and Anti-trade Bias

If the government objective function represents political support, it is reasonable to expect diminishing marginal support in the utilities of various factor owners as in the original formulation by Hillman (1982). Moreover, if the government's objective includes some concern for inequality, then diminishing marginal social utility is more reasonable then the constant marginal social utility assumed in (6), since the latter does not penalize large disparities in utility. As we argue in the introduction this appears to be a potentially important determinant of the structure of tariffs in developed countries. More importantly, this is not an innocuous assumption when trying to explain the bias of trade policy in redistributing income towards the import sector factor owners, as we now show.

4.1 Anti-trade bias due to an inequality concern in a small economy

Suppose that G is strictly concave in the utility of each factor owner, which can reflect a concern for inequality or simply diminishing marginal political support. To illustrate our points clearly we consider a loglinear objective function:[13]

$$(17) \qquad g = \sum_j \gamma^j \ln U^j$$

In view of (2), which implies $U^j = (R/e)\theta^j$ at $t = 0$, the change in g due to a unit change in t is

$$(18)\qquad \left[\frac{dg}{dt}\right]_{t=0} = \left[\frac{R(.)}{e(.)}\sum_j \frac{\gamma^j}{\theta^j}\,\theta_t^j\right]_{t=0}$$
$$= \left[\frac{R(.)}{e(.)}\right]_{t=0}\left[\left(\frac{\gamma^1}{\theta^1} - \frac{\gamma^L}{\theta^L}\right)\theta_t^1 + \left(\frac{\gamma^2}{\theta^2} - \frac{\gamma^L}{\theta^L}\right)\theta_t^2\right]_{t=0}$$

As before, it is useful to think of the γ^j as representing lobbying pressures. Suppose first that these pressures are absent and $\gamma^j = 1$ for all j. This does not result in free trade, however. Because the government prefers a more equitable distribution and is denied the use of lump-sum taxes to affect redistribution, it still chooses a t different from zero. For example, a positive t is chosen provided the share of labor in income is smaller than that of each specific factor and the increase in t reduces the share of each specific factor. Trade policy is used to redistribute income in favor of the initially "poor" factor.

Alternatively, consider the special case in which a change in t at t = 0 leaves the combined share of specific factors in the total income unchanged. In this case $\theta_t^1 = -\theta_t^2$ and (18) reduces to:

$$(18')\qquad \left[\frac{dg}{dt}\right]_{t=0} = \left[\frac{R(.)}{e(.)}\left(\frac{\gamma^1}{\theta^1} - \frac{\gamma^2}{\theta^2}\right)\theta_t^1\right]_{t=0}$$

Thus, unlike the linear case, even if we have $\gamma^1 = \gamma^2$ and trade intervention is unable to redistribute income between labor and specific factors, a non-zero t may be chosen. The reason is that we still have the equitable distribution objective at work and there are benefits to be had from redistributing income between the two specific factors as long as θ^1 and θ^2 differ.

To get some further fix on the results, consider the special case in which preferences, technology and the endowments of specific factors are entirely symmetric so that the autarky relative price of good 1 is unity. Suppose further that the world price of good 1 is less than unity. The country then imports good 1 with labor reallocating from sector 1 to sector 2. At the free trade equilibrium, we now have $\theta^1 < \theta^2$. The introduction of a tariff on good 1 redistributes income in favor of the factor specific to sector 1 and against

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[13] With strictly concave objective function, the concentration of ownership of each factor makes difference to the outcome. We return to this issue in section 4.4 below but assume for now that either there is a single

that specific to sector 2. Assuming that these effects are exactly offsetting so that $\theta_t^1 = -\theta_t^2 > 0$, the tariff is positive in the linear case if $\gamma^1 > \gamma^2$ and in the log linear case if $\gamma^1/\theta^1 > \gamma^2/\theta^2$. Since we have $\theta^1 < \theta^2$ at the initial equilibrium, in the latter case, it is possible to have a positive tariff even when $\gamma^1 < \gamma^2$. Thus, protection can be the outcome even if the export industry has greater lobbying power. We summarize this result in

Proposition 2 (Linear vs. Log Linear Objective Function): *Consider a small economy with two entirely symmetric sectors in terms of endowments, technology and preferences. Assuming that an import tariff leaves the mobile factor's income share unchanged, a positive tariff is chosen if and only if* $\gamma^1 > \gamma^2$ *when the government's objective is* $\Sigma\gamma^j U^j$ *and* $\gamma^1/\theta^1 > \gamma^2/\theta^2$ *when the government's objective is* $\Sigma\gamma^j \ln Uj$. *In the latter case, since* $\theta^1 < \theta^2$ *where sector 1 is the import-competing sector, a positive tariff can be imposed even if* $\gamma^1 < \gamma^2$.

Proposition 2 refers to an economy in which (i) the share of labor in income is invariant with respect to the tariff rate, (ii) preferences, technologies, endowments and initial income shares are symmetric and (iii) there is no inter-sectoral capital mobility. We now show the motivation for the anti-trade bias highlighted in Proposition 2 is robust to relaxing each of these assumptions in the case when the initial autarky shares of the three factors in the total income are equal. Moreover, it also applies to a two-country model, predicting anti-trade bias in both of them even after we neutralize for the TOT motive for tariffs through a cooperative choice of the policy (section 4.2). We then return to the more general case in which initial income shares differ from one another (section 4.3). Two additional issues we discuss relate to the implications of the concentration of factor ownership (section 4.4) and the poverty-reduction motive for the anti-trade bias in trade policy.

In this section, we limit ourselves to the case in which $\theta^j = \theta$ in the initial, autarky equilibrium so that according to (18) the government has no incentive to impose a tariff or export subsidy, unless it weights the factor owners differently. We establish that if the government's objective is (17) and it places similar weight

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owner of each factor or the government takes the owners of each factor as a group in evaluating welfare.

on all factor owners then *any* shock that leads the country to trade will also trigger a non-negative tariff under at most additional mild restrictions on the elasticity of substitution in production.

Thus, suppose there is a reduction in the world price of good 1 leading the country to import this good. The lower price depresses θ^1 and increases θ^2, a standard result in the specific factors model. Moreover, the change in θ^2 is larger than that in θ^L, which in turn is larger than θ^1. Thus, after the reduction in p^w we have: $\theta^2 > \theta^L > \theta^1$ and consequently $1/\theta^1 - 1/\theta^L > 0 > 1/\theta^2 - 1/\theta^L$. According to (18), the government chooses a positive tariff if θ_t^1 is positive and θ_t^2 is negative. Since a positive tariff on good 1increases the domestic price of that good it has precisely that effect.

Next, suppose there is an increase in K_2. This leads the country to export 2 and import 1. It also increases θ^L as labor becomes relatively scarce and moves to sector 2, which in turn implies that θ^1 falls. Moreover, if capital and labor exhibit some substitution (the precise condition is $\sigma > ½$) then the share for capital owners in sector 2 increases by more than labor's. Thus after an increase in K_2 we have $1/\theta^1 - 1/\theta^L > 0 > 1/\theta^2 - 1/\theta^L$ and the government sets a positive tariff.

Finally, a positive Hicks-neutral technological shock in sector 2 also leads the country to export good 2 and import good 1. It increases the share of labor, as it becomes more productive in sector 2, and induces some workers to move out of sector 1 thus reducing θ^1. The labor movement partially offsets the initial increase in wages due to the technical change. This implies that θ^L does not rise by as much as θ^2. The share θ^2 increases both because of the technical change and the increased labor supply to sector 2. Thus after a positive Hicks-neutral technological shock in sector 2 we have $1/\theta^1 - 1/\theta^L > 0 > 1/\theta^2 - 1/\theta^L$ and thus the government will set a positive tariff.

We summarize these results and their straightforward generalizations to situations involving differential lobbying powers of different factors in the following proposition.

Proposition 3 (Inequality concern and anti-trade bias): *Consider a country that is a small replica of the rest of the world with two initially symmetric sectors in terms of endowments, technology and preferences, such that* $\theta^j = \theta$ *for all j. Suppose also that the government's political support function is log linear. Any shock*

that causes the country to import good 1 leads to a positive tariff if $\sigma \geq 1/2$ *and* $\gamma^j = \gamma$. *The same result also holds true for* $\sigma \geq 1/2$ *and* $\gamma^L \in (\gamma^2\theta^L/\theta^2, \gamma^1\theta^L/\theta^1)$ and $\sigma \geq 1/2$ with either $\gamma^L < \gamma^2\theta^L/\theta^2 < \gamma^2$ *or* $\gamma^L > \gamma^1\theta^L/\theta^1 > \gamma^1$.

In our discussion we assumed that the government placed equal weight on all factor owners, for expositional simplicity. However, the result holds more generally as is clear from (18). Importantly our result holds even if the government places the least weight on the specific factor owners in the import sector. The condition on σ is only required if we consider the change in factor endowments as the source of trade, and even then it is not necessary, but sufficient. Thus, the anti-trade bias result in proposition 2 for a government with an inequality concern holds even when labor's share is allowed to respond to the change in the tariff and for a number of different shocks that induce a country to trade.

4.2 Anti-trade bias in a two-country model with reciprocal trade liberalization

Thus far we focused on a small economy. We now confirm that the anti-trade bias resulting from a loglinear political support function extends to the case of large economies, even if governments cooperate on setting tariffs, which neutralizes the TOT motive. That is we show that in the spirit of Propositions 2 and 3, *both* governments choose positive tariffs when their objective is (17). This is true when the governments value all factors equally, value import capital owners more than the remaining factor owners and even in some cases when the welfare of the capital owners in the export sector is more heavily weighted than that in the import sector.

Consider a world with two countries, home and foreign, initially identical and with complete symmetry, across preferences, technology and endowments. The equilibrium relative price of good 1 is then unity. Because of the initial symmetry there is no motive for trade. The symmetry also implies that income shares are identical for all factors so there is no motive for a tariff or subsidy if the government's objective is (17) and all factors are equally weighted.

Next, suppose we transfer δ units of K_2 from foreign to home and δ units of K_1 from home to foreign. Given the symmetry in technology between the two sectors, the integrated equilibrium is unchanged and the free trade price is again be unity with home exporting good 2 and importing good 1. Because the increase of

K_2 is exactly offset by the reduction in K_1 and the free trade price remains unity, the real wage and thus total labor income is unchanged at that price. With the price and wage unchanged, the real return to capital in each sector is also unchanged. Therefore we have $\theta^2>\theta^L>\theta^1$ at home and $\theta^{1*}>\theta^{L*}>\theta^{2*}$ in foreign at $t=t^*=0$.

An anti-trade bias in a model with two large economies is readily generated from the optimum tariff argument. To ensure that our result is not driven by this motive, we show that the cooperative tariff chosen by each country is positive in the present case. Since the countries are symmetric, allowing them to set the tariff cooperatively internalizes any TOT motive for a tariff. The symmetry also ensures that whatever, non-prohibitive, equilibrium tariffs they choose are identical, leaving the final world price at unity.

The joint objective function for two cooperating governments with a political support function such as (17) is:

(19) $g^{world} = \Sigma\gamma^j \ln U^j + \Sigma\gamma^{j*} \ln U^{j*}$

In principle, joint maximization may require transfers between countries but given the symmetry, this will not happen *ex post* in the present case. Taking the FOC with respect to t and t* we would have two symmetric conditions of the following form:

(20) $\Sigma\gamma^j U_t^j/ U^j + \Sigma\gamma^{j*}U_t^{j*}/ U^{j*} = 0$

The first set of terms in this condition, U_t^j/ U^j, is exactly the same as (18) if evaluated at t=0 *and* if the world price is constant. So, if this were the only term then (18) would again determine whether a positive tariff or subsidy is chosen. The second set of terms in (20) internalize the cost of home's tariff on foreign. We know, however, that the symmetric equilibrium implies an unchanged free trade price. Moreover, the only effect of the domestic tariff on the foreign factor's utility occurs via changes in the world price. Therefore $U_t^{j*}=0$ for all j. That is, by imposing the equilibrium final world price and recognizing that it is simply the original price we have:

(21) $[\Sigma\gamma^j U_t^j/ U^j + \Sigma\gamma^{j*}U_t^{j*}/ U^{j*}]_{t=t*=0}$

$\Leftrightarrow [\Sigma\gamma^j U_t^j/ U^j]_{t=t*=0,\ p=1}$

We are now in a position to state the following result:

Proposition 4: (Inequality concern and anti-trade bias: 2-country model) *Consider a two-country model with identical preferences and technologies for both goods such that if they shared the same endowments no trade would occur and* $\theta^j = \theta$ *for all j. Suppose that the actual endowments for home and foreign are symmetric:* $L=L^*$ *and* $K_2= K_1^*= K_2^*+2\delta= K_1+2\delta$*, where* $\delta>0$*, so that home imports good 1 and exports 2 at the free trade price of unity. The cooperative tariff jointly set by home and foreign,* $t=t^*$*, is positive if the governments have identical loglinear political support functions and* $\gamma^j=\gamma$*. The same result also holds true for* $\sigma \geq 1/2$ *and* $\gamma^L \in (\gamma^2\theta^L/\theta^2, \gamma^1\theta^L/\theta^1)$ and $\sigma \geq 1/2$ with either $\gamma^L < \gamma^2\theta^L/\theta^2 < \gamma^2$ *or* $\gamma^L > \gamma^1\theta^L/\theta^1 > \gamma^1$.

4.3 Anti-trade bias due to an inequality concern: initially asymmetric income distributions

In the preceding, we have deliberately focused on income distributions that are initially symmetric to demonstrate the presence of an anti-trade bias in trade policy under entirely neutral conditions. We now show that the anti-trade bias is robust to other initial income distributions. In particular, we show that if all initial factor owner's joint income distributions have the same probability of occurring and the government has a concern for inequality then a positive tariff will result with a probability greater than an export subsidy once a country starts trading. To do this we focus on a more general version of the small economy. We place no restrictions on the initial distribution of income in the small economy or on the ROW and introduce trade through a reduction in the trading costs.

International trading costs play an important role in limiting the volume of trade even today. These costs may arise due to information barriers, transport costs, administrative procedures, product-standards and of course trade restrictions. Reductions in these costs, due for example to technological improvements and multilateral trade liberalization, have been an essential driving force for the integration of many economies in the world trading system. Thus, any good explanation for an anti-trade bias and the effects of increased import penetration must consider these large reductions in trading costs.[14]

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[14] Hummels (2001) reports the trends in international transport costs while Limão and Venables (2001) offer evidence on the effect of transport costs on the volume of trade. Venables and Limão (2002) model the effects of transport costs on the pattern of trade.

Let us assume that for each unit of good i arriving at destination, τ_i units must be shipped where $\tau_i > 1$. We can then interpret τ^i-1 as the tariff per unit or the Samuelson iceberg trading cost. Suppose that the relative price of good 1 in the rest of the world is p^w. For each unit of good 1 shipped by the rest of the world, home receives $1/\tau_1$ unit. Moreover, for each unit of good 2 delivered to the rest of the world, it must ship τ_2 units of good 2. Thus, the effective relative price of good 1 facing home in the world market is $p^w\tau_1\tau_2$. The small economy will then import good 1 only if $p^d > \tau_2\tau_1 > 1$. Alternatively, the economy export good 1 if $p^d < 1/\tau_2\tau_1 < 1$. Therefore, the economy does not engage in trade if $p^d \in (p^w/\tau_2\tau_1, \tau^2\tau^1)$.

Consider now a small economy with some endowment, technology and preference structure different along at least one dimension from the rest of the world. Let good 1 denote the good that the economy would import in the absence of trading costs and assume that these costs are initially sufficiently large to prevent any trade. The simplex (equilateral triangle) in figure 2 shows all possible initial income distributions for home. The vertices S_1, S_2, S_L represent the extreme distributions with all income going to K_1, K_2 and L, respectively. Along a segment such as S_1S_2, the share of the factor with unit share at the opposite vertex (labor) is 0. As we move along S_1S_2 from left to right, the share of K_1 declines linearly from 1 to 0 and that of K_2 rises from 0 to 1. Along any line parallel to S_1S_2 (not shown), the share of the factor with unit share at the opposite vertex (labor) is constant and increases as we move the line closer and closer to the vertex until it reaches 1 at S_L. As we move from left to right along such a line, the share of K_1 falls and that of K_2 rises. Along a segment such as $S_LS'_L$, where S'_L is the midpoint of $S_1S'_1$, the share of labor declines and those of K_1 and K_2 rise monotonically with $\theta^1 = \theta^2$ as we move from S_L to S'_L. At midpoint S, all factors have equal shares. Analogous interpretations apply to $S_1S'_1$ and $S_2S'_2$. The center point, *S*, represents the symmetric distribution already analyzed.

Remembering that the small country under consideration imports good 1 by assumption and if all lobbies are equally effective, according to (18), $\theta^2 \geq \theta^L \geq \theta^1$ is *sufficient* but not necessary to give rise to a

non-negative tariff. The triangle $S_1S'_1S_2$ defines $\theta^2 \geq \theta^L$ and triangle $S_2S'_2S_L$ defines $\theta^L \geq \theta^1$. Therefore in a trading equilibrium any distribution inside triangle $S_2SS'_1$ necessarily yields a positive tariff. Conversely, an export subsidy results if the post-trade distribution is in triangle $S_1SS'_2$. We can further note that as we approach any point of specialization in sector 2, for example point S'_1, the first term in (18) becomes arbitrarily large. Since that term as well as θ_t^1 are positive we can find shares such that (18) remains positive even when $\theta^L > \theta^2$. This implies that all distributions in the shaded area contained in the triangle $S_LSS'_1$ also entail a positive tariff if $\gamma^j=\gamma$.[15] Similar arguments justify why the shaded combinations along the curve that connects S and S_2 also surely entail a positive tariff.

Using figure 2 we can confirm proposition 3 when home and ROW are initially identical, the shares are identical and there are no trade costs. Symmetry means that we start at *S* and there is no trade. If there is an improvement in the TOT faced by the economy, a reduction in p^w in the case of proposition 3, then the country imports 1. Moreover the share of K_2 increases by more than the labor share and the share of K_1 falls. Thus we must end up at a point inside the triangle $S_2SS'_1$ and a positive tariff follows if all lobbies are equally effective. Since the tariff is strictly positive and (18) is continuous we can find some $\gamma^2 > \gamma^1 = \gamma^L$, such that a positive tariff is also set.

We can also confirm proposition 4 when $\gamma^j=\gamma$. The initial equilibrium, when countries are identical, is at *S*. After the increase in K_2 and reduction in K_1 at home there is no change in θ^L, an increase in θ^2 and a decrease in θ^1. Thus the movement is along a horizontal line through *S* towards the right, the area that surely yields a positive tariff. For foreign we have the opposite movement, which also necessarily entails a positive tariff since foreign exports good 1.

Let's now consider *I* in Figure 3, a non-symmetric initial distribution. Rule out the deployment of a domestic policy instrument to alter this asymmetric distribution. If trading costs are sufficiently high, the economy does not trade. As these costs fall, we eventually obtain $p^d = p^w\tau^2\tau^1$. Further reductions in trading

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[15] The shape of the shaded area as we approach point S_L is explained by the fact that as θ^2 itself also

costs result in a commensurate reduction in p^d and the country begins to export 2 and import 1 (or vice-versa if we had labeled the goods such that $p^d < p^w$ under autarky).

The fall in p^d lowers θ^1 and raises θ^2. Since the movements along $\Delta\theta^2 = 0$ (or any line parallel to S_1S_L) imply no change in the share of K_2, the change is constrained to movements in the direction of S_2 spanned by $\Delta\theta^2 = 0$ in Figure 3. The fall in θ^1 means that we must move in the opposite direction of S_1, so towards S_2, in any direction spanned by the line $\Delta\theta^1 = 0$. The share of labor increases relative to that of K_1 so the movement must be in the direction of S_L as spanned by $\Delta\theta^1 = \Delta\theta^L$. The value of the change in the labor share is not as large as that of K_2 so the final constraint is for the movement to be in the direction of S_2 , in any direction spanned by the line $\Delta\theta^2 = \Delta\theta^L$.

Thus from some initial distribution such as *I*, a trade inducing shock leads to a movement towards a distribution within the shaded cone in figure 3. Comparing with figure 2 we can see that a sufficiently large shock always exists such that a positive tariff will be chosen once the country has a motive to trade. This is obviously the case if trading costs fell to zero and at p^w the small economy specializes in and exports good 2. However, the shock need not cause specialization, it must only entail a sufficient reduction in the import sector's income share, as is clear from the shaded area in figure 2 that leads to t>0.[16]

The general anti-trade bias due to an inequality concern is now clear. If any initial distribution of income is equally likely then the probability of $\theta^2 \geq \theta^L \geq \theta^1$ is equal to that of $\theta^1 \geq \theta^L \geq \theta^2$. However, large reductions in trading costs, such as the ones observed over the last 50 years, induce the country to import good 1 *and* imply that the probability of $\theta^2 \geq \theta^L \geq \theta^1$ is higher than that of $\theta^1 \geq \theta^L \geq \theta^2$. Thus we can state the following.

Proposition 5: (Inequality concern and anti-trade bias: asymmetric distributions) *Consider a small 2-sector economy endowed with labor and specific capital, it faces trading costs* τ^j *and* $p^d \in (p^w/\tau^2\tau^1, p^w\tau^2\tau^1)$ *so it does*

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approaches zero it becomes increasingly difficult to find $\theta^L > \theta^2$ such that (18) remains positive.

not trade initially. The government has a loglinear political support function and $\gamma^j=\gamma$. If any initial distribution of income is equally likely then there always exists some reduction of the trading costs, τ^j, such that the probability of a government setting a positive tariff is higher than that of it setting an export subsidy in a trading equilibrium. There always exists a p^w such that the probability of a positive tariff is one even if the small economy is not specialized.

Proof: A reduction in trading costs implies an improvement in the small economy's TOT for $p^d \leq p^w\tau^2\tau^1$ and a consequent increase in θ^2 and a decrease in θ^1, as shown in figure 3. Therefore, given that $\theta^2 \geq \theta^L \geq \theta^1$ and $\theta^1 \geq \theta^L \geq \theta^2$ are equally likely events in the initial equilibrium, in the trading equilibrium, we necessarily have $Pr(\theta^2 \geq \theta^L \geq \theta^1) > Pr(\theta^1 \geq \theta^L \geq \theta^2)$. From (18) if $\theta^2 \geq \theta^L \geq \theta^1$ and $\gamma^j=\gamma$ the government necessarily sets a positive tariff if good 1 is the import good and one of the inequalities is strictly valid. Conversely it necessarily sets a subsidy if $\theta^1 \geq \theta^L \geq \theta^2$. Thus there exists some reduction in trading costs such that the probability of a government necessarily setting a positive tariff is higher than that of it necessarily setting an export subsidy in a trading equilibrium. If at p^w the economy were almost fully specialized in 2 then $\theta^1 \rightarrow 0$ and (18) would become arbitrarily large and positive. The government would then set a positive tariff with a probability one.

Thus, the observed fall in trading costs can justify a higher frequency or more pronounced negative shocks to the price of an economy's imported good. When coupled with the government's concern for inequality we end up with a trade policy with an anti-trade bias.[17] This conclusion is consistent with the historical observation, noted by O'rourke and Williamson (2000, pp 113-117), that reductions in trading costs during 19th century that led to the opening of the economies of Australia Canada, Europe and Latin

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[16] Note that if we chose *I* closer to S_1 then $\Delta\theta^1 = \Delta\theta^L$ would cross S_1S_2. This does not invalidate our result because along S_1S_2 the labor share is zero. This is not an equilibriun since labor is an essential factor in the poduction of 1 and 2 and either of the two goods is always produced.

America were also accompanied by increased tariffs in those countries. For example, they write on p. 113, "The most common European response to globalization was to protect agriculture. Declining transport costs typically provoked offsetting tariff policies--designed to compensate those whose interests were damaged by steamship and railroad--rather than structural adjustment policies like education and retraining." In the same vein, they write on p. 117, "While the third quarter of the nineteenth century saw an easing of protection in Latin America, tariffs rose again in the final quarter."

4.4 Extension to the Heckscher-Ohlin model

The specific factors model is best suited for an analysis over the medium-run. In the long run, if the import sector capital owners were indeed worse off they would move their capital. This suggests that in the long run the inequality concern may disappear as a source of anti-trade bias. We now argue that this is not the case--an objective function such as (17) can explain the anti-trade bias even if capital mobility is perfect across sectors as in the HO model.

To illustrate, consider a small economy with identical preferences over two goods, equal initial endowments of labor and capital and symmetric production functions with a constant capital share $\theta^k<0.5$ in good 1 and $1-\theta^k$ in good 2. If the rest of the world has identical preferences and capital to labor ratio there is no trade and also no motive for the government to set a tariff.

After an increase in capital the country will import the labor-intensive good, labeled good 1. Since the country is small the world price remains unchanged and so do the wage and rental rates (provided the country does not specialize). The increase in capital implies an increase in national income but the labor supply and wage remain unchanged so the labor's share in the national income declines and capital's increases. If the government's objective is given by (6), i.e. if it weights the utility of factor owners linearly

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[17] Note that this argument is valid around the initial situation that we derive around the free trade point. It does not imply, however, that reductions in trading costs will uniformly lead to higher tariffs. It is possible at low enough trading costs further reductions lower the optimal tariff chosen for redistribution purposes.

then it chooses free trade if $\gamma^k=\gamma^L$. However, if the government has an inequality concern, as reflected in (17), then the reduction of the labor income share induces it to redistribute towards labor.[18]

This redistribution requires an import tariff to raise the price of the labor intensive good, which is imported. Evidently if labor is relatively more effective in lobbying then capital, i.e. $\gamma^L > \gamma^K$, then the government has an added motive to chose an import tariff. More importantly, even if $\gamma^L < \gamma^k$, the government may choose a positive tariff. Note that in our example home becomes relatively capital abundant and so the argument is broadly compatible with the pattern of protection in the US if we interpret capital to include human capital so that labor represents unskilled labor. [19]

To conclude, the inequality concern holds a potentially important role in explaining the anti-trade bias of trade policy. The very motive that causes a country to trade provides the government with a motive for redistribution, which reduces trade. Thus holds true for both workhorse models of trade policy, the specific factors and HO model.

4.5 Concentration of ownership and anti-trade bias

According to Olson (1965) higher concentration of factor ownership reduces the incentive for free riding thus minimizing the collective action problem inherent in lobbying activities. This theory implies that the more highly concentrated industries receive more trade protection. However, the empirical evidence is at best mixed. Baldwin (1985) finds that industry concentration is insignificant in explaining the level of protection in the US whereas Treffler (1993) finds that seller concentration has a positive and significant effect.[20] We provide an argument that explains why high concentration of factor ownership in a particular sector can have a *negative* effect on the equilibrium level of protection for that sector, thus, potentially

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[18] It is readily shown that the first-order conditions in the HO model lead to an outcome similar to that in equation (10).

[19] If in our experiment we had increased labor instead of capital then the government would redistribute towards capital owners. Since the labor abundant country imports the capital intensive good, 2, the redistribution would again entail an import tariff.

[20] A number of other authors have found evidence for and against the theory, Rodrik (1995, p. 1481).

explaining the mixed evidence. More importantly, for our purpose, our argument implies that if the concentration of factor ownership is relatively higher in the export sector and the government's objective includes a redistribution motive then it pursues a policy with an anti-trade bias.

Consider the implication of the logic of collective action on the trade bias of trade policy. If the concentration of ownership of the specific capital in the import were always higher than in the export sector then the theory predicts an anti-trade bias, assuming that labor ownership is the most dispersed. However, there is no a priori reason to believe that ownership is more concentrated in the import sector. In fact, there is ample firm level evidence that export firms are larger than the average firm. At least for this reason, factor ownership is relatively more concentrated in the export sector than in the import-competing sector. In this case the logic of collective action predicts a trade policy with a pro-trade bias--the more highly concentrated exporting industries would be more successful in lobbying and thus obtaining export subsidies.

Thus far we have aggregated different agents within each group and defined the government's objective over the utility of the group, U^j. When the government's objective is linear this has no important implication since the utility of each of the n^j identical agents in group j is simply $u^j = U^j/n^j$, as is clear from (2). So, defining *G* over the individual agents would lead to the exact same expression as (6) and different factor ownership concentration has no effect on whether a tariff or import subsidy is chosen.

If the government's objective includes an inequality concern then the concentration of factor ownership becomes important. To see this let us first assume that all factor owners are equally effective in lobbying in order to neutralize Olson's demand side argument. When inequality is a concern there is a natural interpretation of the weights γ^j in (17): they represent the share of the population that owns that factor, i.e. $\gamma^j = n^j/n$. This interpretation arises simply because the objective of a government with an inequality concern is well represented by a geometric average of each individual's utility, where each is given an identical weight, 1/n, if it is as effective in lobbying as others.

$$e^g = \left[(u^1 u^1 ... u^1)(u^2 u^2 ... u^2)(u^L u^L ... u^L) \right]^{\frac{1}{n}}$$
$$\prod_j \left(u^j \right)^{\frac{n_j}{n}}$$

Now consider an initial situation in the specific factors formulation of our model where the factor shares are all identical and so is the share of factor ownership, i.e. $\gamma^1/\theta^1=\gamma^L/\theta^L$ and $\gamma^2/\theta^2=\gamma^L/\theta^L$, such that, according to (18), the government sets t=0. Now, for a fixed level of the endowments, redistribute capital away from some owners in the export sector towards others in their own group. Simultaneously redistribute all the capital in the import sector among the existing owners in that sector *and* the "expropriated" owners in the export sector. Because all individuals are assumed to have identical and homothetic preferences this change in ownership does not alter anything in the economic equilibrium, i.e. in the absence of government intervention. Importantly, the aggregate factor shares remain unchanged. However, the concentration of capital ownership is now higher in the export sector, 2, than in the import sector, 1, and thus $\gamma^1/\theta^1>\gamma^L/\theta^L$ and $\gamma^2/\theta^2<\gamma^L/\theta^L$. According to (18) the government sets a positive tariff now that the concentration in the import sector has fallen below that of the export sector.

If we believe that the government objective reflects an inequality concern then it is natural to interpret the weights γ^j as being proportional to the share of the group in the population. In this case the prediction is that a higher concentration of ownership of factor j *relative* to a factor $i \neq j$ makes the government less likely to enact a policy that increases the share of j and reduces the share of *i.* This supply side effect does not nullify the theoretical argument on the demand side of protection that concentration in ownership facilitates lobbying and thus the implementation of a policy that favors the concentrated group. Taken together the two arguments can account for the mixed empirical evidence on the effect of factor ownership concentration on trade protection.[21]

[21] In the simple example we use the number of owners in the export sector after the redistribution of capital is lower than in the import sector. So the prediction in this case is similar to the one in Caves (1976) where industries that command more votes obtain more protection. However, empirically we can distinguish our

4.6 Anti-trade bias due to a poverty reduction concern

The anti-trade bias results in the previous sub-sections extend to other government objective functions, such as an extreme case where the government's objective is simply to improve the condition of the worse off factor owners. Although such an objective is insufficient to explain the structure of protection it does appear to be quite important in justifying the finding that protection in the US and the EU tend to be highest in sectors with low wage and low skill workers. Suppose that is the case and the government objective can be approximated by the Rawlsian welfare function:

(22) $G^p = Min\ U^j$

The government will now chose a positive tariff if it increases the income share of the group that is worst off under the free-trade equilibrium. We can use the simplex in figure 4 to illustrate this. The darker shaded area represents the distributions for which the specific factor owners in the import sector, 1, have the minimum share. Those are the distributions for which the government with objective (22) surely sets a positive tariff. Conversely the lighter shaded are represents the area where it surely sets a subsidy. If the distribution lies in the lower unshaded triangle, where labor has the lowest share, then it sets an import *tariff* if and only if the condition in (16) does not hold, i.e. $\theta_t^L>0$.

Starting from a non-trading equilibrium at S any shock that induces trade increases the share of exporters, reduces that of importers and does not leave workers worse off than capital owners in the import sector. Thus the resulting distribution is in the triangle on the right in figure 4 and entails a positive tariff. More generally, we can start from any distribution and a TOT improvement leads to a movement towards the area where t>0 (see figure 3 for the direction of change) so a proposition analogous to proposition 5 holds when the government objective is absolute poverty reduction.

It is also straightforward to show that a result analogous to proposition 4 for the two-country model holds where both countries protect their respective import sectors. The simple example for the HO model

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model from that in Caves by noting that our result also holds if there are equal number of voters but capital ownership is more concentrated in the export sector, e.g. because there is more capital in that sector.

also produces an anti-trade bias when the objective is (22). The intuition for all these is basically the following. The very shock that causes countries to trade tends to also reduce the need for an export subsidy if the motive is a redistribution or poverty reduction one. This occurs because that very shock immediately improves the welfare of the export factor owners and lowers that of the owners of specific factors in the import sector.

5 Conclusion

In his review of trade policy Rodrik (1995) concludes that one of the main puzzles of trade policy is why trade policy typically favors import-competing sectors and is consequently trade restricting rather than trade expanding. Levy (1999) points out that, ceteris paribus, the leading political economy model of tariff policy, due to Grossman and Helpman (1994), predicts a pro-trade bias in trade policy. As we noted in the introduction, this prediction stands in contrast to the reality, which is characterized by an anti-trade bias in both small and large economies. The central question addressed in this paper therefore is how do we explain the anti-trade bias in trade policy, especially in small economies that do not have the terms of trade motive to restrict trade?

Our investigation proceeds along two lines. First, we replace the almost-partial-equilibrium model commonly employed these days including by Grossman and Helpman by a more conventional two-sector general-equilibrium model. This modification by itself is sufficient to eliminate any presumption in favor a pro-trade bias in trade policy. Using the same political economy model as in Grossman and Helpman, we are able to show that if the two sectors are entirely symmetric in both consumption and production and the elasticity of substitution between factors exceeds unity, the outcome is protection rather than export subsidy.

Our second line of investigation proceeds along an alternative political-economy model. We replace the GH linear government objective function by one that is strictly concave in the utilities of factor owners. This feature allows us to generate a strong presumption in favor of anti-trade bias in trade policy. We are able to generate this presumption in small economies as well as large ones even when the latter set tariffs cooperatively so that the terms of trade motive for tariffs is absence.

The anti-trade bias in trade policy due to equity concerns may have interesting implications for political-economy analyses in other areas. For example, they may influence external-tariff setting during the formation of PTAs. To offset the negative effect of tariff preferences on importers, the government may choose to set its non-preferential tariffs higher than they would otherwise.

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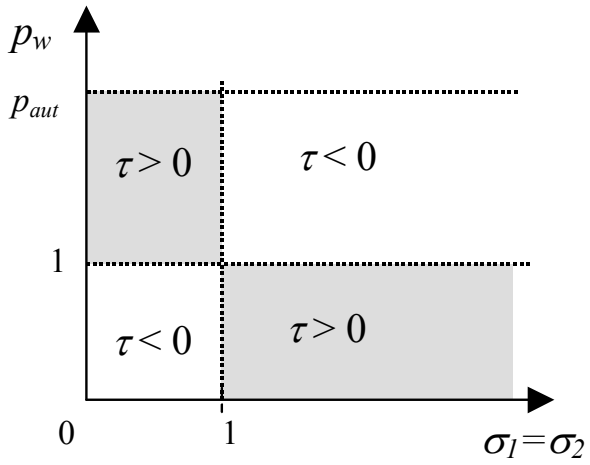
Fig 1: Equilibrium tariff: linear government objective

(CES production)



Notes: CES with $\sigma_1=\sigma_2$; $p=p_1/p_2$. Equal marginal valuation for specific factors $G_{k1} = G_{k2} > G_l$, tariff signs reverse if $G_{k2} = G_{k1} < G_l$.. In this example we assume that $K_2>K_1$ such that $P^{aut}>1$ and home imports 1.

Fig 2: Sufficient conditions for an anti-trade and pro-trade bias in trade policy

(Government with inequality concern and all lobbies equally efficient)

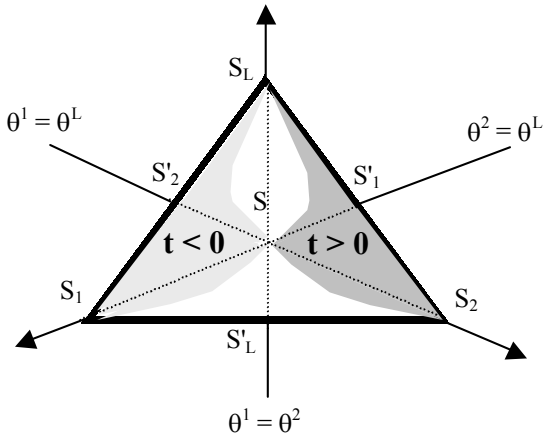


Fig 3: Effect of a TOT improvement on some pre-trade income distribution I

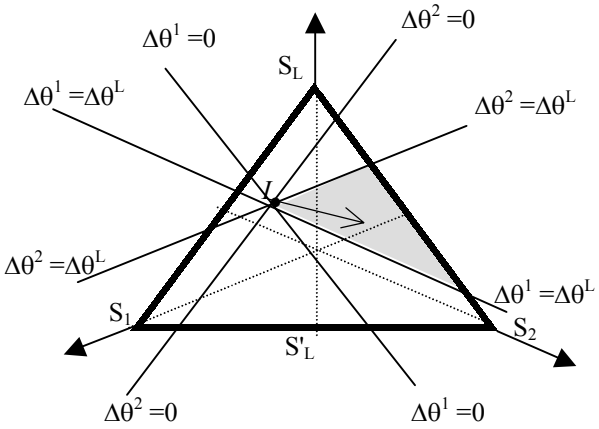


Fig 4: Sufficient conditions for anti-trade and pro-trade bias

(Government's objective Min U^j, equal lobbying strength)