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## **IMPORT PROTECTION BIAS\***

Paul Pecorino  
Department of Economics, Finance and Legal Studies  
Box 870224  
University of Alabama  
Tuscaloosa, AL 35487  
Phone: 205-348-0379  
Fax: 205-348-0590  
E-Mail: [ppecorin@cba.ua.edu](mailto:ppecorin@cba.ua.edu)

### Abstract

Rodrik (1995) notes that trade regimes tend to be biased towards import protection. Meanwhile, the standard political economy models either yield no prediction on the bias of the trade regime, or predict, counterfactually, a bias towards the export sector. Rodrik argues that import protection bias in developing countries might be explained by the revenue effects of the two policies. In this paper, the Grossman and Helpman (1994) "Protection for Sale" model is extended by adding exogenous government expenditure. This expenditure may be financed via a combination of tariff revenue and a distorting income tax. In addition to the exogenous expenditure, export subsidies need to be financed either via tariff revenue or a distorting wage tax. With this addition to the model, plausible values of the model's parameters yield import protection bias.

\*I would like to thank Wolfgang Mayer and Xenia Matschke for making helpful comments on the paper.

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## 1. INTRODUCTION

Rodrik (1995) notes that trade regimes tend to be biased towards import protection. Meanwhile, the standard political economy models either yield no prediction on the bias of the trade regime, or predict, counterfactually, a bias towards the export sector. Rodrik argues that import protection bias in developing countries might be explained by the revenue effects of the two policies. In this paper, the Grossman and Helpman (1994) “Protection for Sale” model is extended by adding exogenous government expenditure.<sup>1</sup> This expenditure may be financed via a combination of tariff revenue and a distorting income tax. In addition to the exogenous expenditure, export subsidies need to be financed either via tariff revenue or a distorting wage tax. With this addition to the model, plausible values of the model’s parameters yield import protection bias.

The Grossman and Helpman model implies that sectors with larger levels of output receive more protection. Other models, such as Findlay and Wellisz (1982) yield the same prediction. The reason is that a high level of output raises the returns to the lobby group of an import tariff (export subsidy) of a given size. Other factors, such as elasticity of net imports, also affect the level of protection. A priori, we do not expect these other factors to differ systematically across the import and export sectors, and so these factors cannot explain import protection bias. Further, if the level of consumption of the import good and export good are similar, then the level of production in the export sector must be larger than in the import sector. As a result, the standard models give us a presumption of a pro-trade bias, i.e., net subsidization of exports. As noted by Rodrik, this prediction is strongly counterfactual.<sup>2</sup>

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<sup>1</sup> Other extensions of Grossman and Helpman include Mitra (1999), who models endogenous lobby formation and Gawande and Krishna (2005) who consider lobbying competition between upstream and downstream firms.

<sup>2</sup> Krueger (1984) finds trade regimes in most developing countries to be either neutral or to exhibit a strong import protection bias.

Rodrik goes on to argue that the revenue needs of developing countries combined with underdeveloped tax systems can explain import protection bias at low levels of development.<sup>3</sup> For rich countries with highly developed tax systems Rodrik argues that another explanation must be found for import protection bias. He argues that policy persistence can explain this bias.<sup>4</sup> That is, at lower levels of development, countries tax trade to finance their government, and policy persistence explains why the bias does not disappear, even as the country grows richer and develops a more sophisticated tax system. In this paper, I argue that reasonable parameterizations of the Grossman and Helpman model are sufficient to explain import protection bias in wealthy countries, even without resort to models of policy persistence.<sup>5</sup>

An important previous work along the lines pursued here is by Mayer (2002). He focuses on trade policy preferences at the individual level. His starting point is a symmetric model in which the number of people supporting an import tariff is exactly balanced by the number supporting an import subsidy. When costly tax collections are added to the model he shows that the median individual will favor an import tariff. Thus costly revenue collections leads to what he calls “systematic political grass-roots support for tariffs”.<sup>6</sup> This suggests that if tariff policy were set via a direct election (e.g., Mayer 1984), there would be a bias towards import protection. What I show in this paper is that there is a presumption of import protection bias in the Grossman and Helpman model as well.

Other explanations for import protection bias have been offered in the literature, which are not based on the revenue effects of trade taxation. Limão and Panagariya (2004) note that the

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<sup>3</sup> A similar argument may be found in Krueger (1990).

<sup>4</sup> On policy persistence, see Fernandez and Rodrik (1991) and Coate and Morris (1999).

<sup>5</sup> This is not to deny the existence of policy persistence which surely exists and is an important phenomenon.

<sup>6</sup> Feldman and Gang (1996) incorporate tax revenues in a political support model along the lines of Hillman (1982). They find that revenue effects can influence the conditions under which trade liberalization occurs. Pecorino (1999) incorporates revenues into a model along the lines of Findlay and Wellisz (1982) and finds that vicious circles of protection (as per Krueger 1993) are more likely to emerge in import competing sectors than in export sectors.

Grossman and Helpman model is “almost” partial equilibrium, due to the existence of a numeraire sector which fixes the wage at a constant value. They develop a more fully general equilibrium model and find that import protection bias can emerge if the elasticity of substitution in production exceeds unity. Limão and Panagariya (2002) argue that import protection bias can emerge if the government is concerned about inequality. Finally, the terms of trade effects inherent in a model with monopolistic competition may lead to an import protection bias. This can be seen in the analysis of Chang (2005).

After writing an initial draft of this paper, I came across independent work by Matschke (2005), which is closely related. I discuss the similarities and differences between our papers at the end of section 2.<sup>7</sup>

## 2. THE MODEL

This is a modified version of the Grossman and Helpman (1994) model. The exposition follows Helpman (1997) fairly closely, with a few exceptions. The most important of these is the addition of costly government expenditure and distorting taxes to the model.

All consumers have an identical utility function given by

$$u(c) = c_0 + \sum_{i=1}^n u_i(c_i). \quad (1)$$

There are  $n + 1$  consumer goods, where good  $c_0$  is numeraire. This good is produced with one unit of labor, and as a result the wage rate measured in units of good 0 is constant at 1.<sup>8</sup> The functions  $u_i(c_i)$  satisfy  $u_i' > 0$  and  $u_i'' < 0$ . Goods  $i = 1 \dots n$  are produced with mobile labor and sector-specific capital. Factor ownership is highly concentrated, so that owners of the specific

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<sup>7</sup> While my first draft was independent of Matschke, it should be noted that her paper was widely distributed, via SSRN, prior to mine.

<sup>8</sup> This requires that good 0 be produced in equilibrium, and I assume throughout that this is the case.

factors constitute a negligible fraction of the total population.<sup>9</sup> The total labor supply is normalized to 1, and it is assumed that the owners of specific capital do not supply any of this labor. World prices are normalized to 1, with the domestic price of good  $i$  given by  $\tau_i$ . Thus, a sector is receiving a positive level of protection if  $\tau_i - 1 > 0$ .

Individuals own at most one type of sector-specific capital. The welfare of the owners of specific factor  $i$  is given by

$$W_i(\tau_i) = \Pi_i(\tau_i), \quad (2)$$

where  $\Pi_i$  are the returns to specific factor  $i$ , and the assumptions of the model guarantee that  $\Pi_i' > 0$ . Output in sector  $i$  is denoted  $X_i$ .

The government must finance an exogenous level of spending  $g < 1$ , measured in units of the numeraire good. This spending can be financed through a distorting wage tax  $t < 1$ . Since total labor earnings equal 1, a tax  $t$  will raise revenue equal to  $t$  units of the numeraire good. However, for each unit of revenue raised, there are excess costs of  $k > 0$ . Thus, the marginal welfare cost of raising a unit of revenue via the tax  $t$  is  $1+k$  units of the numeraire good.<sup>10</sup> The value of  $k$  can reflect the welfare losses from a wage tax arising from reduced labor supply, but it can also reflect administrative costs associated with collecting the tax.<sup>11</sup> Government spending can also be financed via net taxation of the traded good sector. Thus, the government budget constraint is

$$t + \sum_{i=1}^n (\tau_i - 1)M_i(\tau_i) - g = 0, \quad (3)$$

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<sup>9</sup> In the notation of Helpman (1997),  $\alpha_i = 0$  for all  $\forall i$ . As discussed below, this assumption will bias the model against a finding of import protection bias.

<sup>10</sup> This approach to modeling the tax distortion is found in Neary and Leahy (2004) among others.

<sup>11</sup> The value of  $k$  is believed to be high in developing countries because of high administrative costs associated with a underdeveloped tax system. Burbidge and Meyers (2004) consider the effect of collection costs on the outcome of a tariff war.

where  $M_i(\tau_i)$  are net imports in sector  $i$ . I assume, even taking net taxation of the traded good sector into account, that  $t > 0$ .

In the aggregate, consumers will have  $1 - g - kt$  units of labor income to spend on consumption goods. Letting  $S_i(\tau_i)$  be aggregate consumer surplus from consumption of good  $i$ , we can express aggregate welfare as follows:<sup>12</sup>

$$W = 1 - g - kt + \sum_{i=1}^n (\tau_i - 1)M_i(\tau_i) + \sum_{i=1}^n \Pi_i(\tau_i) + \sum_{i=1}^n S_i(\tau_i). \quad (4)$$

The objective function of the government is

$$G = C + aW, \quad (5)$$

where  $C$  is campaign contributions and  $a$  is the weight placed on general welfare. A subset  $i \in \ell$  of industries is politically organized. Organized interest groups play a Nash game against the other interest groups in which each submits a campaign contributions function  $C_i(\tau)$  to the government, while knowing that the government will chose  $\tau$  to maximize (5). Grossman and Helpman (1994: 840) show that in the truthful Nash equilibrium of this game, the government will choose the vector of tariffs to

$$\text{Max}_{\tau} \sum_{j \in \ell} W_j(\tau) + aW(\tau). \quad (6)$$

Organized sectors receive a weight of  $1+a$  in the government's objective function, while general welfare receives a weight of  $a$ . Using (3) and (4), the first order conditions to (6) imply

$$(\tau_j - 1) = \frac{X_j + akM_j}{a(1+k)(-M_j')}, \quad j \in \ell \quad (7a)$$

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<sup>12</sup> Alternatively, by substituting for  $g$  from equation (3), we can write  $W = 1 - t - kt + \sum_{i=1}^n \Pi_i(\tau_i) + \sum_{i=1}^n S_i(\tau_i)$ . Writing it this way, it is clear that the welfare benefit of tariff revenue occurs (via equation (3)) through a reduction in the tax rate  $t$ .

$$(\tau_j - 1) = \frac{kM_j}{(1+k)(-M_j')}, \quad j \notin \ell. \quad (7b)$$

Equation (7a) applies to organized sectors and equation (7b) applies to unorganized sectors. For import sectors,  $M_j > 0$ , so that from (7b), even unorganized import sectors obtain protection due to the revenue motive. In export sectors,  $M_j < 0$ , so these sectors are taxed when they are unorganized. Note that the magnitudes of the import tariff and export tax are increasing in the size of the income tax distortion  $k$ . Thus, in sectors that are not organized, we have import protection bias due to the revenue motive of the government.

Now, let's turn to the organized sectors. Let sector  $E$  be a representative export sector and sector  $I$  be a representative import competing sector. Under free trade, the relative price  $p_E/p_I = 1$ . Because world prices are normalized to 1, the expressions in (7a) can be considered the ad valorem tariff rate. Taking the ratio of the ad valorem rates in our representative import and export sectors, we get

$$\frac{\tau_E - 1}{\tau_I - 1} = \left( \frac{X_E + akM_E}{X_I + akM_I} \right) \left( \frac{M_I'}{M_E'} \right) = \left( \frac{x_E + akm_E}{x_I + akm_I} \right) \left( \frac{M_I'}{M_E'} \right), \quad (8)$$

where the lower case  $x$ 's and  $m$ 's after the second equal sign represent output and imports as a fraction of GDP. (Note  $m_E < 0$ , since this is the export sector.) If  $(\tau_E - 1)/(\tau_I - 1) < 1$ , then the typical export sector has lower ad valorem protection than the typical import competing sector and we have import protection bias. There is no particular reason to believe that the slope terms  $M_I'$  and  $M_E'$  differ systematically across sectors. On the other hand, as Rodrik (1995) points out, there is reason to believe that output in the export sector is systematically larger than output in the import competing sector. In the absence of the tax distortion ( $k=0$ ), this would lead to a bias towards export subsidization. Note that because  $m_E < 0$  and  $m_I > 0$ , the terms reflecting the

tax distortion enter negatively in the numerator and positively in the denominator. This reflects the fact that a tariff raises revenue, while an export subsidy costs revenue.

Increases in the weight placed on general welfare,  $a$ , or in the tax distortion,  $k$ , will both reduce the fraction in (8) and therefore move the country toward import protection bias. On the other hand, the larger the size of the export sector relative to the import competing sector, the more likely it is that we would have a bias towards export subsidization. While the existence of import protection bias will depend upon parameter values, it is important to see whether a reasonable parameterization of the model will yield such a bias. Since there is no reason to believe that they are leading to systematic bias, assume  $M_I' = M_E'$ . Further, assume the export industry produces \$60 billion of output and the import competing industry \$20 billion, both in a \$10 trillion dollar economy.<sup>13</sup> This gives  $x_E = .006$  and  $x_M = .002$ , making the export sector three times larger than the import competing sector. Since there is no reason to presume that consumption in either sector is higher, let  $m_E = -.002$  and  $m_I = .002$ .<sup>14</sup> (Thus consumption divided by GDP is .004 in each sector.)

There have been several empirical estimates of  $a$ , the weight placed on general welfare. Estimated values have generally been quite high, ranging from about 40 to 3000.<sup>15</sup> Since higher values of  $a$  are more likely to lead to import protection bias, we will chose a relatively conservative value of  $a = 10$  for our sample parameterization.

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<sup>13</sup> For the U.S. in 2003, this gives us the approximate sizes of category “other transportation equipment, which includes aircraft, and the apparel industry. See Table 972 in the 2004-2005 edition of the United States Statistical Abstract.

<sup>14</sup> This puts aircraft exports at one third of production. This is approximately correct for 2003. See the 2004-2005 U.S. Statistical Abstract Tables 1013 and 1299. These numbers imply that apparel imports equal apparel production. This is also about right. See “apparel” on Table 976 and “clothing imports” on Table 1299 of the 2004-2005 U.S. Statistical Abstract.

<sup>15</sup> See Goldberg and Maggi (1999), Gawande and Bandyopadhyay (2000), Mitra et al. (2002), McCalman (2004), and Gawande and Krishna (2005). Gawande and Krishna (2003) survey the empirical literature on the political economy of trade policy.

The final parameter we need to choose is  $k$ , where the marginal welfare cost of taxation is  $1+k$ . Kleven and Kreiner (2003) have estimated the marginal welfare cost of taxation for 23 OECD countries. Their most conservative set of estimates range from 1.09 in Japan to 1.80 in Belgium with an unweighted average estimate for the 23 countries equal to 1.29.<sup>16</sup> Bearing in mind that higher values of  $k$  tend to impart import protection bias, we will choose a fairly conservative value of  $k = .2$ .<sup>17</sup>

Using all of our parameter values in equation (8) we find that  $(\tau_E - 1)/(\tau_I - 1) = 1/3$ , where any value less than 1 indicates import protection bias. We find this using fairly conservative values of  $a$ , and  $k$ , and while allowing the export sector to be three times the size of the import competing sector. If we let the weight on general welfare fall to  $a = 5$ , holding other parameters constant, the ratio rises to 1, i.e., there is no trade policy bias in this revised example. This would be a very low value of  $a$  relative to the estimates in the empirical literature.

Alternatively, if we keep other parameters at their original values (including  $a = 10$ ) and let  $k = .10$  we again have  $(\tau_E - 1)/(\tau_I - 1) = 1$ , i.e., an unbiased policy. Based on the most conservative set of estimates in Kleven and Kreiner, only two countries out of twenty-four have values of  $k = .10$  or less.<sup>18</sup>

Highly developed countries have often used quotas and voluntary export restraints to restrict imports. These policies do not raise revenue for the government. We can eliminate the revenue effects of tariffs in equation (8) by setting  $akm_I = 0$  in the denominator. Under our initial set of parameter values, the ratio in (8) then equals 1, and we have an unbiased policy. If  $a$  or  $k$

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<sup>16</sup> The median is 1.26. These estimates are found in their Table II and are based on a proportional tax change.

<sup>17</sup> This figure is in line with some of the estimates in Ziliak, Kniesner and Holtz-Eakin (2003). However, these authors notes that their estimates are very sensitive to the precise way in which the tax change is modeled. Some of their estimates would put  $k$  below .10. On the other hand, the preferred estimates of Browning (1987) and the estimates of Feldstein (1999) are much higher than the value of .2 used here. All these papers are based on U.S. data, or parameter estimates based on U.S. data.

<sup>18</sup> Japan has an estimated value of  $k = .09$ , while in New Zealand the estimated value is  $k = .10$ .

are slightly higher, or the relative size of the export sector slightly lower, an import protection bias will emerge, even in the absence of any tariff revenue collections. Thus, we can identify plausible parameter values where the cost of the export subsidy alone is sufficient to induce import protection bias.

It should be clear that there are a wide range of reasonable parameter values which will lead to import protection bias in the Grossman and Helpman framework. Further, it appears that the model can explain this bias in highly developed economies, without appeal to policy persistence. While more highly developed countries may have better developed tax systems, which lead to lower values of  $k$ , they may also have better systems of governance which are reflected in higher values of  $a$ .<sup>19</sup> For example, Mitra et al. (2002) find higher values of  $a$  for Turkey during periods of democracy compared with periods of dictatorship. To the extent the richer countries tend to be more democratic, we would expect to find higher values of  $a$  in these countries. While reductions in  $k$  will reduce import protection bias as countries develop, increases in  $a$  (due to better governance) will tend to restore it as governments become more sensitive to the revenue costs (and associated welfare losses) associated with export subsidies.

The simplicity of the model does cover up some potentially important interactions. In particular, there is no interaction between the tariff distortion and the distortion arising from the wage tax, whereas in a richer model, such an interaction would naturally be present. This could make import tariffs less attractive if they aggravate the labor market distortion associated with the wage tax. This can occur, because a tariff of 10% may be thought of as a combination of a 10% consumption tax and 10% production subsidy for the industry in question. The consumption tax will interact with the wage tax in determining the level of labor supply.

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<sup>19</sup> The highly developed countries are generally viewed as being less protectionist than the developing countries. This is consistent with higher values of  $a$  in highly developed countries.

However, the export subsidy can also be thought of as a production subsidy and consumption tax levied at the same rate, and it too may act to aggravate the distortion associated with the wage tax. This interaction could make export subsidies more damaging to welfare than they appear in this paper. Thus, in a richer model, both tariffs and subsidies might appear less desirable, and this would tend to move us closer to free trade. However, there is no a priori reason to believe that this effect would systematically increase or decrease the extent of import protection bias, because it makes both policies less desirable with no presumption as to how it affects their relative desirability.

In independent work, Matschke (2005) has developed a model similar to the one presented in this paper. The major difference is that Matschke does not set  $\alpha_i = 0$ , as I do here. This parameter (denoted  $\theta_k$  in Matschke) reflects the percentage of population which owns the factor specific to sector  $i$ .<sup>20</sup> In the Grossman and Helpman model, the level of protection is a decreasing function of the percentage of the population which owns sector specific capital in any organized sector, i.e.,  $\sum_{i \in \ell} \alpha_i$ .<sup>21</sup> (This is denoted  $\Theta$  in Matschke.) It can be shown from Matschke's equation (2.5), that increases in this percentage lead to an increased tendency towards import protection bias. Thus, if I allowed for nonzero values of  $\alpha_i$  in my model, there would be a greater tendency towards import protection bias.

The key difference between this paper and Matschke's is in the analysis of the model. My approach is to parameterize the model to see if plausible parameter values yield import protection bias. Matschke notes that a value of  $k > 0$  ( $c > 1$  in her notation) will raise the level of

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<sup>20</sup> Thus, my equations (7a) and (7b) are special cases of equations in Matschke. To obtain (7a), set  $\Theta = 0$  and  $c = 1+k$  in her equation (2.5).

<sup>21</sup> If 100% of the population owns sector specific capital in an organized sector, we obtain free trade in the Grossman and Helpman model, because the lobbying groups completely internalize the negative effects that tariffs impose.

the tariff, lower the level of the export subsidy and therefore move the model towards import protection bias. However, she does not produce an analog of (8) and show that reasonable parameterizations of the model, allowing for the expected greater size of the export sector, are consistent with import protection bias.<sup>22</sup> After developing the model, Matschke estimates it empirically and finds support for it in the data. It should be noted that her estimate of  $k$  is between .04 and .05, which is low relative to the values of Kleven and Kreiner (2003), and low relative to the value of  $k = .2$  that I use in my baseline parameterization of the model.

### 3. CONCLUSION

I am not claiming that the Grossman and Helpman model necessarily implies an import protection bias, but rather that the model is consistent with such a bias for parameter values which are quite reasonable. This conclusion complements Mayer's (2002) results showing support for tariffs at the grass root level as a result of the revenue effects of trade taxation. The results on import protection bias will be reinforced if we make world prices endogenous and therefore provide a terms of trade motive for tariffs.<sup>23</sup>

If we accept the Grossman and Helpman framework as having significant explanatory power, then import protection bias should not be considered a puzzle, as it is entirely consistent with this framework. The work of Limão and Panagariya (2002, 2004) and Chang (2005) provide additional channels through which import protection bias may emerge.

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<sup>22</sup> She does note that if industries are otherwise equal (including size), then there will be import protection bias.

<sup>23</sup> When prices are endogenous, the politically determined tariff will include a term which reflects the optimal tariff. See equation (11) in Helpman (1997). Since the optimal tariff is positive and the optimal export subsidy is negative (i.e., the optimal policy is an export tax), endogenizing the terms of trade will contribute to import protection bias in this model.

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