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Tariffs and the Byrd amendment

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Abstract

The Byrd amendment to US anti-dumping law distributes the revenue from anti-dumping duties imposed on foreign firms to the domestic firms that lodged the complaint of dumping. This paper shows that the presence of the Byrd Amendment can yield lower duties and greater welfare than in its absence. This result holds when the US government puts a sufficient weight on the profits of the domestic industry in the welfare function. A sufficient condition for this result is that the market share of the domestic industry exceeds 50%, which applies in most US antidumping cases.

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1. Introduction

President Clinton signed into law the Byrd amendment, formally known as the Continued Dumping and Subsidy Offset Act (CDSOA), on 28th October 2000. It introduced a system where the liquidated anti-dumping and countervailing duty revenues are distributed to the 'affected domestic producers' who supported the petition for the investigation. An 'affected domestic producer' is defined in the CDSOA as any manufacturer, producer, farmer, rancher, or worker representative who was a petitioner or interested party in support of the anti-dumping or

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countervailing duty investigation. The petitioners may receive a portion of the anti-dumping or countervailing duty revenue to offset 'qualifying expenditures', which includes fixed cost and some variable costs (e.g., investment in manufacturing facilities and the acquisition of technology) incurred in the production of the good subject to duties. The major beneficiaries of the CDSOA have been the ball-bearing, steel and other metals, household items and food (in particular, pasta) sectors. In the financial year 2001, one year after the introduction of the Byrd amendment, over US$230 million was distributed to 900 claimants; in the financial year 2002, US$330 million was distributed to 1200 claimants; in the financial year 2003, US$190 million was distributed to 1800 claimants; and in the financial year 2004, US$284 million was distributed.[1]

The Byrd amendment was subject to criticism from its inception. The European Union together with Australia, Brazil, Chile, India, Japan, Korea and Thailand complained to the World Trade Organisation about the Byrd amendment on the grounds that the offsets under the CDSOA were an illegal response to dumping and subsidies. They also claimed that it would create a clear incentive to petition for anti-dumping or countervailing duties, and would make it more difficult for exporters subject to anti-dumping or countervailing investigations to secure an undertaking. A WTO Panel Report was issued in September 2002 and, following an appeal by the US, the Appellate Body confirmed in January 2003 that the Byrd amendment was inconsistent with the Anti-Dumping Agreement, the Subsidies and Countervailing Measures Agreement, the GATT 1994 and the WTO Agreement as the offsets under the CDSOA were a non-permissible action against dumping and subsidies. The US was given until 27th December 2003 to bring its legislation into conformity with its WTO obligations but, when it failed to repeal the CDSOA, the EU together with several other co-complainants applied in January 2004 for WTO authorisation to apply sanctions in the form of higher import tariffs on US products. The failure by the US to bring its law into conformity with WTO rules resulted in August 2004 in a 'right to retaliate' for the European Union and seven other WTO members. The authorized level of retaliation is proportional to 'the amounts of payments disbursed to the US industry in the latest annual distribution'.

One obvious implication of the Byrd amendment is that it increases the incentive of US firms to lobby for anti-dumping duties. However, a question that has not really been addressed is how the Byrd amendment affects the level of the anti-dumping duty set by the US government, and this is the question that will be addressed in this article. If one believes that the level of anti-dumping duties is determined by the application of the rules then one might not think that the level of the anti-dumping duty will be affected. Alternatively, one might think that the level of the anti-dumping duty is determined by political economy factors. This paper will analyse how the level of the anti-dumping duty may be affected by the Byrd amendment in a political economy model. In order to concentrate on the political economy arguments, the model will not explicitly analyse dumping or anti-dumping duties rather it will analyse the setting of a tariff by a government that maximises a government objective function. As usual in political economy models, the government objective function puts more weight on the profits of the domestic industry than on consumer surplus and government tax revenue. Then, the Byrd amendment may result in a lower tariff and higher welfare for the home country. The reason is that as the Byrd amendment gives the tariff revenue to the domestic industry, the interests of the domestic industry will include the tariff revenue as well

[1] Sources for this and the following paragraph are the World Trade Organisation, Trade Policy Review for the United States from 2001 and 2003, and various press releases from the European Commission from 2000 to 2004.

as the profits. It will become clear that when the government attaches a sufficiently large weight to the interests of the domestic industry then it is optimal to lower the tariff in order to increase the tariff revenue.[2]

2. The model

Consider a two-country model with the home country variables labelled with a subscript one and the foreign country variables labelled with subscript two. In the domestic market of the home country, there are n_1 domestic firms that compete with n_2 foreign firms in a Cournot oligopoly. Each domestic firm has constant marginal cost c_1 and its output for sale in the domestic market is q_1 while each foreign firm has constant marginal cost c_2 and its exports to the home country are q_2. Total domestic production for sale in the home country is $Q_1=n_1q_1$, and total imports into the home country (exports from the foreign country) are $Q_2=n_2q_2$; therefore, total sales in the home market are $Q=Q_1+Q_2$. Consumer preferences in the home country are quasi-linear, and demand is given by the linear inverse demand function: $P=\alpha-\beta Q$, where the demand parameters are positive: $\alpha,\beta>0$, $\alpha>c_1$ and $\alpha>c_2$. The specific tariff set by the government in the home country is t per unit imported. It is assumed that markets are segmented and that marginal costs are constant so the home market can be analysed independently of the foreign market.

The n_1 home and n_2 foreign firms compete as Cournot oligopolists in the domestic market of the home country taking the tariff set by the government as given. With the Byrd amendment the tariff revenue is given to the domestic industry so the profits of the ith domestic firm will include its share of the tariff revenue, which is tQ_2/n_1 if the revenue is distributed equally between all domestic firms.[3] Thus, the profits of the ith domestic firm and the jth foreign firm are:

$$\pi_{1i}=\begin{cases}(P-c_1)q_{1i} & \text{without the Byrd amendment}\\ (P-c_1)q_{1i}+tQ_2/n_1 & \text{with the Byrd amendment}\end{cases}$$

$$\pi_{2j}=(P-c_2-t)q_{2j} \tag{1}$$

In the Cournot equilibrium, each firm is setting its output to maximise its profits given the tariff and the output of its competitors. Therefore, since $\partial Q_2/\partial q_1=0$ in a Cournot equilibrium, the presence of the tariff revenue in the profits of the domestic firms will not have any effect on the Cournot equilibrium outputs. Assuming an interior solution where the home country is supplied by both domestic production and imports from the foreign industry, the Cournot equilibrium outputs (2) of the domestic industry and the imports from the foreign industry are:

$$Q_1=\frac{n_1}{(N+1)\beta}[\alpha-(n_2+1)c_1+n_2c_2+n_2t]$$

$$Q_2=\frac{n_2}{(N+1)\beta}[\alpha+n_1c_1-(n_1+1)c_2-(n_1+1)t] \tag{2}$$

[2] In contrast to Schmitz and Seale (2004), this article analyses the Byrd amendment under Cournot oligopoly rather than under perfect competition.

[3] This assumption about the distribution of the tariff revenue is not important as the tariff revenue turns out not to affect the Cournot equilibrium outputs.

where $N \equiv n_1 + n_2$ is the total number of firms selling in the domestic market. Note that to sign some of the later results it will be assumed that the quantity of imports is positive under free trade, $Q_2 > 0$ when $t = 0$, which implies that $\alpha + n_1 c_1 - (n_1 + 1)c_2 > 0$. Substituting the Cournot equilibrium outputs into the demand function gives the Cournot equilibrium price:

$$P = \frac{1}{N+1}[\alpha + n_1 c_1 + n_2 c_2 + n_2 t] \tag{3}$$

The government is assumed to set its tariff to maximise some objective function. It seems plausible to assume a government objective function that attaches more weight to the interests of the domestic industry than to the consumers' interests. Such a government objective function arises in the Grossman and Helpman (1994) model where special-interest groups lobby for protection by making political contributions to the government politicians who have a payoff function that depends upon the political contributions received and the welfare of the country. Hence, in line with Grossman and Helpman (1994), it will be assumed that the government attaches more weight to the profits of the domestic industry, the special-interest group in this case, than to consumer surplus or tax revenue.[4] Thus, the government in the home country chooses its tariff to maximise its objective function, which is given by the weighted sum of consumer surplus, profits of domestic firms and tariff revenue:

$$G = V(P) + \lambda(P - c_1)Q_1 + \mu t Q_2 \tag{4}$$

The government attaches a weight of one on consumer surplus, given by the indirect utility function: $V(P)$; a weight $\lambda > 1$ on the profits of the domestic industry, $\Pi_1 = (P - c_1)Q_1$; and a weight μ on tariff revenue, $R = tQ_2$. Without the Byrd amendment, the tariff revenue goes to the general taxpayers and has a weight of one ($\mu = 1$), whereas with the Byrd amendment the tariff revenue goes to the domestic industry so it has the same weight as the profits of the domestic industry in the government objective function ($\mu = \lambda$). Therefore, the Byrd amendment can be modelled as an increase from $\mu = 1$ to $\mu = \lambda$, and by treating it as a continuous variable it is possible to analyse the problem using calculus.

Assuming an interior solution where the domestic market is supplied by both domestic production and imports from the foreign industry, the first-order condition for the maximisation of the government objective function is:

$$\frac{\partial G}{\partial t} = \frac{1}{(N+1)\beta}[(2\lambda - 1)n_2\beta Q_1 + \{(N+1)\mu - n_2\}\beta Q_2 - n_2(n_1 + 1)\mu t] = 0 \tag{5}$$

Further differentiation yields the second-order condition for the maximisation of the government objective function:

$$\frac{\partial^2 G}{\partial t^2} = \frac{-n_2}{(N+1)^2\beta}[2(n_1 + 1)(N+1)\mu - 2n_1 n_2 \lambda - n_2] < 0 \tag{6}$$

The second-order condition will be satisfied provided the term in square brackets is positive, and this will be the case if the weight on the profits of the domestic industry is not too large: $\lambda < \lambda^s \equiv [2(n_1+1)(N+1)\mu - n_2]/2n_1 n_2$, which implies that $\lambda < 11/2$ in the case of a duopoly

[4] Veugelers and Vandenbussche (1999) provide casual evidence that in most AD cases, producers interests clearly outweigh consumer interests.

($n_1=n_2=1$) without the Byrd amendment ($\mu=1$).[5] Note that the second-order condition will always be satisfied with the Byrd amendment when the weight on tariff revenue is the same as the weight on the profits of the domestic industry ($\mu=\lambda$) as the term in square brackets will be positive: $2\lambda(n_1+1)^2+(2\lambda-1)n_2>0$.

The optimum tariff that maximises the government objective function is obtained by setting the expression in square brackets in (5) equal to zero and rearranging:

$$t^* = \frac{\beta}{n_2(n_1+1)\mu}[(2\lambda-1)n_2Q_1 + \{(N+1)\mu - n_2\}Q_2] > 0 \tag{7}$$

Since the outputs of the domestic and foreign industry are assumed to be positive quantities, the optimum tariff for the government is unambiguously positive, but it is interesting to consider how it depends upon the weight that the government puts on the profits of the domestic industry. The effect of the weight attached to the profits of the domestic industry on the optimum tariff can be assessed by totally differentiating the first-order condition for the maximisation of the government objective function (5), which yields:

$$\frac{dt^*}{d\lambda} = -\frac{\partial^2 G}{\partial\lambda\partial t} \Big/ \frac{\partial^2 G}{\partial t^2} = \frac{2(N+1)\beta Q_1}{2(n_1+1)(N+1)\mu - 2n_1n_2\lambda - n_2} > 0 \tag{8}$$

The second-order condition (6) implies that the denominator is positive and the numerator is clearly positive. As one would expect, the greater the weight that the government attaches to the profits of the domestic industry then the larger will be the optimum tariff. This leads to the following proposition:

Proposition 1. *The optimum tariff that maximises the government objective function is positive, and increasing in the weight on the profits of the domestic industry in the objective function of the government.*

If $\mu=\lambda=1$ then optimum tariff would be the same as the optimum-welfare tariff in Brander and Spencer (1984a,b), where the tariff improves welfare by shifting profits from foreign firms to domestic firms and by extracting rent from the foreign firms. When the government puts a weight greater than one on the profits of the domestic industry then the optimum tariff will be larger than in Brander and Spencer (1984a,b).[6]

3. Tariffs and the Byrd amendment

Having derived the optimum tariff of the government without the Byrd amendment ($\mu=1$), one can now consider how the Byrd amendment affects the optimum tariff. With the Byrd amendment, the tariff revenue is distributed to the domestic industry so the firms are now concerned about tariff revenue as well as their profits. The government will attach the same

[5] The profits of the domestic industry are increasing and convex in the tariff so if the government puts a large weight on the profits of the domestic industry then the welfare of the government will be convex in the tariff. Then, the optimum tariff will be prohibitive so imports will be equal to zero.

[6] Using a general demand function, Brander and Spencer (1984a,b) show that the optimum tariff is positive unless demand is extremely convex. However, when the government attaches a weight greater than one to the profits of the domestic industry then the optimum tariff is more likely to be positive even when demand is convex.

weight to tariff revenue as to the profits of the domestic industry and this implies that $\mu=\lambda$ in the model. Thus, the Byrd amendment can be represented by an increase in the weight on tariff revenue from $\mu=1$ to $\mu=\lambda$ in the objective function of the government. The effect of the Byrd amendment can be derived by looking at the comparative static results for how the optimum tariff is affected by an increase in the weight on tariff revenue. Totally differentiating the first-order condition for the maximisation of the government objective function (5) and solving yields:

$$\frac{dt^*}{d\mu} = -\frac{\partial^2 G}{\partial \mu \partial t} \Big/ \frac{\partial^2 G}{\partial t^2} = \frac{\beta(N+1)[Q-2\lambda Q_1]}{\mu[2(n_1+1)(N+1)\mu - 2n_1 n_2 \lambda - n_2]} \tag{9}$$

The sign of the expression in square brackets in the denominator is positive if the second-order conditions are satisfied while the term in square brackets in the numerator is negative if the weight on the profits of the domestic industry exceeds a critical value: $\lambda^* \equiv Q/2Q_1 = 1/2d$, where $d \equiv Q_1/Q$ is the market share of the domestic industry. Note that if the market share of the domestic industry is greater than one-half (fifty percent) then the critical weight is less than one so $dt^*/d\mu$ is negative for any $\lambda \geq 1$. If $\lambda > \lambda^*$ the optimum tariff will decrease as a result of the Byrd amendment (an increase in μ), and this leads to the following proposition:

Proposition 2. *The Byrd amendment (an increase in μ) will result in a lower tariff if the weight on the profits of the domestic industry in the government objective function exceeds the critical value $\lambda^* \equiv 1/2d$.*

To understand this result intuitively one has to appreciate that in a Cournot oligopoly model, in contrast to a model with perfect-competition, the optimum-welfare tariff may exceed the maximum-revenue tariff. In a Cournot duopoly model, Collie (1991) showed that the optimum welfare tariff exceeds the maximum-revenue tariff unless the foreign firm has a significant cost advantage. When the government attaches a weight greater than one on the profits of the domestic industry then it is even more likely that the optimum tariff exceeds the maximum-revenue tariff. Then, an increase in the weight that the government attaches to tariff revenue as a result of the Byrd amendment will lead the government to reduce its optimum tariff, as this will increase the government objective function by increasing tariff revenue. Proposition 2 shows that if the weight that the government attaches to the profits of the domestic industry is sufficiently large, $\lambda > \lambda^*$, then the optimum tariff will exceed the maximum-revenue tariff and the Byrd amendment will lead to a reduction in the optimum tariff. If the market share of the domestic industry is greater than 50%, $d > 1/2$, then the critical value of the weight on the profits of the domestic industry is less than one, $\lambda^* < 1$. In that case, the Byrd amendment will result in a lower tariff for any weight on the profits of the domestic industry greater than one, $\lambda < 1$. Since the market share of the domestic industry is greater than 50% in the majority of US anti-dumping duties, proposition two is likely to apply to many anti-dumping cases.[7]

4. Welfare and the Byrd amendment

As the optimum tariff that maximises the government objective function is larger than the optimum-welfare tariff, it may be conjectured that if the Byrd amendment results in a lower tariff

[7] The average US market share in US antidumping cases between 1980–95 was 67.26%. This was calculated on the basis of the data provided on the 'US Antidumping Database webpage' http://darkwing.uoregon.edu/~bruceb/adpage.

then it will increase the welfare of the home country. To ascertain whether this conjecture is correct, one has to analyse how the welfare of the home country is affected by changes in the optimum tariff as a result of the Byrd amendment. The welfare of the home country (as opposed to the government objective function) is defined as the unweighted sum of consumer surplus, producer surplus and government revenue.

$$W = V(P) + (P - c_1)Q_1 + tQ_2 \tag{10}$$

To evaluate the effect of the Byrd amendment (an increase in μ) on the welfare of the home country differentiate (10) with respect to μ. Noting that $\partial W/\partial \mu = 0$, and using (7) and (9) this yields:

$$\frac{dW}{d\mu} = \frac{\partial W}{\partial \mu} + \frac{\partial W}{\partial t}\frac{dt^*}{d\mu} = \frac{-n_2}{(N+1)\mu}[(2\lambda - \mu - 1)Q_1 + (\mu - 1)Q_2]\frac{dt^*}{d\mu} \tag{11}$$

Since $1 \leq \mu \leq \lambda$ and the outputs of the domestic and foreign industries are positive, the term in square brackets is positive so the overall sign is the opposite to the effect on the tariff of an increase in the weight on the profits of the domestic industry, $dt^*/d\mu$. Therefore, if the Byrd amendment results in a lower tariff then the welfare of the home country will increase as a result. This leads to the following proposition:

Proposition 3. *If $\lambda > \lambda^* \equiv 1/2d$ then the Byrd amendment (an increase in μ) will result in a lower tariff and higher welfare for the home country.*

Proposition one and two are illustrated in Fig. 1. It shows the government objective function (with and without the Byrd amendment), welfare of the home country, profits of the domestic industry and tariff revenue plotted against the tariff. Note that figure one is drawn such that the tariff rate that maximises welfare, t^W, exceeds the tariff rate that maximises

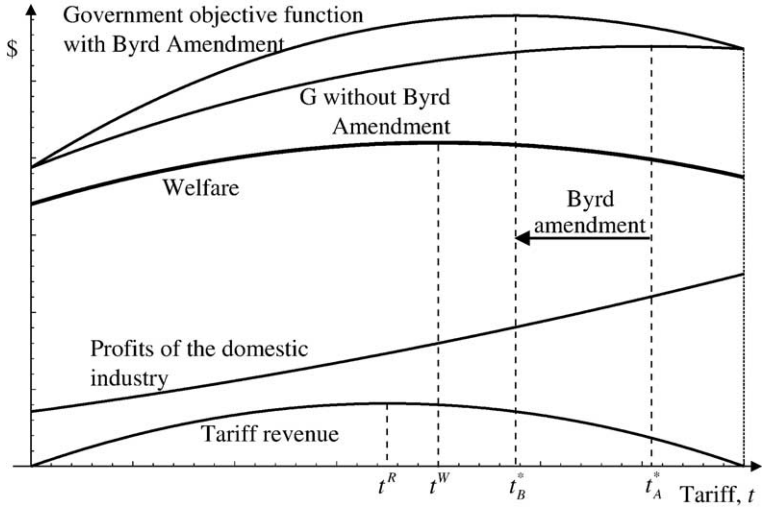

Fig. 1. Welfare and the Byrd Amendment.

revenue, t^R, an outcome that Collie (1991) showed to be a distinct possibility. In the absence of the Byrd amendment, the government maximises its objective function by setting the tariff t_A^*, and in figure one the tariff revenue decreases as the tariff rate increases. With the Byrd amendment, the government attaches more weight to tariff revenue so its objective function shifts such that the optimum tariff is t_B^*, which is lower than t_A^* as was shown in Proposition 2. Since both the tariff rates (t_A^* and t_B^*) exceed the tariff rate that maximises welfare of the country, t^W, the reduction in the tariff as a result of the Byrd amendment will increase welfare, as was shown in Proposition 3.

5. Conclusions

In this paper we have shown that the Byrd amendment can result in a lower tariff and higher welfare for the home country. This theoretical possibility will occur if the weight that the government attaches to the profits of the domestic industry in its objective function is sufficiently large. A sufficient condition for this result to hold is that the market share of the domestic industry exceeds 50%, which seems to be a reasonable assumption for anti-dumping cases. Based on all US antidumping cases between 1980–95, the average market share of the US industry is equal to 67.3%, which implies that the results of the paper will hold in most US antidumping cases. Of course, these theoretical results need to be treated with a great amount of caution, especially the result on the welfare effects, and some critical discussion of the assumptions is necessary.

Firstly, the Byrd amendment has been criticised for increasing the incentive for domestic industries to petition for an anti-dumping investigation due to the increased return from anti-dumping duties as a result of the domestic industry receiving the duty revenue. This paper compares the situation with and without the Byrd amendment in an industry that has anti-dumping duties in both situations so it ignores the increased incentive to petition for ant-dumping investigations. An increase in the number of anti-dumping investigations and consequently the number of industries protected by anti-dumping duties will undoubtedly increase the welfare loss from anti-dumping regulations, which according to Gallaway, Blonigen and Flynn (1999) is already substantial. Secondly, the possibility of receiving a share of the duty revenue will lead firms to engage in rent seeking activity, using real resources such as lawyers and accountants, to obtain a larger share of the duty rent. This seems to be a distinct possibility given the level of claims for a share of the duty revenue. For example, in 2003, the total amount available was US$190 million but the amount claimed by the 1819 claimants was US$1 trillion, which means that claimants received on average US$104,000 or 0.016% of their claim. The welfare analysis in the paper assumes that the duty revenue is a transfer from foreign firms and domestic consumers via the government to the domestic industry, but if the Byrd amendment leads to an increase in rent-seeking then this will reduce welfare in the presence of the Byrd amendment and may negate the result that there is welfare gain from the Byrd amendment.

Thirdly, the possibility of retaliation by other countries is more than a theoretical possibility as the European Union, Japan and six other countries obtained the right from the WTO in August 2004 to retaliate against the Byrd amendment by withdrawing concessions from the US.[8] The withdrawal of concessions is likely to harm the interests of US exporters and their loss should be offset against any possible gain from the Byrd amendment.

[8] The six other countries are Brazil, Canada, Chile, India, Korea and Mexico.

Finally, as in all models of trade policy under imperfect competition, the results may not be robust to the type of oligopoly behaviour assumed. In this case, if Bertrand oligopoly was assumed rather than Cournot oligopoly then the underlying result that the optimum-welfare tariff may exceed the maximum-revenue tariff would still hold as Clarke and Collie (in press) have shown. However, the Byrd amendment may affect the strategic interaction between firms under Bertrand oligopoly in a way that it did not under Counot oligopoly, as suggested by the preliminary results of Evenett (this issue). An extension of the present model to the case of Bertrand oligopoly is a topic that may be the subject of future research.

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