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Authors(s)	Neary, J. Peter
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Export Subsidies and Price Competition

by

Peter Neary

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EXPORT SUBSIDIES AND PRICE COMPETITION

ABSTRACT

This paper examines optimal policy towards a home exporting firm which competes on price with a foreign firm. Two kinds of instrument are compared: an output subsidy and a price subsidy; and two kinds of game are considered: the conventional *ex ante* game, where the government sets the value of the subsidy before firms set their prices, and the *ex post* game, where firms first set their prices, in the anticipation of a subsidy chosen by the government in the second stage. It is shown that the two types of subsidy are equivalent in the *ex ante* game and that a higher level of welfare can always be achieved in the *ex ante* than in the *ex post* game. This reinforces the view that optimal policy in Bertrand competition is an export tax rather than a subsidy.

EXPORT SUBSIDIES AND PRICE COMPETITION

1. Introduction

The traditional case against export subsidies is twofold: in a small open economy no type of trade intervention can be first-best; and in a large economy which can affect its terms of trade there is a presumption that its exports should be taxed rather than subsidised in order to raise their world prices. However, these arguments have been extensively reexamined in recent years. Even in competitive environments, Feenstra (1986) and Itoh and Kiyono (1987) have shown that subsidies to some exports may be desirable if as a result the terms of trade of other exports are improved. More surprisingly, Brander and Spencer (1985) have shown that, if the market structure is a Cournot duopoly, an export subsidy is always optimal because it raises the profits of the home firm at the expense of the foreign.[1]

Such a startling and clearcut departure from orthodoxy as the Brander-Spencer result has naturally attracted a great deal of attention. However, recent work has shown that it is not very robust. In particular, Eaton and Grossman (1986) have shown that if firms are assumed to be Bertrand price competitors rather than Cournot quantity competitors, then the

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[1] In Neary (1988) I have argued that the Brander-Spencer result can be understood as reflecting the same kind of considerations as those which underlie the Feenstra and Itoh-Kiyono results. In all these cases, an export subsidy has a *direct* effect of worsening the terms of trade of the subsidised commodity and an *indirect* effect which *may* improve the terms of trade in the markets for related goods. In the Cournot duopoly case, the direct effect is exactly offset by the additional profits earned by the home firm while the indirect effect must be welfare-improving since (under plausible restrictions) the output of the foreign firm falls, which tends to *improve* the home country's terms of trade.

optimality of an export tax is restored.[2] More recently still, this result has itself been challenged by the work of Carmichael (1987) and Gruenspecht (1988). Carmichael argues that the traditional method of modelling export subsidies diverges from practice in the real world in two important respects: firstly, subsidies are typically paid on the *price* secured on an export contract rather than on the *volume* of export sales; and, secondly, the level of the subsidy is typically determined not *before* but only *after* an export contract has been secured and a price agreed between the exporting firm and the foreign buyer. Taking this empirical paradigm as given, Gruenspecht proceeds to show that subsidies may be optimal when firms are price competitors for plausible parameter values.

The objective of the present paper is to examine these novel arguments and to show that they do not in fact rescue the optimality of export subsidies in markets where firms compete on price. In Section 2, I introduce the framework to be adopted and compare the effects of output and price subsidies in the standard Brander-Spencer framework. Section 3 explores the Carmichael-Gruenspecht model and Section 4 shows that subsidies are never a dominant policy.

2. Price versus Output Subsidies

The framework I consider is one where the home and foreign firm produce differentiated products, whose output levels are denoted x and y respectively. To clarify the issues I concentrate throughout on the case where there is no home consumption and the foreign government does not subsidise its own country's firm. The home government can impose either an

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[2] The Brander-Spencer result has also been shown to be sensitive to relaxations of the assumptions of only two firms (Dixit, 1984), barriers to entry (Markusen and Venables, 1988) and exogenously determined costs (Dixit and Grossman, 1986).

output subsidy, which effectively reduces the home firm's unit costs by an amount s, or a price subsidy, which reduces the price charged by the home firm by an amount σ. Letting p and q denote the home and foreign prices (not including the subsidy), the demand functions may therefore be written as:

$$x = x(p-\sigma,q) \qquad \text{and} \qquad y = y(p-\sigma,q), \tag{2.1}$$

while the home and foreign firm's profits are:

$$\pi = [p+s-C(x)]x \qquad \text{and} \qquad \pi^* = [q-C^*(y)]y. \tag{2.2}$$

For many of the derivations in the paper it is convenient to assume a much simpler specification of demand and costs. For the most part, therefore, I assume that demands are determined not by (2.1) but as follows:

$$x = \alpha - \beta(p-\sigma-q) \qquad \text{and} \qquad y = \alpha + \beta(p-\sigma-q). \tag{2.3}$$

This implies that the demand conditions facing firms are symmetric and that the relative price p-σ-q determines the division of the fixed total demand 2α between them. In addition, I assume that both firms have zero fixed costs and identical marginal costs which are fixed independently of the level of output at a level c.

As noted in the introduction, two alternative assumptions can be made about the timing of subsidy decisions. Firstly, there is the conventional assumption (adopted by Brander and Spencer (1985) among many others) that the government chooses the value of the subsidy *before* any decision is taken by firms. I shall refer to the resulting game as the *ex ante* game and the government's instrument can be either an output subsidy (as has been typically assumed) or a price subsidy. Secondly, there is the assumption whose realism is argued by Carmichael (1987) whereby the government chooses the level of the subsidy *after* the firms have played among themselves. Forward-looking firms anticipate this of course and so they take their

ecisions in the first stage of the game in the knowledge of how the overnment will react in the second stage. I shall refer to this game as he *ex post* game. Note that this assumption does not make sense if the ubsidy is an output subsidy. For in this case, all prices and outputs are etermined before the government makes its choice of subsidy and so ntervention is redundant. Hence, although the issues of whether subsidies re related to the home firm's output or price and whether the game is *ex nte* or *ex post* are distinct in principle, they are related in that the *ex ost* game makes sense only with price subsidies.

In the next section I will examine the *ex post* game in detail. In the emainder of this section, I review the *ex ante* game briefly and show that he two types of subsidy are equivalent in that framework. Consider first he decision problem of the home firm. With demand given by (2.3), it hooses its price to maximise profits taking the foreign firm's price and the evels of both subsidies as given. This yields the following first-order ondition, which is also the home firm's reaction function:

$$2p - q = \mu + c + \sigma - s. \tag{2.4}$$

ere I have introduced the parameter μ, defined as α/β, the relative price p-σ-q) at which the foreign firm captures all the market. A similar series f derivations for the foreign firm yields:

$$-p + 2q = \mu + c - \sigma. \tag{2.5}$$

hen both subsidies are zero, these equations are represented respectively by he lines HH' and FF' in Figure 1. Their intersection point at A is thus he no-intervention or free trade equilibrium. For later use, the values of rices, outputs and profits in this equilibrium are easily calculated as:

$$\bar{p} = \bar{q} = \mu + c, \tag{2.6}$$

$$\bar{x} = \bar{y} = \alpha, \tag{2.7}$$

$$\bar{\pi} = \bar{\pi}^* = \alpha\mu. \qquad (2.8)$$

It is clear from inspection of (2.4) and (2.5) that the two types of ubsidy have very different effects on the location of the reaction curves nd so on the gross prices charged in equilibrium. An output subsidy shifts he home firm's reaction function only, causing the equilibrium to move ownwards along FF' as s rises; both prices fall, the home price faster than he foreign. By contrast, a price subsidy shifts both reaction functions ightwards, causing the equilibrium to shift down along the line SS' through .[3] The two prices therefore move in opposite directions, the home price ctually rising. These comparisons may be seen explicitly from the olutions for p and q from (2.4) and (2.5):

$$p = \mu + c + \frac{\sigma}{3} - \frac{2}{3}s \quad \text{and} \quad q = \mu + c - \frac{\sigma+s}{3}. \qquad (2.9)$$

owever, these differences between the operation of the two types of subsidy re in fact illusory when it is noted that they have identical effects on the et price of home output, $p-\sigma$, and thus on the relative price of the two oods:

$$p - \sigma - q = -\frac{\sigma+s}{3}. \qquad (2.10)$$

n the *ex ante* game, therefore, there is no real distinction between price nd output subsidies: both lower the relative price of home output and so xpand the home firm's profits and market share. Moreover, from the results f Eaton and Grossman (1986), the optimal level of both subsidies is actually egative. This is illustrated in Figure 1. The curve W^0 through A is one f many iso-profit loci for the home firm *in the absence of either subsidy*. ecause it is an iso-profit locus, it is horizontal where it cuts the HH'

Adding (2.4) and (2.5) to eliminate σ and setting s equal to zero, the quation for SS' is found to be: $q = -p+2(\mu+c)$.

line and is convex from below at that point.) This curve is also an iso-welfare locus for the home country, where (in the absence of home consumption) welfare equals simply home profits less subsidy payments and where the only instrument used is an output subsidy:

$$W = \pi(p,q,s) - sx \tag{2.11}$$

$$= (p-c)x, \tag{2.12}$$

the last step following from (2.2). Of course, W^o is not an arbitrary iso-welfare locus, but rather the highest attainable given the constraint that the foreign firm's behaviour must be consistent with its reaction function FF'. Thus point B is the optimal intervention point when s is the only policy instrument and, since p is above $\bar{p}$, the optimal value of s is *negative*, corresponding to an export tax. The optimal point when σ is the policy instrument is therefore point B': it lies horizontally across from B (since from (2.9) the value of q is affected identically by the two instruments) and lies on the SS' locus.[4] This point will prove useful in Section 4.

Finally, it should be noted that the equivalence between output and price subsidies in the *ex ante* game is a general result which does not depend on the particular specification assumed here. To see this, return to the general specification of demand and costs in (2.1) and (2.2) and write P for the *net* price of the home good, $p-\sigma$. It may now be seen that the two types of subsidy operate in exactly the same way. In particular, both have identical effects on the two firms' profits:

$$\pi = [P+s+\sigma-C\{x(P,q)\}].x(P,q), \tag{2.12}$$

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[4] It happens to be the case that W^o passes through point B', but no significance should be attached to this, since in the presence of a price subsidy (by contrast with the case of an output subsidy) the iso-welfare loci are shifted.

$$\pi^* = [q-C^*\{y(P,q)\}].y(P,q). \qquad (2.13)$$

Evaluating and differentiating the first-order conditions in the general case shows that changes in the two types of subsidy have identical effects on the equilibrium:

$$\begin{bmatrix} \pi_{pp} & \pi_{pq} \\ \pi_{qp} & \pi_{qq} \end{bmatrix} \begin{bmatrix} dP \\ dq \end{bmatrix} = \begin{bmatrix} -x_p \\ 0 \end{bmatrix} (ds+d\sigma) \qquad (2.14)$$

ence, provided both firms take the levels of the subsidy rates as given in hoosing their prices (or, what amounts to the same thing, provided the home irm negotiates with foreign buyers on the basis of the net price P only), he two types of subsidy are fully equivalent. Of course, this is not urprising. If the two subsidies operated in different ways, the home overnment would in effect have two independent policy instruments at its isposal and, with only two target variables to control (x and y), would be ble to implement any desired pattern of output.

Table 1 summarises the conclusions of this section.

		Type of Subsidy	
		Output	Price
Nature of the Game	Ex Ante	Brander-Spencer	Degenerate
	Ex Post	same as Brander-Spencer	Carmichael-Gruenspecht

Table 1: Alternative assumptions about type of subsidy and the nature of the subsidy game

. Post-Contract Choice of Subsidies

Since the choice of instrument in the *ex ante* game does not of itself aise any substantive issues, I turn next to explore the implications of ssuming that governments move after rather than before firms in determining he subsidy level. Moreover, since an output subsidy is redundant in this ontext, as already noted, I concentrate in the remainder of the paper on rice subsidies.

The first issue to be addressed when price subsidies are considered is hat they are not formally consistent with the standard welfare function 2.11). The reason is that there is no upper bound on the price which the ome firm may charge: since the government is indifferent between extra profits and extra subsidy disbursements but the firm is not. To avoid the mplausible implication that subsidies should be increased without bound, I follow Gruenspecht in introducing a parameter δ, assumed to be greater than unity, which measures the opportunity cost of public funds:[5]

$$W = \pi(p,q,\sigma) - \delta\sigma x. \qquad (3.1)$$

This ensures that the *ex post* optimal subsidy is bounded and has the plausible implication that an extra pound of subsidy payments reduces welfare by more than an extra pound of profits increases it.[6]

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[5] Carmichael dealt with this problem by postulating an arbitrary upper bound on the contract price, but this begs the question of how the government agency chooses the limit. Carmichael's analysis also fails to justify an export subsidy.

[6] Browning (1987) provides estimates for the United States of the marginal welfare cost of taxes on labour earnings, equivalent to δ-1 (assuming that changes in export subsidies are matched by changes in labour taxes). His estimates (see his Table 2, p. 21) imply a value for δ between 1.10 and 4.03, with his preferred estimates lying between 1.32 and 1.47.

To explore the solution of this game, it is necessary as usual to solve
st for the second stage, assuming that the firms have already chosen their
ces in the first stage. The government therefore chooses σ to maximise
welfare function (3.1) taking p and q as given, which yields the
lowing function of p and q:

$$\tilde{\sigma}(p,q) = -\frac{\mu}{2} + \frac{1}{2}(p-q) + \frac{1}{2\delta}(p-c). \qquad (3.2)$$

ation (3.2) shows that a higher subsidy is warranted the greater the
sting gross price differential, p-q (since this reduces exports and so
fare) and the greater the home firm's price-cost margin (since this makes
more profitable to encourage an expansion of output). Thus a rise in p
ds to raise σ on two counts, but because of the lower social valuation
ced on profits than on government revenue, the government only partly
pensates for a price rise with an increase in the subsidy. A rise in the
e firm's price is therefore partly (though never fully) passed on to
sumers:

$$\frac{\partial}{\partial p}\left[p-\tilde{\sigma}(p,q)-q\right] = \frac{\delta-1}{2\delta} \qquad (3.3)$$

ch is increasing in δ and lies between zero and 0.5.[7]

Whereas the government takes both prices as fixed in the second stage of
game, the firms set prices in the first stage in the anticipation that a
sidy will be provided according to the formula (3.2). Thus, with its
fits given by (2.2) (setting s equal to zero), the home firm's first-order
dition may be written as:

$$\frac{d\pi}{dp} = \frac{\partial\pi}{\partial p} + \frac{\partial\pi}{\partial\sigma}\frac{\partial\tilde{\sigma}}{\partial p} = 0 \qquad (3.4)$$

ce a higher price induces a higher subsidy which raises profits, the

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y contrast, the home government always raises the subsidy to offset
ctly half of an increase in the foreign firm's price.

firm will always, for a given price charged by the foreign firm, set a higher price than it would if it did not anticipate a change in the subsidy. Writing (3.4) explicitly gives the home firm's reaction function:

$$2(\delta-1)p - \delta q = \delta\mu - (2-\delta)c. \tag{3.5}$$

Surprisingly, similar incentives face the foreign firm, which implies that *both* firms gain from the mere existence of the subsidy program. This follows from the corresponding equation for the foreign firm:

$$\frac{d\pi^*}{dq} = \frac{\partial\pi^*}{\partial q} + \frac{\partial\pi^*}{\partial\sigma}\frac{\partial\tilde{\sigma}}{\partial q} = 0 \tag{3.6}$$

Since a rise in q will cause the home government to *lower* the subsidy, the foreign firm's profits will rise. Hence it too will (for given p) charge a higher price than in the absence of the subsidy program. Writing (3.6) explicitly gives the foreign firm's reaction function:

$$-(\delta-1)p + 2\delta q = 3\delta\mu + (1+\delta)c. \tag{3.7}$$

Equations (3.5) and (3.7) can now be solved for the equilibrium prices which arise from price competition between firms in the first stage of the game:

$$\tilde{p} = c + \frac{5\delta}{3(\delta-1)}\mu \qquad \text{and} \qquad \tilde{q} = c + \frac{7}{3}\mu \tag{3.8}$$

Given what has been said, it is not surprising that both prices exceed their common value in the non-intervention case, $\bar{p}$ and $\bar{q}$. (See (2.6) above.) These prices in turn imply, by substitution into (3.2), the following explicit expression for the optimal subsidy in this game:

$$\tilde{\sigma} = \frac{5(3-\delta)}{6(\delta-1)}\mu. \tag{3.9}$$

This gives one of Gruenspecht's principal results: the optimal subsidy is positive for values of δ less than 3. Though the values of p and $\tilde{\sigma}$ vary with δ, the net price paid by consumers does not; at the optimum, the relative price is independent of δ and is positive. (It equals $\mu/6$.) This implies that, whatever the shadow price of government funds, the effect of the

subsidy programme is to bring about the same pattern of sales, one which moreover gives a *larger* market share to the foreign firm: home output is $5\alpha/6$ whereas foreign is $7\alpha/6$. Thus both firms gain from the subsidy program, the foreign firm because its larger market share raises its profits and the domestic because it benefits directly from the subsidy.

Finally, does the home government gain from the subsidy program? Substituting into (3.1), the expression for welfare at the optimum is:

$$\tilde{W} = \alpha\mu \frac{25}{36} \delta. \qquad (3.10)$$

This is increasing in δ: as the shadow price of government funds rises, the government gains more by having access to an increasingly efficient source of tax revenue. Nevertheless, for values of δ in the range 1.44 (=36/25, the value at which $\tilde{W}$ equals $\bar{W}$) and 3, the optimal policy is a positive subsidy and it yields a higher level of welfare than does the absence of a subsidy programme. Since this range is consistent with many empirical estimates of δ (see the results of Browning (1987) already cited), a plausible case for the optimality of an export subsidy when firms are price competitors would appear to have been established.

4. The Relative Optimality of Ex Post and Ex Ante Subsidies

So far I have followed Gruenspecht in assuming that subsidies are offered on an *ex post* basis, with both firms anticipating the effects of the prices they set on the government's choice of subsidy level. But it is not enough to compare the outcome of this game with the level of welfare in the absence of any intervention. We must also examine whether it leads to a *higher level of welfare than in the ex ante game where the government first* sets the level of subsidy and the firms take this as a parameter in their decisions. Since this sequence of decisions is the standard one considered in most writings on export subsidies, we already know a good deal about its

implications. In particular, we know from Eaton and Grossman (1986), as I have illustrated in Section 2, that, at least when δ equals unity, the optimal policy in this game is an export tax rather than a subsidy. However, it is necessary to reexamine its properties under the parameterisation adopted in this paper in order to determine which of the two games yields a higher level of welfare.

To examine this, recall the results derived in Section 2 for the second stage of this game, in which both firms choose price to maximise profits, taking the subsidy rate s as given. As we saw, the subsidy raises the price received by the home firm and lowers that charged by the foreign firm, while on balance it lowers the relative price of home output:

$$p - \sigma - q = -\frac{\sigma}{3}. \qquad (4.1)$$

(This just repeats (2.10), with s equal to zero.) Now, consider the first stage of the game, in which the government chooses σ to maximise (3.1), in the knowledge that firms will react as shown by (2.9). Calculating the solution for σ yields:

$$\sigma^{o} = -\frac{3(3\delta-2)}{2(3\delta-1)}\mu. \qquad (4.2)$$

This is negative and decreasing in δ, which extends the result of Eaton and Grossman (who implicitly assumed a value of unity for δ): in the *ex ante* game, the optimal policy is *always* an export tax, irrespective of the value of δ. The optimal point in Figure 1 moves away from point B' (corresponding to a value for δ of unity) in a northwesterly direction along QQ' as δ rises.[8] From (4.1), it follows that the net relative price of home output is raised by the export tax. Hence, in this game too, the effect of the

[8] As δ approaches infinity, the optimal point approaches the point T on SS' where p equals $c+\mu/2$ and q equals $c+3\mu/2$.

ptimal subsidy is to cause the home firm to lose market share. Indeed, his effect is considerably more pronounced than in the *ex post* game: home utput is 16.6% lower than without intervention in the *ex post* game but depending on the value of δ) between 25 and 50% lower in the *ex ante* game.[9] he values of p and σ in the two games are compared in Figure 2, while Figure compares the values of home output.

Finally, what do these results imply for the level of home welfare? ubstituting into (3.1) leads, after some manipulations, to the following:

$$W^{o} = \alpha\mu \frac{9\delta^2}{4(3\delta-1)}. \qquad (4.4)$$

his is increasing in δ, reflecting once again the advantages to the overnment of having a source of tax revenue which is more highly valued than orporate profits. Much more significantly, it is *always* greater than the evel of welfare in the *ex post* game, given by (3.10). Thus it is *not* true o say that the government can gain by playing the *ex post* game: this is true nly if the alternative is to avoid intervention altogether, not if it can lay the *ex ante* game instead.

Why then might the *ex post* game emerge? An obvious incentive favouring ts adoption can be seen by considering the levels of *profits* by both firms n both games. In the *ex post* game these are:

$$\tilde{\pi} = \alpha\mu \frac{25\delta}{18(\delta-1)} \quad \text{and} \quad \tilde{\pi}^{*} = \alpha\mu \frac{49}{18} \qquad (4.5)$$

ile in the *ex ante* game they are:

$$\pi^{o} = \alpha\mu\left[\frac{3\delta}{2(3\delta-1)}\right]^2 \quad \text{and} \quad \pi^{*o} = \alpha\mu\left[\frac{9\delta-4}{2(3\delta-1)}\right]^2 \qquad (4.6)$$

calling from (2.8) that profits of both firms in the symmetric

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The values of home output at the optima of the two games (to be compared th the free trade value, from (2.7), of α) are:

$$\tilde{x} = \frac{5}{6}\alpha \quad \text{and} \quad x^{o} = \frac{3\delta}{2(3\delta-1)}\alpha. \qquad (4.3)$$

no-intervention case are $\alpha\mu$, a number of important results follow from these equations. The principal one is that *both* firms have higher profits in the *ex post* game than in *either* the *ex ante* game or the no-intervention case. Therefore, in the truly *ex ante* situation of "choosing between games," the incentives facing firms are exactly opposite to those facing the home government. Both firms would prefer the *ex post* game to be adopted. This suggests that my earlier result that the home government attains a lower level of welfare when this game is played is not inconsistent with the empirical evidence adduced by Carmichael. However, the interpretation of this evidence is not that governments have been well advised in their choice of the "rules of the game" but rather that their interests have been subordinated to those of the firms. Bearing in mind that the "government" in real-world situations is typically a specialist export credit agency (the ExIm Bank in the U.S., etc.), this interpretation is fully consistent with the theories of Stigler and Posner that specialist government agencies, rather than seeking to maximise some measure of general welfare, are typically "captured" by the very private sector actors whose actions they are intended to regulate.

All these results are illustrated in Figure 4, where the vertical axis is measured in multiples of the benchmark level of welfare and profits ($\bar{W} = \bar{\pi} = \bar{\pi}^* = \alpha\mu$). Note that the foreign firm gains from both types of export subsidy, whereas the home firm actually has lower profits in the *ex ante* game than in the no intervention case.

5. Conclusion

The main result of this paper is that positive export subsidies cannot be justified on welfare maximisation grounds if home and foreign firms compete on price. This conclusion was also reached by Eaton and Grossman

(1986) but only in the context of the standard theoretical paradigm of how export subsidies are administered in practice: namely, a two-stage game, where the government fixes the subsidy level in the first stage, knowing that that will affect firms' decisions in the second stage. However, the realism of this paradigm has been challenged by Carmichael (1987), who argues that the policy of the U.S. ExIm bank may be better characterised as a game where *firms* move first, choosing thier prices in the knowledge that a predictable level of subsidy will be provided by the government in the second stage. This reversal of the standard assumption about timing in the choice of export subsidies has been shown by Gruenspecht (1988) to imply that a positive export subsidy may, in plausible circumstances, lead to a level of welfare higher than in the absence of intervention.

While not disputing these results, I have shown that welfare is *always* higher in the *ex ante* subsidy game where the government moves first than in the *ex post* subsidy game. The government's first-mover advantage is clearcut therefore: to the extent that it can influence the choice of subsidy regime (or the "rules of the game"), it should opt for an *ex ante* rather than an *ex post* type of programme. Precommitment to a subsidy *level* rather than to a subsidy *rule* is always welfare-enhancing. Of course, as I have noted, this is not necessarily in conflict with the empirical evidence presented by Carmichael. However, it implies that lobbying by firms rather than welfare maximisation may be the explanation for the adoption of *ex post* subsidy programmes.

Naturally, since these results have only been obtained in a special model, their robustness needs to be investigated. Nevertheless one general reflection seems justified by the conclusions of this paper: the term "rent shifting" is clearly inappropriate as a description of the possibility of

raising welfare by subsidising a home firm which competes in an oligopolistic market with a foreign firm. It is of course true that the potential for raising the home firm's profits provides a source of welfare gain not present in competitive models. But "shifting" profits (or rents) from foreign to home firms is a consequence of optimal intervention only in the Cournot quantity competition case considered by Brander and Spencer (1985). In the cases considered in this paper, optimal intervention shifts rents from foreign consumers towards *both* firms in the *ex post* subsidy game; while in the *ex ante* subsidy game the optimal policy (an export tax) raises the foreign firm's profits and *lowers* the home firm's. Thus no clear guidelines can be drawn about the desirability or otherwise of using government policy to shift rents towards home firms at the expense of their foreign competitors.

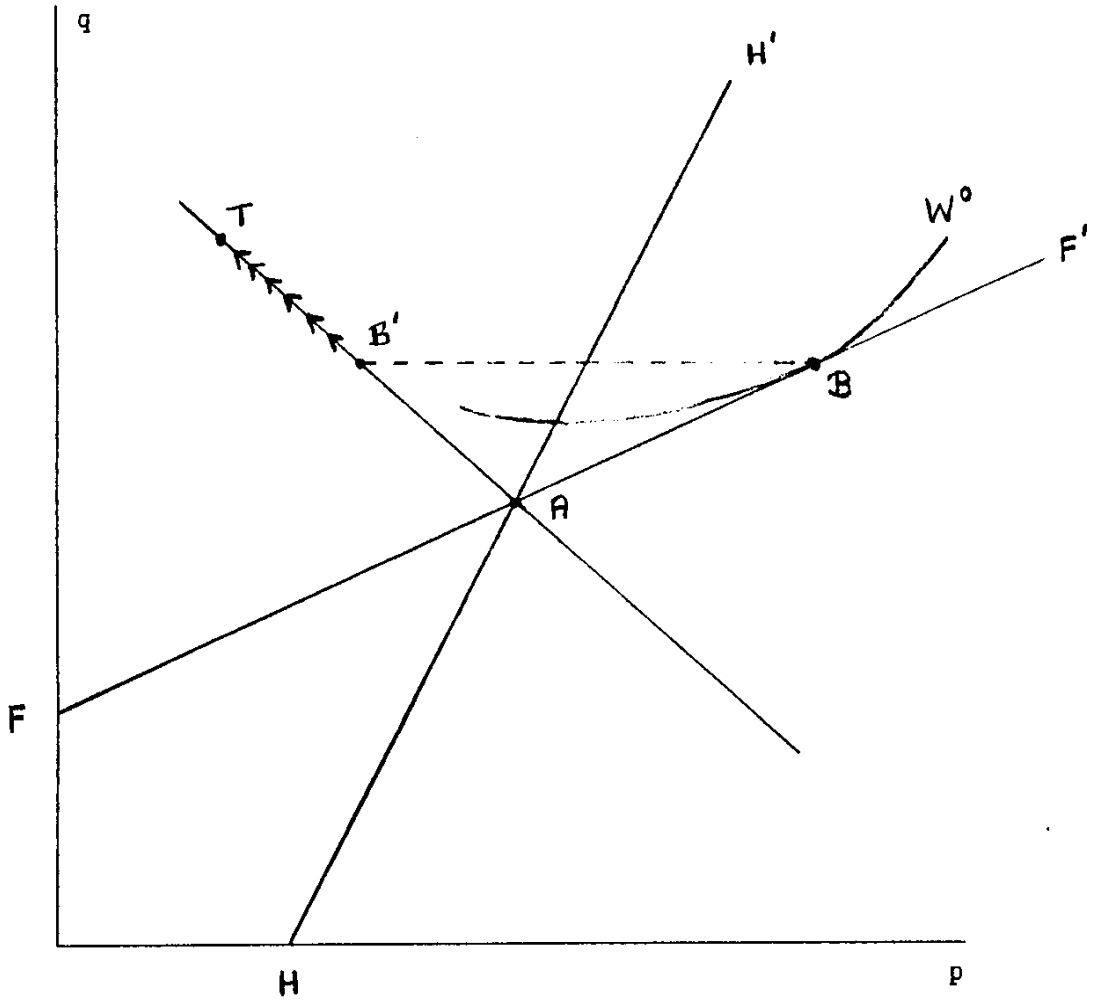

Figure 1: Effects of Output and Price Subsidies
in the *Ex Ante* Game

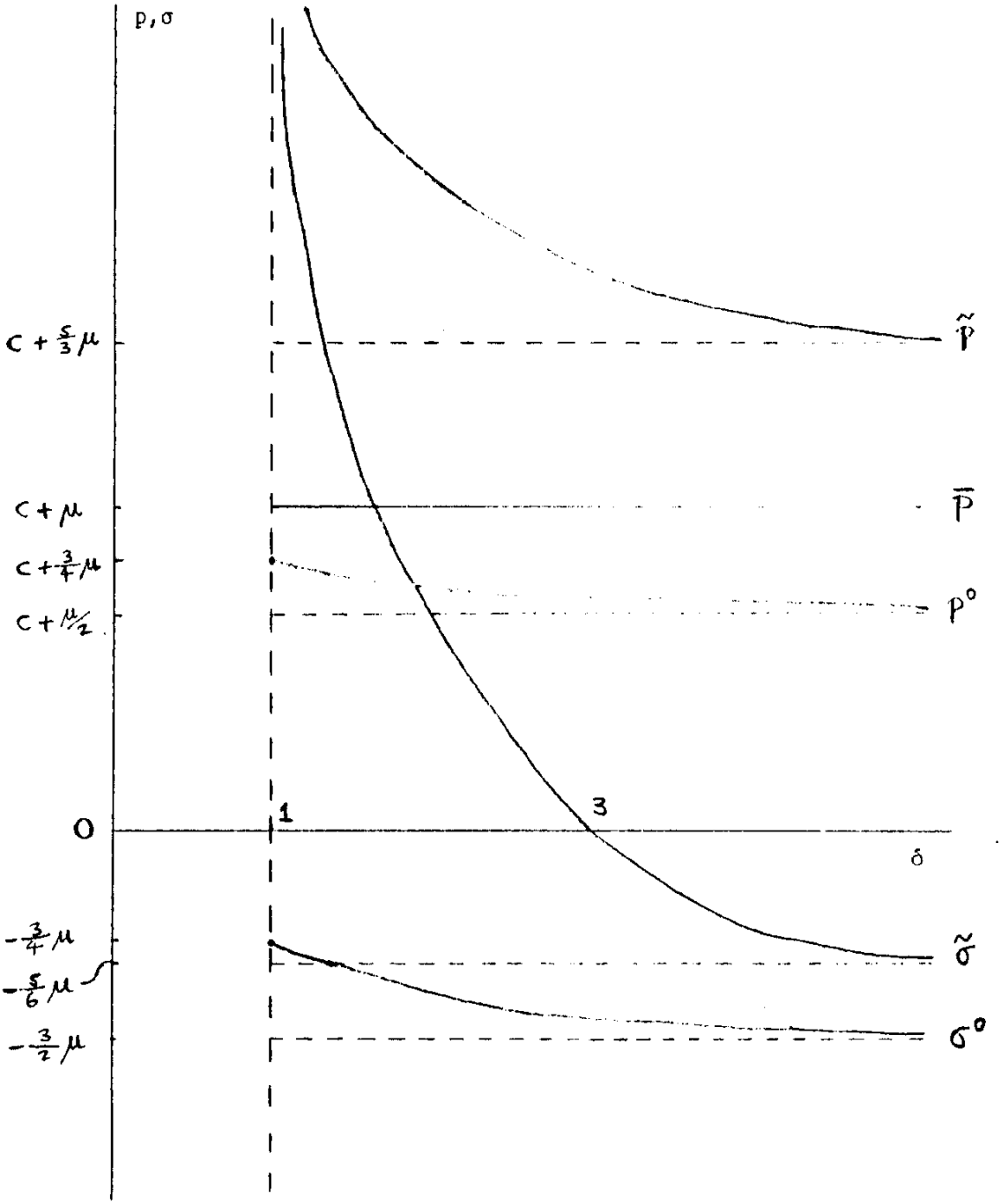

Figure 2: Values of Home Price and of the Optimal Subsidy as a Function of δ in the *Ex Ante* and *Ex Post* Games

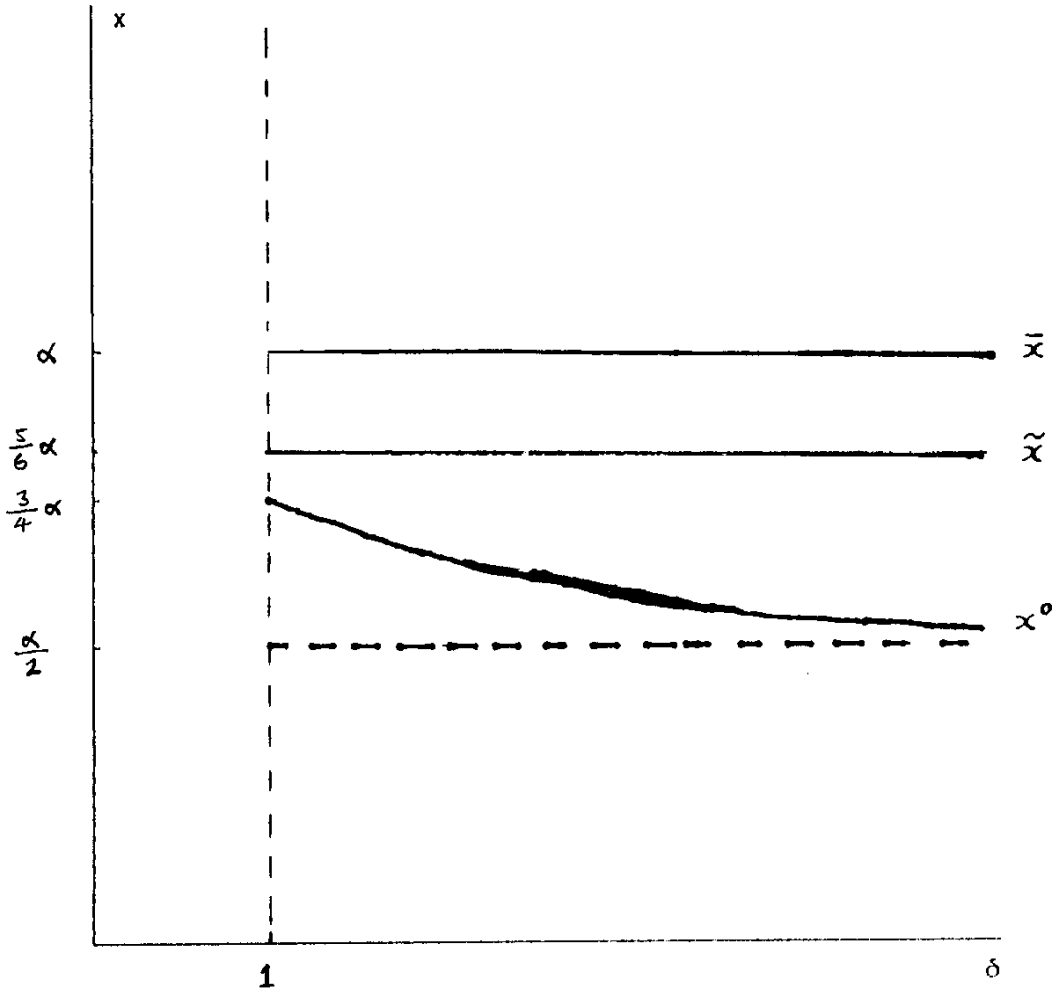

Figure 3: Values of Home Output as a Function of δ
in the *Ex Ante* and *Ex Post* Games

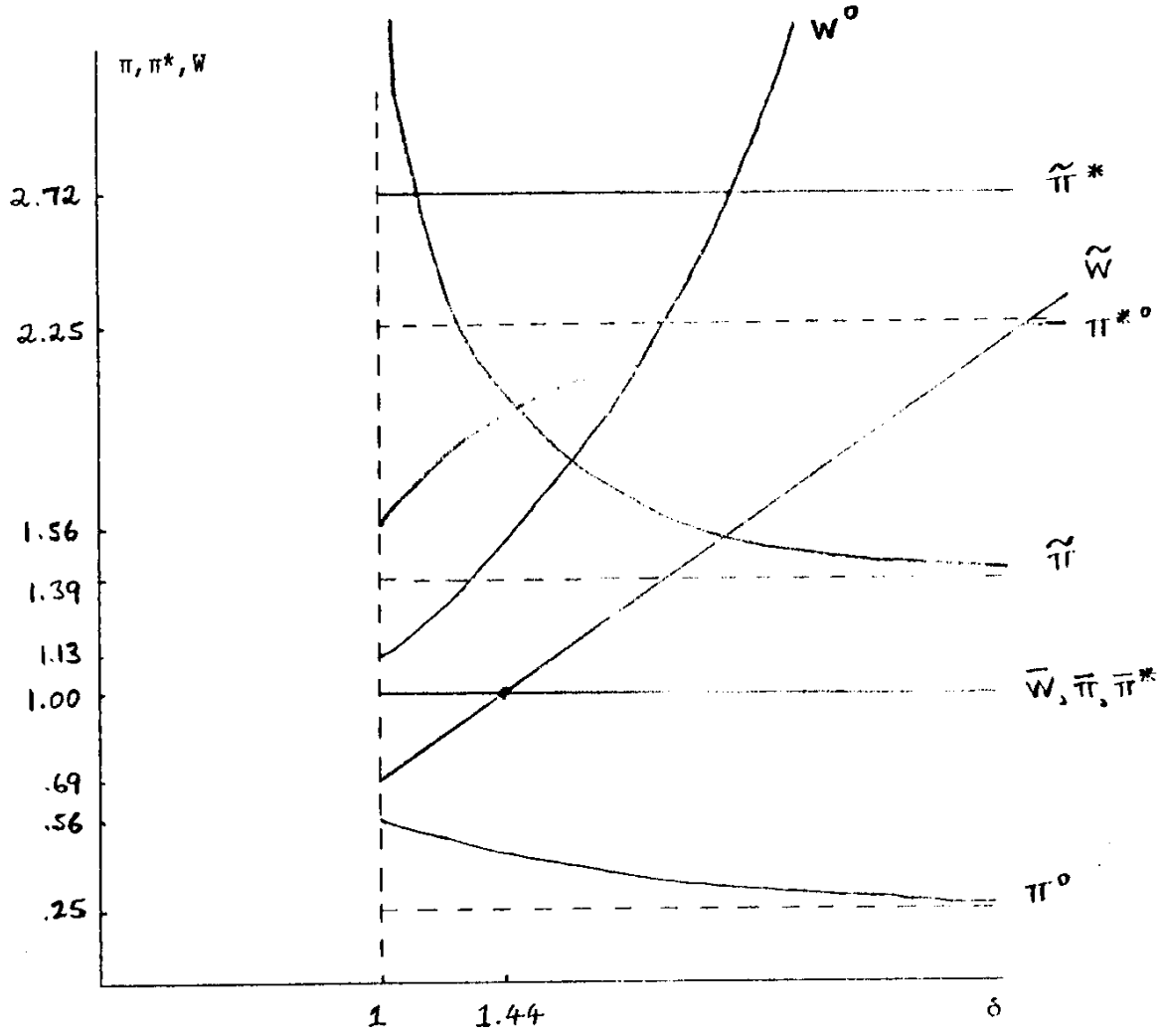

Figure 4: Values of Home Welfare and of Home and Foreign Profits as a Function of δ in the *Ex Ante* and *Ex Post* Games

Note: All figures on the vertical axis are in multiples of $\alpha\mu$

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