INTERNATIONAL POLICY CENTER
Gerald R. Ford School of Public Policy
University of Michigan

IPC Working Paper Series Number 87

Economic Effects of "Leveling the Playing Field" in International Trade

Alan V. Deardorff, University of Michigan

July 9, 2009

Economic Effects of "Leveling the Playing Field" in International Trade

Alan V. Deardorff

The University of Michigan

Report prepared for MEPA,
Industry Canada

Revised July 9, 2009

ABSTRACT

Economic Effects of "Leveling the Playing Field" in International Trade

Alan V. Deardorff

The University of Michigan

This paper uses simple economic theory to examine the effects of various policies that are intended to level the playing field in international trade. That is, when foreign producers are given advantages over domestic producers by government subsidies or other interventions that lower their costs, domestic firms may argue that their own governments should either provide comparable assistance or should protect them from competing with the foreign firms on grounds of fairness. Economic analysis easily shows that granting these requests is usually harmful for the domestic economy as a whole, but that may not prevent such policies from being implemented. Therefore this paper examines what the further effects of such policies may be. The main conclusion that emerges is that policies to level the playing field most often overcompensate those who request them, making them better off than if the playing field had not be tilted against them in the first place.

Keywords: Subsidies
Countervailing duties

JEL Subject Code: F13 Commercial Policy

Correspondence:

Alan V. Deardorff
Ford School of Public Policy
University of Michigan
Ann Arbor, MI 48109-3091
Tel. 734-764-6817
Fax. 734-763-9181
E-mail: alandear@umich.edu
http://www-personal.umich.edu/~alandear/

July 9, 2009

Economic Effects of "Leveling the Playing Field" in International Trade[*]

Alan V. Deardorff
The University of Michigan

I. Introduction

Businesses and industries often argue that national governments should subsidize or otherwise assist them so as to "level the playing field" with their claimed-to-be subsidized competitors in other countries. An example of this argument from the standpoint of a country outside the US and EU would be: the US and the EU both subsidize their airframe manufacturers; therefore to level the playing field we should subsidize our airframe manufacturers. Alternatively, they ask for other sorts of policy, such as protective tariffs, to achieve the same objective.

Economists tend to argue that subsidies and other policies for such a purpose typically decrease total income in the country providing the subsidy, but they also note possible exceptions. The objective of this paper is to examine these arguments, focusing specifically on the following questions:

1. What is the current theoretical understanding as to the circumstances (if any) under which a small, open economy like Canada might benefit from subsidies (or tariffs or non-tariff barriers) designed to "level the playing field"?

[*] This paper was commissioned by Micro-Economic Policy Analysis, Industry Canada, whom I thank for generous financial support. I have benefitted from comments on an earlier draft from Daniel Boothby at Industry Canada, as well as from an anonymous referee and from Wolfgang Keller and other participants at the March 13, 2009, Workshop on Industrial Policy and International Trade, in Ottawa where the paper was presented.

2. Who benefits and who loses from "leveling" actions within the leveling country?

I had a third objective when I set out to write this paper: 3. To review the empirical evidence on polices that have attempted to level the playing field. As I will note below, however, I did not find much to review.

In the title of this paper I have put the term “level playing field” in quotation marks for two reasons. One is that it is not at all well defined. Appelman et al. (2003) provide an extended discussion, with examples, of what the term might mean. They converge on two quite different definitions, both of which seem to be common in the broader literature that covers many domestic issues as well as international trade. One is a “rules-based” definition: the playing field is level if the rules are the same for all firms. The second is an “outcome-based” definition: the playing field is level if all firms have the same expected profit. In the international context here, the relevant firms are domestic and foreign, and both rules and outcomes can easily be different because they are subject to different governments, participate in different markets, and are subject to both natural and policy-imposed cross-border costs.

But the more important reason for putting the term in quotation marks is that it connotes a parallel between sporting competition and economic competition that simply is not valid, especially in the context of international trade. Fundamental to our understanding of the gains from trade is the fact that countries have comparative advantage in some exporting activities and comparative disadvantage in others. Thus in David Ricardo’s famous example of wine and cloth traded between the United Kingdom and Portugal, it is not the case, nor should it be, that British vintners compete on an equal

footing with Portuguese ones. Instead, climate unambiguously favors the latter. The same might also be true of Portuguese weavers, but if these are the only goods available to trade, and if the Portuguese technical advantage in wine is larger than in cloth, then wages will settle in the UK at a low enough level for it to export cloth to Portugal. Again, the low wage in the UK might be viewed as favoring its cloth producers, and indeed it does, but that does not negate the benefits from trade. The gains from trade arise precisely from the unequal relative costs in the two countries, and therefore from the "tilted playing field."

Indeed, the most fundamental misconception that underlies requests to level the playing field in international trade is that trade, like sport, is a zero-sum game. It is not. Two trading countries stand both to gain from mutual exchange, and the size of this gain arises directly from the differences in their costs.

Some might say that differences in ability to produce do not constitute an unlevel playing field, any more than do differences in the innate abilities of athletes in a sporting competition. Their objection, they might say, is not to the differences that underlie comparative advantage, but rather to artificial differences imposed by governments that favor some producers over others. Thus they implicitly favor the rules-based definition of Appelman et al. That, indeed, is primarily what I will examine here, focusing mostly on simple subsidies that governments might pay to producers or exporters. Such policies do stimulate sales, and often exports, that are arguably "unfair" to unsubsidized producers. But to be a basis for policy one must rely on another misconception. That is that the gains from trade, like the profit from business, are about selling rather than buying.

In fact the gains from trade accrue to countries as a whole, and these gains consist of the expansion of what they are able to consume, or buy. Production, exports, and sales are critical, of course, but only because it is through these activities that a country acquires the means to buy more in exchange for what it exports.

It is this focus on what a country is able to buy, as the basis for economic welfare, that underlies one of the better known economist's recommendations for responding to a foreign subsidy: According to Paul Krugman, the recipient of subsidized exports should write a thank-you note, not respond with a countervailing duty, subsidy, or other policy to level the playing field.

This is not to say that unsubsidized producers are not hurt by the subsidy. They are, and they may well go completely out of business as a result. But from the standpoint of their country, this merely means that the resources they were using to produce in competition with their subsidized competitors can be used for something else to produce greater value and therefore finance greater consumption for the country.

Based on this sort of argument, we would not normally expect a valid economic analysis to yield a case in favor of leveling the playing field. Exceptions might be found when markets are distorted, and I will look for them. But primarily this paper is not about making the case for or against leveling, but rather about more fully understanding leveling's effects. For even if one accepts that leveling the playing field is seldom if ever a good idea for a country as a whole, it might still be the case politically that doing it in some fashion is necessary. We therefore need to know what to expect as a result.

The focus here is on a small country, such as Canada. In trade theory, the "small-country assumption" usually means that the country's participation in world markets is

too small for its policies to matter for world prices. This means that, in each industry, both its share of world demand and its share of world supply are negligibly small. However, that seems to be a bit too extreme to characterize many actual relatively small countries, including Canada. In such countries shares of world demand are indeed very small, but shares of world supply in particular industries may not be. And it may be in precisely those industries that demands for leveling the playing field arise most stridently; smaller industries lack the bulk, even within the country, to matter politically. Therefore most of the analysis here will allow the country's policies to matter for the world price of the good in question. Only after that analysis is complete will I check the results against the conventional small-open-economy case where the country's supply in the affected industry is too small to matter for the world price.

II. Theoretical Analysis

Consider two identical,[1] perfectly competitive groups of suppliers of a homogeneous good, selling to the same, single market, which initially is not subject to any government policy. Each supply group has a government that may choose to implement a policy, perhaps in its interest. The obvious context for this analysis is producers from two countries, interacting either in their own or in a third country's market. But the analysis applies equally within a country if lower levels of government champion local firms or if groups of domestic producers are treated differently under the law.

The initial equilibrium is shown in Figure 1. The two supplier groups are assumed to have upward sloping supply curves that, since they are identical, are shown as

[1] That the two groups are identical in size, as well as in costs, is not at all necessary. It merely helps to limit clutter in the figures.

$S_1^0(p) \equiv S_2^0(p)$. Market supply is their horizontal sum, $S^0(p) \equiv S_1^0(p) + S_2^0(p)$, which intersects market demand, $D(p)$, at p^0. In this equilibrium, since the groups of firms are identical, it seems plausible to say that the playing field is level.

Consider first what happens if the playing field is now tilted. There are various ways that could happen in general, but the simplest one in this context is to have the government of one group of suppliers provide it a production subsidy. Assume, therefore, that the government of group 2 – which we can think of as the "foreign firms" and therefore the foreign government – provides a subsidy s_2 per unit of the good that the foreign suppliers produce.

The effect is shown in Figure 2, where the foreign supply curve shifts downward by the amount of the subsidy, s_2, from S_2^0 to S_2^1, since the subsidy reduces marginal cost. This causes the market supply curve to shift to the right by the amount of the rightward shift in S_2, to $S^1 = S_1^0 + S_2^1$, and the equilibrium price therefore falls from p^0 to p^1, a drop that is necessarily less than s_2.[2] The effects of this change are that domestic suppliers lose (area *b*) due to the fall in price; foreign suppliers gain (area *a*) due to the rise in their receipts per unit to $p^1 + s_2$; the foreign government loses the total that it pays out in subsidy (area [*a*+*b*+*c*+*d*]); and demanders gain due to the fall in price.[3]

[2] As shown in the figure, the market supply curve actually becomes kinked at the minimum supply price of domestic firms, which is the vertical intercept of curve S_1^0. A large enough subsidy could push the price down to this range, causing all domestic firms to leave the market. I will look at such a case more directly below when I consider the case of horizontal supply curves, where that is what must happen.

[3] These welfare changes are stated as though suppliers, demanders, and government are all different entities, although in fact they are not. The suppliers, who lose area *b* and gain area *a* in Figure 2, are likely to include both the owners of and the workers in the supplying firms, to the extent that the latter earn any rents in their employment. These people are also likely to be included, in a small way, among the demanders of the good, whose gain is mentioned but not labeled in the figure, as well as among the taxpayers who bear the government's cost of financing the subsidy.

Whether the home country gains or loses from this foreign subsidy depends on what fraction of demanders are residents of the home country, which I have not specified. If all of them are domestic, then they gain more than domestic suppliers lose, and the home country as a whole is better off. If all of them are foreign, on the other hand, then the only effect on domestic welfare is the loss borne by domestic producers, and the home country necessarily loses. In any case, however, domestic suppliers lose, and it is this loss that may give rise to the request for a policy response to level the playing field.

A "Leveling Subsidy"

How can this be done? The obvious answer in the case of a simple foreign subsidy is for the domestic government also to pay a subsidy, of the same size, to its own producers. Suppose it does so.

In Figure 3, the supply curve of domestic firms then also shifts down by the amount of the subsidy $s_1 = s_2$, to S_1^2, and the market supply curve shifts down more than before, to S^2. Price falls further, to p^2, and demand expands. The effects of this "leveling subsidy" are that foreign producers lose from the further fall in price; domestic producers gain because price falls less than the subsidy; the domestic government loses the amount that it pays out in subsidy; the foreign government gains slightly, as its own subsidy payments decline with the small drop in foreign supply; and finally demanders, wherever they may be located, gain yet again.

Thus the leveling subsidy has indeed benefited the domestic suppliers, which is the direction of effect that was intended by the effort to level the playing field. How much has it benefited them? In the figure, they gain the change in producer surplus between price p^1 and $p^2 + s_1$, or area [a+ b], which is drawn as larger than what they

previously lost due to the foreign subsidy, area *a*. The reason is that the per unit receipts of domestic (and foreign) suppliers are now $p^2 + s_1$, which is drawn as above p^0. Is that necessarily the case? Yes. The price to demanders must surely fall, and that implies that quantity demanded rises and so must quantity supplied. But now both groups of firms receive the same subsidy-inclusive price, $p^2 + s_1 = p^2 + s_2$, so to produce more they must both get a higher price.

The end result of the leveling subsidy, then, is to over-compensate the domestic suppliers; they have been made better off by the combination of the foreign subsidy and an equal domestic subsidy. Demanders have also been made better off, but as usual from a market intervention, the world as a whole loses since the two governments are paying out more in subsidy than the sum of the net gains to both producers and consumers.

How well does the domestic country fare as a whole? That depends, again, on where the demanders are located. If all demanders are domestic, so that all of the gain in consumer surplus from the further fall in price (from p^1 to p^2) is part of domestic welfare, then it is possible (but not inevitable) that the country gains from the leveling subsidy. In that case, the country is a net importer of the good, and by using a subsidy to force its price further down, it has improved its terms of trade.

But if all demanders are abroad, then the domestic country necessarily loses: the subsidy payments (area [*a*+*b*+*c*+*d*+*e*+*f*]) are necessarily larger than the gain to domestic producers (area [*a*+*b*+*c*]). In that case certainly, if not in the other, the fact that the "leveling" subsidy has actually more than compensated domestic producers for their loss from the foreign subsidy might be cause to look for an alternative policy.

In any case, and regardless of the location of demanders, a policy that only claims to level the playing field but in fact makes producers better off than they were before, may be politically problematic. I therefore look now at alternative policies.

A Smaller Production Subsidy

What might that alternative policy be? One would simply be to use a smaller production subsidy. That is, find a subsidy that will restore domestic producers' receipts to the level they were before, p^0. That would "hold harmless" the domestic producers, which one might argue is the object of a policy of "leveling." On the other hand, since foreign producers will then be getting a larger subsidy than domestic producers, they will be collecting larger revenues and selling a larger quantity, presumably at higher profit, than domestic producers. If leveling is about comparison with competitors, rather than comparison with the situation before the foreign subsidy, then this will not be viewed as leveling.

A Countervailing Import Duty

An alternative policy, instead of subsidizing domestic suppliers, would be to tax the foreign ones. Obviously, if the domestic government were able to levy a tax on foreign suppliers, t, equal to the subsidy that is being paid to them, s_2, then all effects of the subsidy would be removed and it would become, in effect, a direct payment from the foreign government to the domestic government. That would be such an effective leveling policy that presumably the foreign government would discontinue the subsidy as soon as it was applied.

But such a policy is not possible, at least to the extent that any of the foreign production remains abroad and thus out of the jurisdiction of the domestic government.

To the extent, however, that foreign production enters the domestic economy as imports, then the domestic government can achieve this same outcome with a tariff. Indeed, that is precisely what a "countervailing duty" in response to subsidized imports is intended to do. By neutralizing the foreign subsidy on imported units of foreign production, it does indeed level the playing field for domestic producers.

As I noted earlier, however, to the extent that demand for the subsidized good is indeed domestic, that is also the case in which the domestic economy as a whole is likely (or certain, if all foreign production is imported) to gain from the foreign subsidy. Thus the countervailing duty achieves perfect leveling only in the case where it necessarily lowers national welfare.

Lump-sum Tax and Subsidy

If all foreign production is imported (or if competition in a foreign market can somehow be considered a separate problem), then the fact that the foreign subsidy is necessarily beneficial for the home country as a whole ought to make the problem easier. Indeed it does, if lump-sum taxes and subsidies are possible.

Returning to Figure 2, note there that the foreign subsidy hurt domestic suppliers by only the area *b*, while demanders – who are now all domestic – have gained not only areas *b* and *c* but also the unlabeled areas to the right of these, extending out to the demand curve. Thus a lump-sum[4] tax equal to area *b*, levied on demanders and then given in a lump sum to domestic suppliers, would return suppliers' welfare to what it was before the subsidy while leaving the demanders better off. This is actually the first-best

[4] This is economists' shorthand for a tax or subsidy that is collected or paid independently of any behavior, so that it provides no incentive to change behavior.

policy for responding to the foreign subsidy in this case, under the assumption that domestic suppliers are to be protected from any loss.

What if, in contrast, all demand is foreign so that the domestic economy has no winners at all from the foreign subsidy? In that case a loss equal to at least area *b* is unavoidable. The first-best policy, if domestic producers must be protected, is again to use lump-sum redistribution to accomplish that, simply shifting the loss to some other constituency. Use of any other policy that alters behavior can only increase the aggregate loss to the domestic economy and thus the loss to that other, more politically vulnerable, constituency.

Summary of the Simple Case

To summarize the results in this simple case of identical perfectly competitive domestic and foreign suppliers, the most obvious policy is a "leveling subsidy" equal to the foreign subsidy. This policy does succeed in putting domestic and foreign suppliers on an equal footing, but it actually overcompensates domestic suppliers, leaving them better off than they were before the foreign subsidy. A smaller domestic subsidy would be needed to only "hold them harmless," even though that would leave them at an apparent disadvantage, in sales and profits, to their foreign competitors.

What alternative policies may be available depends on the location of the markets in which the domestic firms are competing with foreign firms. If that is only abroad, where the domestic government lacks the jurisdiction to tax, then the only alternative is to use lump-sum compensation of domestic producers. But if the competition is at home, with foreign production being imported, then an import tariff becomes an option. Such a

countervailing duty can indeed exactly offset the foreign subsidy, leaving all participants in the domestic market exactly where they were before the foreign subsidy.

Variations

The Small-Country Case

In the analysis so far, the domestic country's supply was large enough to matter for the world price, and the domestic subsidy, when applied in Figure 3, caused a further drop in the world price, from p_1 to p_2. Suppose now, instead, that in the tradition of trade theory the domestic country is a "small-open economy" that, by assumption, is too small to affect the world price.

In that case, the domestic supply curve S_1^0 in Figure 1, instead of being identical to S_2^0 as was assumed before for simplicity, is essentially indistinguishable from the vertical axis, and the world price is determined entirely by the intersection of demand *D* with S_2^0 alone. As in Figure 2, however, a production subsidy s_2 paid by the foreign government shifts its supply curve down by the amount of the subsidy and, to the extent that demand is more than zero elastic, causes the world price to fall by an amount less than s_2.

The effect on domestic suppliers is shown in Figure 4. Foreign supply now appears to be horizontal at the initial price p^0, not because it is truly horizontal but because its slope is imperceptible over the small range of quantities that can be supplied domestically. The foreign subsidy of s_2 now shifts this supply curve down, but not by the full amount of s_2. Rather, the new domestic price is p^1 is greater than $p^0 - s_2$, as just stated.

This is important, because it means that if the domestic government were to match the foreign subsidy with $s_1 = s_2$, the price received by domestic suppliers would rise to $p^2 = p^1 + s_2 > p^0$. Thus, again, a subsidy that exactly matches the foreign subsidy and therefore seems only to level the playing field, actually makes domestic suppliers better off than they were before. Instead of losing area *a* in Figure 4, as they do from the foreign subsidy alone, they now gain area *d*. Both of these areas as well as their sum, of course, are less than the cost of the subsidy to the government and thus to the taxpayer, [*a*+*b*+*c*+*d*+*e*].

Constant Costs

I assumed above that supply curves were upward sloping. In the short run that is often appropriate, but for most industries it is not appropriate in the long run, when all factors can be expanded in proportion and costs are constant. Figure 5 shows the simpler case in which supply curves are horizontal.

If initially both groups of suppliers have the same constant marginal costs, then equilibrium price, p^0, is equal to that cost. Quantity demanded, $D(p^0)$, is clear, but the allocation of that quantity to domestic and foreign suppliers is not. Presumably that is an outcome that depends on history, with demand allocated to suppliers based on when they entered the market.

Suppose now that foreign suppliers are given a subsidy, s_2, by their government, as before. Their supply curve shifts down by that amount, pushing the price down by the full amount of the subsidy to p^1. This is below the cost of the domestic suppliers, who therefore leave the market entirely.

This looks like a drastic result arising from the foreign subsidy, but in fact, with a constant cost, the suppliers were not making any surplus anyway, so they lose nothing by shutting down. The only welfare effect is on demanders, who gain from the drop in price. It is not clear, in this case, why domestic suppliers would have sought a level playing field at all, although this just underscores that this long-run analysis may be missing the point.

Suppose alternatively that when the foreign government initiates the subsidy s_2, the domestic government matches it with a subsidy $s_1=s_2$. In that case in the new equilibrium, the price to demanders also falls by this amount while demand expands and, at least potentially, both sets of suppliers may share in the increase. The indeterminacy of supply in this model again leaves us unsure about the outcome. All we can be sure of is that, to the extent that domestic suppliers do manage to capture part of the market, the domestic government shares in the subsidy cost that might otherwise have been borne entirely by the foreign government, since it would then have to pay part of the subsidy itself.

Imperfect Competition

The indeterminacy of supply would not have arisen if the number of suppliers had been small and fixed, in which case the outcome would depend on the strategic interaction among suppliers. A simple case that has been much studied is duopoly, in which a single domestic firm interacts with a single foreign firm to capture the market. If all demand is in a third country, this is the well-known case of an export duopoly studied by Brander and Spencer (1985) with Cournot competition, and by Eaton and Grossman (1986) with Bertrand competition. If the two firms sell into each other's markets, then if there are

positive costs of trade as well, then it becomes the "reciprocal dumping model" of Brander and Krugman (1983).

The export duopoly model addresses directly the issue of subsidies, as it was the first to show how a country can benefit by providing an export subsidy. This is illustrated in Figure 6, which displays the reaction curves of two firms, R_1 and R_2, each showing the profit-maximizing output of the subscripted firm as a function of the output of the other. The maximization is illustrated for firm 1 by showing two isoprofit contours, $\pi_1^0$and $\pi_1^1 > \pi_1^0$, which indicate that profit of firm 1 rises as output of firm 2 falls, and that as its own output rises its profit first rises and then falls. If each firm takes the output of the other as given, then the Nash equilibrium is at E^0. But if the domestic government provides an appropriate subsidy, firm 1's reaction curve shifts from R_1 to R_1'; its output rises and output of firm 2 falls; and firm 1's profit, net of the subsidy and thus equal to the gain to itself and its government combined, rises from $\pi_1^0$to π_1^1.

That argument can be applied to either firm and its corresponding government, showing that if one government does not subsidize, then the other can benefit its country by doing so. In fact the same is true even if the first country does subsidize, since R_2 in Figure 6 could just as well have been country 2's subsidized reaction curve. Thus the case for a subsidy in this model is independent of whether the other government subsidizes or not.[5]

That fact does not, however, answer the question of how a country should or will respond to an increase in the subsidy paid by a foreign government to its firms. In figure

[5] It is not, however, independent of many other assumptions. The case for a subsidy becomes a case for a tax, for example, if competitors take prices instead of quantities as given, as shown by Eaton and Grossman (1986). Likewise, the case for a subsidy is very sensitive to the assumed number of firms, as shown by Dixit (1984).

6, such an increase in subsidy would shift the foreign reaction curve, R_2, upward (not shown). It is not obvious from the Figure whether the domestic subsidy that led to R_1' is now still optimal, too high, or too low, and in general any of these could probably be the case.

However, a simple version of the model is solved in the Appendix with linear demand and constant (not necessarily equal) costs for each firm. The solution yields the following expression for welfare of country 1 as a function of the per-unit subsidies provided at home, s_1 , and abroad, s_2:

$$W_1 = a(B_1 - s_1 - s_2)(B_1 + 2s_1 - s_2) \tag{1}$$

where a and B_1 are positive constants incorporating parameters of cost and demand. Solving for optimal s_1 given s_2, $\hat{s}_1 = \hat{s}_1(s_2)$, one finds that

$$\frac{d\hat{s}_1}{ds_2} = -\frac{1}{4} < 0 \tag{2}$$

Thus, not only is it not optimal for a country in this context to respond to an increase in the foreign subsidy by increasing the domestic subsidy by the same amount; the optimal policy response is actually to reduce the domestic subsidy, as shown by the downward sloping subsidy reaction curves in Figure 7.

Suppose that the home country were nonetheless to respond to an increase in foreign subsidy by increasing its own subsidy by the same amount, in an effort to level the playing field. The effect of this will depend on whether the country's subsidy was already at its optimal level, since if it was not, then the leveling subsidy might be beneficial just because it moves the country towards what would already have been

optimal. However, if its subsidy was already at (or above) the optimal level, then it must be the case that increasing its subsidy will hurt it more than if it responded passively.

What about the profit of the domestic firm? With either no change or a fall in the domestic subsidy, a rise in the foreign subsidy necessarily reduces the profit of the domestic firm. Would an equal rise in the domestic subsidy prevent that? Yes, but again it would overcompensate. The profit of the domestic firm turns out to be

$$\pi_1 = a\left(B_1 + 2s_1 - s_2\right)^2 \tag{3}$$

Thus

$$\left.\frac{d\pi_1}{ds_2}\right|_{ds_1 = ds_2} = 2a\left(B_1 + 2s_1 - s_2\right) > 0 \tag{4}$$

and the domestic firm's profit actually rises when an increase in the foreign subsidy is matched by an equal increase in subsidy at home.

These results do not depend on the two firms being identical, but they do depend on their competing only in a third country's market, where the welfare effects on domestic demanders can be ignored. Dixit (1984) examined the case of oligopolistic firms selling into each other's national markets. He did not address quite the same questions that I do here, but his results were sufficiently similar to these that I would be surprised if that complication were to matter a great deal.

Differences in Costs

The export duopoly case allowed for the two firms' constant costs to be different, thus addressing an issue that is bound to arise in any discussion of leveling the playing field:

Should leveling include "corrections" for differences in costs? That is, if foreign firms have lower costs than ours, should our government attempt to level the playing field by either lowering costs at home or somehow raising the costs of foreign firms? The latter can presumably only be done through trade policy, and therefore only if we import from the foreign firms. The former requires either a subsidy or some other policy that has the same effects, both costs and benefits, as a subsidy.

Since the export duopoly model allowed for differences in costs, and since these costs turned out not to matter at all for the conclusions, we can conclude that the case for offsetting a cost advantage is no better than the case for offsetting a foreign subsidy.

What about the case of perfectly competitive groups of firms that was addressed in Figures 1-3? There we assumed that the two groups' initial supply curves were the same, thus assuming identical profiles of marginal costs. Clearly if one group's supply curve lies below the other's, then it will capture a larger share of the market even without a subsidy. The effect of such a cost difference is exactly like that of the foreign subsidy shown in Figure 2, except that the foreign supply curve may not be parallel to the domestic one. And the effects of responding to that cost difference with a leveling subsidy are essentially the same as in Figure 3, again allowing for curves not to be parallel. In short, cost differences do not seem to matter for the analysis, except occasionally in its simplicity.

III. Alternative Foreign Policies that May Call for Leveling

While the theoretical analysis above dealt with responses to foreign policies that directly subsidize production and/or exports, many of the policies that sometimes lead to a call for

leveling are either not that direct or have justifications that some would say require special treatment. Here I will examine some of these cases, such as subsidies that serve an environmental purpose or are intended to offset some other acknowledged distortion, and policies other than subsidies that may have some of the same effects as subsidies.

Subsidies to correct distortions

Consider first a subsidy such as trade economists often recommend in preference to a tariff: a production subsidy that is intended to offset the effects of a distortion. Suppose for example that an import competing industry generates a positive externality of value *e* for every unit that is produced. Because it is an externality, the producers themselves do not derive the full benefit from the it, and therefore they produce less than would be optimal for society as a whole. As is well understood in trade theory, a tariff $t = e$ will raise the price of the good to domestic producers (by the amount *e* if the country is small), thus inducing them to produce the optimal quantity and generate the optimal amount of externality. This may produce a net benefit for the country as a whole. However, it need not produce a net benefit, and it certainly does not provide the maximum benefit, because a tariff also raises the price to domestic consumers as well as to producers, causing the consumption decision to be suboptimal. The first-best policy in this situation is to pay a subsidy, $s = e$, on production, leaving consumption to be determined by the market price.

This is only one example of a subsidy that is the optimal policy for dealing with a market imperfection, and it raises the issue of how governments in other countries should

respond to it. If they do nothing, then their own producers will understandably complain of an unlevel playing field.

The answer is easy if the distortion that justifies the subsidy in one country is also present and of the same size in other countries. In that case, those other countries' optimal policy is also to subsidize, and for the same reason. They should do it, not in order to level the playing field, but because it is the best way to correct the distortion.

The answer is harder, however, if the distortion exists in only one or a few countries, and not in others. In that case, economic logic says that the subsidy should remain in countries where it is justified by the distortion, and that other countries should simply accept that and not respond. In the example above, the fact of a positive externality in one country, and not the other, justifies a subsidy in the one and not the other. The playing field is then not level, but from the point of view of society as a whole, that is exactly as it should be. Incentives to produce in each country should not be the same, because production in one country generates a benefit that production in the other country does not.

Producers, of course, are unlikely to accept that argument, and given the difficulties of confirming and measuring the presence of externalities it is understandable that they would not. So the incentive to provide a leveling subsidy to the unsubsidized producers will exist and may be responded to. What, then, is the effect of a leveling subsidy that is granted in this situation?

The answer is the same as before. Figures 1-5 remain valid even if there is an externality associated with production by one group and not the other. The only difference is that any welfare implications must now take account of the additional effect

on society due to the externality. Thus in Figure 3 – where now there is assumed to be a positive externality equal to the foreign subsidy – the leveling subsidy causes production abroad to decrease, and this reduces the social benefit of that production. But that is an effect abroad, which was not the focus of our analysis in any case. The effects of the leveling subsidy domestically are all the same. If does not matter whether the foreign subsidy was justified by a distortion or not.

"Green" subsidies

Subsidies for environmental purposes, which deserve separate mention only for their increasing popularity, are often just special cases of the previous case. That is, the environmental benefits of some production activities are precisely the sorts of positive externalities that require government intervention to promote them. Therefore, aside from acknowledging their importance, separate analysis of them is not necessary.

Subsidies unrelated to level of production

If increased production itself is not the intent of a subsidy, as in the case for example when it is the income of producers, not their output, that is a concern, then some governments are increasingly trying to provide subsidies that are not related to the level of production and therefore should not cause production to increase. For example, a group of producers may simply be given a cash payment in return for existing, regardless of whether or how much they produce.

In the context of Figure 2, this has no effect at all on the market, since it leaves the marginal costs, and thus the supply curves, of both supplier groups unchanged.

However, the payment itself is a benefit to the recipients that is not shared by the other group of suppliers. This, again, may be viewed as an unlevel playing field, even though the market is unaffected.

The obvious, and apparently harmless, way of leveling the playing field in this situation is to give the other group of suppliers the same kind of production-unrelated subsidy that the first group got. This is certainly better than responding with a production subsidy, which would in any case be hard to calibrate in terms of leveling and would introduce exactly the distortion that the production-unrelated subsidy was trying to avoid.

A concern, however, is that it may be impossible for subsidies to producers to be truly production unrelated. To the extent that supply varies not just with the output of each producer but also with the number of producers, even a production-unrelated subsidy will allow marginal producers to stay in business, ones who would otherwise have left the market. Quantifying this effect would be much more difficult than in the case of production subsidies, but its existence means that these subsidies fit, after all, into the analysis of the previous section.

Subsidized inputs

Not uncommonly, governments subsidize the use of certain inputs by their domestic producers, rather than subsidizing the production of those inputs themselves for international export. Many oil producing countries, for example, keep oil cheap in their own markets while selling it abroad for the world price. The effect is that the producers who use these subsidized inputs have their costs reduced, exactly as in Figure 2, even

though they are not themselves paid a subsidy. Again the analysis above applies here as well.

Lax regulation

A similar effect, though less costly for the government that provides it, is to maintain a less costly regulatory environment for producers than competitors abroad may experience. Industrialized countries typically have more stringent environmental regulations and higher labor standards than developing countries, and such standards as do exist in developing countries may be enforced less effectively. As a result, developing-country producers' costs in some industries are lower than their rich-country competitors', to the latter's consternation. Once again, the effects on the markets where these two groups trade are exactly like Figure 2, and they may be responded to with the policies already discussed (leveling subsidies or countervailing duties) and with the same effects. Alternatively, producers may argue for relaxing their own regulation, causing a "race to the bottom." That too, in terms of the markets for traded goods, has the same effects that we already saw, although here this is an additional effect on the world's regulatory environment.

A relevant issue for the latter is whether the initial regulations themselves, and/or their lax regulation in some countries, was justified. The case for regulation usually rests, again, on some sort of externality. Also, the welfare implications of that externality may not be independent of the income of the country that is affected. Thus stringent environmental and labor standards may be regarded as justified by the high-income populations of industrialized countries, who feel that they can afford their costs. But

lower-income populations may regard a greater amount of environmental degradation and even risk to workers' health as acceptable in return for escape from extreme poverty.

Thus, it may well be that standards are optimally lower for poor countries than for rich ones, and therefore that the unlevel playing field of rich-country producers who pay the cost of higher standards should simply be accepted. If that means that some industries that are particularly vulnerable to such regulations simply leave the industrialized countries and relocate to developing countries where these costs are viewed as acceptable, so be it.

Direct government involvement

So far we have viewed governments as having their impact on industries from outside, through taxes, subsidies, and regulations. Often, however, governments participate in markets directly as producers or demanders. Three examples come to mind that may alter market outcomes and give rise to complaints by competing producers of an unlevel playing field.

The first is simply state owned enterprises (SOEs) that produce and sell in competition with private-sector sellers elsewhere. Because these SOEs may lack both the profit motive and the budget constraint of private firms, since both profits and losses accrue to the government, they may be able and willing to produce at a loss for extended periods of time. In effect, their supply curves are positioned lower than those of the private-sector suppliers, just as in Figure 2.

A second example is government purchases. In some industries – most obviously military hardware – governments may be significant buyers in the market, and they may

make their purchase decisions based in part on political considerations. Thus, for example, foreign firms may be assured of significant sales to their own governments, an advantage that domestic firms may lack and use as the basis for requesting their own government's assistance. This example has rather surprising implications in the context of the perfectly competitive models considered above: by selling to their own government, foreign suppliers have their supply curve shifted to the left, actually benefiting domestic suppliers. A more relevant context may therefore be one of imperfect competition and especially one with increasing returns to scale where such guaranteed sales will lower the supplier's costs. Effects will be analogous to those noted below for Krugman's idea of import protection as export promotion.

The third and final example of government direct participation in markets is when the state directly provides an input to production. An obvious but usually uncontroversial example of this is infrastructure. Governments provide roads and ports that are essential inputs to many industries. They also may provide the infrastructure for energy and communications services. These are not usually seen as tilting the playing field, but their absence certainly would. The best solution, though, is simply to provide the infrastructure if that is manageable.

A more troublesome example is health care. In some countries this is provided by the state, while in others it is provided by employers, adding to their costs. This is definitely viewed by those employers as giving their foreign competitors an unfair advantage, and it could presumably be the basis, at least in their minds, of requests for a subsidy or tariff to level the playing field. In fact, because this policy difference applies across entire economies, the simple comparison of firm costs is inappropriate as a

measure of its effects. For example, if the United States were to shift all costs of health care to the state, this would have to be accompanied by changes in taxation and perhaps the exchange rate that would also affect competitiveness. Some industries in the US are no doubt penalized by the current system and others favored, but working out which is which would be a major analytical problem.

Foreign protection ("as export promotion")

The last case I will touch on is the advantage that an exporter may derive from being able to sell at home behind tariff protection. This is the case that Krugman (1984) identified as "import protection as export promotion" and it rests on assumptions of imperfect competition and increasing returns to scale. Essentially, by being protected in its domestic market an exporter is able to produce a larger output, lowering its cost of production for both domestic production and exports.

If a domestic firm then competes with such a protected foreign firm, as in the models that were discussed in the previous section, this lower cost gives a strategic advantage very much like the foreign subsidy that was considered there. The implications for policy seem to be essentially the same.

IV. Review of Empirical Studies of Policies to Level the International Playing Field

As the title of this section suggests, I had intended here to review the empirical work that has been done on the subject of this paper. As it turns out, I have found very little work of that sort, and what I have found is only loosely related to the topic. If readers of this

report are aware of contributions that are relevant, I do hope they will draw my attention to them.

In searching for such contributions, I searched among other things for articles that mentioned a "level playing field." Such articles do exist, in some abundance. But even when they deal with the concept in an international context, all that I could find used the term as an organizing principle for conceptual analysis at best, never for anything empirical. I found no articles that attempted to measure whether the international playing field is in fact level, in a particular industry for example.

The closest I could find to relevant empirical work was that on subsidies and/or countervailing duties as are authorized under the General Agreement on Tariffs and Trade and implemented under US law by the International Trade Administration of the Commerce Department and the US International Trade Commission. Cases filed under that law include data to document the subsidies, as well as the injury to domestic industries, and these data have been used for a few purposes. Blonigen and Wilson (2005), for example, used these data to test whether foreign subsidies in the steel industry increased the excess capacity of foreign steel firms in a manner that would adversely impact domestic firms. In that study, however, they did not examine the extent to which countervailing duties offset that impact, or what other effects those duties may have had. In another study, Gallaway et al. (1999) had looked at the effects on US welfare of US countervailing duties, as well as antidumping duties, but they did not examine the effects specifically on the protected industries or connect these with the foreign subsidies that were being countervailed.

Let me conclude this section, then, with a short list of the empirical questions that I would like to have seen answered in the literature, in hopes that others may one day pursue these topics:

- To what extent is the international playing field not level; that is, how big are the differences in industry costs across countries that can be attributed to policies or other factors that, under some definition, would make trade unfair?
- When governments have attempted to level the playing field in international trade, either through subsidies or countervailing duties, what has been the impact of these policies on their domestic firms, on their foreign subsidized competitors, and perhaps also on other foreign firms that had not been subsidized?
- To what extent have policies to level the playing field been retaliated against by foreign governments, and what was their stated justification for that retaliation?
- Is there a consensus among governments that leveling the international playing field is a legitimate objective of policy? If so, how do governments interpret the meaning of such leveling?

V. Conclusion

This paper has not, primarily, been about the desirability of policies to level the playing field in international trade. As trade economists we already knew that from a broad economic standpoint such policies would often lower welfare of the countries that use them, since the very fact that a playing field is tilted against domestic producers often means that it is also tilted in favor of domestic consumers. Foreign subsidies of imported products, in particular, increase the economic welfare of the domestic country. The

exceptions occur when our producers compete abroad, so that our own consumers do not benefit.

But these conclusions may be irrelevant to the policies that are ultimately put in place, since firms and the politicians whom they lobby often care more about their own profit and the fairness of competition than about consumer welfare. As a result, calls for policies to level the playing field are given rapt attention, and the policies themselves may be implemented. This paper has been mostly about the economic effects of such policies, whether or not they are a good idea.

The main conclusion from this theoretical analysis is that most policies that level the playing field do not, as one might have expected, simply restore the economic outcomes that would have arisen if the field had not first been tilted. In both the perfectly competitive model and the export duopoly model, if a foreign subsidy is matched by an equal domestic subsidy, then producers in both countries are made better off than if there had been no subsidy at all. Stated that way, the result is hardly surprising, but by saying that the policy merely levels the playing field one hides this rather obvious implication.

As a trade economist, for reasons I discussed early in the paper, I have always slightly bristled at attention to the slope of the playing field in international trade. Having now written a whole paper on the subject, I feel even more strongly that calls to level the playing field are attempts to distract from the true economic effects of the policies that are being advanced. These effects may or may not be worth having, but saying that they merely level the playing field is misleading.

References

Appelman, Marja, Joeri Gorter, Mark Lijesen, Sander Onderstal, and Richard Venniker 2003 "Equal Rules or Equal Opportunities? Demystifying Level Playing Field," *CPB Document*, CPB Netherlands Bureau for Economic Policy Analysis, October, ISBN 90-5833-133-4.

Blonigen, Bruce A. and Wesley W. Wilson 2005 "Foreign Subsidization and Excess Capacity," NBER Working Paper No. 11798, National Bureau of Economic Research, November.

Brander, James and Paul Krugman 1983 "A 'Reciprocal Dumping' Model of International Trade," *Journal of International Economics* 15, pp. 313-321.

Brander, James A. and Barbara J. Spencer 1985 "Export Subsidies and International Market Share Rivalry," *Journal of International Economics* 18, (February), pp. 83-100.

Dixit, Avinash 1984 "International Trade Policy for Oligopolistic Industries," *Economic Journal: Supplement* 94, pp. 1-16.

Eaton, Jonathan and Gene M. Grossman 1986 "Optimal Trade and Industrial Policy under Oligopoly," *Quarterly Journal of Economics*, (May), pp. 383-406.

Gallaway, Michael P., Bruce A. Blonigen, and Joseph E. Flynn 1999 "Welfare Costs of the U.S. Antidumping and Countervailing Duty Laws," *Journal of International Economics* 49, pp. 211-244.

Krugman, Paul R. 1984 "Import Protection as Export Promotion: International Competition in the Presence of Oligopoly and Economies of Scale," in H. Kierzkowski, ed., *Monopolistic Competition and International Trade*, Oxford: Oxford University Press.

Appendix: Leveling Subsidy in Export Duopoly

Consider two firms producing outputs Q_1 and Q_2 of a homogeneous good, the (inverse) demand for which is given by

$$p(Q) \equiv A - bQ = A - b(Q_1 + Q_2) \tag{A1}$$

where A and b are positive constants. Letting c_i be the constant production cost and s_i be the production subsidy paid per unit of output to firm i, and letting "$\neg i$" represent the country/firm other than i, the profit of firm i is

$$\pi_i = pQ_i - (c_i - s_i)Q_i = [A - b(Q_i + Q_{\neg i})]Q_i - c_iQ_i + s_iQ_i \tag{A2}$$

while the contribution to welfare of country i is that profit minus the subsidy paid by its government:

$$W_i = \pi_i - s_iQ_i \tag{A3}$$

Assuming Cournot competition, each firm takes the output of the other as given in setting its own output to maximize profit. The first-order condition is

$$\frac{d\pi_i}{dQ_i} = A - 2bQ_i - bQ_{\neg i} - c_i + s_i = 0 \tag{A4}$$

from which

$$Q_i = \frac{1}{2b}[A - bQ_{\neg i} - c_i + s_i], \quad i = 1,2 \tag{A5}$$

The two equations (A5) can be solved together to yield

$$Q_i = \frac{1}{3b}[A - 2c_i + 2s_i + c_{\neg i} - s_{\neg i}] = \frac{1}{3b}[B_i + 2s_i - s_{\neg i}], \quad i = 1,2 \tag{A6}$$

where

$$B_i = A - 2c_i + c_{\neg i} \tag{A7}$$

Total output is

$$Q = \frac{1}{3b}[B_1 + 2s_1 - s_2 + B_2 + 2s_2 - s_1] = \frac{1}{3b}[2A - c_1 - c_2 + s_1 + s_2] \tag{A8}$$

and price is

$$p = A - \frac{1}{3}\left[2A - c_1 - c_2 + s_1 + s_2\right] = \frac{1}{3}\left[A + c_1 + c_2 - s_1 - s_2\right] \tag{A9}$$

Now using (A6-9) in (A2) and (A3),

$$\begin{aligned} W_i &= \left\{\frac{1}{3}\left[A + c_1 + c_2 - s_1 - s_2\right] - c_i\right\}\frac{1}{3b}\left[B_i + 2s_i - s_{\neg i}\right] \\ &= \frac{1}{9b}\left[A + c_1 + c_2 - s_1 - s_2 - 3c_i\right]\left[B_i + 2s_i - s_{\neg i}\right] \\ &= \frac{1}{9b}\left[A - 2c_i + c_{\neg i} - s_1 - s_2\right]\left[B_i + 2s_i - s_{\neg i}\right] \\ &= \frac{1}{9b}\left[B_i - s_i - s_{\neg i}\right]\left[B_i + 2s_i - s_{\neg i}\right] \\ &= \frac{1}{9b}\left\{-2s_i^2 + \left(B_i - s_{\neg i}\right)s_i + \left(B_i - s_{\neg i}\right)^2\right\} \end{aligned} \tag{A10}$$

The optimal subsidy, $\hat{s}_i$, for a given level of the foreign subsidy, $s_{\neg i}$, is found by differentiating (A10) with respect to s_i:

$$\begin{aligned} &\frac{dW_i}{ds_i} = \frac{1}{9b}\left\{-4s_i + \left(B_i - s_{\neg i}\right)\right\} = 0 \\ &\Rightarrow \hat{s}_i = \frac{1}{4}\left(B_i - s_{\neg i}\right) \end{aligned} \tag{A11}$$

Thus

$$\frac{d\hat{s}_i}{ds_{\neg i}} = -\frac{1}{4} < 0 \tag{A12}$$

From (A3), (A5), and (A9),

$$\begin{aligned} \pi_i &= W_i + s_i Q_i = \frac{1}{9b}\left[B_i - s_i - s_{\neg i}\right]\left[B_i + 2s_i - s_{\neg i}\right] + s_i\frac{1}{3b}\left[B_i + 2s_i - s_{\neg i}\right] \\ &= \frac{1}{9b}\left[B_i - s_i - s_{\neg i} + 3s_i\right]\left[B_i + 2s_i - s_{\neg i}\right] = \frac{1}{9b}\left[B_i + 2s_i - s_{\neg i}\right]^2 \end{aligned} \tag{A13}$$

Thus

$$\left.\frac{d\pi_1}{ds_2}\right|_{ds_1 = ds_2} = \frac{2}{9b}\left(B_1 + 2s_1 - s_2\right) > 0 \tag{A14}$$

Also, from (A10)

$$\left.\frac{dW_1}{ds_2}\right|_{ds_1=ds_2} = \frac{-1}{9b}(B_1 + 5s_1 - s_2) < 0 \qquad \text{(A15)}$$

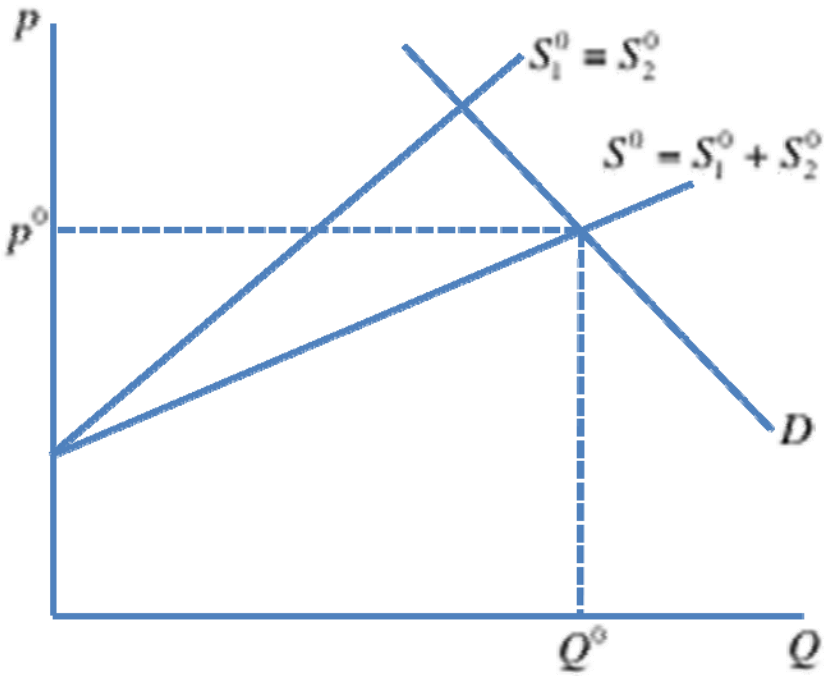

Figure 1
Equilibrium without Government Intervention

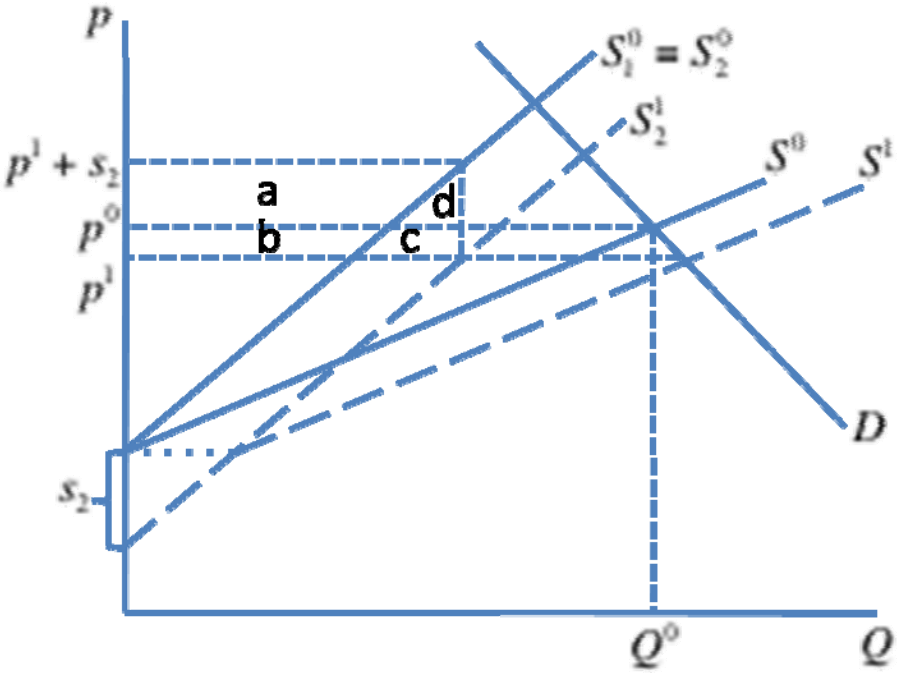

Figure 2
Effects of Foreign Subsidy

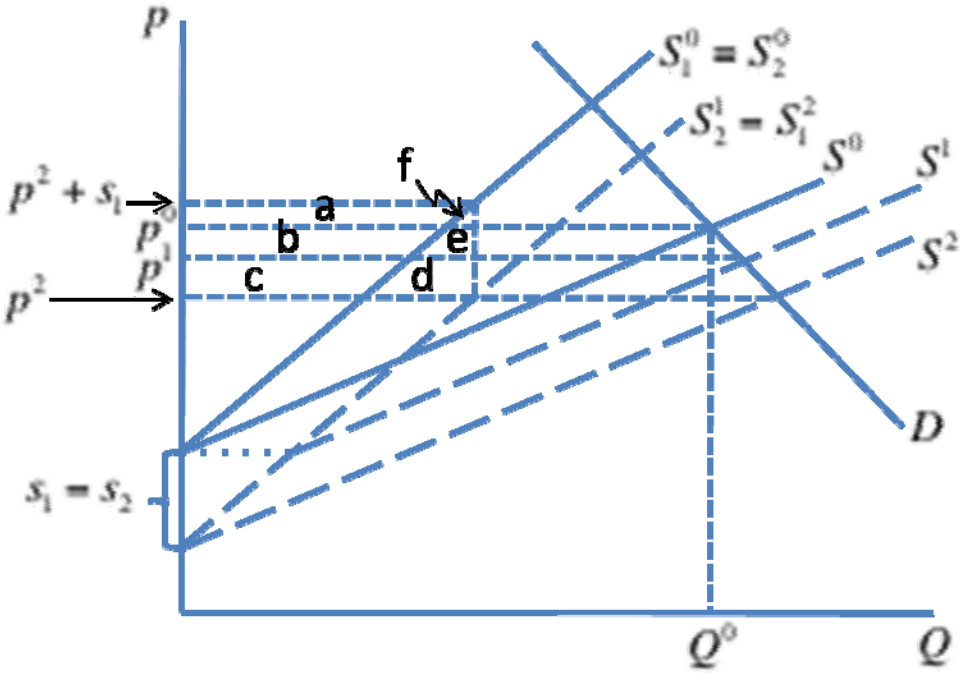

Figure 3
Effects of "Leveling" Domestic Subsidy

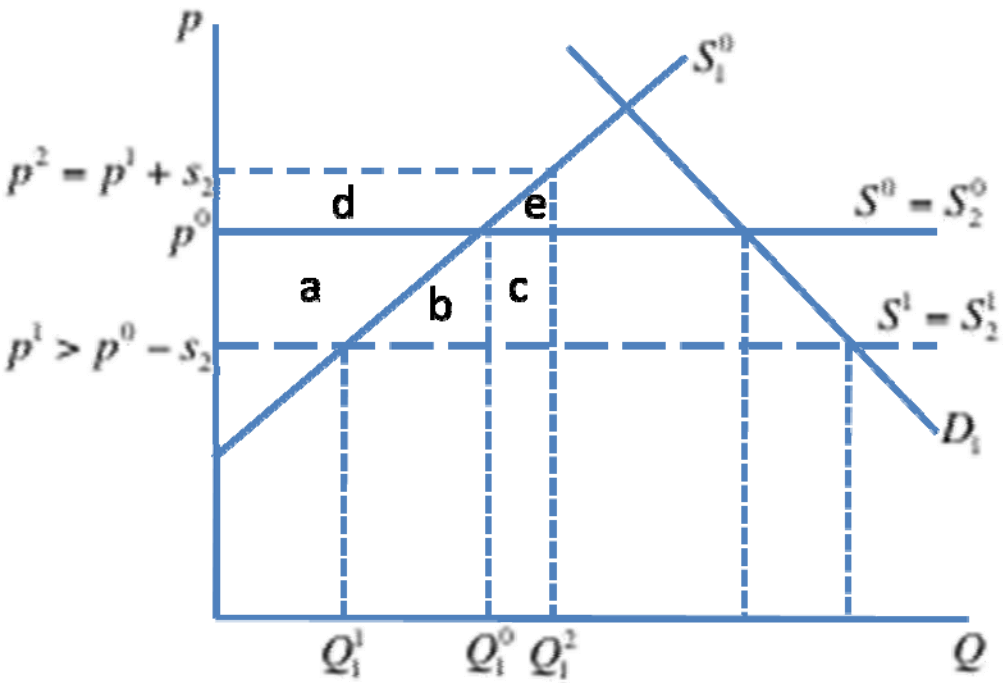

Figure 4
Effects in a Small Country

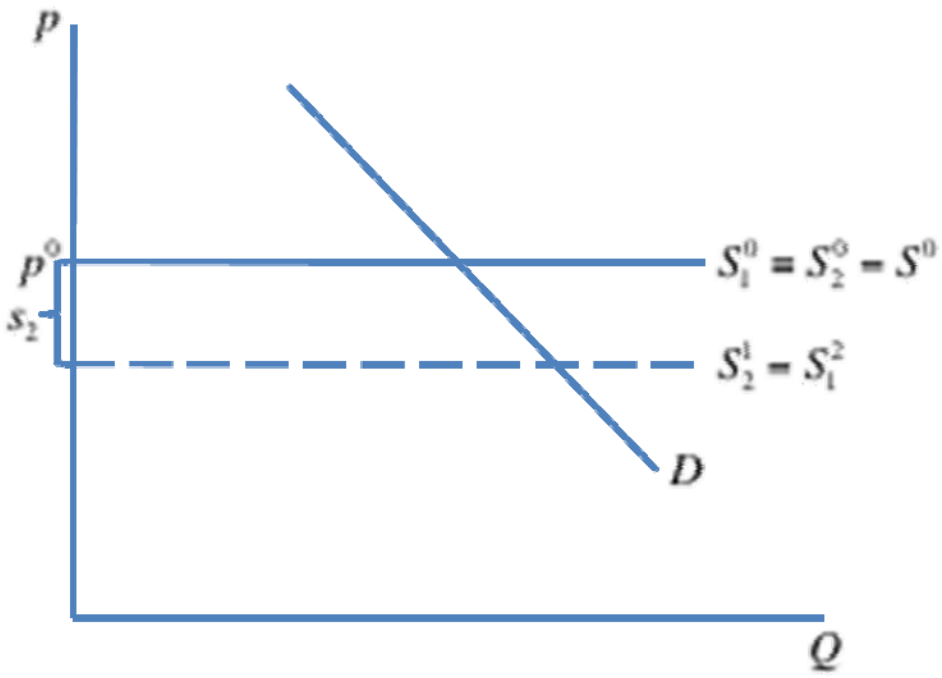

Figure 5
Subsidy with Constant-Cost Supplies

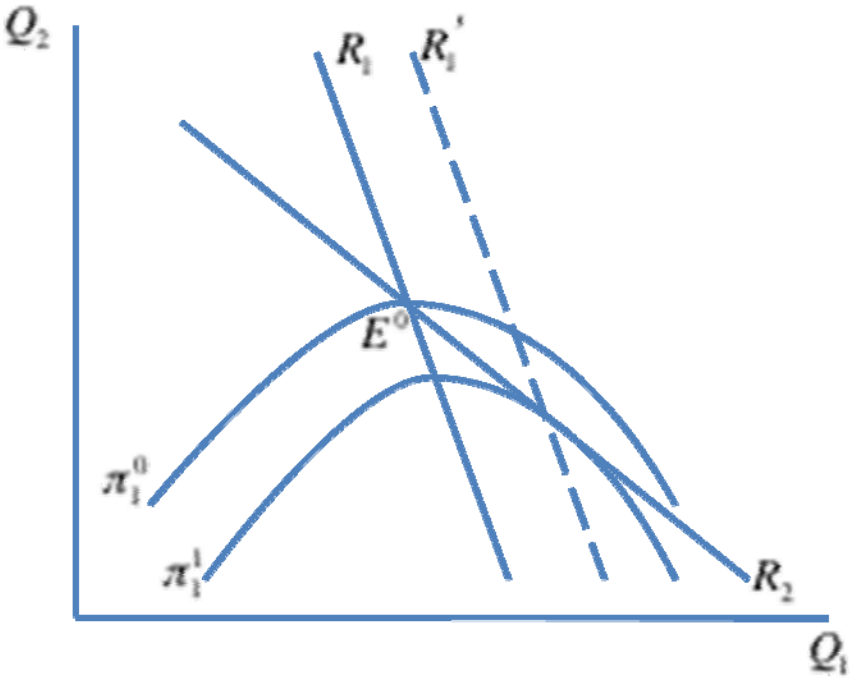

Figure 6
Export Duopoly Reaction Curves and Subsidy

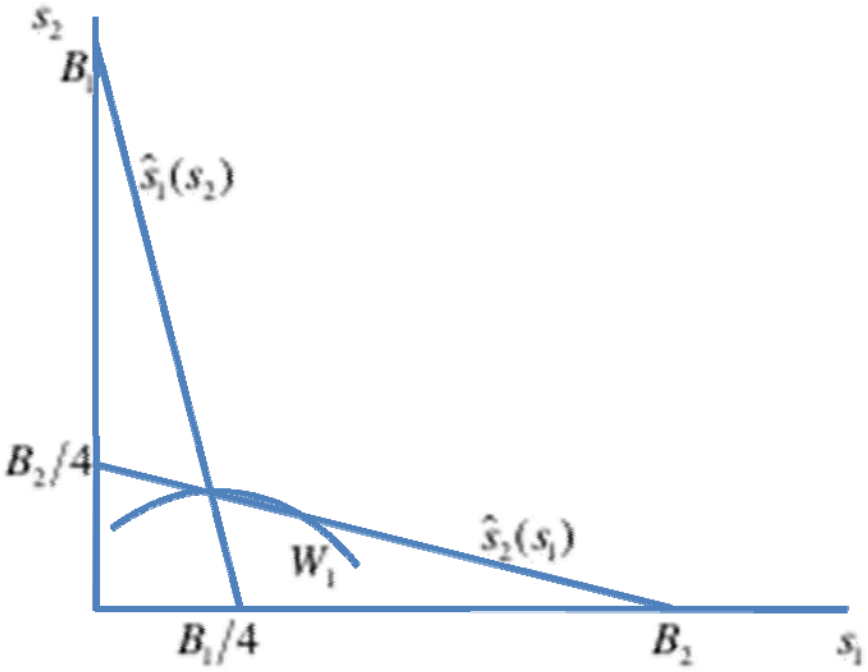

Figure 7
Reaction Curves of Subsidy Providers