

Nontariff Barriers and Domestic Regulation

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This is a lecture given at the World Bank on April 6, 1999, to participants in a core course of the Economic Development Institute on “Global Integration and the New Trade Agenda.”

I have more recently added textual material in addition to the pages of graphs and outlines in order to make it more self-explanatory.

If you have questions about any of it, feel free to contact me at alandear@umich.edu.

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June 3, 1999

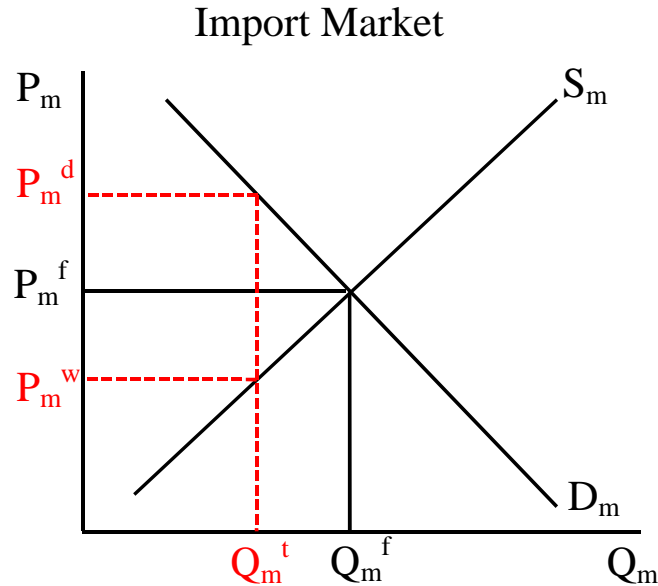
I. Tariffs

The graph below shows the effects of a tariff on imports.

The partial equilibrium model of the market for a country’s imports of a certain good assumes perfect competition, an upward sloping supply of imports, S_m , from abroad, and a downward sloping demand for imports, D_m , by the domestic economy.

With free trade, a single price P_m^f equates supply and demand. A specific tariff, t , drives a wedge between the price paid by domestic importers, P_m^d , and the price received by foreign exporters, P_m^w on the world market.

Effects of a Tariff on Imports



S_m = Supply of imports

D_m = Demand for imports

P_m^f = Free-trade price

P_m^d = Domestic price of imports with tariff

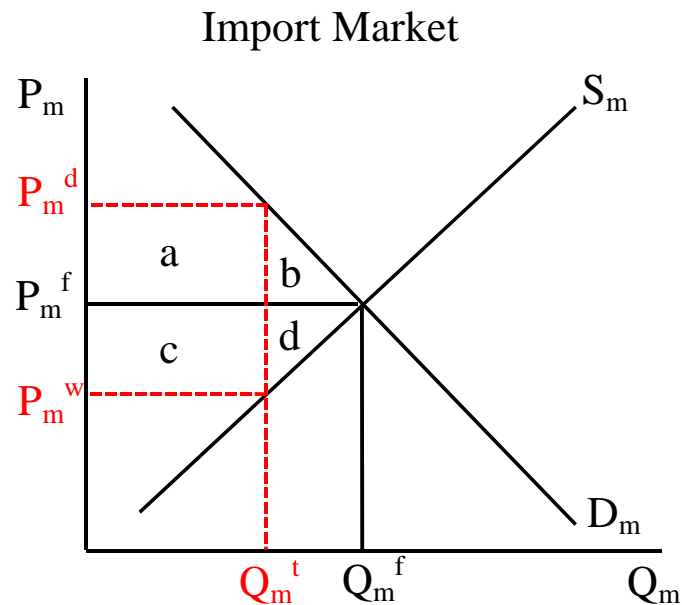
P_m^w = World price of imports with tariff

Tariff: $t = P_m^d - P_m^w$

The effects of the tariff are summarized below. It causes the quantity of imports both supplied and demanded to fall, the price paid by domestic importers to rise, and the price received by foreign exporters to fall.

Effects on the welfare of these groups can be measured by the areas labeled a, b, c, and d in the figure, using the concepts of consumer and producer surplus. Since the supply and demand curves for trade are actually the excess supply and demand curves from the foreign and domestic economies respectively, the areas to their left represent the combined producer plus consumer surpluses in the market for the good.

Effects of a Tariff on Imports



Changes caused by tariff:

- $\Delta Q_m < 0$ Quantity of imports falls
- $\Delta P_m^d > 0$ Domestic price of imports rises
- $\Delta P_m^w < 0$ World price of imports falls
- $a+b$ Domestic consumers-producers lose
- $c+d$ Foreign producers-consumers lose
- $a+c$ Domestic government gains revenue
- $b+d$ World loses - “dead weight loss”

Explanation:

Domestic Producers and Consumers:

Since the domestic price rises, domestic consumers lose and domestic producers gain from the tariff. Since consumers buy more than producers sell (the country imports), the loss is larger than the gain, and the net loss of the two together is the area $a+b$ to the left of the import demand curve.

Foreign Producers and Consumers:

Since the world price falls, foreign consumers gain and foreign producers lose from the tariff. Since producers sell more than consumers buy (the world exports), the loss is again larger than the gain, and the net loss of the two together is area $c+d$ to the left of the import supply curve.

Domestic Government:

It collects tariff revenue equal to the tariff, t , times the quantity of imports, Q_m^t . This is area $a+c$.

World:

The effect on welfare of the world is the sum of these three effects:

World	
$-(a+b)$	Domestic Prod+Cons
$-(c+d)$	Foreign Prod+Cons
<u>$+(a+c)$</u>	Dom Govt
$= -(b+d)$	

Thus, the world as a whole **loses** from the tariff. This is called the Dead Weight Loss.

In what sense does the world lose from a tariff? Since some gain (domestic producers, foreign consumers, domestic government), it does **not** mean that **all** lose. Instead, it means that:

Those who gain from a tariff do not gain enough to be able to compensate the losers and still remain better off.

Does the importing country gain? It may:

Domestic Country:

Domestic	
$-(a+b)$	Domestic Prod+Cons
<u>$+(a+c)$</u>	Dom Govt
$= + c - b$	

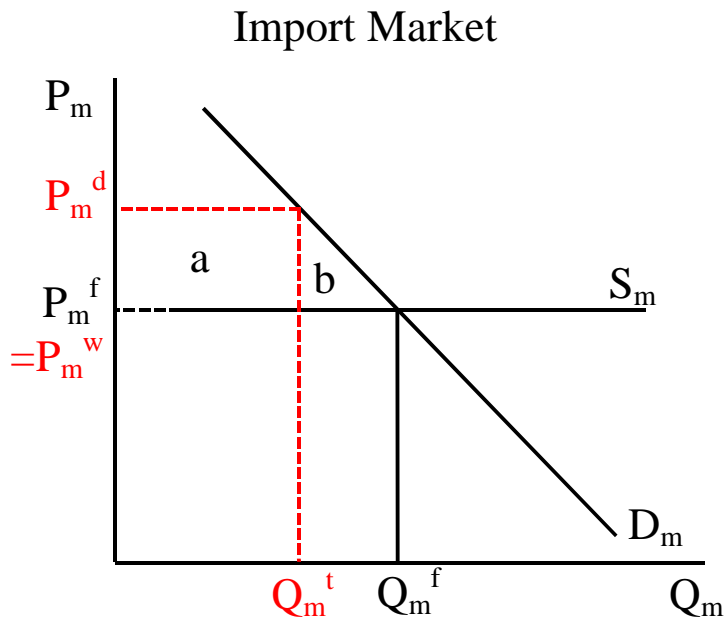
This will be positive if $c > b$. Note that $c > 0$ requires that the world price fall due to tariff.

Small Country Case:

If a country's demand for import of a good is small compared to the world market, as will normally be the case if the country itself is small, then the fall in the world price due to that country's tariff will be negligible – essentially zero. (The supply curve for imports in this case is horizontal at a fixed world price.) In that case, the country **must lose** from the tariff, since area c is zero. Thus:

In a small country, producers and the government together do not gain enough from a tariff to compensate consumers of the good.

Effects of a Tariff in a Small Country



Changes caused by tariff:

- a+b Domestic consumers-producers lose
- a Domestic government gains revenue
-
- b Domestic country loses

Large Country Case:

If a country is large enough for its demand for the good to constitute a significant fraction of the world market, then its tariff may reduce the world price by enough to matter, as shown in the figures above and below. In that case, the tariff-levying country as a whole **may** (but need not) gain from the tariff. What matters is how much the world price falls.

When a large country gains from a tariff, it is called:

- The “terms of trade” argument for a tariff – the terms of trade being the relative price of a country’s exports and imports – the gain coming from changing that relative price in the country’s favor
- The “monopoly” argument for a tariff – since the country is using its size in the world market much like a monopolist, to move price in its favor.
- The “optimal tariff” argument, since there exists a level of the tariff that maximizes the gain to the country. (Note: the optimal tariff of a small country is zero.)

In what sense may a large country gain from a tariff?

In a large country, a tariff **may** – if the world price falls enough – generate enough producer surplus and tariff revenue so that producers and the government could compensate consumers for their loss.

Note however that:

- The gain is not guaranteed. (Price may not fall enough.)
- Compensation may not be paid.
- The rest of the world is losing more than the country gains.
- Other countries may retaliate, igniting a trade war.

Domestic Market Effects of a Tariff:

The effects on domestic producers and consumers can be decomposed by looking at their separate supply and demand curves, as in the figure below.

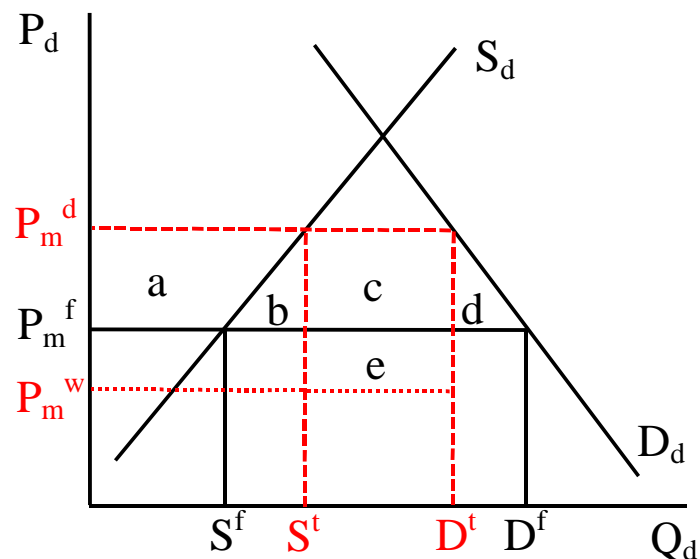
S_d is the domestic supply curve for the good and D_d is the domestic demand curve for the good (all demand, not just for import). P_m^f is the world price of the good if the country does not levy a tariff, determined in the market for imports as discussed above.

Assuming (as was not necessary above) that the good is homogeneous so that what is produced domestically is a perfect substitute for what is imported, the domestic price under free trade must also be P_m^f . Thus the quantities supplied and demanded by domestic producers and consumers under free trade are S^f and D^f respectively.

The tariff raises the domestic price of imports, and thus of domestically produced goods since they are perfect substitutes, to the level P_m^d determined above. As also discussed above, if the country is small, the tariff leaves the world price unchanged at P_m^f , but if the country is large, it lowers the world price to P_m^w . Both cases are considered in the same figure below (although this means that the size of the tariff for the two cases is implicitly different). In either case, the rise in the domestic price leads to an increase in supply from domestic producers to S^t and a decrease in domestic demand to D^t .

Effects of a Tariff on Imports

Domestic Market



Changes in domestic market:

- $\Delta S_d > 0$ Domestic production rises
- $\Delta D_d < 0$ Domestic consumption falls
- $\Delta P_d > 0$ Domestic price rises
- +a Domestic producers gain
- (a+b+c+d) Domestic consumers lose
- +c [+e] Government gains revenue
- (b+d) [+e] Country loses - dead weight loss

Explanation:

Domestic Suppliers:

They gain from the rise in domestic price. Their gain is measured by the increase in producer surplus, which is the area to the left of the supply curve between the two prices, or area a.

Domestic Demanders:

Demanders lose from the rise in price, their loss measured by the decrease in consumer surplus, which is the area to the left of the demand curve, a+b+c+d.

Government:

The government collects tariff revenue equal to the difference between the new domestic price and the new world price of imports, which is P_m^f in the small country case and P_m^w

in the large country case. Thus the tariff revenue is measured by area c plus, in the large country case only, area e. The latter is shown in square brackets above and below.

The Country;

Domestic Country +a -(a+b+c+d) <u> +c [+e]</u> = - (b+d) [+e]	Domestic Producers Domestic Demanders Domestic Government
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In a small country, this must be negative, and the country loses from the tariff.

In a large country, this can be positive or negative, depending on the size of e and therefore on how much the world price has fallen due to the tariff.

II. Nontariff Barriers

A nontariff barrier (NTB) is any policy that restricts trade other than a simple tariff. In the graphs below the following NTBs are analyzed:

- Quota
- Variable Levy
- Voluntary Export Restraint
- Government Procurement Regulation
- Domestic Production Subsidy

Quota on Imports:

A quota is a restriction on the quantity of trade, in this case imports. It may not be binding, if it is set above the level of free trade imports, in which case it has no effect at all if markets are competitive.

A binding quota, however, requires that prices adjust so that the market will import only the restricted quantity in equilibrium. This requires that the domestic price of the imported good rise due to the quota, just as in the case of the tariff above.

This raises the price of the import above its world price, and gives rise to “rents:” the profits that are made by whoever is lucky enough to import under the quota. They buy at the world price and sell at the higher domestic price.

Administration of a Quota:

Exactly how all of this is accomplished depends on how the quota is administered. Examples:

- **Import Licenses, Auctioned:** Government sells the licenses, the market value of which is the quota rent, and the government therefore gets the rents.
- **Import Rights Given to Domestic Residents:** Those residents get the rents, except for any bribes they may have paid to officials, who get the rest.
- **First-Come-First-Served:** Country permits free imports until the quota is met, then stops; rents go to winners of the race, but are largely dissipated by extra resources expended in trying to win (example of “rent seeking”).
- **Import Rights Given to Foreigners:** Foreigners get the rents.

Analysis:

The analysis of a quota, focusing on the import market as shown below, looks very similar to that for a tariff. The quota restricts the quantity of imports to Q_m^q , which raises

the domestic price of imports to P_m^q – the level at which demanders will settle for the smaller quantity. In the large country case shown, the reduced quantity also requires that the world price of the imported good fall, so that foreign suppliers too are in equilibrium, at the lower world price P_m^w . The price difference, $P_m^q - P_m^q$, is called the “**tariff equivalent**” of the quota.

An easy way to think of the quota is as changing the country’s demand curve for imports. The demand curve becomes the dashed red line labeled D_m^q , which has a kink at Q_m^q .

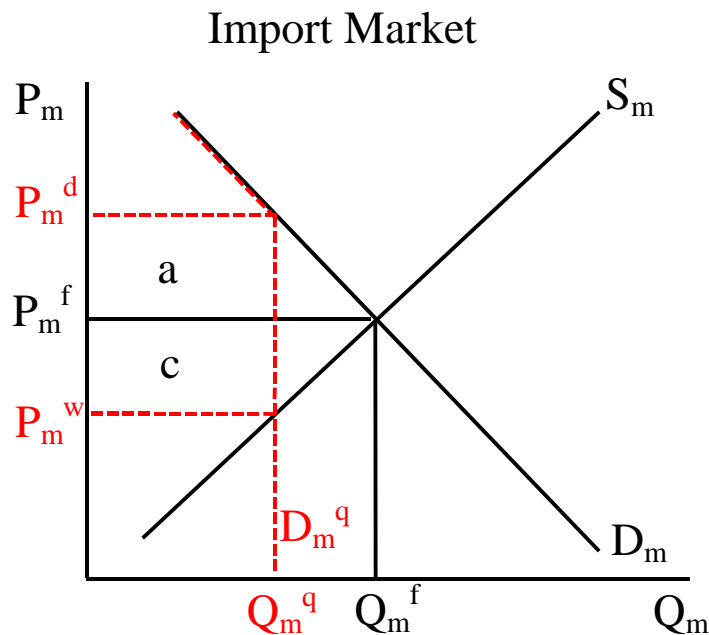
Comparison to a Tariff:

In the figure, the only difference from the case of the tariff is that the area a+c now measures the quota rents, not tariff revenue. Welfare effects are correspondingly altered, depending on who gets these rents.

The more important difference between a tariff and a quota cannot be seen in this static figure, since it appears only when conditions change. As supply and/or demand curves shift over time or due to other policies, the quantity of imports remains fixed under the quota but changes under the tariff.

In practical terms, this is likely to mean that in a growing market a quota will become increasingly restrictive over time, its tariff equivalent rising, unless the Q_m^q is deliberately increased.

Effects of a Quota on Imports



Changes caused by quota:

Same as tariff except:

$(a+c)$ = quota rent instead of tariff revenue. May accrue to foreigners.

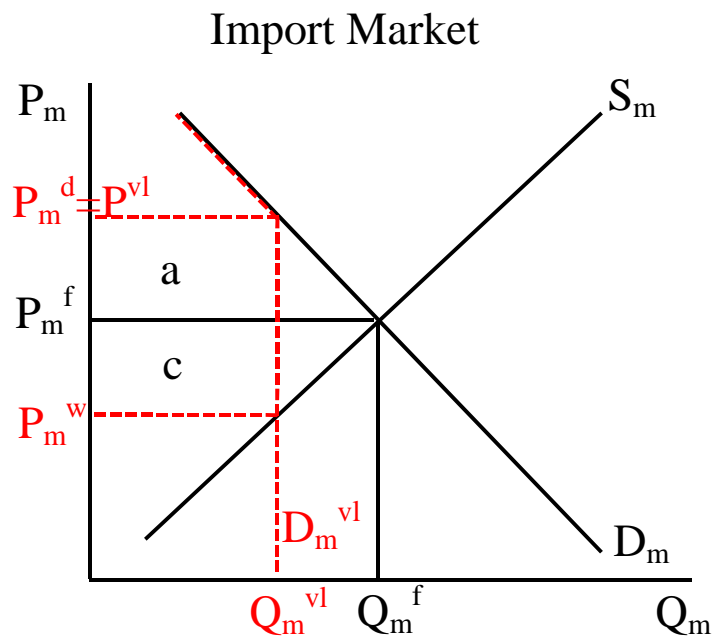
Quantity constant as conditions change

Variable Levy on Imports:

A variable levy is a tariff that is changed automatically so as to keep the domestic price at a pre-set level. Since for a given demand curve for imports, that price implies a certain import quantity, the variable levy also behaves rather like a quota.

The important differences between a tariff, a quota, and a variable levy are only seen when conditions change. Shifts in supply and/or demand will leave import quantity unchanged in the case of a quota, leave import price unchanged in the case of a variable levy, and leave the gap between domestic and world price unchanged in the case of a tariff.

Effects of a Variable Levy on Imports



Changes caused by variable levy:

Same as tariff except:

Domestic price constant at P^{vl} as conditions change

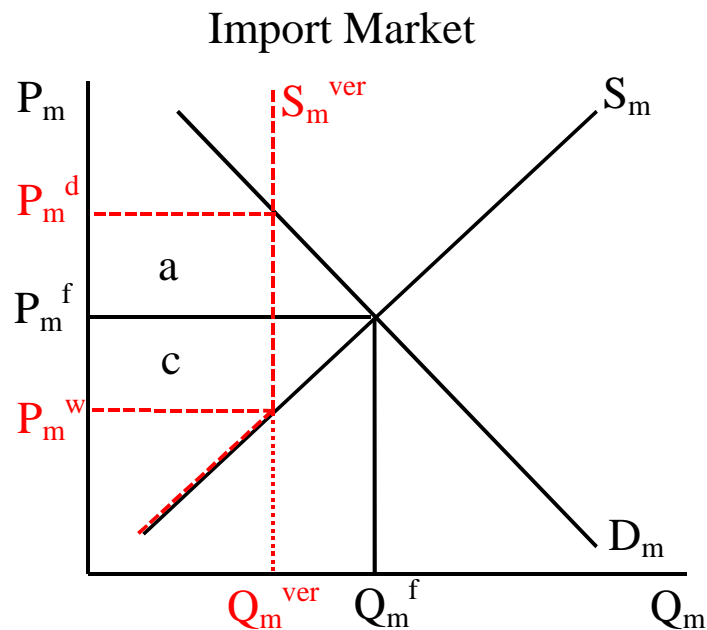
Voluntary Export Restraint on Imports:

A voluntary export restraint (VER) is a restriction on imports that is implemented by the foreign exporting country at the request of the importing country. VERs are normally specified in quantity terms, which is the case considered below.

A VER in the competitive market considered here is in fact identical to a quota for which the rights to import are allocated to foreigners.

The figure below is therefore the same as for a quota, except that it is now more natural to think of the supply curve as changing shape, rather than the demand curve. The supply curve now become the dashed red kinked curve S_m^{ver} .

Effects of a Voluntary Export Restraint (VER) on Imports



Changes caused by VER:

Same as quota except:

$(a+c)$ = quota rent must accrue to foreigners.

Government Procurement Regulation on Imports:

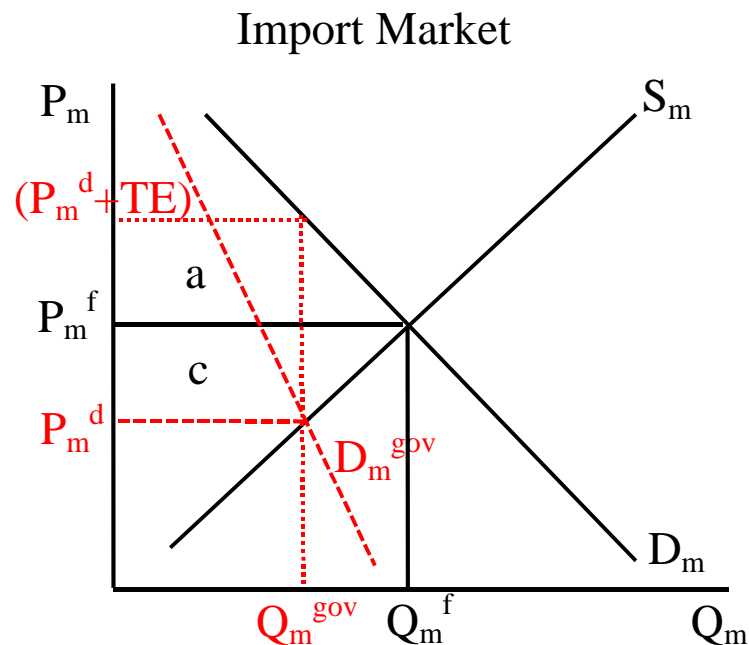
A government procurement regulation creates some sort of preference for domestically produced goods in government purchases. This can be implemented in various ways, formal and informal. In all cases, it means that the quantity of imports that is demanded at any given price by the country, including its government, is smaller than it would have been without the regulation.

This can be illustrated as a leftward shift of the import demand curve, as to D_m^{gov} below. The exact nature of the shift from the free trade demand curve depends on how the regulation is structured, but that matters little for the results.

The effect is to reduce the quantity of imports and also, if the country is large enough for the (foreign) import supply curve to have a positive slope as shown, for the price of imports to fall on both the world market and the domestic market. This last is an important difference compared to a tariff or quota: Demanders of imports other than the government benefit from a lower price (or if the country is small, at least do not suffer from a higher price).

A tariff equivalent can be defined in this case as the tariff that would have reduced imports by the same amount as the regulation. It can be found from the free trade demand curve as shown, although finding it in observable data is much harder. However, it is not the case that the regulation is completely equivalent to that tariff, since the effect on domestic price is quite different.

Effects of a Government Procurement Regulation on Imports



Changes caused by a government procurement regulation:

- Similar to tariff except:

- Domestic price falls.

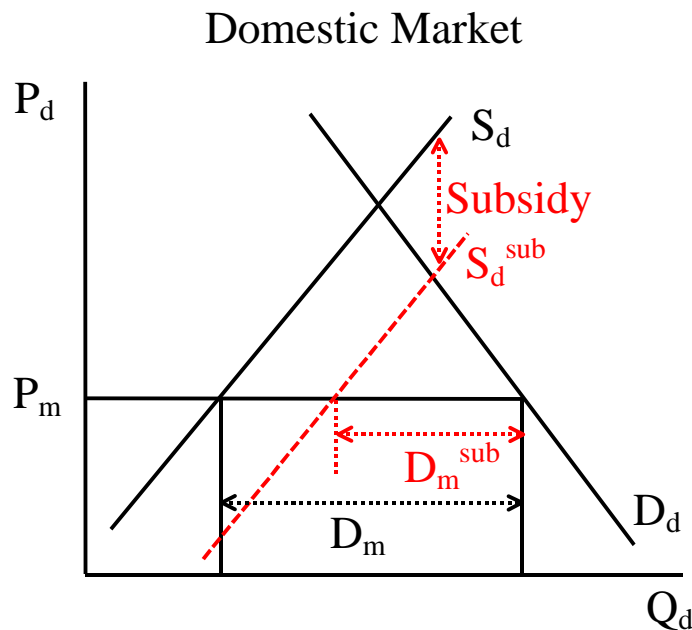
- Size of distortion difficult to observe.

Domestic Production Subsidy:

A subsidy to production in a domestic industry that competes with imports also has some of the effects of an NTB, although the effects are more indirect. By subsidizing production, the government stimulates domestic output and causes demanders to substitute domestic goods for imports, so that imports fall.

The analysis must start with the domestic market, which is shown first below, for a given price of imports, P_m . Before the subsidy, domestic demand, D_d , is greater than domestic supply, S_d , at P_m , so that the country imports an amount D_m . The subsidy then reduces the costs of domestic suppliers, shifting the supply curve down by the amount of the subsidy to S_d^{sub} . If the price of imports does not change, the quantity of imports falls to D_m^{sub} .

Effects of a Domestic Production Subsidy on Import Demand



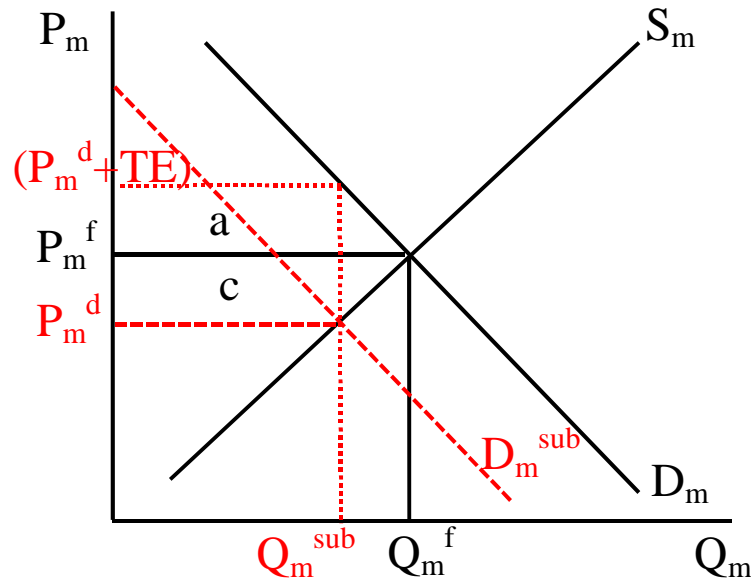
In the market for imports, shown below, the demand curve D_m is the excess demand from the domestic market, or the horizontal difference between D_d and S_d . The fall in imports at price P_m above means that the import demand curve shifts to the left, as shown, to D_m^{sub} .

If the country is large, the result is a fall in the world *and* domestic price to P_m^d together with the fall in imports.

As in the case of government procurement, one can again define a tariff equivalent of the subsidy as the tariff that would have reduced imports by this same amount, as shown. But again, the complete effects are different, since here both producers and consumers gain, while the government loses.

Effects of a Domestic Production Subsidy on Imports

Import Market



Changes caused by a domestic production subsidy:

Effects on trade similar to tariff:

Different effects on producers, consumers, and government.

Other NTBs:

- Domestic Content Requirements
- Anti-Dumping Duties
- Countervailing Duties
- Customs Valuation Procedures
- Standards and Other Technical Barriers to Trade

III. Regulation and Related Government Policies, in the GATT and WTO

GATT

- Started with only trade
- Tariffs were high
- Trade was small
- Domestic policies seemed not to matter

Over Time

- Line between trade and domestic markets has blurred
- Tariffs fell
- Trade grew
- Domestic policies became relatively more important
- Domestic interest groups noticed trade
- Tokyo Round extended GATT to domestic policies:
 - Government Procurement
 - Standards

Recently

- Other non-trade interest groups have noticed both the dangers and the opportunities presented by trade:

Dangers: Trade rules will interfere with other objectives

Opportunities: Trade institutions can be used to enforce solutions

Examples:

Services
Intellectual Property
Environment
Labor Standards

- Trade community noticed domestic policies
 - Domestic policies could undermine trade
 - Regulations could act as NTBs

Today – the World Trade Organization

Expanded: Broader Scope: New Issues
Greater Power: Dispute Settlement

What Should (and Can) the WTO Do?

Monitor Domestic Policies? Effects on Trade
Effects on Other Countries

Regulate Domestic Policies?
(Harder than regulating tariffs: Can't "Just Say No")

IV. Economics of Government Intervention in Markets

From Microeconomic Theory, two results:

1. In Absence of “distortions”
 - Markets work well
 - Intervention hurts
2. In presence of distortions
 - Intervention is needed
 - Theory suggests how to do it

Implications for International Trade:

Since distortions seldom directly involve trade:

- Free Trade is Best.
- Distortions should be corrected with domestic policies.

Lessons for Policy:

1. Countries should not use tariffs or other NTBs
2. Countries should use domestic policies to correct distortions
3. Domestic policies need to be calibrated
 - not too much
 - not too little

The Simple Analytics of Domestic Policy:

Example: External Social Cost (=E) arising from production, such as pollution or threat to public safety.

Policies: Tax on production
Regulation of quantity produced

Cases to consider:

1. No trade, no distortion
2. No trade, distortion
3. Small open economy, no distortion
4. Large open economy, no distortion
5. Small open economy, distortion

Problem: Find optimal policies

Analysis:

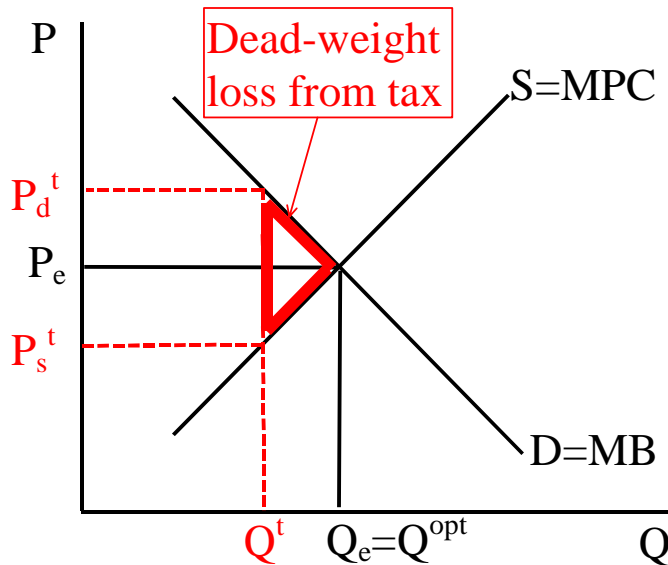
Will examine the domestic market for a good under the assumption of perfect competition.

In the absence of the externality, the supply curve, S , measures (vertically) both the marginal private cost (MPC) and the marginal social cost (MSC) of producing the good. With the externality, MSC exceeds MPC by the amount of the externality, E .

A tax on production drives a wedge between the price paid by demanders, P_d^t , and that received by suppliers, P_s^t , the difference being the tax. This causes changes in consumer and producer surplus and tax revenue, very similar to the tariff in the market for imports. By changing output, it also causes changes in the total external cost, when the externality is present.

Case 1: No Trade, No Distortion (E=0)

Domestic Market



- Q_e = Market output
- Q^{opt} = Optimal output
- Q^t = Output achieved by tax or regulation

In this case:

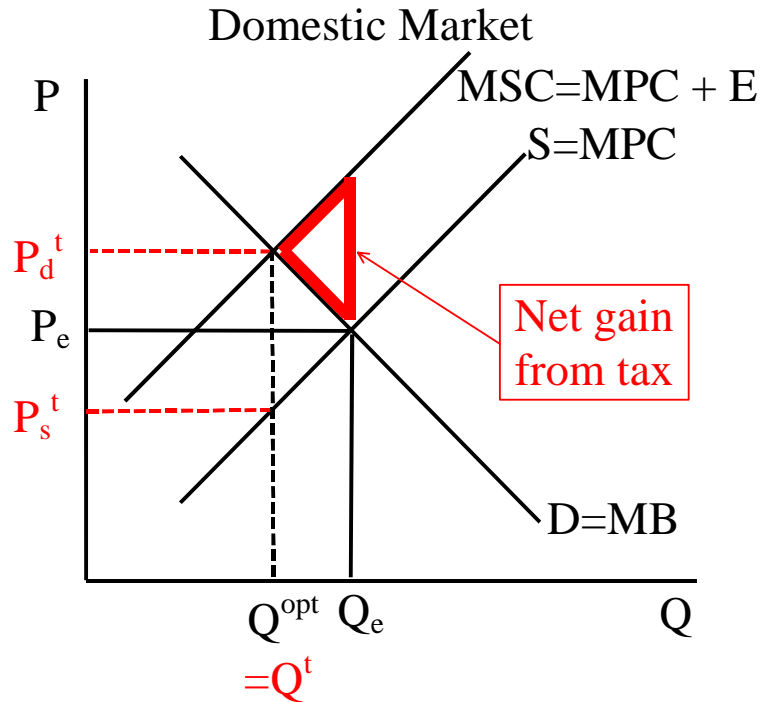
- Market gets it right
- Tax or regulation causes dead weight loss

Explanation:

The market equilibrium at quantity Q_e not only equates the quantities supplied and demanded, but also equates (since there is no externality) the marginal benefit and marginal cost of producing the good. This means that this output is optimal, since we cannot increase benefits further above costs by changing it.

This can also be seen by checking the welfare effects of a production tax or regulation that reduces output to Q^t. It turns out that the losses in consumer and producer surplus exceed the revenues from the tax (or rents from the regulation) by the triangle labeled Dead Weight Loss. Thus a policy that lowers output will lower national welfare. (A subsidy would do likewise.) The market gets it right.

Case 2: No Trade, Distortion = $E > 0$



- Market gets it wrong!
- Tax CAN offset externality and get it right.

Problems with tax: Producers

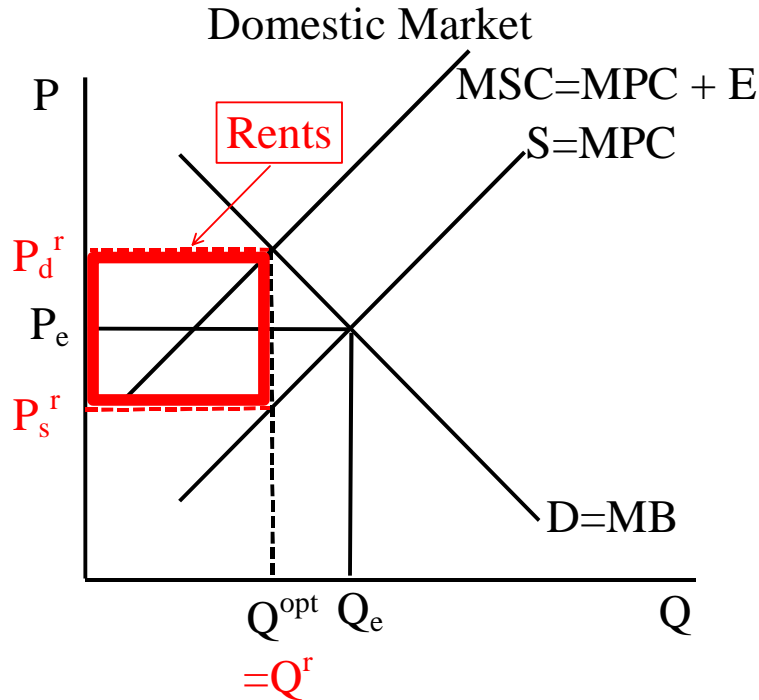
1. Are hurt
2. Won't cooperate (mislead)
3. Lobby against it

Explanation:

With this negative externality, MSC is now greater than MPC and hence greater than MB at Q_e , so that social cost can be reduced more than social benefit by reducing output. The optimum is where $MSC=MB$, at the intersection of the demand curve with the MSC curve (which lies a distance E above the supply curve).

Now a tax (equal to E) is beneficial, because it reduces output to the optimal level. The welfare effects are the same as Case 1, except that now there is the additional benefit of the reduced externality. This is equal to E times the drop in output. In the figures, this is the area of the parallelogram between MSC, S, and the two outputs. It cancels out the Dead Weight Loss from before, and leaves the triangle of Net Gain from Tax that is shown.

Case 2a: Same, but with regulation instead of tax



Government regulates output at Q^r
 Suppliers get rents
 If Q^r is right, net effect is same as tax

But note incentives;

Tax: Suppliers want it weaker
 Regulation: Suppliers want it stricter!

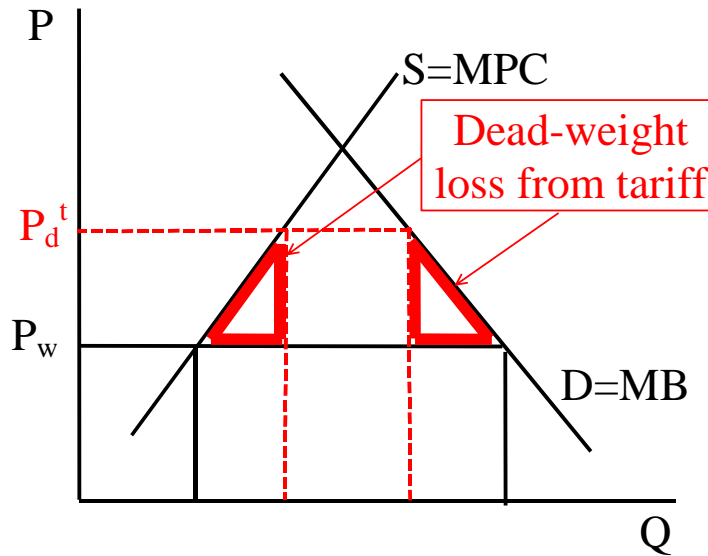
Explanation:

A regulation that limits output to Q^{opt} accomplishes the same purpose as the tax and has the same positive effect on national welfare. However here the amount that the government would have collected in tax revenue goes instead to the producers as increased profits, or rent, from the regulation (their costs go down, while their price goes up).

Comparison of Tax and Regulation:

While the tax hurts producers and will be resisted by them, the regulation benefits producers and will be welcomed by them. (Both hurt consumers equally.) Therefore, in the interaction between the firms and the government, we can expect a regulation to be too restrictive, but a tax to be not restrictive enough.

**Case 3: Open Economy
Small Country
No Distortion
Domestic Market**



- Free trade gets it right
- Tariff causes dead weight loss

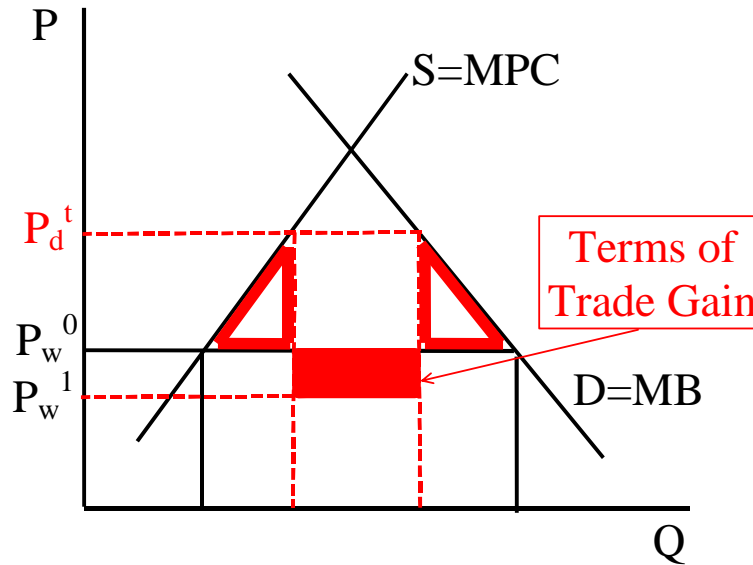
But note gain to suppliers

Explanation:

This just repeats what we saw before, that in a small open economy without distortions, a tariff reduces welfare. This says that free trade gets the levels of both production and consumption right, since it equates the marginal cost of production to the marginal benefit from consumption, and both also to the marginal cost of acquiring the good in trade, P_w .

Case 4: Same, but Large Country

Domestic Market



Tariff lowers P_w^0 to P_w^1 .
 County may gain, but at the world's expense.

(Basis for:

- Prisoners' Dilemma in tariffs
- Resolution via GATT)

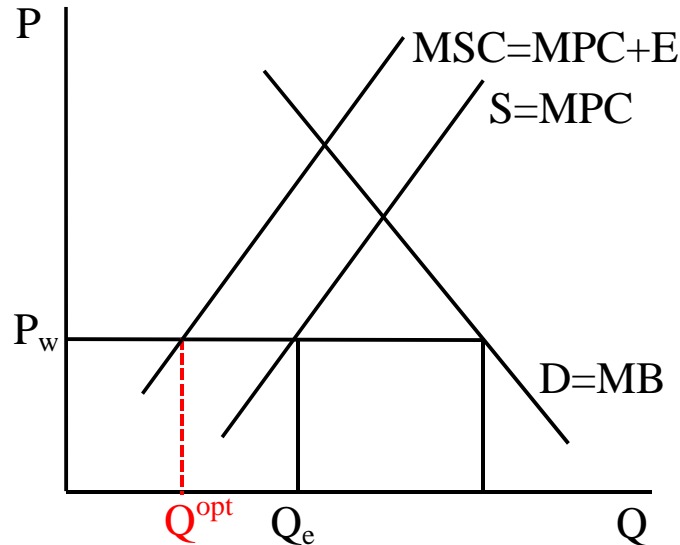
Explanation:

For a large country, free trade does **not** get it right, from the perspective of only the one country's welfare. A tariff raises the domestic price but lowers the world price, as shown. The higher domestic price causes the two triangles of net welfare loss, as in the small-country case, but the lower world price generates also the red rectangle of gain that is shown above (which is a portion of the tariff revenue that is not offset by consumer loss). Therefore a large country may gain from a tariff, and it is not true that output and consumption are optimal.

(The possible gain from a tariff here is at the rest-of-world's expense. Other countries, individually if they are large and collectively if they are not, also have the same incentive. The resulting conflict is part of what the GATT and WTO are intended to resolve.)

**Case 5: Open Economy
Small Country
Distortion $E > 0$**

Domestic Market



Optimal Policies: Tax = E, or Regulate $Q=Q^{opt}$

But suppliers now

- Bear full brunt of tax
- Get less rent from regulation
- Perceive trade as unfair
- Lobby for protection (tariff = E?)

Explanation:

Adding the externality to the small country case, it is no longer true that MSC is equal to MB in a free trade, untaxed equilibrium. Instead, MSC is greater than both MB and P_w by the amount of the externality.

As in the closed economy, the optimum output is the smaller Q^{opt} , where MSC does equal P_w , and this again can be achieved by a production tax of E or a regulation of output to that level.

However, by fixing the price to demanders, trade has caused producers to either bear the whole cost of the tax or to lose whatever rents they might have gotten from regulation. In addition, they will blame this on trade, perceiving it as unfair, and they may lobby for some sort of protection, such as a tariff equal to the tax.

Leveling the Playing Field:

With a Tariff

A tariff equal to the tax can be viewed as “leveling the playing field,” by subjecting the imports to the same requirement as domestic production. Analysis of that case (not done here) can easily show however that this negates any benefit from the tax in reducing the externality, and at the same time causes a dead weight loss by raising prices to demanders.

With a Processing Requirement

A more interesting case, however, is one in which instead of being taxed, producers are required to eliminate the externality by some sort of processing that raises their cost. By itself, this will have effects very similar to the tax considered above, if the processing cost, A , is equal to E . The supply curve shifts up due to the extra cost, the optimal level of output is reached, and domestic producers bear the entire cost.

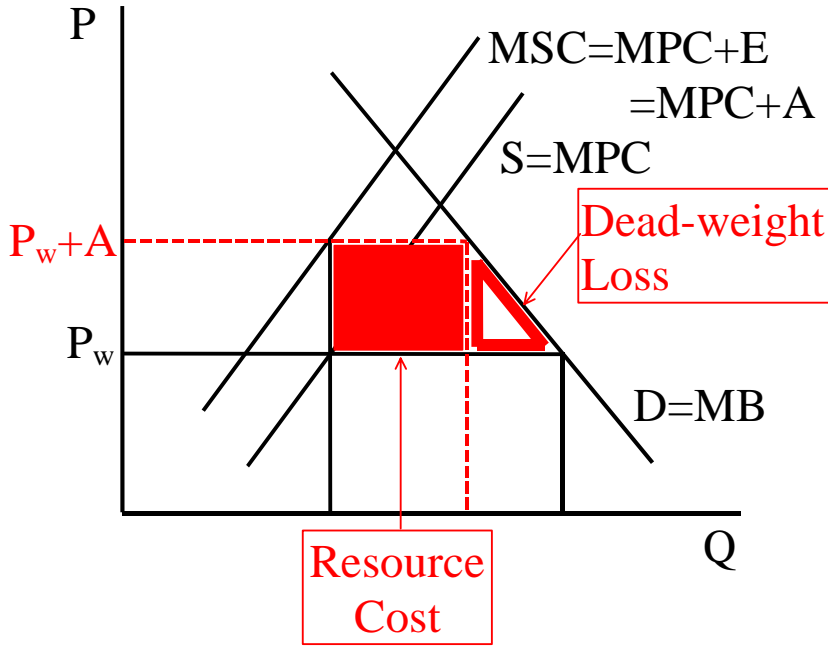
Now suppose that domestic producers lobby to have imports subject to the same processing requirement, again to level the playing field. If foreign production generates the same negative externality for the domestic country as domestic production, then this will work well, but for plausible externalities that seems unlikely.

Assume instead the opposite extreme: that foreign production generates **no** externality for anyone. (Perhaps foreign production occurs in a location where pollution, if that is the problem, is more readily dissipated, for example.) Then the requirement that imports be processed adds to their cost without actually doing any good.

This case is analyzed below. The domestic processing requirement shifts the supply curve up by the amount $A=E$, making it coincide with the MSC curve. At the same time, foreign costs are also increased by A , raising the price of imports from the world market to P_w+A . In the new equilibrium domestic output is the same as it was without any policy at all, while consumption and imports are both reduced.

Case 5a: Same, but with import processing

Domestic Market



Result: Extra net resource cost of unnecessary import processing.

Welfare Effects of the Processing Requirement:

Domestic producers are now unaffected, since their cost and price have both risen by the same amount. Domestic consumers are worse off by their loss of consumer surplus. Part of that loss is payment for the elimination of the externality, which is a benefit and therefore cancels out. But the rest – the red areas in the figure below, are net losses for the country and the world.

The triangle is the usual deadweight loss of raising the price to consumers above the true marginal cost. The rectangle is an additional cost in resources, wasted on processing imports that did not need it.

Other Issues:

1. Policy “harmonization”: To what extent is it helpful for domestic policies to be either the same or coordinated?
2. Will governments act for the best? Are the incentives confronting governments such that it is in their interest to select policies that will be optimal for the world? Or do they need to be restrained from using policies that will hurt each other?
3. Terms of Trade Effects: Domestic policies can change world prices in ways that benefit some countries and hurt others. To what extent do these price changes matter for policy choice, and how can these effects be neutralized by international institutions?