MOT 112A – Economic Foundation

Lecture W5-A – Trade policy analysis

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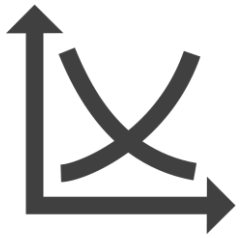
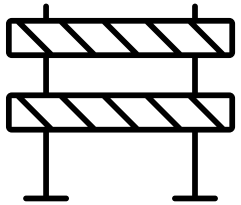
Content

1 Introduction



2 The open economy equilibrium



3 Import tariffs in perfectly competitive markets

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1. Introduction
Trade policy – a contentious issue

TRADE

Miles apart: U.S. and Europe diverge on Chinese EVs

The threat of China taking over the electric vehicle industry on two continents is shaping debates about jobs, trade and the fight against climate change.

Chinese electric cars are coming — and the U.S. and Europe are split on how to respond

On both sides of the Atlantic, the push to move beyond the internal combustion engine is creating a giant strategic opportunity for China, whose carmakers already dominate global markets for batteries and clean energy technology.
From there, the responses of policymakers diverge, as U.S. protectionism contrasts to the European Union's low tariffs and generous national subsidies for battery-powered imports. […] [T]he threat of China taking over yet another industry is becoming an issue governments cannot ignore — and it's shaping debates about jobs, trade and the fight against climate change.

The U.S. imposes a stiff 27.5 percent tariff for Chinese-made cars […] Meanwhile, Europe's[…] tariffs on imported cars are only 10 percent, …

Source: Politico, 23 June 2023
https://www.politico.com/news/2023/06/23/u-s-and-europe-diverge-on-chinese-electric-cars-ee-00103186

1. Introduction
Trade policy

- Trade policy is a part of economic policy which regulates a country's trade with foreign countries.
- An extreme form of trade policy orientation is **free trade**, which means the government does not intervene at all with exports and imports. At the other end of the spectrum is protectionism which in an extreme form can close of a country (or individual industries) from foreign trade
- Typical trade policy instruments are (non-exhaustive list)
  - **Import tariffs** – a tax on the sales by foreign producers to the domestic market
  - **Quotas** – a quantitative restriction to the amount that can be imported of a certain good
  - **Export subsidies** – a transfer to domestic firms for their international sales
  - **Export taxes** – a tax on exports of domestic producers
  - **Voluntary export restrictions (VERs)** – commitment of a country to limit the amount of exports
  - **Non-tariff measures (NTMs)** – a wide set of measures including e.g. technical standards, sanitary measures, intellectual property rights (IPRs), environmental standards,…

1. Introduction
General comments and assumptions for analysis

- We perform a **'partial equilibrium'** analysis of a specific market (e.g. potato chips, computer chips, wheat, wine, smart phones, etc.).
  - The market equilibrium is determined by supply and demand
  - Focus on price effects for the respective market (partial analysis), income effects are not taken into account, neither are prices on the factor markets (wages, interest)
- The market under consideration is characterized by **perfect competition**
  - Atomistic competition (no market power of firms)
  - Complete information of market participants
  - Completely defined property rights
  - No transaction costs

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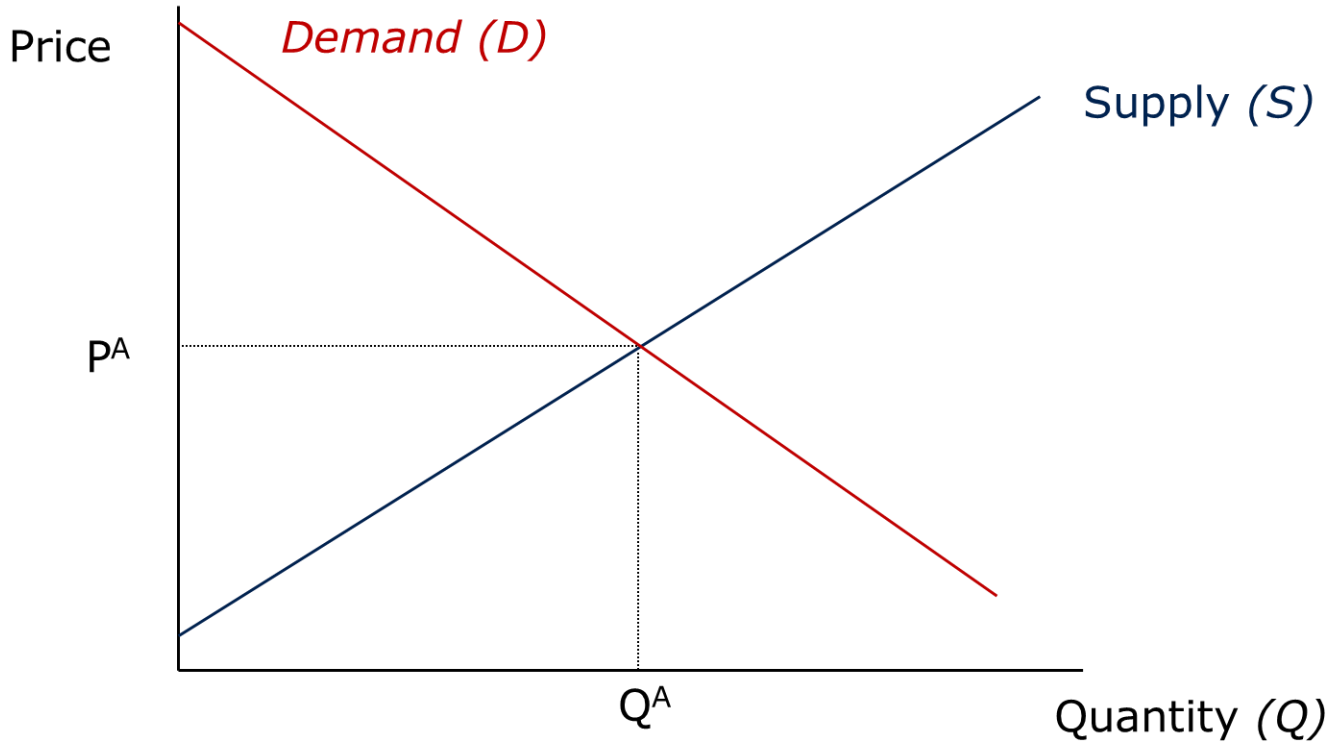
1. Introduction
The closed economy equilibrium (autarky)

- The **demand curve reflects marginal utility** in consumption; MU is decreasing in output
- The (private) **supply curve reflect marginal cost** (MC) of production; MC is increasing in output
- The market equilibrium in autarky (Q^A) is found at the intersection of supply and demand
- The market equilibrium implies that the resulting market price, P^A equals MU and MC, that is

$$P^A = MU = MC$$



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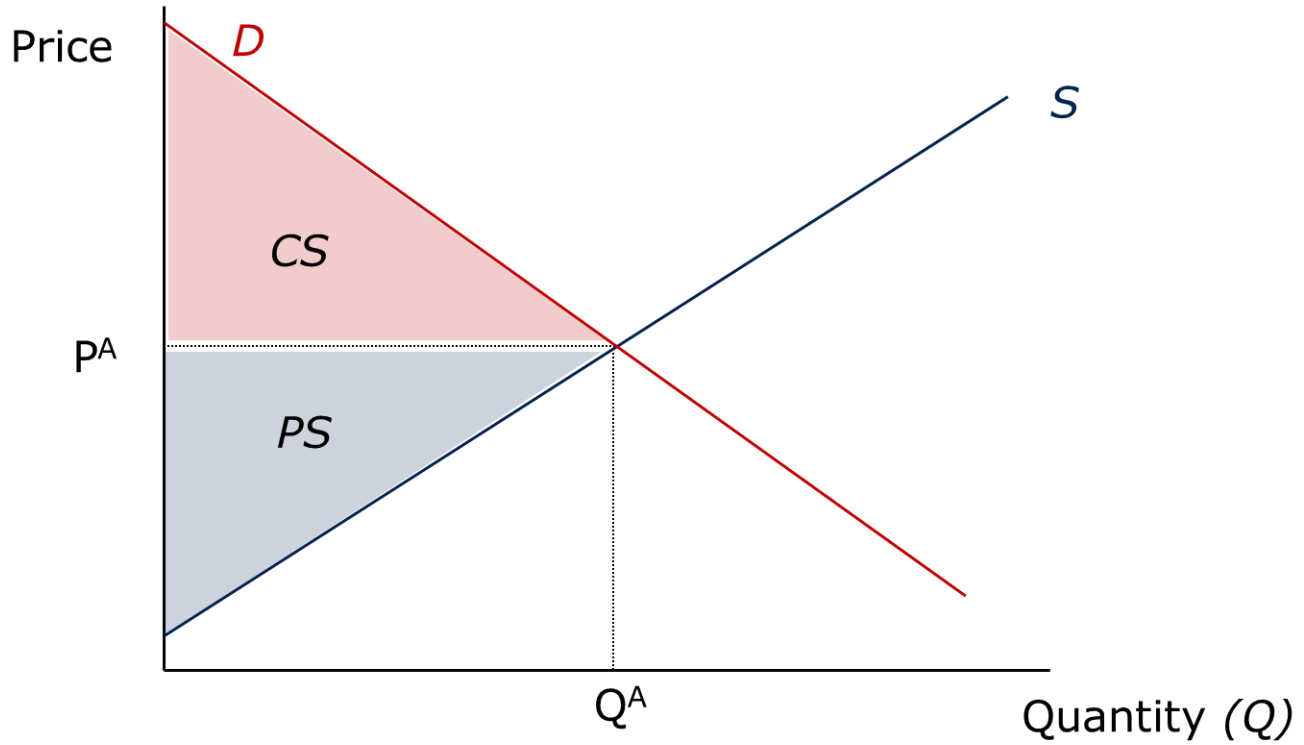
1. Introduction
Welfare in the closed economy

- Because MU is decreasing, consumers enjoy a benefit from consumption of every unit until the last because at consumption levels below Q^A, it must be that MU > P^A
- Because MC is increasing, producers enjoy an advantage from producing of every unit until the last because at production levels below Q^A, it must be that MC < P^A
- The sum over the consumer benefits add up to the consumer surplus (CS).
- The sum over the advantages of producer add up to the producer surplus (PS).
- Consumer surplus and producer surplus add up to welfare (W)

$W = CS + PS$



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2. The open economy equilibrium
Analyses of the open economy

- Opening up to international trade means that countries can export or import the good under consideration
- **Analysis Part 1:** Comparison of the market equilibrium under autarky with that under free trade
  - Characterisation of the market as export industry or import competing industry
  - Welfare implications (‘gains from trade’)
- **Analysis Part 2:** Analysis of trade policy instruments open markets
  - Import tariffs → focus of analysis
  - Export subsidies → illustrated in the appendix
- We analyse the case of a **small open economy**, defined as an open economy which cannot influence the world market price

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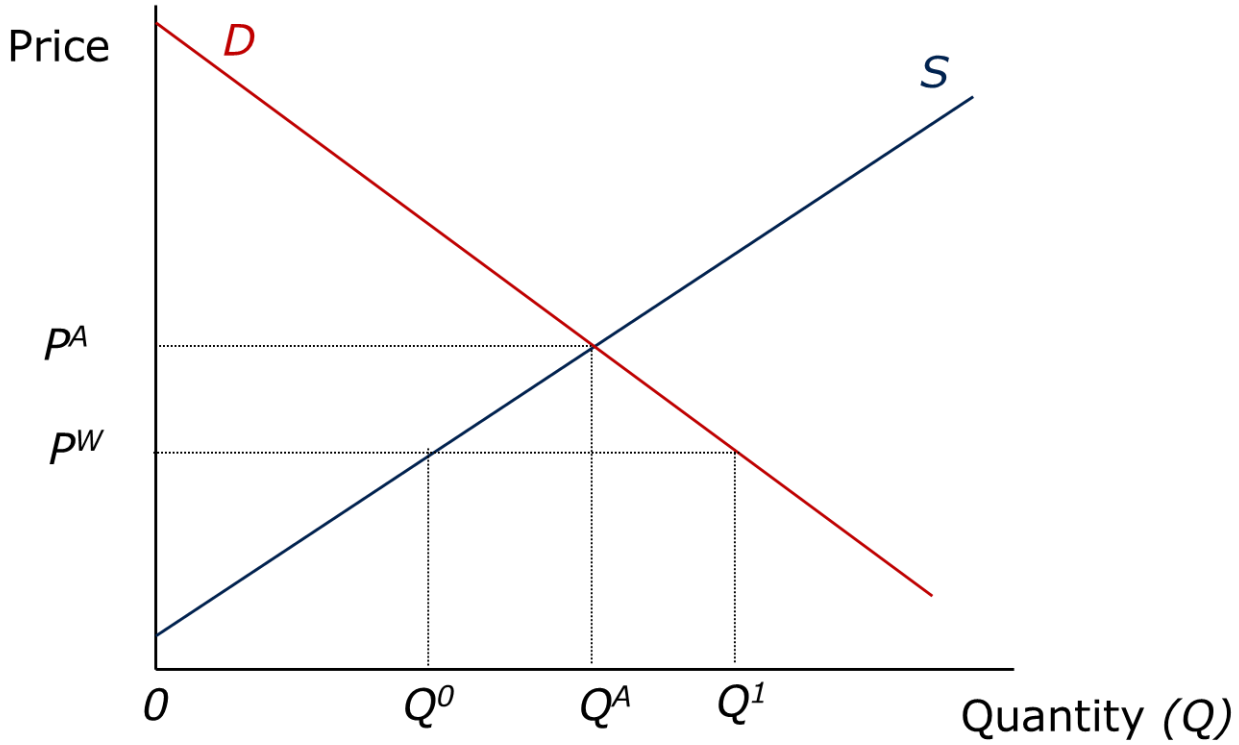
2. The open economy equilibrium
Export industry and import-competing industry

- In a small open economy, the world market price (P^W), that is, the price at which the economy can sell to or buy the good from a foreign country, is given.
- If the autarky price $P^A < P^W$
  → **Export industry**
- If the autarky price $P^A > P^W$
  → **Import-competing industry**

The case of an import-competing industry



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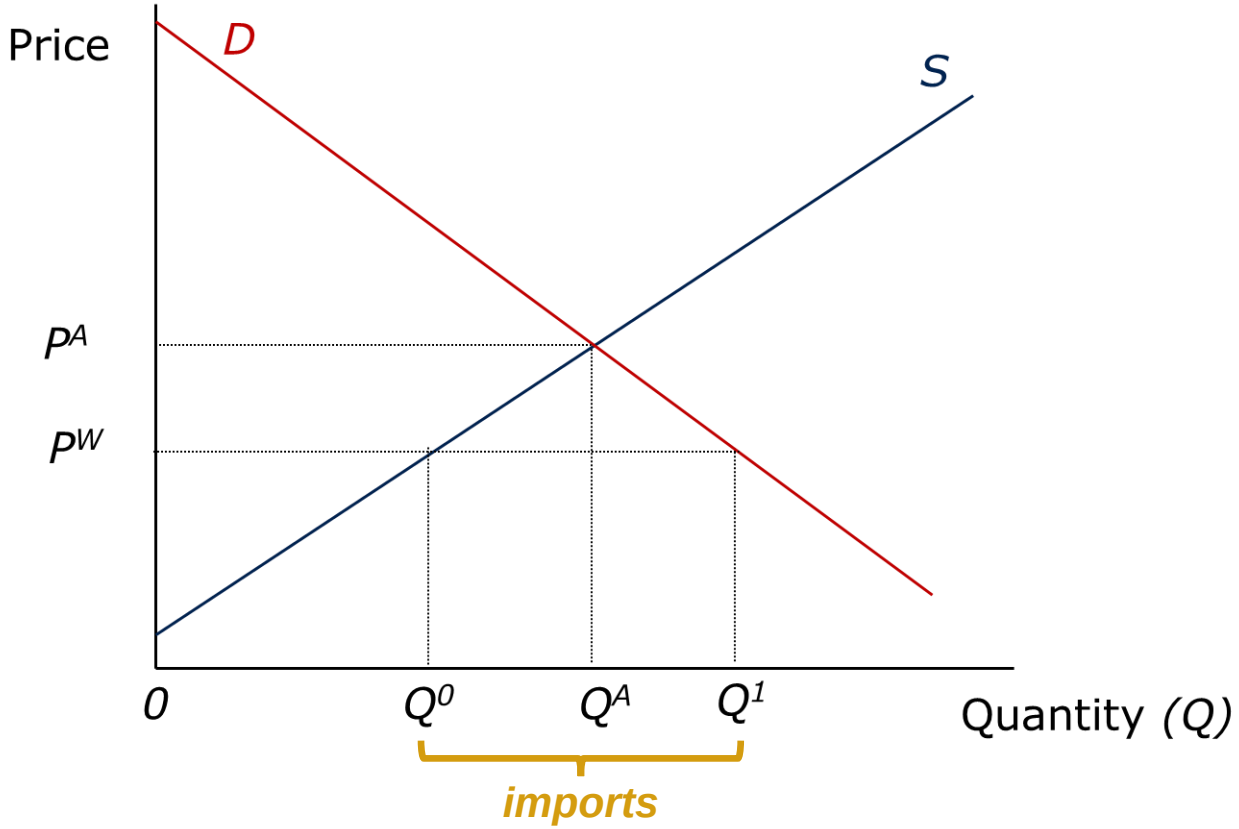
2. The open economy equilibrium
Free trade equilibrium in an import-competing industry

- Sticking to case of an import-competing industry, we can characterize the free trade equilibrium assuming a given world market price P^W.
- The domestic price under free trade will have to be the world market price P^W .
- By definition, in an import-competing industry, this price will be lower compared to the autarky situation
- Demand will be at Q^1.
- Domestic production will be at Q^0.
- Imports constitute the difference between demand (Q^1) and domestic production (Q^0)

The case of an import-competing industry



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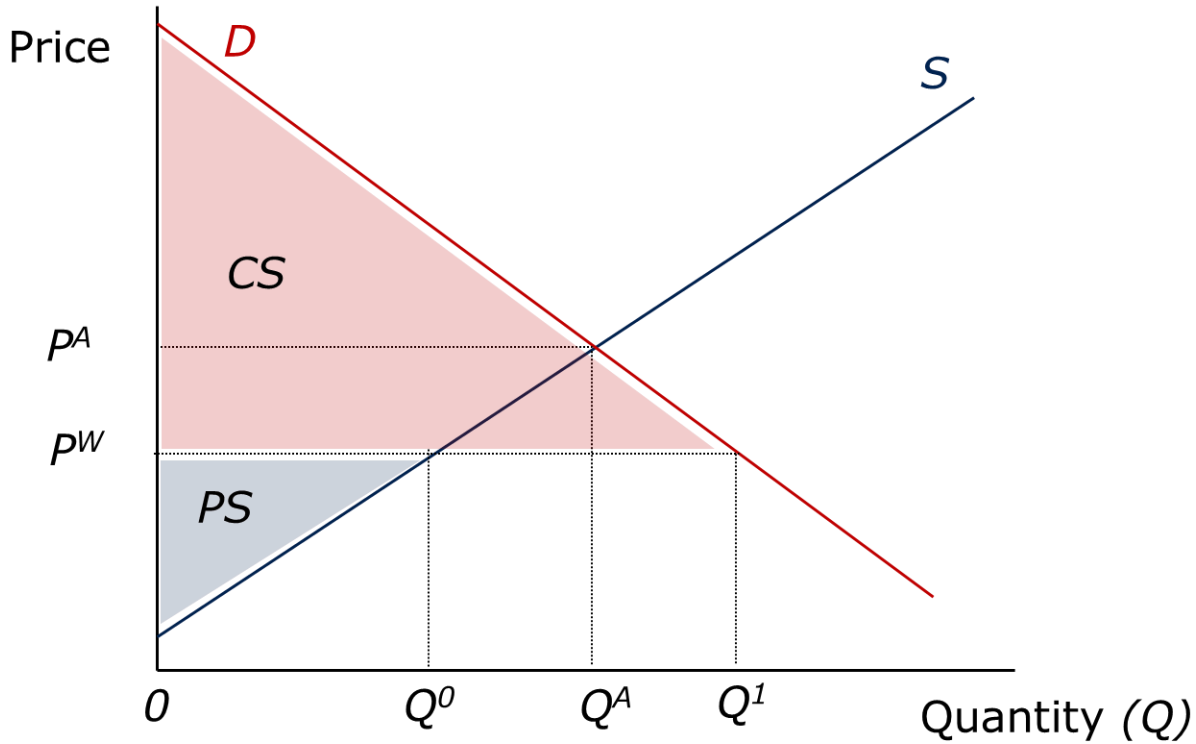
2. The open economy equilibrium
Welfare in the free trade equilibrium (import-competing industry)

- Consumer surplus (CS) and producer surplus (PS) are derived as in the closed economy.

- Note that producers have no incentive to produce beyond Q^0, because marginal costs would exceed the price they get
- Consumers benefit from the lower price under free trade, which is why the consumer surplus expands compared to autarky.

Welfare in an import-competing industry



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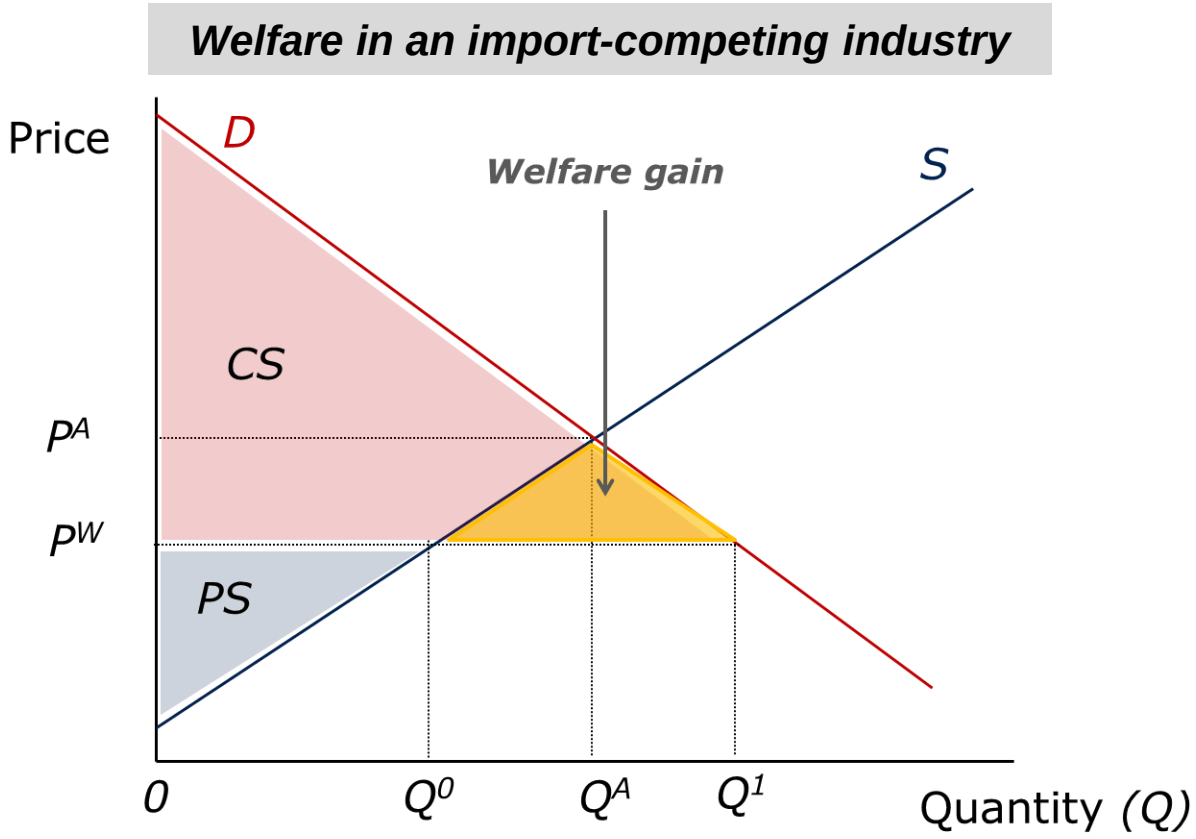
2. The open economy equilibrium
Welfare in the free trade equilibrium (import-competing industry)

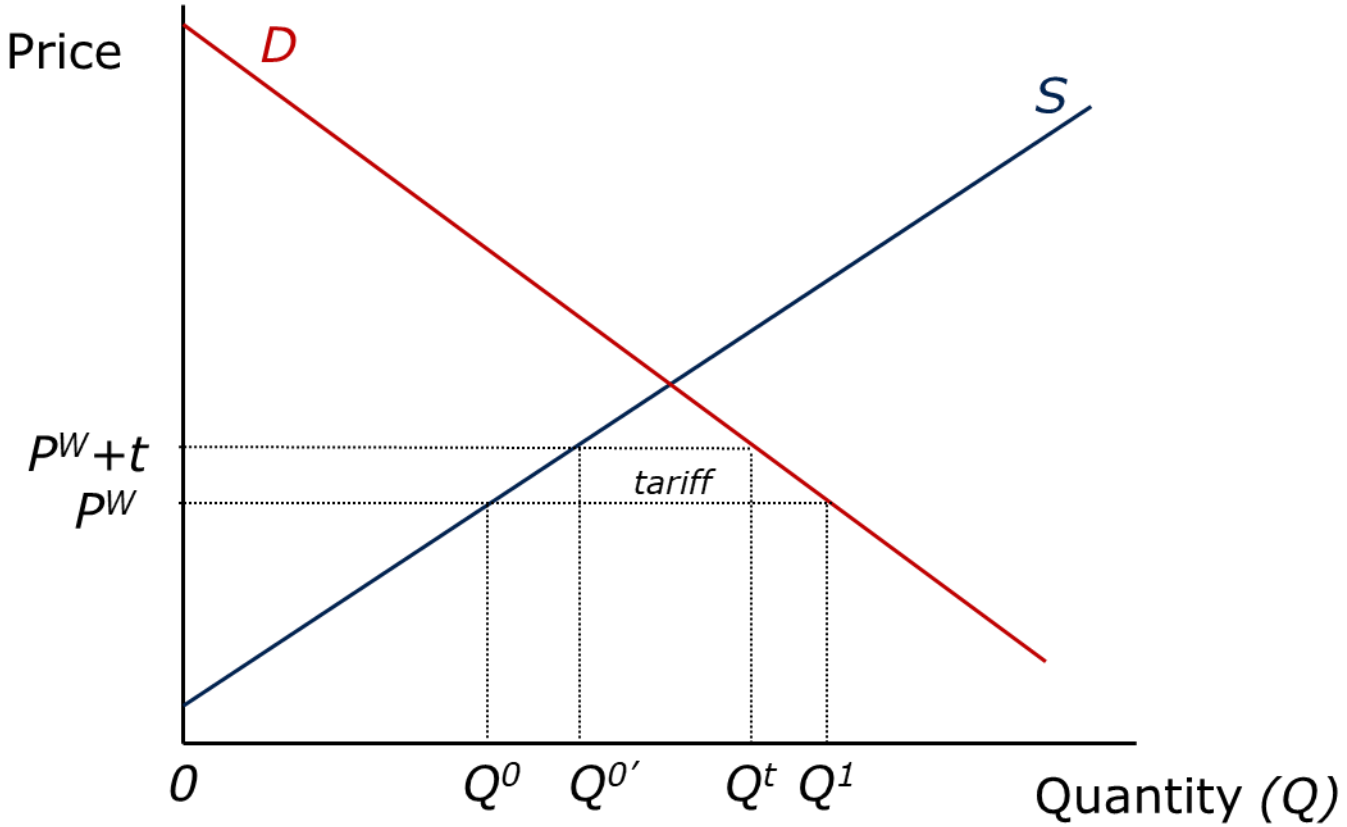
- Consumer surplus (CS) and producer surplus (PS) are derived as in the closed economy.

- Note that producers have no incentive to produce beyond Q^0, because marginal costs would exceed the price they get. Hence, PS shrinks compared to autarky.
- Consumers benefit from the lower price under free trade, which is why the CS expands compared to autarky.
- Overall, there will be a welfare gain, because |ΔPS| < |ΔCS|.
- The 'gains from trade' (yellow triangle) results from (i) the access to foreign goods at lower prices coupled with (ii) higher demand.



3. Import tariffs in perfectly competitive markets
The effects of an import tariff

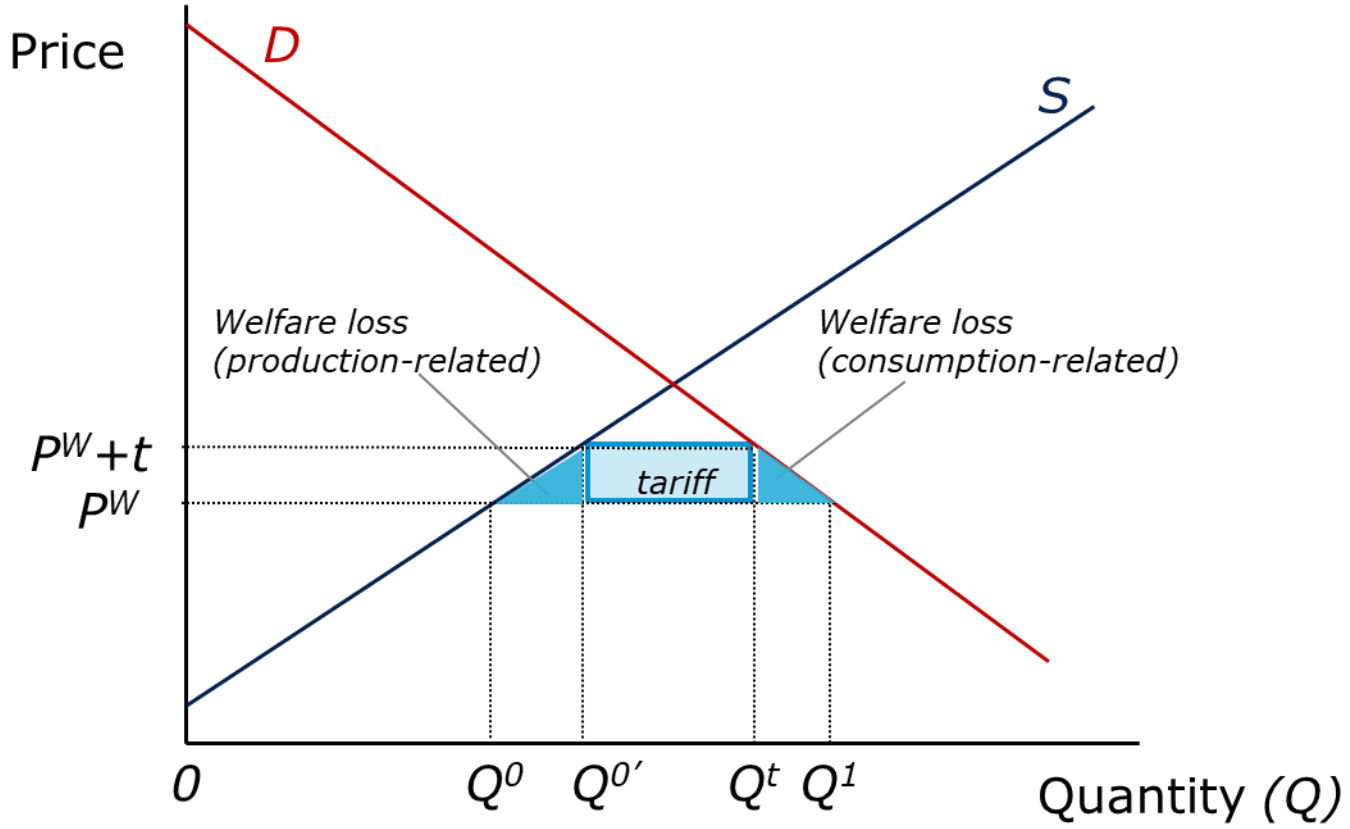
- An import tariff (*t*) is a tax imposed on the imports (the sales of foreign producers)
- The effect of such a tax is that imported goods become more expansive.
- Domestic producers will use this fact to raise prices too. Hence, the levy of an import tariff drives a wedge between world market price, P^W, and the domestic price P^W+t.
- Compared to the free trade equilibrium, with a tariff imposed
  - consumption Q^t is lower
  - Imports are lower (distance $Q^{0'}$ Q^t)
  - Domestic production expands (to $Q^{0'}$)



3. Import tariffs in perfectly competitive markets
The welfare effects of an import tariff

- In the presence of a tariff, welfare includes tariff revenue (TR) accruing to the government.
- The introduction of an import tariff will result in a welfare loss compared to the free trade equilibrium.

- The welfare loss stems from two factors.
  - **Production-side:** the higher price P^W +t induces firms to produce at marginal costs which are above P^W which is not efficient.
  - **Consumption-side:** Consumers have to pay higher prices so they consume less. Both factors make CS shrink.



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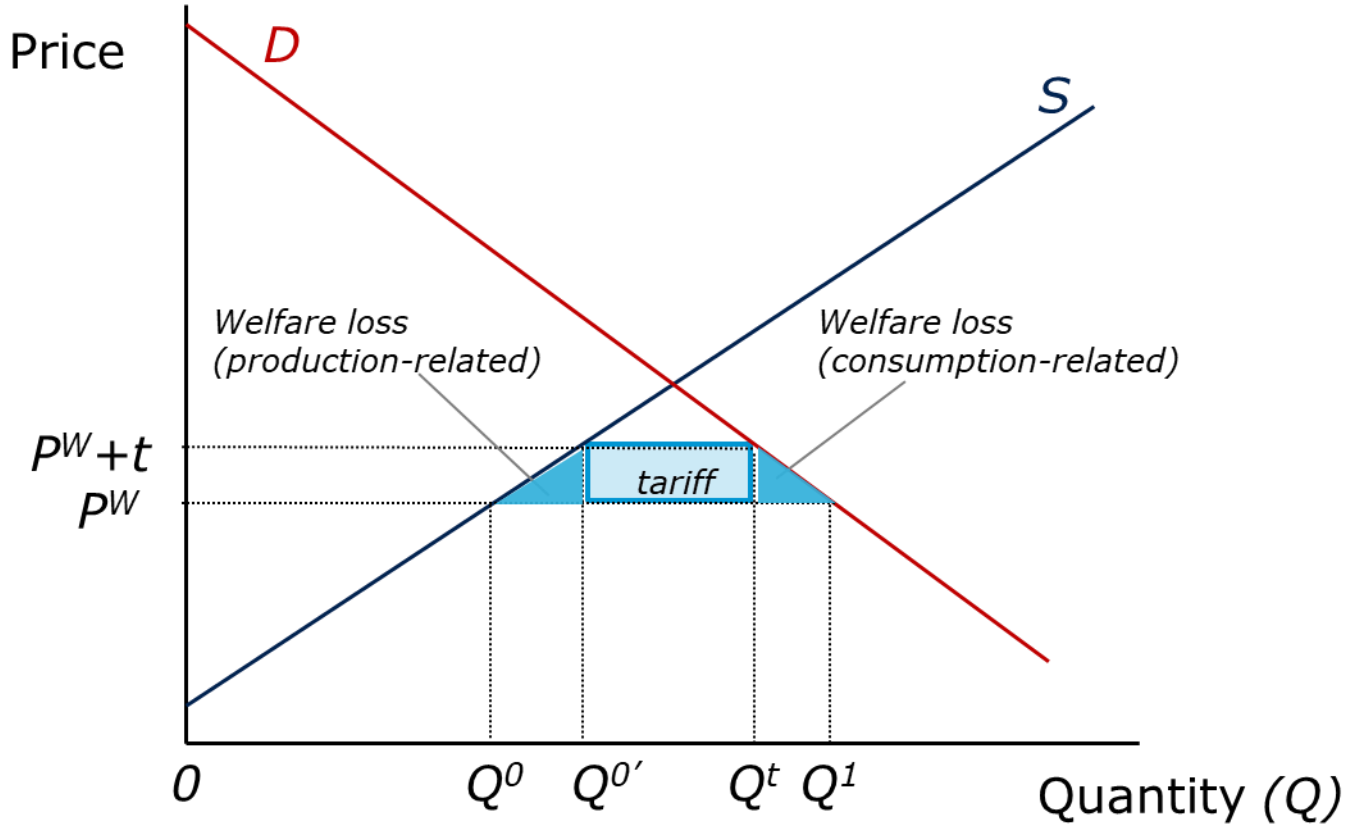
3. Import tariffs in perfectly competitive markets
The welfare effects of an import tariff (con't)

- Welfare: $W = CS + PS + TR$
- TR equals $\overline{Q^{0'} Q^{t}} \cdot t$

- Change in welfare compared to the free trade situation stems from .
  - a decline in CS (so ΔCS is negative)
  - an increase in PS (so ΔCS is positive)
  - The tariff revenue TR
- It turns out that |ΔPS| + TR < |ΔCS|
- so that the loss in CS dominates the joint increase in PS and the tariff revenue
- Graphically, the welfare loss is represented by the two blue triangles.



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3. Import tariffs in perfectly competitive markets
Import tariff - Summary

- The introduction of an import tariff leads to an increase of the domestic price which ends up being above the world market price
- The import tariff leads to more domestic production and less imports
- The import tariff leads to less consumption which is a direct consequence of the higher price
- Overall, domestic welfare declines compared to a free trade equilibrium because the loss in consumer surplus exceeds the joint increase in the producer surplus and the tariff revenue.
- In static terms, this outcome is deemed inefficient.

3. Import tariffs in perfectly competitive markets
Why do countries impose tariffs?

- The negative welfare effect of tariffs raises the question why a country would use such an instrument.
- There are several reasons for that
  - **Easy to collect income for the state.** For developing countries tariff revenue constitutes additional revenue for the state which is relatively easy to administer (e.g. compared to an income tax).
  - **Political factor.** Since domestic producers gain, import-competing industries often lobby for tariffs.
  - **Market failures.** The welfare result was derived assuming perfect competition. The implications of a tariff could be different if there is a market failure (free trade equilibrium is then not efficient). Positive externalities from innovations in high-tech industries would be an example.
  - **Industrial policy/development objectives.** Historically economic development is correlated with industrialization. This is why many countries have industrial policy programmes which provide support, including tariffs and (export) subsidies for manufacturing industries.
  - **Large country case as an exception.** The clear-cut welfare result of an import tariff hinges upon the small economy assumption. Theoretically, a large country could reap a welfare gain by introducing an 'optimal tariff' because it can influence the world market price and therefore shift the terms-of-trade in its favour.*

* For details see Feenstra & Taylor, pp.263-269 and the Appendix slides

3. Import tariffs in perfectly competitive markets
Concluding remark

- The finding that an import tariffs is counterproductive with regard to welfare in the context of a perfectly competitive market should not come as a surprise. If the market already ensures an efficient outcome, then there is no potential for the government to improve the situation with interventions (such as introducing a tariff).*
- The same result with regards to welfare are obtained for other trade policy instruments, notably export subsidies. Export subsidies are subsidies provides to exporters for their sales to foreign countries. They are relevant in export industries (see appendix slides for an exposition).
- As we shall see, the effectiveness of tariffs can change drastically is we make slightly different assumptions on the market conditions, notably the cost structures of firms.

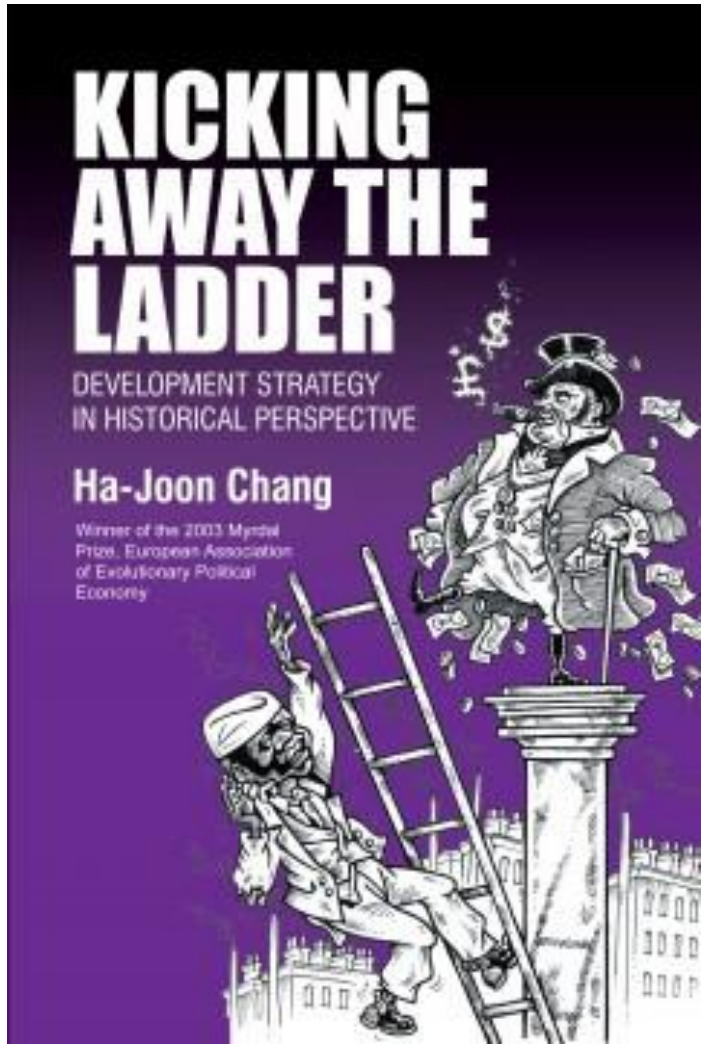
* Note again that the large country case may be an exception.

4. The infant industry argument

Introductory quote

"[…]there is a respectable historical case for tariff protection for industries that are not yet profitable, especially in developing countries. By contrast, free trade works well only in the fantasy theoretical world of perfect competition."

Ha-Joon Chang (2005)



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4. The infant industry argument
Objective and basic idea

- The main objective is to make a new (or nascent) domestic industry grow and develop a ‘targeted industry’.
- Protect a nascent industry from foreign competition with a prohibitively high tariff.
- Give domestic producers in the ‘infant industry’ sufficient time to gain experience and learn thereby reducing their production costs.
- This reduction in production cost must be strong enough to enable the protected industry to survive in the long term.
- Once the industry is internationally competitive, the tariff can be eliminated.
- The idea of an infant industry tariff goes back to Alexander Hamilton (1791), Friedrich List (1856), and John Stuart Mill (1848).

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4. The infant industry argument
Framework for infant industry protection

- Average cost of productions in a new industry can initially be very high.
- This is particularly the case when there are **learning effects in production** also referred to as **learning by doing**.
- Learning by doing implies that there are **dynamic economies of scale**.
- In open economies the high initial average costs is particularly troublesome because costs of domestic producers are too high to be successful in the market (both international and domestic).
- The consequence is that domestic firms will not even start production at the given world market prices because it is not profitable. Hence, no domestic industry will emerge.
- This is true even if domestic firms would be more cost-competitive in the longer term (e.g. because the wage level is lower). This constellation is the central element in the infant industry arguments and a country in such a situation is said to have **latent comparative advantage**.

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4. The infant industry argument
Enter the infant industry tariff

- One way to avoid such a situation where potentially cost-competitive industries will fail to develop is to **protect domestic producers from foreign competition**.
- The consequence of such an **infant industry protection** is that **domestic producers can serve the domestic market** and gain experience in producing and over time bring down average costs.
- An important feature of an infant industry tariff is that this **protection for domestic firms is temporary**, that is, the import tariff is eliminated after a certain period of time.
- After that period, when the industry has matured (‘overcome its stage of infancy’), it must keep up with foreign competition.

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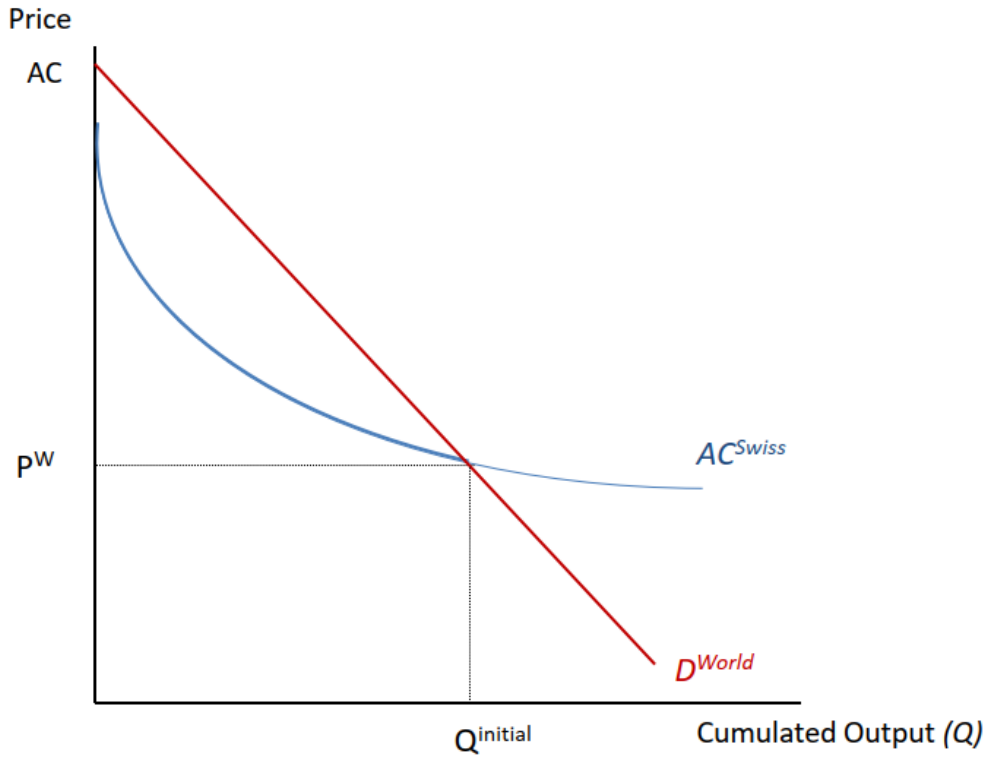
4. The infant industry argument
External economies of scale

- We **deviate from perfect competition** and assume that there are **external economies of scale**.
- External economies of scale arise at the level of the industry not at the level of individual firms. Reason for such external economies of scale are
  - **Specialised suppliers.** In a large industry there will be a high number of specialized suppliers which help reduce costs
  - **Labour market pooling.** If there are more firms in the industry there will be larger pool of highly-trained workers which help reducing costs by raising labour productivity
  - **Knowledge spillovers.** With a greater number of firms there are more knowledge flows between them which diffuses new technologies and again drives down costs. Research shows that such knowledge spillover are mainly local.
- It is reasonable to assume that in a new or young industry, **building up a dense network of suppliers, a large labour pool and highly innovative firms takes time**. Hence, we analyse **dynamic external economies of scale**.

4. The infant industry argument
Dynamic economies of scale and average cost

- Let's assume there is a market which is characterized by dynamic economies of scale. Let's say it is the market for watches and Switzerland is the country which has conquered the market (initial situation).
- External economies of scale imply that the **average cost curve (AC)** – which we can interpret as the supply curve – is **downward sloping** (average cost declines with the number of units produced).
- Since we argued that economies of scale materialize over time, it is best to think of the output produced as the cumulative output (Q) produced over time.
- In the Figure, it is assumed that Switzerland is satisfying world demand (D^W) by supplying $Q^{initial}$ at world market price P^W.



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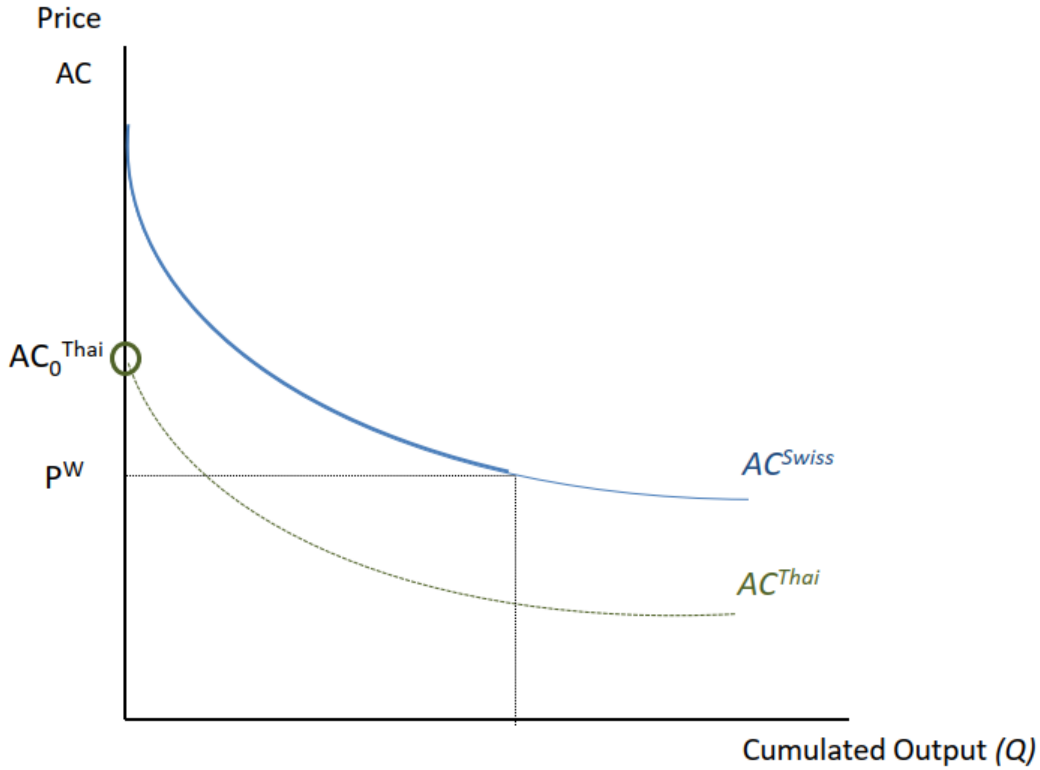
4. The infant industry argument

Appearance of a new entrant at the world market

- Assume that Thailand want to develop a watch industry. Let's assume further that Thailand has a competitive cost structure (maybe because the technology is not too complexe and wages are lower in Thailand than in Switzerland).
- However, initial average cost is high because Thai firms lack experience in production.
- Will Thailand be able to enter the market?
- Market entry will not happen because initial average cost AC_0^{Thai} is above the world market price.
- Despite the better cost structure of Thailand, Switzerland will be able to 'defend' the market because it could already move down the AC curve (to P^W)



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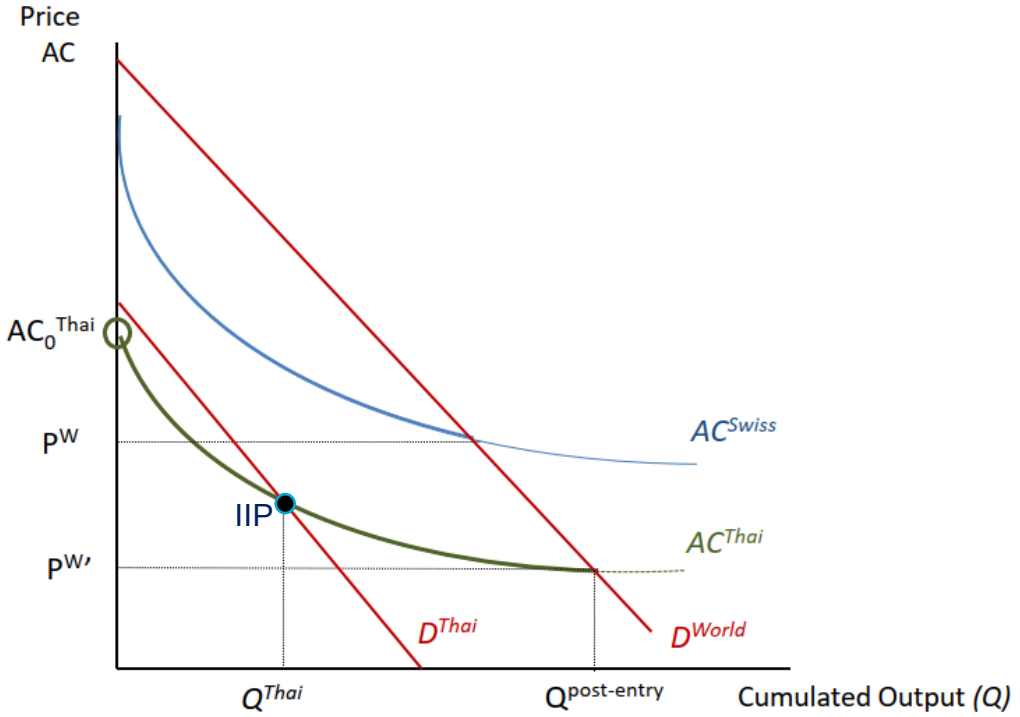
4. The infant industry argument

Solution for Thailand: Protect the domestic market with a tariff

- Assume the Thai government introduces a prohibitively high tariff so that there are no imports.
- In this scenario, the Thai producers can serve the Thai market with demand D^{Thai}.
- With the infant industry tariff in place, Thailand can serve the domestic market and thanks to learning effects can move down the cost curve until the cumulative Thai demand is satisfied (until point IIP).
- Note that at this point Thailand's AC is already below the world market and hence its firms are cost competitive.
- Therefore, the Thai government can safely remove the infant industry tariff.
- Most importantly, Thailand will not only serve the domestic market but the entire world market with output $Q^{post\text{-}entry}$ at price $P^{W'}$



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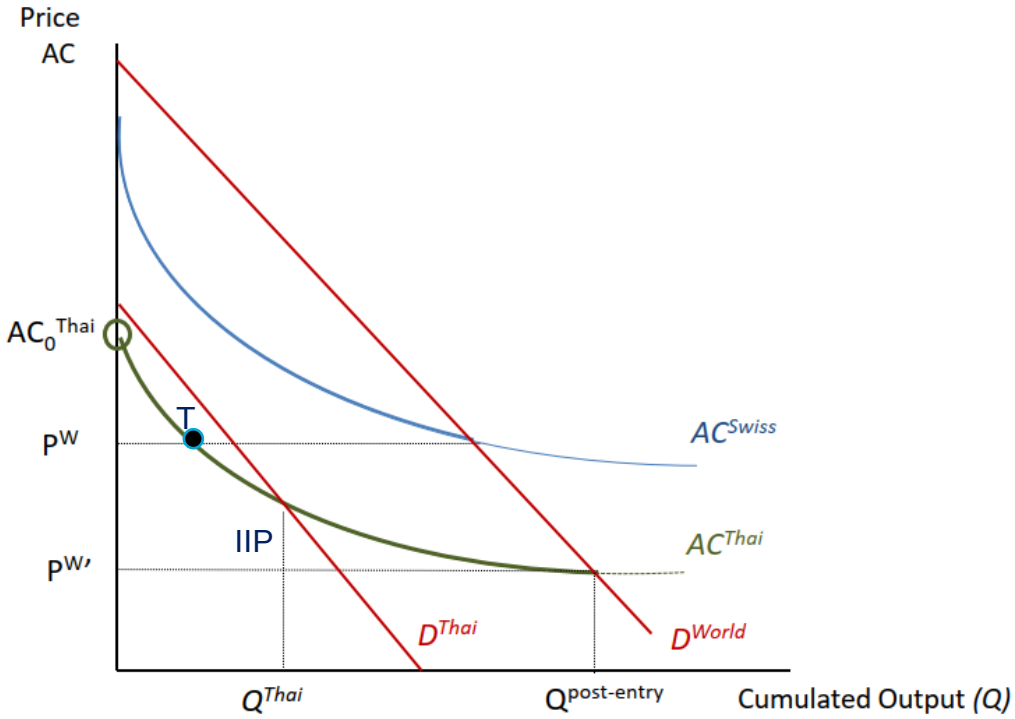
4. The infant industry argument
Result

- In our setting, the support of the Thai government was successful and the initially high-cost Thai watch producers became internationally competitive and replaced Switzerland as the world watch supplier.
- The Thai government can remove the infant industry tariff in principle already at the threshold (T) where the AC^{Thai} curve intersects the word market price.
- Importantly, this outcome – while unfortunate for Swiss watch producers – is likely to be welfare enhancing not only for Thailand but for the world as whole
- This is a result of the fact that Thailand has latent comparative advantage. It cost structure is far below that of Switzerland. Hence, turning the latent into an actual advantage results in lower prices for consumers worldwide.



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4. The infant industry argument

Caveats

- The effectiveness of infant industry tariffs is highly disputed, because there are several factors which can impede their success.
- Potential complications include
  - **Lack of information**. Governments do not know a priori which industries have latent comparative advantage.
  - **Home market is too small**. If domestic demand is low, the domestic industry may not sufficiently move down the cost curve.
  - **Political economy problems.**
    $\longrightarrow$ Resistance to remove the tariff even when it has been successfully applied
    $\longrightarrow$ Resistance to remove the tariff even when it is clear that it will not be successful
  - **Learning effects are insufficient**. If the industry does not feature learning effects, then the infant industry protection will fail (average costs will remain too high).
  - **New competitors.** It is also possible that by the time the domestic industry becomes competitive, a new competitor with even lower costs may enter the market.

4. Infant industry in practice
Examples

- US steel rail industry (≈1860s)
- Danish wind power industry (2000s)
- Microcomputer industry in Brazil in the 1980s
- Heavy and chemical industries (HCI such as steel in the 1960 and 1970s in South Korea
- Semi-conductor industry in Japan in the 1980s
- The entry of Airbus in the wide-body aircraft industry

4. The infant industry argument
Concluding observations

- The infant industry argument is appealing because it is one of the few trade policy interventions which **need not be a 'beggar-thy-neighbour' policy**, that is, they do not necessarily harm trading partners.
- The infant industry argument is popular with many development economists (see introductory quote)
- Infant industry tariffs were heavily used by many Latin American countries in the 1960s and 1970s (with lukewarm results).
- The following tests can be used to evaluate the 'success' of infant industry tariffs
  - **Mill-Test:** Will the industry survive after the removal of the infant industry tariff?
  - **Bastable-Test:** Do the benefits of the tariff exceed the cost of the intervention (the initially higher AC)
  - Together they are known as the **Mill-Bastable criterion** (but it is rather hard to test in practice)

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5. Strategic trade policy
What it is all about?

- Strategic trade policy analysis emerged in the 1980s.
- It is based on the observation that international competition is particularly fierce in high-tech industries and that the common market structure in these industries is an **oligopoly**.
- Oligopoly is characterised by **above-normal profits** (see lecture on oligopoly), also referred to as **'economic rents'**
- The existence of such above-normal profits make these industries strategic, in the sense that it may be beneficial for a country to have many of such industries in the domestic economy.
- Strategic trade policy analysis investigates how governments can support domestic firms in strategic industries to make them grow. Having many strategic industries in the domestic economy implies that the associated economic rents accrue to the domestic economy, likely to the detriment of other countries ('rent shifting').
- The main trade policy instrument used for this purpose are subsidies.

5. Strategic trade policy
A simplified international Duopoly setting

- Strategic trade policy analysis strongly relies on game theory and can become very complex.
- We therefore consider a simplified example with only two firms (duopoly), where the two firms are located in different countries.
- We shall think of these two firms as Airbus (or firm A if you prefer) and Boing (or firm B if you prefer) which are located in the EU and the US respectively. Hence, we study the wide-body aircraft industry.
- The oligopoly is a **Cournot oligopoly** (firms set quantities – see lecture on oligopoly).
- As usual, the profits of the two oligopolists are interdependent because world market prices are a function of their combined output.
- Both firms maximise profits and there is no collusion.

5. Strategic trade policy
Simplifying further the Cournot oligopoly

- Let's assume both Airbus and Boing decide whether to invest in the development of a new aircraft and produce it or not. (that is we reduce firms' reaction functions to just two choice which are to "produce" or "not produce").
- The cost structures in the industry are such that production is only profitable if there is only one producer in the market. When both firms produce, they incur a loss*. Being the sole producer, however, results in high economic rents
- We shall further assume that all aircraft are sold on a third market so that when analysing the US and the EU economy, we only have to care about profits.
- We will use a so-called pay-off matrix to analyse the outcomes for the two firms.
- The two firms are the main actors (or 'players' in game theory jargon).
- However, governments may decide to intervene. These interventions take the form of providing a subsidy to the domestic producer.

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* This assumption can be adapted, e.g. one can also think of constellations in which profits are asymmetric and, for example, only one of the firms incur a loss in the duopoly situation.

5. Strategic trade policy
The pay-off matrix for the Airbus-Boing Duopoly

- Assume that, given the two possible choices of each firm ("produce" or "don't produce"), the pay-off matrix has the following form:

Boeing \ Airbus	produce	don't produce
produce	-5 / -5	0 / 100
don't produce	100 / 0	0 / 0

In each row depicts a decision by Boing, each column depicts a decision by Airbus. Each cell has two entries: the bottom-left entry (in red) shows the profit ('pay-off') of Boing and the top-right entry (in blue) show the profit ('pay-off') of Airbus.

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5. Strategic trade policy
Possible outcomes

- The outcome will be that either only Airbus produces or only Boing produces.

(technically each of the two outcomes is a Nash equilibrium. A Nash equilibrium is a stable state of a system (with interdependencies like here), in which no participant can gain by unilaterally changing their strategy if the strategies of the others remain unchanged).

Boeing \ Airbus	produce	don't produce
produce	-5 -5	0 100
don't produce	100 0	0 0

- Which of the two outcomes will be realised, depends on which of the two firms gets a slight head start and brings the Aircraft to the market first.

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5. Strategic trade policy
Outcome with a head start for Boing

- To make progress, let's assume that Boing is the first to develop and produce the new Aircraft

Boeing \ Airbus	produce	don't produce
produce	-5, -5	100, 0
don't produce	0, 100	0, 0

- In this case, the outcome will be that Boing produces while Airbus will decide not to produce. This is because once the decision of Boing has been made, Airbus is better off not to produce (this way it can avoid a loss of 5).

5. Strategic trade policy
Strategic trade policy in action: a subsidy for Airbus

- If the EU is aware of the pay-off structure, the EU ‘government’ can improve the situation for the EU/Airbus
- The instrument of choice is a subsidy for Airbus
- Let’s assume the EU decides to provide Airbus a subsidy in the amount of 25, which is provided only in the case Airbus decides to produce.
- As we shall see, the EU subsidy changes the outcome drastically

5. Strategic trade policy
The pay-off matrix with a subsidy for Airbus

- With the EU subsidy (resulting in extra profits for Airbus in case it produces, we have a new pay-off matrix

Boeing \ Airbus	produce	don't produce
produce	-5, 20	100, 0
don't produce	0, 125	0, 0

- This is a fundamentally different situation now.

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5. Strategic trade policy
The pay-off matrix with a subsidy for Airbus (con't)

- The new outcome will be that Airbus produces while Boeing does not produce.

Boeing \ Airbus	produce	don't produce
produce	-5 / 20	100 / 0
don't produce	0 / 125	0 / 0

- This is because Airbus face a different situation. It is now better off to produce irrespective of which decision Boing makes (this is called a 'dominant strategy')
- Boing is well aware of this and will refrain from producing to avoid the loss of 5.

5. Strategic trade policy
Subsidy for Airbus – A remarkable result

- This outcome is remarkable in several respects
- First, it seems that the subsidy is highly effective (for the EU)
- Second, the change from the no-subsidy scenario to the EU subsidy scenario leads to a **rent shifting** from the US to the EU (the profits worth 100 previously accruing to Boing is now earned by Airbus). Of course, this was the primary objective of the subsidy.
- Third, the additional profits Airbus/the EU gets as a result of the strategic trade policy exceeds the cost of the subsidy for the EU government. There is a **net gain for the EU**.
- Fourth, the EU subsidy is a beggar-thy-neighbour policy because the net gain for the EU comes at the expense of Boing/the US who loose profits worth 100.
- Fifth, this outcome is stable, in the sense that once this outcome is established, neither Boing nor Airbus has an incentive to modify their decision.

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5. Strategic trade policy
Complications and limitations

- **Different cost structures.** If the subsidised firms has an unfavourable cost structure compared to its rival, it could be the case that the subsidy will not lead to a dominant strategy. This will definitely be the case, if the other firm had a dominant strategy to begin with.
- **Uncertainty about cost structures.** Governments typically do not know the cost structures. Hence, it is difficult for governments to tell a priori if a strategic trade policy will be successful (in the sense that it will lead to a rent shifting which exceeds the cost of the subsidy).
- **Lobbying (Political economy problem).** Once governments start providing subsidies, more firms/industries will lobby for subsidies irrespective of whether there is a potential for rent shifting or not.
- **Beggar-thy-neighbour policy.** Strategic subsidies which aim at capturing the rents in oligopolistic industries are typically beggar-thy-neighbour policies.
- **Retaliation.** Subsidies provided by one country are likely to provoke retaliation by the other country. This can lead to a ‘subsidy race’ which often ends up being costly for the governments involved.

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Summary and take-aways

- Under perfect competition, free trade leads to gains from trade (compared to autarky).
- Under perfect competition, tariffs (as well as export subsidies) are harmful for domestic welfare (with the possible exception of a tariff in the large country case)
- These rather clear-cut results change quickly when different market structures are assumed.
- In the presence of learning effects in production, infant industry tariffs may help countries building up new industries if they have latent comparative advantage.
- Infant industry tariffs may be globally advantageous because producers with lower costs will ‘take over’ the world market
- In oligopolistic markets with above-normal profits (economic rents), subsidies can be used strategically to attract production and associated economic rents in such markets.
- Strategic trade policies are beggar-thy-neighbour policies by design and are likely to provoke retaliation.

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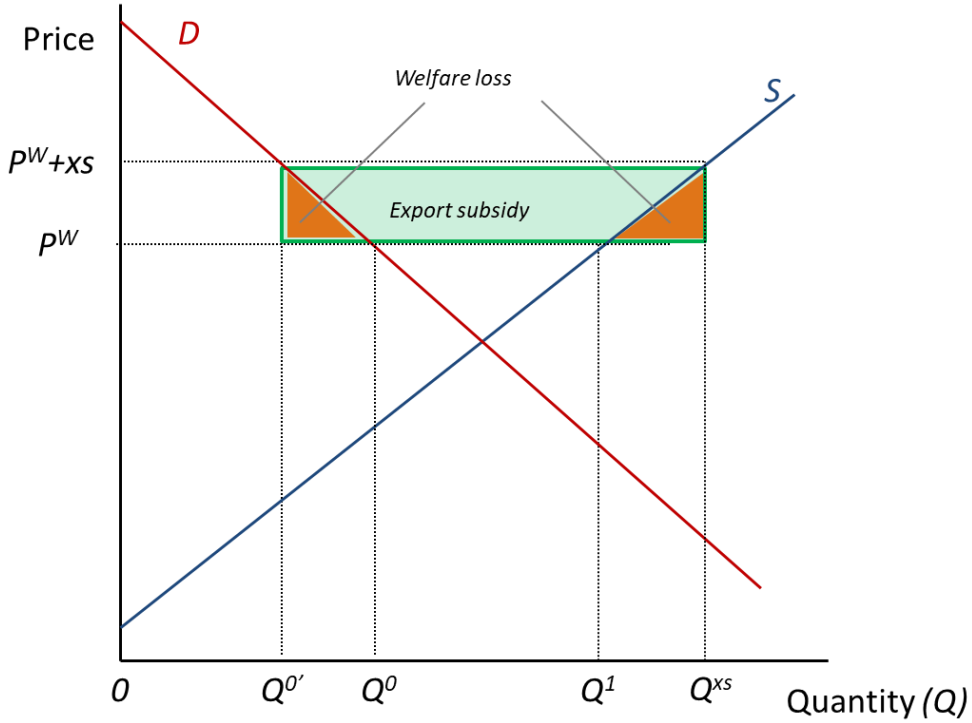
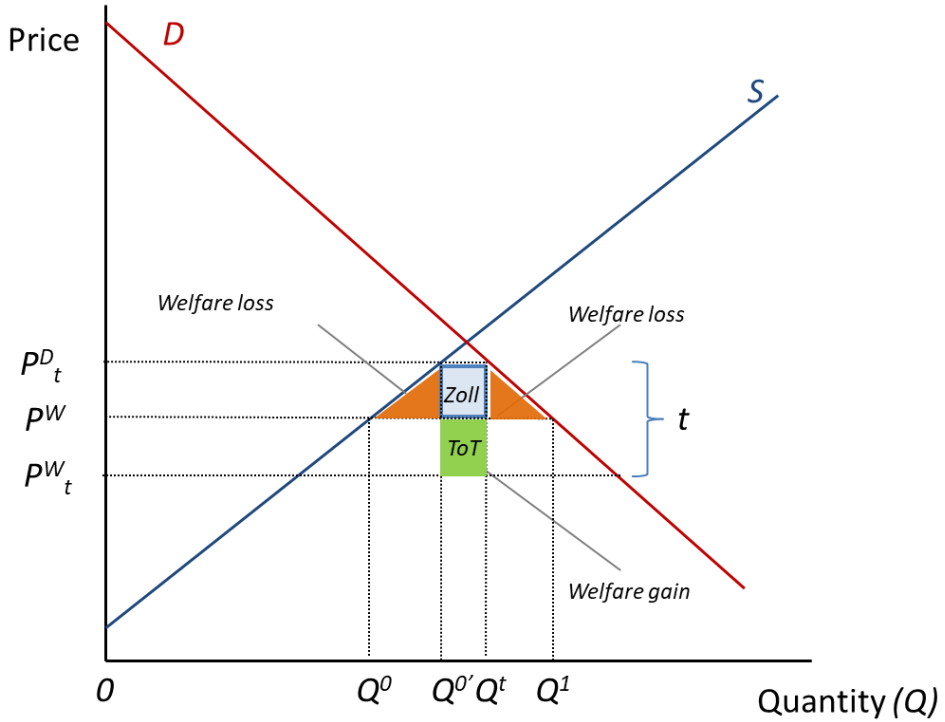
Appendix
The effects of an export subsidy – see also Feenstra and Taylor, pp. 338-343

- In export industries, governments may use export subsidies to support domestic exporters.
- Export subsidies (*xs*) are a payment by governments to domestic producers for their export sales.
- In analogy to tariffs in import-competing industries, export subsidies increase domestic production and producer surplus but at the expense of total welfare.
- Just like in the case of import tariffs, an export subsidy leads to a domestic price above the world market price (Reason: producers will only be willing to sell to domestic consumers if they receive the same price as for their exports (P^W + xs).
- The welfare losses result from (i) the higher price and associated lower consumer surplus) and (ii) production at costs above world market price (units produced from Q^1 to Q^{xs}).
    - A difference between tariffs and export subsidies is that the latter implies at a cost for governments rather than revenues and that there is no way to improve the terms of trade. Hence, even in the large country case, an export subsidy is not welfare enhancing.



Appendix
Import tariffs in the large country case – see also Feenstra & Taylor, pp. 263-269

- The difference in the large country case is that the import tariffs affects the world market price (P^W). More specifically P^W will decline because of the reduced demand.
- This shifts changes the relative price of the country's import goods in its favour (they become cheaper). This relative price ratio is known as the terms-of-trade (ToT) and entail a welfare gain for the country.
- As a result, the effect of an import tariff *t* could lead to a welfare gain or a welfare loss in a large economy.
- The ambiguity comes from the ToT effect, which may or may not compensate the welfare loss encountered in the small country case.
- For large countries, there is an optimal tariff which maximises domestic welfare.



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