Question 1

a) One of the reasons for trade is comparative advantage, and this is what David Ricardo based his trade model on. He explained how trade could be beneficial even among the most unequal trading partners. He assumed there was only one input factor in production (labour, and that countries differed in their labour productivies. A country has a comp.adv in producing a good if the opportunity cost of producing that good in terms of the other is lower in that country than in other countries. In other words the country has a comp.adv. if it uses relatively less labour to produce a good compared to other countries. The opportunity cost of one (X) good in terms of another (Y) good is how much you sacrifice of good Y in order to produce an additional unit of good X. The opp.cost is constant in the Ricardian model since we only have one input factor.

most productive countries

Some believe that trade is only beneficial for countries that have an absolute advantage in production, meaning that the country is generally more efficient in producing good. However, since a country only has a comp.adv in producing one good (you can't produce both goods relatively efficient! compared to the other good), this can give rise to mutual beneficial trade which will expand consumption and production possibilities of both countries leaving everyone better off. So it turns out that you don't need an abs.adv. in producing a good in order to gain from trade.

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Another common misconception is that trade exploits workers in countries with lower wages. This is not true, because it doesn't matter if your comp. adv. comes from that labour is more productive or that wages in your country are lower. Both will lead to gains from trade by expansion of consumption possibilities and therefore everyone is better off with trade than without trade. The Ricardian model does not allow us to look at distributional effects, but as we see in all trade models – as long as the pie is increasing – everyone could be better off with trade. Even if the bad labour standards hurt them – free trade is not part of the reason why they are hurt. What trade does is increase consumption possibilities – leaving them better off with trade. Some also belive that specializing and trading pollutes more, but we can't really know that there would be less pollution w/o trade.

~~conclusion~~

b) To answer question b), we continue with the framework of the Ricardian model since we only have one input factor. The assumptions are:

- 2 countries: USA, China
- 2 goods: computers and textile
- 1 input factor: labour
- labour is mobile between sectors but not between countries
- We have a fixed labour supply
- Consumers in both countries have the same preferences
- Perfect markets.

To derive the production possibilities, we set up the equation for the PPF; in this model, we assume the unit labour requirements are constant. This gives us:

PPF: $a_{LC} \cdot Q_C + a_{LT} \cdot Q_T \leq L$ (total labour supply)

where:

a_{LC}: unit labour requirement for one computer

Q_C: production of computers (quantity)

a_{LT}: unit labour requirement for one unit textiles

Q_T: production of textiles (quantity)

This equation shows us the amount of goods the economy can afford to produce, given their fixed supply of resources (labour). It (the PPF) shows different combinations of computers and textiles the economy can produce. To be able to draw the PPF, we solve it for Q_T.

└ production possibility frontier.

$$Q_T = \frac{L}{a_{LT}} - \frac{a_{LC}}{a_{LT}} \cdot Q_C$$

(We also assume this is PPF US, PPF China: $Q_T^* = \frac{L^*}{a_{LT}^*} - \frac{a_{LC}^*}{a_{LT}^*} \cdot Q_C^*$)

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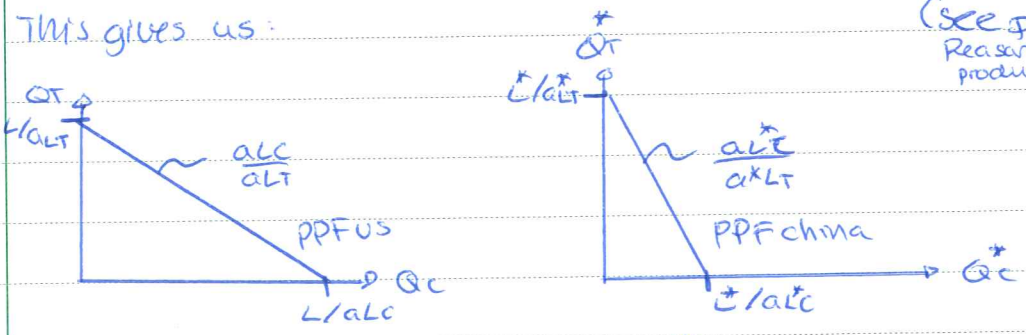
This gives us: (see page 8) Reason for diffent production possibilities



Here, we assume that $\frac{a_{LC}}{a_{LT}} < \frac{a^*_{LC}}{a^*_{LT}}$.

The slope of the PPF is the opportunity cost (OC) of computers in toms of textile. Can conclude that US has a comp. adv. in producing computers since their OC is lower than in China. (of computers in toms of textile)

• Comp. adv. US: computers. China: textile.
(with trade, they will specialize in good they have a comp adv. in)

In this model it is the movement of labour that determines the supply of goods - where on the PPF the economies will choose to produce. Since there are no profits, the cost of producing is the hourly wage:

In computers: P_C / a_{LC}

In textiles: P_T / a_{LT}

Since labour is mobile, it will move to the sectors with the highest wage. In absence of trade, in order for the economy to produce both goods, the wage must therefore be the same in each sector:

$$\frac{P_C}{a_{LC}} = \frac{P_T}{a_{LT}} \Rightarrow \frac{P_C}{P_T} = \frac{a_{LC}}{a_{LT}}$$ (when we rewrite)

$\frac{P_C}{P_T}$: relative price of computers; $\frac{a_{LC}}{a_{LT}}$: opportunity cost of computers in terms of textiles.

Here, labour won't have any incentive to move, and the economy is supplied with both goods. (Same goes for China, only with *)

c) Now, we will see what happens if we introduce trade

Remember that $\frac{a_{LC}}{a_{LT}} < \frac{a_{LC}^*}{a_{LT}^*}$. Let's again determine the movement of labour to derive supply.

- If $\frac{P_C}{P_T} < \frac{a_{LC}}{a_{LT}} \left(< \frac{a_{LC}^*}{a_{LT}^*}\right)$: US will specialize in producing textiles and China will specialize in producing textiles. No supply of computers. Indifinite supply of textiles

They will specialize in textile because: $\frac{P_C}{P_T} < \frac{a_{LC}}{a_{LT}} \iff \frac{P_C}{a_{LC}} < \frac{P_T}{a_{LT}}$

- the wage is lower in computer sectore than textile.

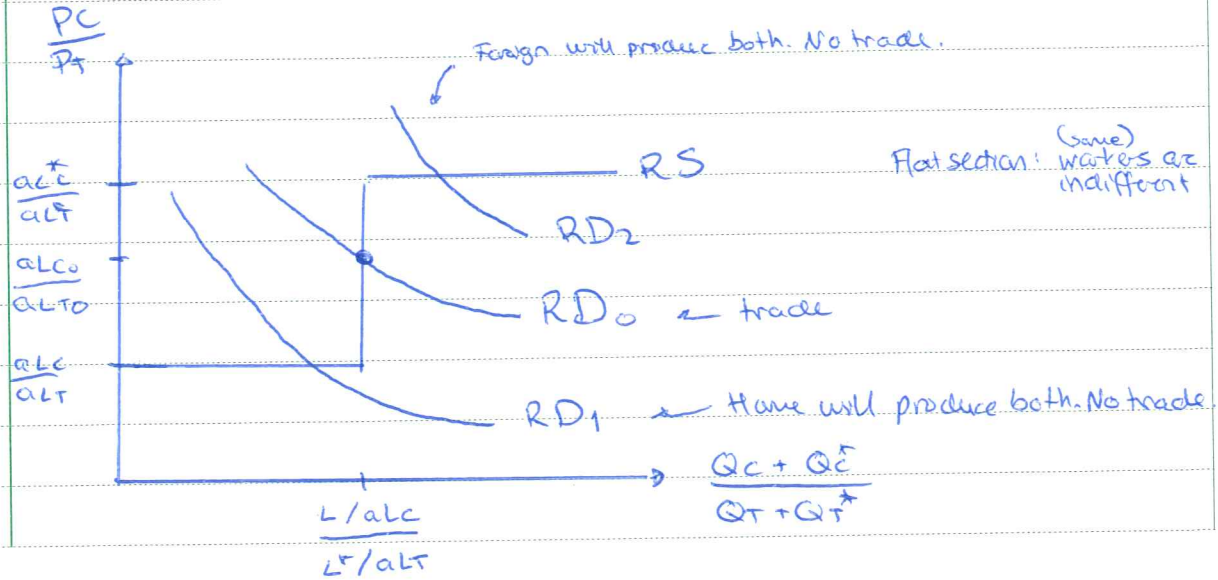
- If $\frac{P_C}{P_T} = \frac{a_{LC}}{a_{LT}} \left(< \frac{a_{LC}^*}{a_{LT}^*}\right)$: US will produce both goods since workers are indifferent. China will still only specialize in textile.

- If: $\frac{a_{LC}}{a_{LT}} < \frac{P_C}{P_T} < \frac{a_{LC}^*}{a_{LT}^*}$: US will specialize in computers. China will specialize in textiles. This is where we will have trade, since they specialize in different goods.

- If $\frac{P_C}{P_T} = \frac{a_{LC}^*}{a_{LT}^*}$: China will produce both goods. US will still specialize in computers.

- If $\frac{P_C}{P_T} > \frac{a_{LC}^*}{a_{LT}^*}$: China will also specialize in computers.

This creates a ladder-like (Crriatic) supply curve



We find the market equilibrium where the relative supply and relative demand curves intersect. Since we have no information about the RD-curve, we can use several RD-curves to explain when there will be trade.
In order for there to be trade between countries, they need to be specializing in different goods – the good they have a comp.adv. in. If an economy produces both goods there is no need for mutual trade to take place. Therefore, in order to have trade, our equilibrium between RS and RD must be in the area where the RS is a straight upward-curve.
– in other words, when the RD is similar to RD$_0$ and the intersection gives us the relative quantity $\frac{L^T/aLC}{L^*/aL^*_C}$.

d) Trade will affect national welfare because it affects relative prices and consumption possibilities. Both workers in US and China will be better off because both will experience an increase in the relative price of the good they are producing.

Before trade, the US will experience a relative price: $\frac{P_C}{P_T} = \frac{aLC}{aLT}$, but with trade, the relative price will be $\frac{aLC_0}{aLT_0} > \frac{aLC}{aLT}$ which means increased income for workers.

Before trade, China had a relative price: $\frac{P_T}{P_C} = \frac{aL^*_T}{aL^*_C}$
but now they have $\frac{aLT_0}{aLC_0} > \frac{aL^*_T}{aL^*_C}$. This means that workers experience an increased income. (Both countries) They will experience a Terms of trade gain as they get a higher export price, and a lower import price with trade. The gains leads to an increase in welfare.

Trade leads to a more effiant use of resources (labour). Specializing in are good can be seen as indirect production of another. Ex ~~Home~~ US can produce textile in two ways
- take one unit of labor and produce $\frac{1}{a_{LT}}$ units of textile, or
- " " " $\frac{1}{a_{LC}}$ units of computers, sell at a world price P_C, and use the income $\frac{P_C}{a_{LC}}$ to buy textiles.

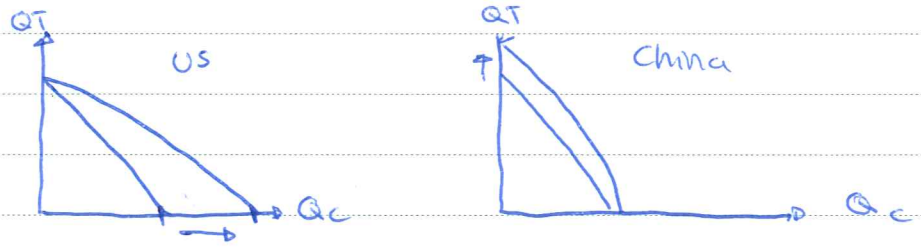
The second option is better if $\frac{\frac{P_C}{a_{LC}}}{P_T} > \frac{1}{a_{LT}}$

$\Leftrightarrow \quad \frac{P_C}{a_{LC}} \cdot \frac{1}{P_T} > \frac{1}{a_{LT}}$

$\Leftrightarrow \quad \frac{P_C}{P_T} > \frac{a_{LC}}{a_{LT}}$

This price is what they get when they trade.

Trade also expands production and consumption possibilities and expands their PPFs:



~~By specializing they can now afford to~~

By specializing in the good they have a comp. adv. in producing, they can produce more with trade, and consume more which will give everyone higher welfare (everyone gains from trade). Since there is only one input factor, this model won't show any distributional effects. Trade gives an effiant allocation of resources, more effiant productive production, increases "pie".

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e) The Ricardian model predicts complete specialization in production. However, this is not a very realistic prediction. - when there are more than one factors in production, complete specialization will not occur because countries will also differ in resources and resource abundancies. In the real world we also have barriers to trade, which can stop complete specialization, because countries won't be able to ~~able~~ trade freely and to make sure they have access to all goods, they need to be produced at home. You rarely use only one input factor - like labour - when producing something. Labour itself can't produce much without other inputs like capital, land etc. In a world with different ideologies, politics and several wars, there will also be risks when becoming completely dependent on other countries producing necessary goods for you.

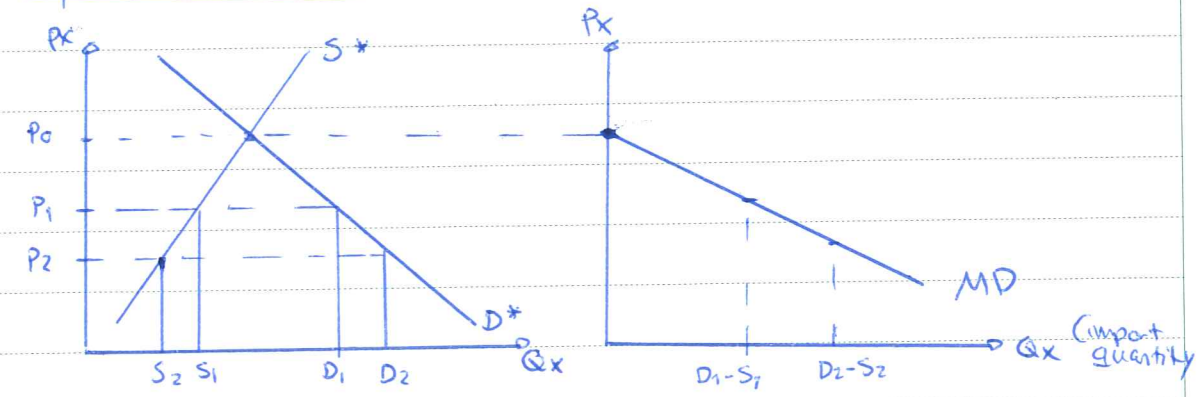
Extra on b). The PPF differences in production possibilities can come from differences in technology and (natural) resources. Countries trade because of labour productivity differences - it is the differences in their PPFs that give rise to trade.

Question 2

In absence of trade, prices and quantity are determined by the intersection of national supply and demand curve. But with trade, world market prices are determined by the intersection of the import demand and export supply curve.

We assume China has a comp.adv in producing steel and therefore exports it while US exports it.

Import demand curve US:



we have: Qx: quantity of steel

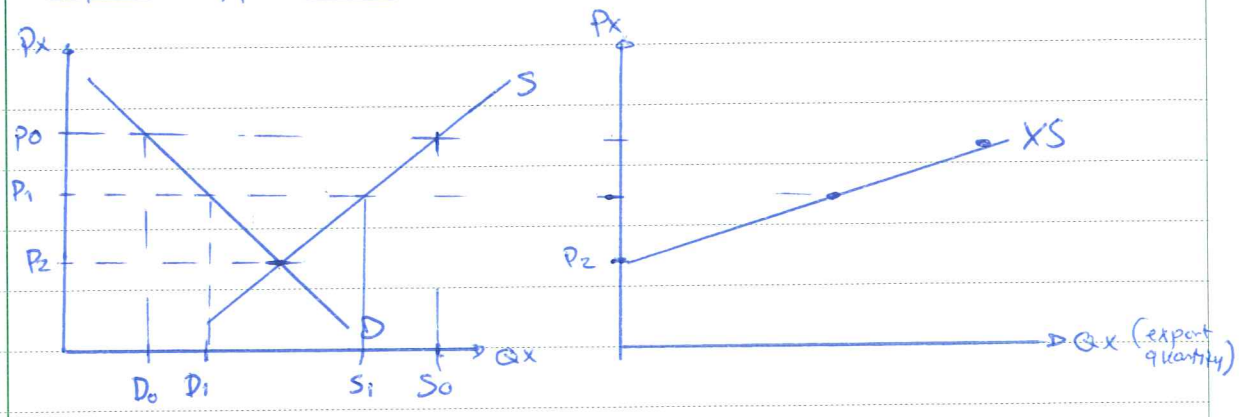
Px: price —"—

S*: US supply of steel

D*: US demand —"—

The import demand curve shows the differe between quantity demanded by domestic consumers and quantity produced by domstic suppliers. It is downward sloping because as price decreases, the import quantity gets bigger as supplies supply less dd consumers demand more. As we move from price p_1 to price P_2 which is lower, we see this, and the quantity of imports demanded increases. At P_0 we have the price in autarky. US supply = US demand.

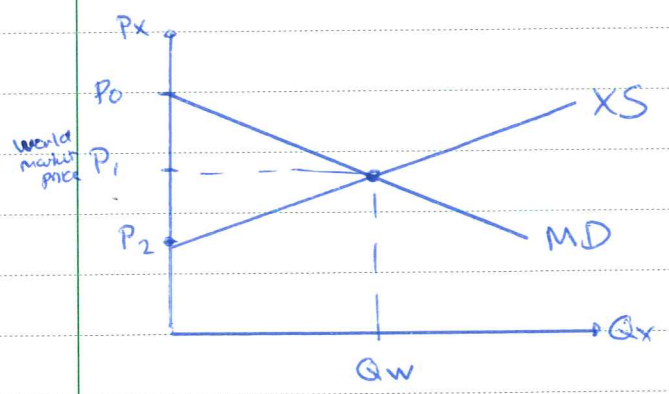
Export supply curve (China)



The export supply curve is the difference between the quantity domestic producers supply and domestic consumers demand. It is upward sloping because as price increases, the amount supplied increases and the amount demanded decreases, causing the XS curve to be upward-sloping because the export supply quantity will increase (as PF)

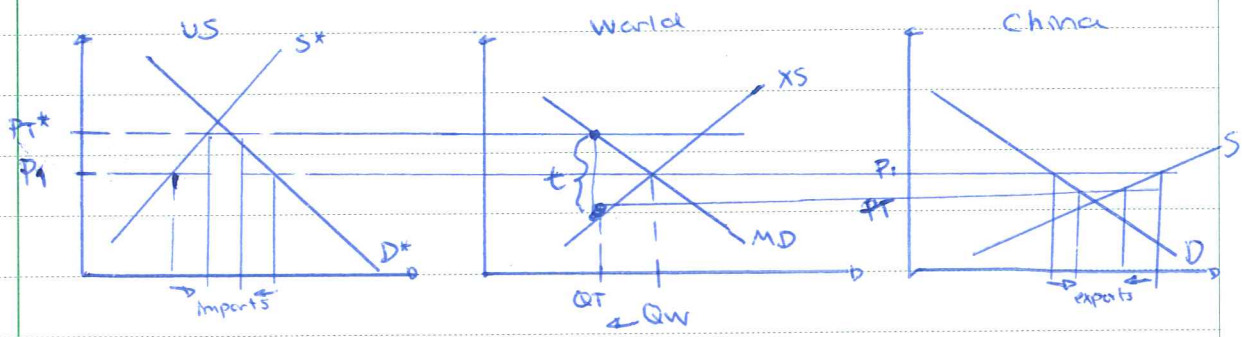
We see that before trade, the price in US > in China, they will therefor engage in trade.

World equilibrium determined by XS = MD



We get Qw: quantity traded at P_1 world market price. At the equilibrium, imports demanded by US equal exports supplied by China. This can be the case if we assume only two countries in the world, and they are each other's only trading partner.

Assume now that the US introduces an import tariff t on steel imports. This import tariff drives a wedge between internal and external prices, making the good more expensive for importation in the US. Let's look at this graphically.



The tariff raises the price in the US, making the import demand - quantity decrease. However, it also lowers export prices of China. The USA is a big country that will have a large impact on world market prices. The tariff raises the price in the US and also lowers price in China because China will experience an excess supply leading to a decrease in their price. Price in US ends up at P_T^* and price in China is P_T. Again, the price will increase in the US and decrease in China until the price difference equals the tariff t.

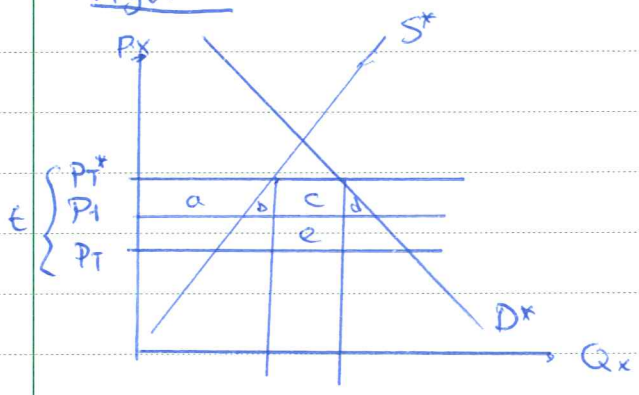
(Tariffs: are taxes levied on imports in order to reduce import quantity. They do this indirectly by increasing price)

The ability of the ~~import~~ tariff-imposing country to drive down the other country's export prices (their import prices) depends on the size of the country

- The tariff reduces the quantity traded from Q_W to Q_T.

The tariff affects prices, therefore it will lead to different gains and losses, and it has effect on welfare.

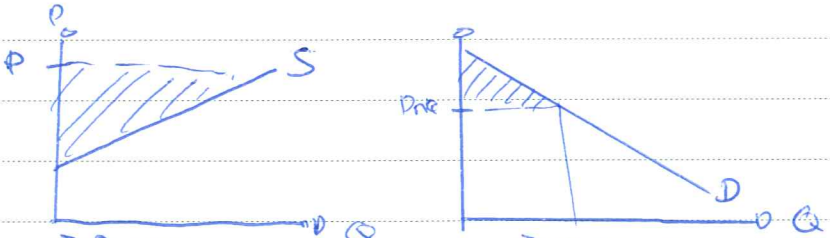
Figure 1



US

Domestic consumers and producers face price P_T^*.
Consumers and producers in China face price P_T.
Since it raises prices for consumers in US, we can expect it to hurt consumers, and since it raises the prices producers in US get for they products, we expect it to benefit producers in US.

To say anything about welfare effects, we can look at the definition of consumer and producer surplus:



a) Producer surplus

b) Consumer surplus.

Producer surplus is defined as the difference between the price they are willing to sell a good for and what they actually get. Consumer surplus is defined as the difference between their willingness to pay and what they actually pay.

From figure 1 on the previous page we see that: (effect of a tariff)

producers gain: a

consumers lose: a+b+c+d

government revenue: import tariff × quantity

c: revenue gain that domestic consumers pay for.

e: terms of trade gain. Since the tariff leads to a decrease in import prices US face, this will increase their terms of trade

ToT = price of exports / — " — imports. The ability of the import tariff-imposer to drive down import prices decides the extent of this gain.

Net cost (effect on welfare): (a+b+c+d) - a - (c+e)

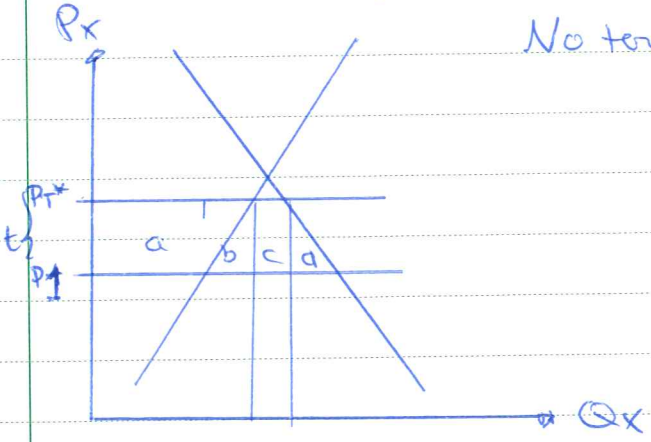
= b+d-e

If the tariff-imposer is a small country that takes the world prices as given, there won't be an area e and the cost will always be positive (b+d > 0). However, for a big country e can exceed b+d, and the net cost can be negative. b+d represent efficiency losses. b represents the production distortion loss and d the consumption distortion loss. The tariff distorts incentives to consume and produce. With it, producers will receive a higher price and therefore be willing to produce more, while consumers must pay a higher price and will therefore consume less. Compared to the free-trade scenario with

No trade barriers, with the tariff producers produce too much and consumers consume too little. The fact that the net cost can be negative for a big country that imposes an tariff (ToT gain can exceed the production and consumption distortion) can be a argument against free trade. Since the US is a big country, we assume that they can affect world prices and that they therefore drive down the export prices of china.

Let's look at a small country: (if US was small)

We see that there is no area e. No terms of trade gain.



(Big country: betters their ToT at the expense of the other country which gets a lower ToT because of lower export prices!)

In the "big-country"-scenario, a tariff can have a positive effect on welfare because of the (potential) ToT-gain. However, the tariff itself makes consumers worse off and producers better off, but it is the positive government revenue that transfer in welfare will increase overall welfare in the country. However, in reality there is no such thing as national welfare, only the personal interest of different groups.

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Tariffs and other trade policies are often used in order to protect the income of certain groups / producers in a country. They are often costly, but we use them because of their ability to transfer welfare between groups. There are several arguments against trade barriers but also some ~~barriers~~ arguments for trade barrier.

One of the arguments against trade barriers is that it hinders optimal resource allocation and that it's not efficient - we have looked at this through the distortions a tariff causes. The goal of a tariff is to reduce the amount imported and providing an incentive for domestic producers to produce more (even if it is not efficient that it is they who produce compared to the foreigners who can do it cheaper). This way, a tariff can lead to more firms entering a market, which implies that internal economics of scale are not taken advantage of. In the case where p this is a market / industry that has a cost structure which gives internal increasing returns to scale. 

~~Trade policies are the trade policies that are~~

By allowing free trade you also ensure that the effects of trade policies are not captured by special interest. Because usually those who are hurt by free trade - are groups that (• owners of the specific factor stuck in the import-competing industry in the specific factors model
• owners of the relative scarce factor in HO)
are very effective politically ~~these~~ This shows the problem of collective action. Although it is in the interest of the group as a whole to take "political action" it is not in the interest of each individual to do so.

So therfore, those who are not directly affected by trade (in a bad way) don't take action. However, groups with a lot at stake take political interest and lobby their interest, and therfore, we see trade policies (that are costly) enforced.

To sum it up: the tariff leads to an increased price in US, decreased price in china, and the difference between them is t. Generally, domestic producers gain from tariff, while domestic consumers lose, and government gets revenue. If the country is a big importer (like US) their decrase in import quantity demanded will decrase export price of the other country because of its excess supply. This leads to a terms of trade gain which could exceed the distortion (efficiency) loss.

Extra: A tariff usually gains few on the expense of many, but this could also imply that a tariff really isn't too costly because f.ex a small group of producers could be supported and by dividing this total cost on many, it won't cost each person a lot.