

Department of Economics
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ECON239: Development Economics

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Assignment #3 — Answer Guide

Monday December 7, 2009

Section A (40 percent): Discuss the validity of each of the following statements. In your answer define or explain as precisely as possible any terms or concepts which are underlined, with particular reference to the context in which they are being used. Your answer should be no longer than a page (single-spaced), and you should include diagrams or examples where appropriate. All questions have equal value.

A1. Group lending schemes can offer a way to mitigate the consequences of enforcement problems in rural credit markets.

In a group lending scheme, individuals form a small group that is **jointly liable** for the debts of each member. If one member cannot pay his debts, the other members are liable to repay them. In this institutional arrangement, the group has an incentive to undertake the burden of screening, monitoring and enforcement that would otherwise fall on the lender. Since these transactions costs are, in principle, lower for the members than for the bank, the reduction in the interest rate should more than compensate borrowers for this increased burden. An enforcement problem in a rural credit markets is a situation where it is hard to ensure that borrowers repay their loans. This might be the case if only weak sanctions that can be effectively imposed on borrowers who abscond without paying. Typically, enforcement problems are likely to arise where borrowers offer no collateral. Group lending can help to mitigate the consequences of such behaviour in two main ways. First, from the lenders point of view risk is reduced because if one borrower absconds, the others in the group will cover his loan. Secondly, since the group members are typically well known to each other and may even be related, they are more likely to be able to keep track of each others' whereabouts and be able to influence each others behaviour (e.g. by not trading with them in the future).

Other benefits to group lending include mitigation of adverse selection problems and problems of excessive risk-taking. In addition, if there are any fixed administrative costs associated with each loan, group lending reduces the average cost of lending by making each loan larger (this

is another transactions cost reduction). However, there may also be transactions costs that rise through group lending. The risk of default is effectively transferred from the lender to borrowers, if the borrowers are very risk averse compared to the lender, then net cost may rise.

A2. According to the Lewis-Fei-Ranis model of development, once surplus labour in agriculture has been exhausted modern sector wages must rise in response to increased demand.

Surplus labour in agriculture arises when at some level of production, the marginal product of labour is zero. That is, over some range, some workers could be withdrawn from agricultural production without lowering output. The Lewis-Fei-Ranis model of development describes how an economy transitions from a agriculturally-based economy to modern manufacturing based one. As demand grows in the modern sector, profits are not initially offset by rising wages because of surplus labour, so that industrialization can continue through subsequent investment. During this phase, wages in the modern sector remain equal to the value of the subsistence output in agriculture. Even after this surplus labour phase, agricultural wages are not bid up as labour leaves because the marginal product of labour is still below the subsistence wage (this is the "disguised unemployment" phase). However, at this point the supply of agricultural output starts to decline, so that the relative price of agricultural goods rises. As this relative price rises, workers who migrate to the modern sector must receive sufficient compensation to offset it so the modern sector wage must indeed rise in response to the increased demand.

Subsequently, when the marginal product of labour rises above the subsistence wage, competition for labour drives up the wage in the agricultural sector as well. Consequently, the modern sector wage rises even more quickly in response to rising demand and eventually the process stops because there are no returns to further investment.

A3. According to the Harris-Todaro model, the best policy approach to reducing the size of the urban informal sector is to expand formal sector employment by, for example, offering tax incentives to employers.

The urban informal sector refers to economic activity taking place in cities that is neither taxed nor monitored by a government. It is not included in that government's Gross National Product (GNP), as opposed to the formal sector. The basic Harris-Todaro model attempts to account for the existence of a large informal urban sector where the wage, w_I , is low, even if rural-urban migrants are making rational choices to migrate. A key assumption is that the wage in the formal sector is institutionally determined at a level, \underline{w} , which is higher than a market equilibrium would imply. Such a high wage restricts the number of formal sector jobs to \underline{L}_F . Rational migrants in

the model compare the agricultural wage, w_A , with the expected urban wage

$$w^e = p \cdot \underline{w} + (1 - p)w_I$$

where p represents the probability of obtaining a formal sector job. The Harris–Todaro migration equilibrium is illustrated in Figure 1. In the equilibrium, the agricultural wage equals the expected urban wage and, at this wage, the demand for agricultural workers is L_A . Since the total labour force exceeds the number of workers in agriculture and in formal sector jobs, the remaining L_I workers end up in the informal sector.

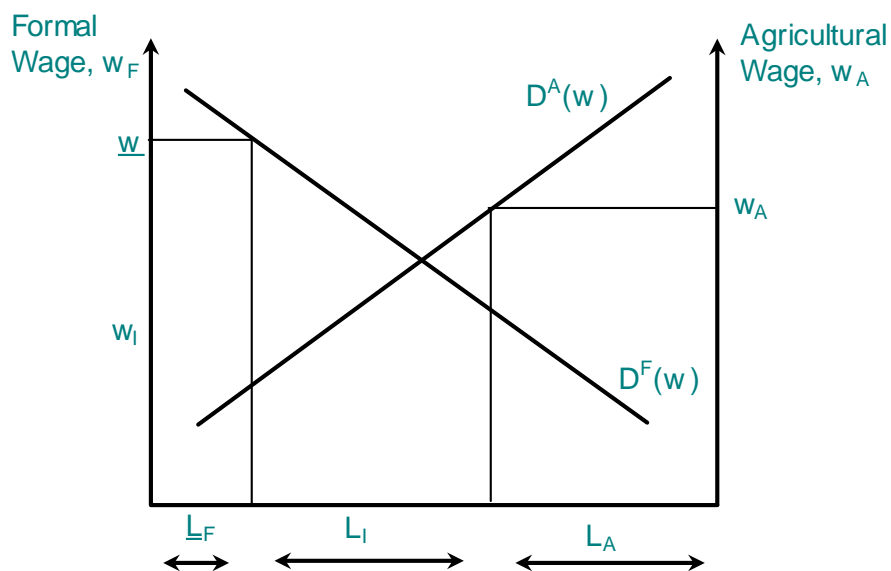


Figure 1: Harris–Todaro Equilibrium

In general, offering tax incentives to employers in the formal sector is not the best approach to reducing the size of the informal sector. Although, this may reduce its size in the short run, it will also increase the likelihood of obtaining a high wage job. In the long run this will induce migration into the city until the agricultural wage rises enough. If the wage elasticity of demand for agricultural workers is sufficiently high, as in Figure 2, more workers may migrate than there are new formal job. Thus, as illustrated, the size of the informal sector could actually expand in the long run (the Harris–Todaro paradox). A better approach would be a more balanced policy of stimulating demand in both the urban formal sector and the rural sectors simultaneously.

A4. While import substitution policies may create welfare-reducing distortions to trade in the short term, they are justified because they generate growth in the long term.

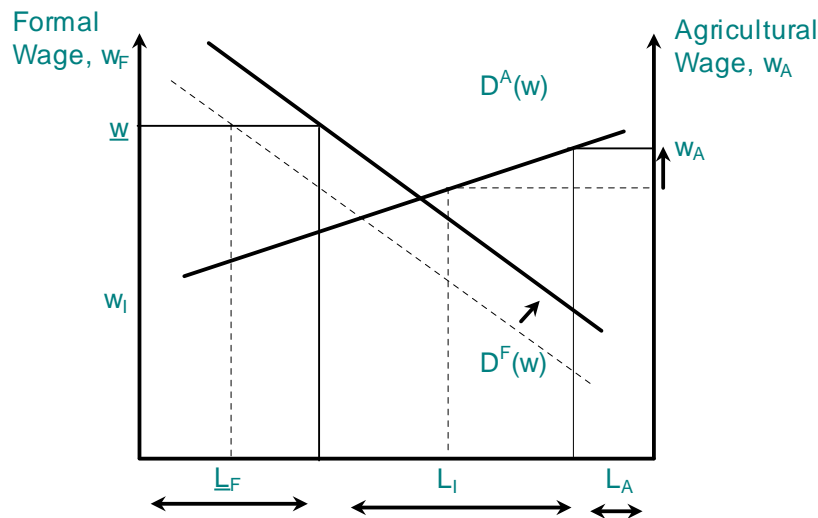


Figure 2: Long Run Migration Equilibrium

The idea behind IS policies (at least in principle) is to impose tariffs (or other trade barriers) on foreign imports to allow domestic producers to expand their production. Assuming a small open economy and competitive markets, in the short term the overall impact of such a policy is illustrated in Figure 3. The tariff raises the domestic price from P^* to P^t causing domestic supply to rise and domestic demand to fall, so that imports are “squeezed out”. Overall welfare is reduced because the resulting increase in domestic prices lower consumer surplus by an amount represented by the area P^tDBP^* , which exceeds the combined gain in producer surplus, P^tCAP^* and tariff revenue $CDEF$. However, in the long term it is possible that there are dynamic gains from expanding domestic production (due to economies of scale or learning-by-doing effects), which more that offset these short-term losses. If firms make the investments necessary to achieve these gains and become competitive with foreign producers, then eventually the tariff barrier can be lifted. One problem with this argument is that once the tariffs are in place it becomes very costly (economically and politically) to remove them if producers’ efficiency does not improve. Knowing this, firms may have little incentives to make the necessary improvements. Thus, the potential gains depend very much on the credibility of the government’s plans to eventually remove the tariff barrier. Another problem with the IS strategy, if it is applied on a broad scale, is that it can lead to an overvalued domestic currency — by reducing the demand for foreign imports, the supply of domestic currency on world currency markets is reduced, thereby increasing its price. This can have negative affects on the country’s exporting industries because now these goods become more expensive from the perspective of foreign consumers and the demand for them will tend to decline.

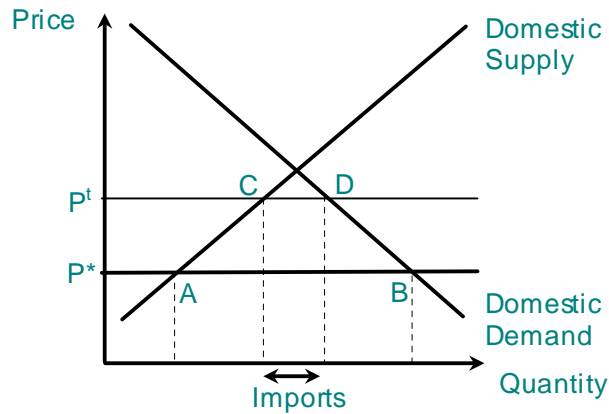


Figure 3: Static welfare impact of a tariff

A5. South Korea’s “export-driven” growth during the postwar period is an excellent example of the benefits of opening an economy’s borders to unfettered global market forces (Hint: Take a look at the article “Industrial and Export Policy in South Korea” by Smith, ch. 15, which is on the Course Outline page of the ECON239 web site).

Although South Korea did open up to international trade, its exporters did not face “unfettered global market forces”. In fact, South Korea’s industrial and export policy involved substantial protectionism, ranging from erecting tariff barriers to protect its infant industries in the early 1960s, to significant subsidization (directly or indirectly) of its exporters. As we have seen, these policies are likely to have negative welfare affects in the short run (especially since South Korea was not a large economy). However, these policies acted to protect domestic firms from lower cost foreign competitors, allowing them to take advantage of learning-by-doing possibilities and overcome capital market imperfections. Moreover, foreign direct investment was limited. Unlike many other developing countries, many of South Korea’s industries did eventually become more competitive than their counterparts in Europe and North America, so that the government has been able to scale back these protectionist policies more recently.

Section B (60 percent): Answer the following **Long Questions**.

B1. Consider the following lending contract between a farmer and a bank, both of whom are risk-neutral. The farmer needs a to borrow \$100. If she puts in a certain level of effort, the investment will pay off for sure and generate a crop yielding a value \$150. However, if she “shirks” (i.e. does not put in the effort), the crop yield is uncertain. Specifically, her yield will be \$150 with probability 0.5 and 0 with probability 0.5. The cost of providing the effort is assumed to be 40 and the gross cost of the funds to the bank is 80. The bank must decide what repayment R it will require as part of the contract. Assume that the borrower has limited liability.

(a) For a given repayment R , what is the expected income of the borrower if she does not shirk? What is her expected income if she does shirk?

Her expected income if she does not shirk is

$$I_1^N = 150 - 40 - R = 110 - R$$

Her expected income if she does shirk is

$$I_1^S = 0.5 \times (150 - R) = 75 - 0.5R$$

(b) Use your answer to part (a) to derive the maximum repayment R^* that the bank can charge while still inducing borrower not to shirk.

The maximum repayment must satisfy

$$\begin{aligned} 110 - R &\geq 75 - 0.5R \\ R &\leq R^* = 70 \end{aligned}$$

(c) Illustrate on a diagram how the bank’s expected profits vary as R is increased from 0 to some value $R > R^*$. Will the bank make the loan ?

The bank’s expected profits are given by

$$\pi = \begin{cases} R - 80 & \text{if } R < 70 \\ 0.5 \times R - 80 & \text{if } R > 70 \end{cases}$$

This profit function is illustrated in Figure 4. The bank will not make this loan. It is not possible to find a value of R such that the borrower will not shirk and the bank makes a profit. If the bank just put up with shirking it would have to set $R = 160$ to at least break even. However, for this repayment rate, a shirking lender would never borrow.

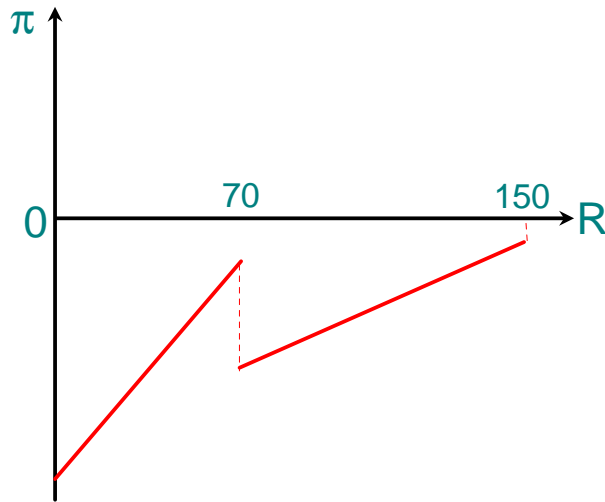


Figure 4: Bank's Expected Profit

Suppose now that two such borrowers form a group and borrow from the bank under a joint liability clause. Assume also that the borrowers act in unison so as to maximize their joint payoff.

(d) For a given repayment R , what is the expected joint income of the borrowers if they do not shirk? What is their expected joint income if they do shirk?

Note first that in this example, if one borrower is successful and earns \$150, this is not enough to cover the cost of funds to the bank ($= 2 \times 80 = \$160$). It follows that the only situation in which default does not occur is when both borrowers are successful. That is, the probability of no default if both shirk is $0.5 \times 0.5 = 0.25$. It follows that the group's expected income if they don't shirk is

$$I_2^N = 300 - 80 - 2R = 220 - 2R$$

Their expected income if they do shirk is

$$I_2^S = 0.25 \times (300 - 2R) = 75 - 0.5R$$

(e) Derive the maximum repayment, R^{**} , that the bank can charge while still inducing borrowers not to shirk. Will the bank make the loan now?

Yes. The new maximum repayment must satisfy

$$220 - 2R \geq 75 - 0.5R$$

$$1.5R \leq 145$$

$$R \leq R^{**} = 96.67$$

If the bank charges a repayment rate equal to 96.67, the borrowers would not shirk and the bank makes a profit of $2 \times 96.67 - 160 = 33.34$. So it will make this loan.

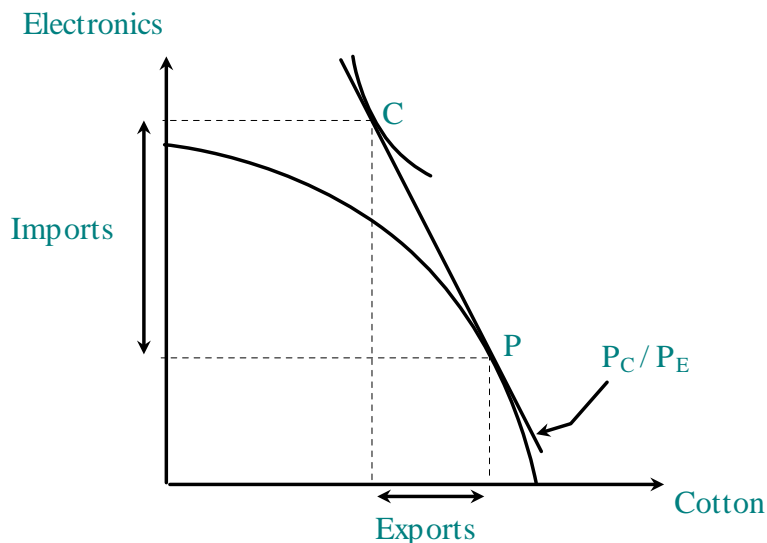
[If $R > 96.67$, the borrowers will shirk and the bank's expected profit would be

$$\pi = 0.25 \times 2R + 0.25R + 0.25R - 160 = R - 160.$$

Note again that the bank can't make profits by charging a high rate and ignoring the shirking issue. The most it could ever charge the borrowers in this case would be \$150, but this yields a loss.]

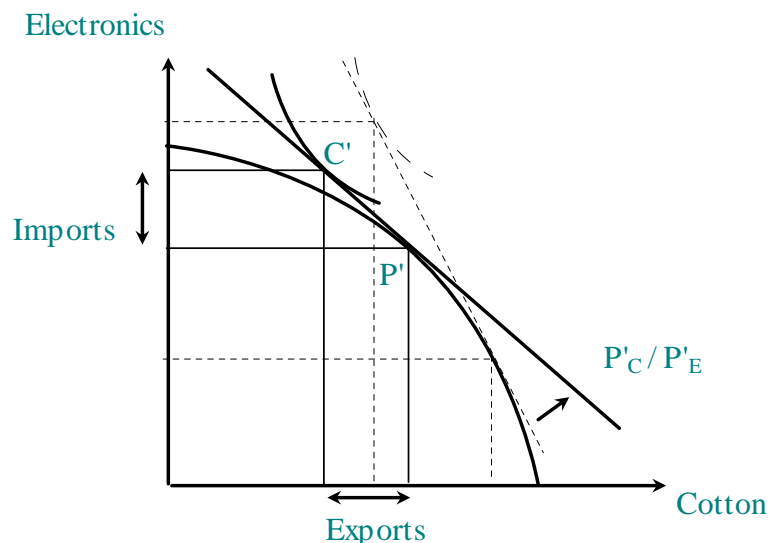
B2. Indostania is a hypothetical developing country that produces and consumes two goods — cotton and electronic components — using two factors of production — land and labour. Cotton production uses land relatively more intensively, so that electronics production uses labour relatively more intensively. Indostania is a small open economy that trades freely in international markets, and faces world prices for cotton given by P_C and for electronics given by P_E .

(a) On a diagram showing the economy's production possibilities frontier and indifference curves, illustrate a situation where the world relative prices of cotton and electronics are such that Indostania exports cotton and imports electronics.



(b) Suppose that, as the world economy grows richer it spends an increasing proportion of its income on electronic components and a decreasing proportion on cotton. Illustrate on a diagram, like the one in part (a), how this is likely to affect

the consumption and production of the two goods in Indostania, and hence the exports/imports of each.



(c) Explain the distributional consequences of the changes described in (b) for landowners and workers.

Because the relative price of cotton has fallen, production shifts away from cotton and towards electronics. Since cotton is land-intensive and electronics is labour intensive, this will tend to drive down the return to landowners and will drive up the return to workers. Thus, the distributional consequences depend on the initial distribution of factor ownership. Those households who largely supply labour and little land (especially those in the urban sector) will gain, while those who only rely mostly on income from land will tend to lose.

(d) Suppose the government of Indostania recognizes that the relative demands for the two goods are likely to continue to change in this way in the future. How would you expect this perspective to influence its trade policy? Under what conditions would this intervention be justifiable on economic grounds?

If the relative price of cotton is anticipated to decline in the long term, it may make sense for the country to move away from exporting cotton and towards exporting electronics. If credit markets are imperfect and there are significant externalities involved, it is likely that the private sector won't achieve this switch on its own. Such concerns might motivate a trade policy which favours electronics production over rubber production. If Indostania has a large internal market (like Brazil), it may make sense for its to follow an import substitution policy, which protects its electronics industry, allowing it to achieve full economies of scale, and "learn by doing". If instead,

the internal market is small (like South Korea), a policy of subsidizing exports of electronics and thereby switching the country's trade flows may be relatively more efficient.

(e) Assuming that cotton production is concentrated in rural areas and electronics production is concentrated in urban areas, how might such an interventionist trade policy affect relative wages, internal migration and urban living conditions? What problems might arise, in the long run, as a consequence of the policy described in (d)?

The policy will tend to drive up the wage in the urban sector and drive down the wage in the rural sector, inducing rural–urban migration. This will tend to occur until wages (or rather expected wages) across the two sectors are equilibrated again. Since the urban wage increase is a result of a policy distortion, wage will tend to be above its market–clearing level so that a Harris–Todaro migration equilibrium may arise. That is, excess migration might occur effectively creating an informal urban sector, consisting of low wage jobs and possibly underemployment. Experience suggests that such informal sectors are often characterized by bad living conditions (shanty towns, unsanitary conditions, water and air pollution, etc.).

For this kind of export promotion strategy to work, it requires that producers anticipate that the government will eventually remove the protection from foreign competition. Otherwise, they will have little incentive to undertake the investments necessary to increase their efficiency. If they do not, it will become very costly (politically, socially and economically) for the government to remove any subsidies, etc. and force them to face foreign competition in the long run. Other problems that may arise include the fact that the exchange rate may become overvalued, making all exports more expensive, which will tend to undermine the policy.

B3. In class we discussed the effect of a tariff on a small open economy. However, some countries (e.g. the US) consume so much of some goods that their domestic demand significantly affects the world price. In this question, we will show that under such circumstances a positive tariff may be optimal for a large country.

(a) For simplicity, suppose that a good is fully imported, so that there are no domestic producers of it. On a diagram, draw the domestic demand curve and the foreign supply curve of the good to this country and show the free trade equilibrium. Mark off the equilibrium price (p^*) and the equilibrium quantity of the good. Shade the amount of consumer and producer surpluses generated by the equilibrium.

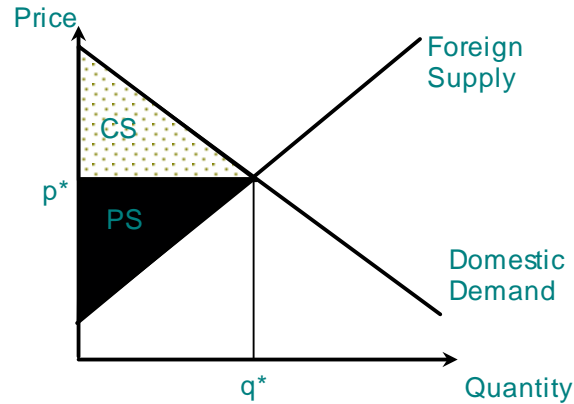


Figure 5: Free Trade Equilibrium

(b) Now draw another diagram which displays a tariff at rate t on the good. Show the new equilibrium price and quantity. How does the sum of consumer surplus, producer surplus and tariff revenue compare with the sum of producer and consumer surplus in part (a).

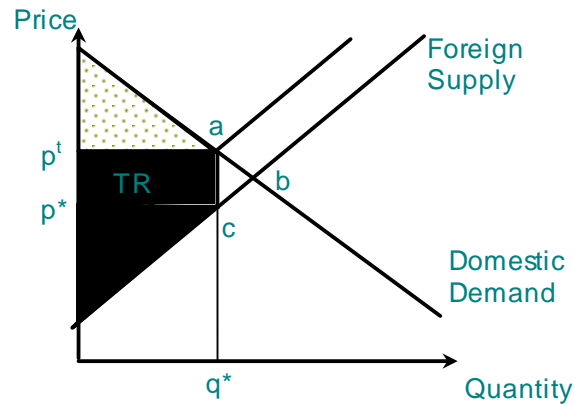


Figure 6: Impact of Tariff

The sum $CS + PS + TR$ is less than that in part (a) by the area abc .

(c) Expand the problem to include import subsidies (negative tariffs). Show as in part (a), that the sum of consumer surplus, tariff revenues and foreign producer surplus is maximized when the tariff is set equal to zero. Draw a diagram (with tariffs/subsidies on the horizontal axis and the sum of surpluses on the vertical) that relates this total surplus to the tariff.

As a result of the negative tariff, the effective supply curve shifts out. The domestic price falls

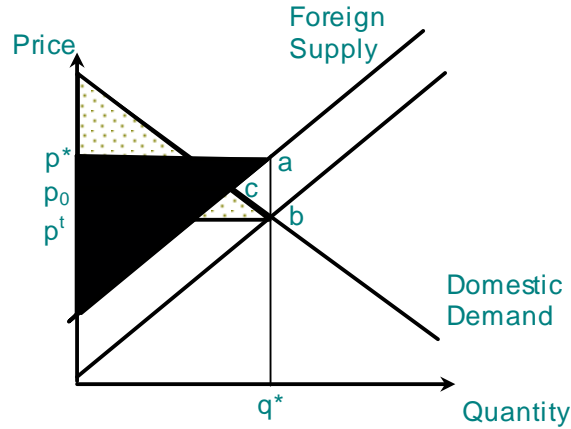


Figure 7: Impact of import subsidy (negative tariff)

and the world price rises in response to the increased demand. Relative to the non-distorted situation with price p_0 , CS rises by p_0cbp^t and PS rises by p_0cap^* . However, these increases are more than offset by the cost of the subsidy which is equal to the area p^*abp^t . The net loss is therefore represented by the triangle abc . Clearly then, the further we are away from a zero tariff, the lower is the overall welfare. This is illustrated in Figure 8 by the curve $CS + PS + TR$ which reaches a maximum when the tariff is zero.

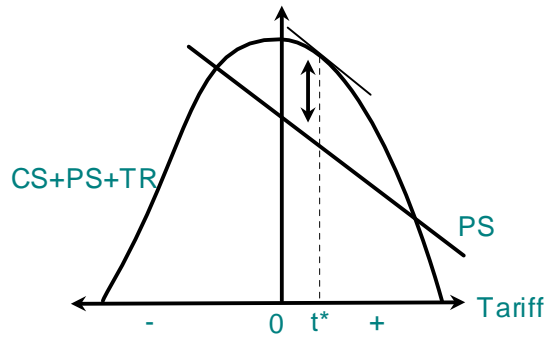


Figure 8: Surpluses

(d) Show that, if the supply curve is upward sloping, foreign producer surplus consistently increases as tariffs are lowered to zero and continues to increase with import subsidies. Draw this curve on the same diagram as in part (c).

It can be seen from Figures 6 and 7 that the foreign producer surplus increases as tariffs are lowered. The relationship is illustrated in Figure 8 by the curve PS .

(e) **If the domestic government's objective is to maximize the sum of consumer surplus and tariff revenue, show that this will lead it to set a strictly positive tariff.** The vertical distance between $CS + PS + TR$ and PS in Figure 8 is maximized at the tariff rate t^* , where the slopes of the two curves are equal. This tariff rate must be positive.