

International Trade: Final Exam

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ECON 4415, Fall 2018

This is an individual, closed book exam. You may consult your own term paper. Use of internet is forbidden. Be concise.

Trade and migration (3 points)

Read the attached Vox column. The authors use an Heckscher-Ohlin (HO) model to predict the effects of trade liberalization and migration policy on US districts. They consider two factors, skilled and unskilled labor. The US overall is abundant in skilled labor (and some districts are more than others) and the rest of the world is abundant in unskilled labor.

1. (1 point) First focus on trade. Their first prediction is that legislators are more likely to support trade liberalization in districts with more skilled workers. Explain why (assume that political leaders only care about the welfare of the population of their district). Your answer should be based on the mechanisms and predictions of the HO model, which you need to explain carefully.

Expected elements of answer: The US is overall abundant in skilled labor, so when it opens to trade the wages of skilled workers increase (Stolper-Samuelson theorem; mechanisms need to be explained). What about the gains from trade? We know that in neoclassical theories, the more the countries are different, the larger the gains. Districts with more skilled workers win more because they are more different from the rest of the world. If leaders care only about overall welfare, then they should be more pro-liberalization in high skill labor districts (in these districts unskilled labor endures larger losses but overall the gains from trade are larger and the government can redistribute these gains).

Where in the curriculum: Lecture 1 and 2's slides on Gains from Trade; Lecture 3's slides on Factor Proportion Theory.

2. (1 point) Now, turn to migration. Now we ignore the differences across districts within the US, and focus on country level predictions (this is equivalent to assuming free movement of goods and labor within a country).

In class when discussing the HO model we have assumed that factors were immobile across countries. Now assume both types of labor can migrate. Explain what predictions you would expect the HO theory to deliver in terms of the migration patterns of each type of labor in

each of the following cases. (i) If the countries cannot trade; (ii) If trade is fully liberalized (free trade, zero trade costs). Explain carefully.

Expected elements of answer: Factor migrate where their real income is the highest. If the countries cannot trade we expect skilled labor to migrate where its wage is higher, i.e. where it's relatively scarce, in unskilled labor abundant districts. Same for unskilled labor. These changes the relative supply and demand for unskilled and skilled labor until factor prices are equalized. If trade is fully liberalized, we know that we should have factor price equalization (or at least a tendency for FPE): trade acts as a substitute for factor mobility. This means that we should observe no migration (or much less).

Where in the curriculum: Lecture 3's slides on Factor Proportion Theory

3. (1 point) The authors find support for their hypotheses: legislators from districts with a larger share of skilled workers are more likely to vote pro-trade and pro-unskilled labor migration policies. They interpret this as evidence supporting a HO-type of explanation. Can you imagine alternative mechanisms which would generate such a pattern?

Expected elements of answer: Here the answer is quite open. A possibility is to mention the influence of lobbies which might be stronger in skill intensive sectors. This political economy argument applies to low skill migration as well. Another possibility is that the firms winning from trade liberalization are the most productive (Melitz model) which employ more skill workers.

Where in the curriculum: Lecture 13's slides on Political Economy; Lecture 7 and 8's slides on Melitz model and its extensions.

The effect of opening to trade (3.5 points)

1. (1.75 points) The US and Mexico have signed a free trade agreement in 1994. Explain what this agreement should have implied in both countries in terms of:
- (i) Trade specialization (provide your answer based on HO and Ricardian Theories).
 - (ii) The geography of economic activities (provide your answer based on the New Economic Geography models).
 - (iii) The number of producers and exporters (provide your answer based on the Melitz model).
- Now consider the agreement between the US and Honduras in 2004 (think that Honduras is similar to Mexico, but smaller in terms of country size). What would be the main differences?

Expected elements of answer: Specialization: the US should specialize in capital intensive and skill intensive goods (HO), and in goods in which its relative labor

productivity is higher (Ricardo). The opposite for Mexico. The number of exporters should increase in both countries, and the number of producers should decrease (some firms exit, Melitz model). Activities should concentrate on regions which gain more market potential (e.g. California). The difference with a US-Honduras agreement is that Honduras is a small countries: the US would be less affected, but effects – and gains in comparative advantage models – should be magnified for Honduras.

Where in the curriculum: Lecture 1's slides on Ricardian Theory; Lecture 3's slides on Factor Proportion Theory; Lecture 7 and 8's slides on Melitz model and its extensions; Lecture 6's slides on Economic Geography.

2. (1.75 points) Consider the two following hypothetical free trade agreements: EU-US and EU-Brazil.
 - (i) Using the HO theory seen in class, discuss its hypothetical effects on wage inequality in the EU, US, and Brazil.
 - (ii) Suppose more productive firm hires more skilled worker; what does the Heterogeneous Firm theories predict the wage inequality in these three countries?

Expected elements of answer: HO theories predict that the first should have little impact (skill abundance is similar in EU and US) while the second should increase wage inequality in the EU and decrease it in Brazil (Stolper Samuelson theorem). Melitz model should predict that both should increase wage inequality in both countries: resources are reallocated in each countries toward the high productivity, skill intensive producers.

Where in the curriculum: Lecture 3's slides on Factor Proportion Theory; Lecture 7 and 8's slides on Melitz model and its extensions.

Exports versus FDI in the Melitz model (3.5 points)

Consider a Melitz model with two countries, Home and Foreign (labelled with a “*”). Each country produces differentiated goods w under monopolistic competition and increasing returns to scale, and a freely traded homogenous good under perfect competition and constant returns to scale. The labor endowment at Home and Foreign are L, L^* , respectively. Labor can freely move across sectors, and wages are assumed to be equal to 1 in both countries. Consumers spend a fixed share of their income μ in the differentiated good sector, and preferences over differentiated goods are CES:

$$Q = \left(\sum_{w \in \Omega} q(w)^{\frac{\sigma-1}{\sigma}} dw \right)^{\frac{\sigma}{\sigma-1}}, \quad (1)$$

which yields the following demand function:

$$q(w) = \left(\frac{p(w)}{P}\right)^{-\sigma} \frac{\mu L}{P}, \quad (2)$$

where $P = (\sum_{w \in \Omega} p(w)^{1-\sigma} dw)^{\frac{1}{1-\sigma}}$. Similar demand function applies to the Foreign.

Firms use $1/\varphi$ unit labor to produce one unit of differentiated goods, and firms differ in their productivity, φ . Now consider firms in the Home country. As in the standard Melitz model, they have to pay a fixed cost to produce and sell on their domestic market (labelled F_D), an additional fixed cost to export (labelled F_X), and a variable “iceberg” trade cost τ on each unit they ship to the foreign country. *In addition*, firms can avoid paying τ by doing Foreign Direct Investment (FDI), i.e. produce and sell directly in the foreign country. In this case they pay a fixed cost F_I without incurring further trade costs. We assume that $F_D < \tau^{\sigma-1} F_X < F_I$.

1. (1.25 points) Write (i) the domestic profit of a Home firm; (ii) the export profit of a Home firm; (iii) the FDI profit of a Home firm.

Answers:

- (i) Domestic profits (assuming φ is at least the production cutoff value):

$$\Pi_D = p(w)q(w) - \frac{q(w)}{\varphi} - F_D,$$

and since $q(w) = \frac{p(w)^{-\sigma} \mu L}{P^{1-\sigma}}$ and $p(w) = \frac{\sigma}{(\sigma-1)\varphi}$ due to profit maximization, the profits become:

$$\Pi_D = \frac{\mu L}{P^{1-\sigma}} \sigma^{-\sigma} (\sigma-1)^{\sigma-1} \varphi^{\sigma-1} - F_D.$$

- (ii) Export profits (assuming φ is at least the export cutoff value):

$$\Pi_X = p^*(w)q^*(w) - \frac{\tau q^*(w)}{\varphi} - F_X,$$

and since $q^*(w) = \frac{p^*(w)^{-\sigma} \mu L^*}{P^{*1-\sigma}}$ and $p^*(w) = \frac{\sigma\tau}{(\sigma-1)\varphi}$ due to profit maximization, the profits become:

$$\Pi_X = \frac{\mu L^*}{P^{*1-\sigma}} \sigma^{-\sigma} (\sigma-1)^{\sigma-1} \varphi^{\sigma-1} \tau^{1-\sigma} - F_X.$$

- (iii) FDI profits (assuming φ is at least the FDI cutoff value):

$$\Pi_I = p^*(w)q^*(w) - \frac{q^*(w)}{\varphi} - F_I,$$

and since $q^*(w) = \frac{p^*(w)^{-\sigma} \mu L^*}{P^{*1-\sigma}}$ and $p^*(w) = \frac{\sigma}{(\sigma-1)\varphi}$ due to profit maximization, the profits

become:

$$\Pi_I = \frac{\mu L^*}{P^{*1-\sigma}} \sigma^{-\sigma} (\sigma - 1)^{\sigma-1} \varphi^{\sigma-1} - F_I.$$

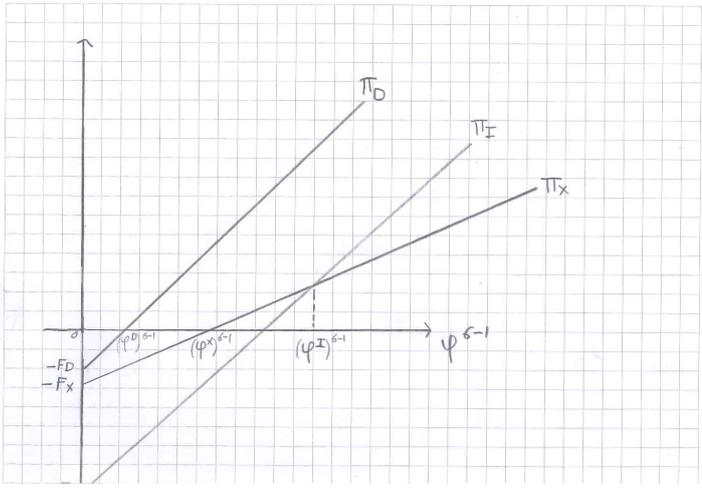
2. (1.25 points) Plot each profit curve as a function of $\varphi^{\sigma-1}$, where φ is the firm's productivity. How many cutoffs of productivity are there? What do the most productive firms do? What is the intuition?

Answers: See the plot below. When plotting the curves it is important to make sure that the intercepts are in the right order and that since we assume symmetric countries (i.e. $L = L^*$ and $P^{1-\sigma} = P^{*1-\sigma}$), Π_D and Π_I are parallel to each other, with Π_X flatter due to $\tau^{1-\sigma}$. These three profit functions are all increasing in $\varphi^{\sigma-1}$ and create three cutoff productivity levels: one for production, one for exports, and one for FDI. The most productive firms do FDI in addition to domestic production but do not export. This setup treats exports and FDI as substitutes whereas in real world they might be complements as firms do both FDI and export.

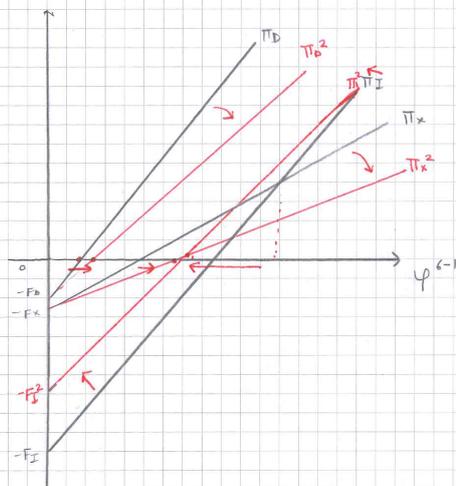
3. (1 point) Assume a decrease in F_I in both countries (e.g. government-sponsored FDI). What happens to the number of firms at Home that (i) produce domestically and (ii) export? What would be the effect on trade flows? (you can show that graphically, but explain carefully)

Answers: See the plot below. The direct effect is the decrease in F_I which shifts Π_I leftwards, decreasing the cutoff productivity level for FDI (we are assuming that the decline in F_I does not change the order of fixed costs given in the question). The number of firms that produce only domestically does not change but the number of exporting firms decreases which reduces trade flows (at the expense of more FDI firms). Note that there is an additional indirect effect. This comes from the decline in price indices in both countries since we assume that F_I has decreased for both countries (this leads to a larger number of firms serving the "other" country). This effect rotates all three curves rightwards (tougher competition everywhere), which increases the production cutoff productivity value (leading to firm exits), increases the export cutoff productivity value (leading to less firms exporting), and slightly increases the FDI productivity value (but the net effect is a decrease in this value, leading to more firms doing FDI instead of exporting). If instead we assumed a one-way decrease in F_I , then the domestic price index won't change and thus there won't be firm exits in the domestic economy.

2 - Profits from domestic sales, exports, and FDI



3- Decrease in F_I



Where in the curriculum: Lecture 7 and 8's slides on Melitz model and its extensions.