

Written Exam for the M.Sc. in Economics Winter 2015–16

Advanced International Trade

3-hour closed-book exam

December 15 2015

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. That is, if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by 'eksamen på dansk' in brackets, you must write your exam paper in Danish.

This exam consists of 4 pages in total.

Problem 1:

Consider a small economy producing two tradable goods. Workers L produce a continuum of intermediate goods $i \in [0, 1]$ that are combined with capital K into the final output in each industry using a CRS technology. Intermediates are normalized such that they all require the same amount of labor to produce. Let a_{fj} denote the required input of factor f to produce one unit of the final good $j = \{1, 2\}$. Offshore production of intermediate good i costs $\beta(1 + \frac{1}{2}i)$.

1. How would you interpret the cost of offshoring?
2. Assume $\beta < \frac{w}{w^*} < \frac{3}{2}\beta$. What does this restriction imply for production of intermediates at home and offshore? Write down a condition for the cut-off intermediate good, I , for which domestic and offshore production costs are balanced.
3. Show that the cost of producing one unit of output is $c_j = wa_{Lj}\Omega + ra_{Kj}$, where $\Omega \equiv 1 - \frac{I^2}{2(2+I)}$. How does offshoring affect unit costs?
4. Show that the cost-savings/productivity effect of easier offshoring tends to increase wages and leave capital owners unaffected. Hint: Use the zero-profit conditions and assume $\hat{p} = 0$ for the small economy.

Problem 2:

Consider the Dornbusch, Fischer and Samuelson (1977) model with two countries, Home and Foreign. We use $*$ to denote parameters specific to Foreign. Each country produces a continuum of goods, indexed $z \in (0, 1)$. The only factor of production is labor which is paid the wage w in Home and w^* in Foreign. The countries' labor endowments are given by L and L^* . Consumers have identical Cobb–Douglas preferences such that they spend a fraction $b(z)$ of their income on good z . It is assumed that $b(z) > 0 \forall z$ and $\int_0^1 b(z) = 1$.

In the free trade equilibrium, countries produce and specialize in the goods in which they have a comparative advantage. Assume Home produces all goods in $(0, \tilde{z})$, while Foreign produces all goods in $(\tilde{z}, 1)$, where \tilde{z} is the good for which production costs are exactly the same in the two countries.

One of the equilibrium conditions in Dornbusch, Fischer and Samuelson (1977) is:

$$\theta(\tilde{z})w^*L^* = (1 - \theta(\tilde{z}))wL \quad (1)$$

where $\theta(\tilde{z}) = \int_0^{\tilde{z}} b(z)dz$.

1. What is the interpretation of $\theta(\tilde{z})$? What is the interpretation of equation (1)?
2. Show that $\theta(\tilde{z})$ is equal to the home country's share of world income:

$$\theta(\tilde{z}) = \frac{Y}{Y^* + Y}$$

where $Y = wL$ and $Y^* = w^*L^*$.

3. Derive the Gravity Equation. That is, derive a relationship between bilateral trade and the two countries' incomes. Holding world income fixed, will two countries of unequal income levels trade more or less compared to two countries of similar income levels?
4. Eaton and Kortum (2002) present a multi-country Ricardian model with geographic barriers to international trade. What are the key differences between the 2002–article by Eaton and Kortum and the 1977–article by Dornbusch, Fischer and Samuelson? What determine absolute and comparative advantages in Eaton and Kortum (2002)? Note that you are not required to derive any statements formally in your answer.
5. The Gravity Equation derived in Eaton and Kortum (2002) is:

$$X_{ni} = \frac{\left(\frac{d_{ni}}{p_n}\right)^{-\theta} X_n}{\sum_{m=1}^N \left(\frac{d_{mi}}{p_m}\right)^{-\theta} X_m} Q_i \quad (2)$$

where X_{ni} is total spending in country n on goods produced in country i . $d_{ni} > 1$ describes how many units of a good must be shipped from n for one unit to arrive in i . Country n 's price index is p_n and its total spending is X_n . Q_i is exporter i 's total sales. The parameter $\theta > 1$ governs the dispersion in technology.

Explain what happens to country i 's export to n , X_{ni} , if trade costs decrease such that $d'_{mi} < d_{mi} \forall m \neq n$ and $d'_{ni} = d_{ni}$. Do exports adjust at the extensive margin or the intensive margin?

Problem 3:

Answer True or False to each of the statements below. Briefly explain your answer.

1. If exporting involves lower fixed costs while FDI involves lower variable costs, only the most productive firms engage in FDI.
2. Consider a $2 \times 2 \times 2$ Heckscher–Ohlin model where the two factors are low-skilled and high-skilled workers. According to the Rybczynski theorem, an increase in the factor endowment of low-skilled workers due to immigration leads to a decrease in low-skilled wages.
3. Between two trading partners, tariffs reduce international trade relative to internal trade more for the larger country.

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4. In the $2 \times 2 \times 2$ Heckscher–Ohlin model, the abundant factor gains from international trade, while the scarce factor loses.
5. Based on the figure below, Bernhofen and Brown (2004) reject the Law of Comparative Advantage in the context of Japan's transition from autarky to free trade in the mid-19th century.

