# Exam: International Trade (1004)

Winter Term 2006/07

# Examiner: PD Dr. Christiane Clemens

- **No aids except for English–English dictionaries may be used.**
- *The exam comprises four parts. All questions must be answered.*
- *The exam lasts 120 minutes.*
- *Students enrolled in the German diploma programs may answer the questions in German.*

## Question 1: Rybczinski Theorem and Growth

Consider Silicon Island which is a two–sector economy producing computers $C$ and computer software $S$. The model economy satisfies the standard assumptions of the Heckscher–Ohlin model. The production of computers is capital–intensive, the production of software is labor–intensive. Employment of factors can be written as: $L = L_C + L_S$ and $K = k_C L_C + k_S L_S$, where $k_C > k_S$ denote sectoral capital intensities. The sectoral production functions in intensive form are given by: $Q_C = L_C q_C(k_C)$ and $Q_S = L_S q_S(k_S)$.

(a) Which result on the output effects of an increase in the economy–wide labor endowment does the Rybczinski–Theorem state? Explain the importance of the factor price ratio $w/r$ for the validity of of the theorem.

(b) Give a formal proof of the Rybczinski Theorem, by (i) expressing sectoral labor inputs $L_C$ and $L_S$ in terms of factor endowments and capital intensities only, and (ii), by determining the partial derivative of sectoral outputs $Q_C$ and $Q_S$ with respect to labor endowment $L$.

(c) Illustrate the Rybczinski Theorem in an Edgeworth Box.

(d) Assume that Silicon Island is labor–abundant and exports computer software. Which phenomenon describes *'immiserizing growth'*?

## Question 2: Tariffs and Trade

Consider the steel market for two large economies, the United States ($U$) and the European Union ($E$) in a partial equilibrium context. In the absence of trade, $P^U > P^E$.

(a) When engaging in free trade, who will be is exporting steel, and what can be said about the world price $P^W$ of steel? Underline your argument by using the three part diagram, showing both domestic markets, as well as the world market in terms of import demand and export supply.

(b) In order to protect its steel industry, the U.S. imposes a specific tariff $t$ on steel imports. Explain the effects on U.S. and EU prices, the terms of trade, domestic demands and supplies, and the volume of trade. Illustrate your results.

(c) Explain the welfare effects of a tariff for U.S. citizens in terms of consumer and producer surplus, and efficiency losses. Can the country actually benefit from the imposition of a tariff?

(d) What if the European Union answered to this trade policy by declaring a trade war and imposes a tariff, for instance, on U.S. oranges? Explain the game–theoretic background of trade wars and a possible solution to this dilemma.

**Question 3: Specific Factors Model**

Consider Paradise Island producing two types of tourism: seaside holidays $H$ and mountain trekking $T$. Beaches and mountains are specific factors, workers can be employed in both sectors. Underline your argument of item (b), (c), and (d) with an adequate graphical illustration.

(a) What can be said about the autarky equilibrium wage rate in both sectors, if labor is paid according to its marginal product? How do marginal products of labor relate to commodity prices in equilibrium?

(b) What is the effect of an equal proportional increase in commodity prices $P_H$ and $P_T$?

(c) What is the effect of an increase in the relative price $P_H/P_T$?

(d) Explain the distributional effects of the increase in the relative price for factor owners (beach–owners, mountain–owners, workers)?

**Question 4: Short Answer Questions**

(a) Consider two economies (HOME, FOREIGN) producing manufactures and food with the input factors capital, land and labor. If HOME is relatively capital–abundant and FOREIGN is relatively land–abundant, what does the specific factors model predict about pretrade and world trade relative prices $P_M/P_F$? Underline your argument by using a graphical illustration of relative supplies and relative demand.

(b) What is the difference between intra–industry and inter–industry trade and how do they relate to the concepts of *'economies of scale'* and *'comparative advantage'*? Why are both forms of international trade considered to be welfare–improving for consumers?

(c) Calculate the comparative costs, the comparative cost (dis)advantage and the opportunity costs for each of the two following countries (HOME, FOREIGN), whose technologies are characterized by the following per unit costs of production:

| | HOME | FOREIGN |
|---|---|---|
| cloth | $a_{LC} = 8$ | $a^*_{LC} = 12$ |
| wine | $a_{LW} = 16$ | $a^*_{LW} = 20$ |

(d) What is the difference between Ohlin's point and Keynes' point regarding the effects of transfer payments on the terms of trade?

(e) From the viewpoint of the Heckscher–Ohlin framework, is there a difference between trade in commodities and trade in factors of production? Give a brief discussion of the theoretical implications and the empirical dimension.