

Exam – ECON 4415 - Solutions

Question 1 – Ricardian Trade Theory (1/3)

Up until 1913 there was an important barter trade between Norway and Russia in the north. This *Pomortrade* was trade between Norwegians in Finnmark and Russian pomors who travelled to Finnmark from the Russian city Archangelsk. The pomors brought grain that was exchanged for fish with the Norwegians.

You may assume that the Russian pomors had the same unit labour requirement in fishing as the Norwegians (they crossed the oceans where the Norwegians fished), but lower unit labour requirement in grain production (Russia has very productive soil).

For instance, the unit labour requirements may have been:

	Fish (per kg)	Grain (per kg)
Norway	$a_N^F=1$	$a_N^G=2$
Russia	$a_R^F=1$	$a_R^G=1/2$

a)

Given that unit labour requirements were as in the table,

- which country had an absolute advantage in grain?

Russia had absolute advantage in grain.

- which country had an absolute advantage in fish?

None of the countries had absolute advantage in fish. Their unit labour requirements were the same.

- what was the opportunity cost of fish in terms of grain in the two countries?

The opportunity cost of fish in terms of grain in Norway was $\frac{1}{2}$.

The opportunity cost of fish in terms of grain in Russia was $2=(1/0.5)$.

- what was the opportunity cost of grain in terms of fish in the two countries?

The opportunity cost of one good in terms of another good is the inverse of the opportunity costs of the other goods in terms of the first. Therefore, the opportunity cost of grain in terms of fish in Norway was 2. The opportunity cost of grain in terms of fish in Russia was $\frac{1}{2}$.

- which country had a comparative advantage in fish? Which country had a comparative advantage in grain?

A country has a comparative advantage in producing a good if the opportunity cost of this good is lower than in the other country. Therefore, Norway had a comparative advantage in fish and Russia had a comparative advantage in grain.

b)

Assume that the labour forces in Norwegian Finnmark and Russia (L_N and L_R) were fixed. Think of Finnmark as country. Derive the production possibility frontiers (PPF) for grain for any quantity of fish (as a function of the two countries' populations). What is the interpretation of the slope of the PPF?

Generally:

$$L_i = a_i^F Q_i^F + a_i^G Q_i^G$$

$$Q_i^G = L_i / a_i^G - (a_i^F / a_i^G) Q_i^F$$

$$Q_N^G = L_N / a_N^G - (a_N^F / a_N^G) Q_N^F = L_N / 2 - (1/2) Q_N^F$$

$$Q_R^G = L_R / a_R^G - (a_R^F / a_R^G) Q_R^F = L_R / 0.5 - (1/0.5) Q_R^F = 2 L_R - 2 Q_R^F$$

The interpretation of the slope of the PPF is the opportunity cost of fish in terms of grain.

c)

The goods were produced under perfect competition. Prices equal unit costs. In country i (i =Norwegian Finnmark, Russia) autarky prices were:

$$P_i^F = a_i^F w_i$$

$$P_i^G = a_i^G w_i$$

Normalize the price of fish in both countries to be equal to 1. For each of the two countries, derive wages and the price of grain in autarky.

$$P_i^F = 1 = a_i^F w_i$$

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$$w_i = 1$$

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$$P_N^G = a_N^G w_i = 2$$

$$P_R^G = a_R^G w_i = 1/2$$

Here students may well illustrate with graphical presentations of the PPFs

d)

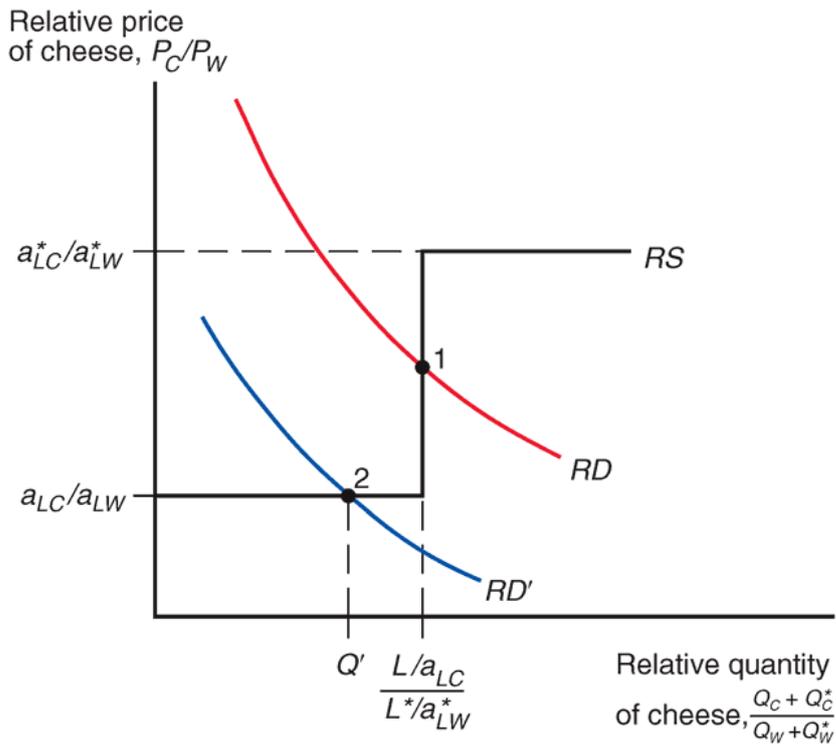
Now assume that trade was introduced. We assume that trade was free so that prices became equal in the two countries.

With trade, either

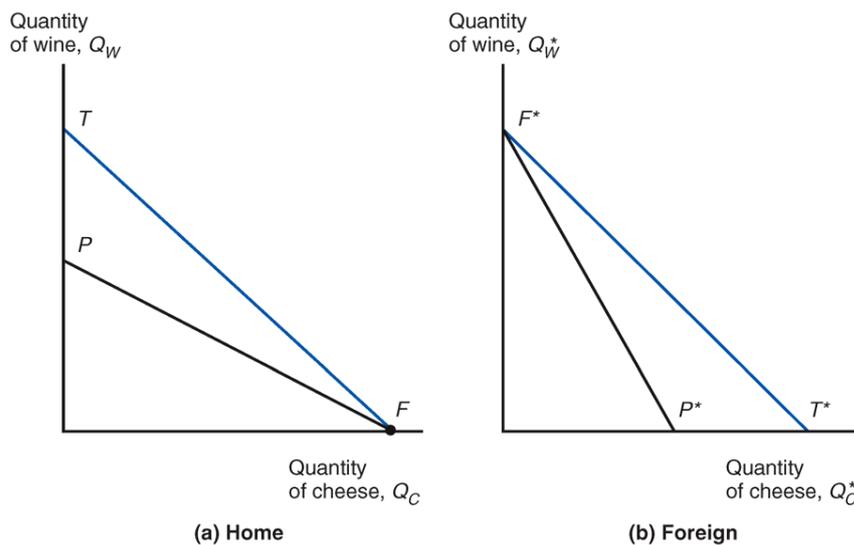
- Norwegian Finnmark produced both goods and the Russia produced only grain, or
- Russia produced both goods and the Norwegian Finnmark produced only fish, or
- the two countries specialized so that Norwegian Finnmark produced only fish and Russia produced only grain.

Explain why trade gives these three alternative outcomes. Which country gains from trade in the three alternative outcomes? Explain.

Trade gives rise to a stepwise relative supply function. The lower horizontal part represents incomplete specialization for the first country. The vertical part represents complete specialization for both countries. The upper horizontal part represents incomplete specialization for the second country. The equilibrium will be where the relative supply curve intersects with the relative demand curve. The relative demand curve is common for the two countries (their preferences are assumed to be identical). Equilibrium prices may therefore be equal to the first country's autarky price, the second country's autarky price or in between the two countries' autarky prices. Students should be credited for thorough explanations.



Gains from trade arise when traded prices differ from autarky prices. In this case, the trading countries face a budget line after trade that has a different slope than the PPF. In this case, the countries' consumption possibilities exceed the countries' PPF. The students may well use a version of the below diagram. They may also use the unit labour requirements and the calculated prices and wages to produce a numerical example.



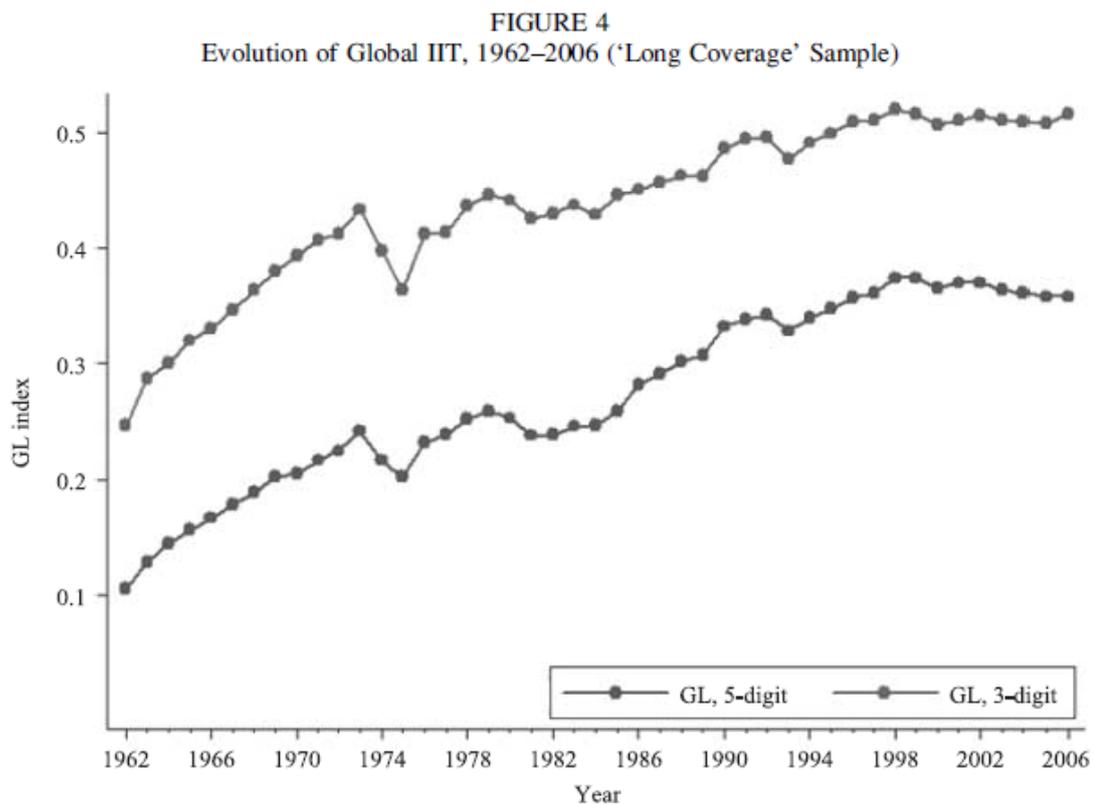
The second alternative may be the most realistic for trade between Norwegian Finnmark and Russia. Why is that?

It is more likely that prices will change due to trade for a small country than for a large country.

Question 2 – Intra and interindustry trade

Consider the graph below taken from Brühlhart, M. (2009) “An account of Global Intra-Industry Trade, 1962-2006” *World Economy*.

The graph illustrates the share of intra-industry trade in the world economy in the period from 1962. Intra-industry trade denotes countries exports and imports of goods varieties in the same commodity groups. Inter-industry trade denotes exports and imports of goods that belong to different product categories.



a) Which group of trade theories can explain inter-industry trade? Explain.

Theories of comparative advantage explain inter-industry trade. The course has covered the Ricardian trade model, the HOS trade model, the specific factor model and the standard trade model. These models imply that differences between countries give rise to comparative advantages. Countries are expected to export goods for which they have comparative advantages and import goods for which they have comparative disadvantages. Students shall be evaluated on the basis of the quality of their discussion of the topic.

b) Which group of trade theories can explain intra-industry trade? Explain.

Trade theory based on increasing returns to scale and monopolistic competition within industries give rise to intra-industry trade. If students discuss the model from the textbook they shall be credited.

- c) What can be the reasons that intra-industry trade seems to become more important over time?

Trade based on comparative advantage is very trade in raw materials, natural resources, or agricultural goods. Trade based on increasing returns to scale is often trade in manufactured goods. Over the last 50 years, manufacturing production has increased in importance in many countries and many developing countries have industrialized. This may explain why intra-industry trade has become more important.

- d) In the graph, the upper line represents goods aggregation at 3 digits and the lower line represents aggregation at 5 digits. The upper line therefore represents more aggregated commodity groups than the lower. Why does the share of intra-industry trade increases with commodity group aggregation?

If there was only one commodity group, all trade would have been intra-industry. The less aggregated and the more detailed defined commodity groups one has, the more likely it is that two goods belongs to separate rather than a common commodity group.

Question 3 – Factor proportions theory (1/3)

Consider the text below. The text is the abstract of Autor, D. H, D. Dorn and G. H. Hansen “The China Syndrome – Local Labour Market Effects of Import Competition in the United States” (*American Economic Review*, 2013, 3 (6), pp 2021-2068).

We analyze the effect of rising Chinese import competition between 1990 and 2007 on US local labor markets, exploiting cross-market variation in import exposure stemming from initial differences in industry specialization and instrumenting for US imports using changes in Chinese imports by other high-income countries. Rising imports cause higher unemployment, lower labor force participation, and reduced wages in local labor markets that house import-competing manufacturing industries. In our main specification, import competition explains one-quarter of the contemporaneous aggregate decline in US manufacturing employment. Transfer benefits payments for unemployment, disability, retirement, and healthcare also rise sharply in more trade-exposed labor markets.

The main findings are:

Rising imports cause higher unemployment, lower labor force participation, and reduced wages in local labor markets that house import-competing manufacturing industries

Discuss how international trade theory can explain these findings in the article.

Evaluation guideline: This part of the exam invites students to a broad and independent discussion of the impact of imports on labour market. The students should be able to discuss income distribution effects of trade within the framework of the HO-model. The students should be well prepared for this task. They were given almost the same question in a voluntary assignment during the autumn semester.