Model Ricardo

Problem 1

Let us assume that Country (domestic economy) is characterized by the labour supply equal to 1000 hours and Abroad (*) has the labour supply equal to 1200 hours. Each country can produce two goods: Rockets and Wrenches. The unit labour requirements in production at home is equal to 5 hours for Rockets and 2 hours for Wrenches. The same for abroad is equal to: 3 hours for Rockets and Wrenches.

a) Make a graph of production possibilities frontier (PPF) for both economies
b) What is the relative price of Rockets in conversion to Wrenches in both economies?
c) What is the price range under which the trade is possible?
d) Let us assume that under free trade the relative price (*Terms of Trade*) is equal $\frac{P_W}{P_R} = \frac{4}{5}$. How will the consumption possibilities of both countries change? Will both countries satisfied with the exchange? Why? Show this situation in the picture.
e) Let us assume that under free trade the relative price (*Terms of Trade*) is equal $\frac{P_W}{P_R} = \frac{2}{5}$. How will the consumption possibilities of both countries change? Will both countries satisfied with the exchange? Why? Show this situation in the picture.

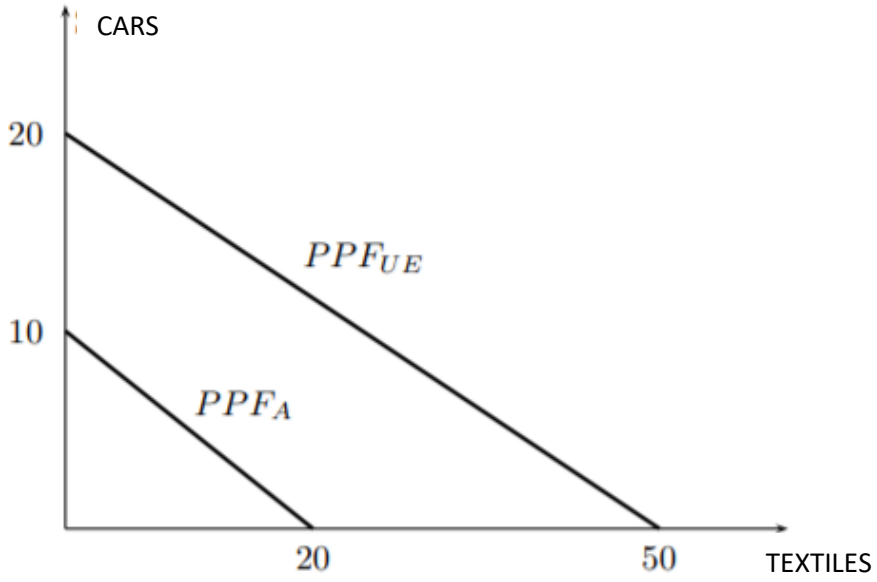
Problem 2

Let's assume that in a small open economy we have a resource of 200 work units. The technology of production of one unit of Food (F) requires the employment of 1 hour and one unit of Clothing (C) requires 3 operating hours. Let's assume that in the autarkic equilibrium in each sector of production 100 work unit is employed. Under free trade, the world price of food is $ 10 and the world price of clothing is $ 20.

a) If wages under autarky are $ 8 per hour, what are the autarkic prices of food and clothing? What will the country's income be in the case of autarky?
b) What will the structure of production be and which goods will be exported and which will be imported when the country opens to international trade? What will the country's income be in terms of trade?
c) Is it possible to determine the volume of production, import and export? What additional information is needed to determine this?
d) Let's assume that, unlike Ricardo's assumptions, after opening to trade employees cannot or want to move between sectors. What will be the country's income in this situation (after opening to trade)? What can be said about the value of this income in relation to the situation when employees were mobile?
e) What will be the level of employees salary in both sectors in this new situation?
f) Does the country as a whole benefit from trade in the new situation? Who gains and who loses?

Problem 3

Suppose the world consists of two countries: Algeria (A) and the European Union (EU), which produce two goods – Cars (C) and Textiles (T). The European Union has 200 units of labour, while Algeria 120. The figure below shows sets of production possibilities (PPF) for both countries. We assume that consumers in both countries want to consume both goods.



a) What does the technology used in production in both countries look like? Calculate the input unit labour requirement needed to create units of each good.
b) What is the relative price of the Car (expressed in units of Textiles) in the autarky equilibrium in both countries?
c) Which good will be the subject of Algerian exports and which EU according to the theory of comparative advantages?
d) What is the relative price range (car price expressed in units of textiles) enabling trade between Algeria and the EU?
e) What is the relative price range (car price expressed in units of textiles) that allows full specialization of production in both countries?
f) In a situation of significant differences between countries (market size) such as in this task, only one country completely specializes in production. Which country will specialize completely and what will be the exchange price? Draw an adjustment of the other country when they start international trade.

Problem 4

Let's assume that two countries, **A** and **B** produce only Wine and Fruits. The table below presents labour endowments in both countries and its unit requirements for the production of one unit of every good:

Country	Labour endowment	Unit labour requirements	
		Wine	Fruits
A	800	8	10
B	960	12	8

a) Based on the data from the table, determine which country has a comparative advantage in the production of Wine, and which in the production of Fruits.
b) Draw a curve of the relative global supply of Fruits (relative to Wine).
c) What determines the relative price of Fruits in global equilibrium?
d) How would the shape of the relative supply curve change from point (b) if there was a third country in the world - **C**, with 700 labour endowment and the unit labour requirements in the production of both goods equal to 10 work units?

Problem 5

Z Suppose the South American countries listed in the table below only produce coffee and bananas. The table below presents the labour endowments and unit labour requirements needed to produce a kilogram of each good.

Country	**Labour endowment**	Unit labour requirements	
		coffee	bananas
Peru	**40**	**2**	**0.25**
Columbia	**60**	**2.5**	**1**
Brazil	**110**	**4**	**1.25**
Panama	**60**	**2**	**0.75**
Uruguay	**50**	**2.5**	**0.5**

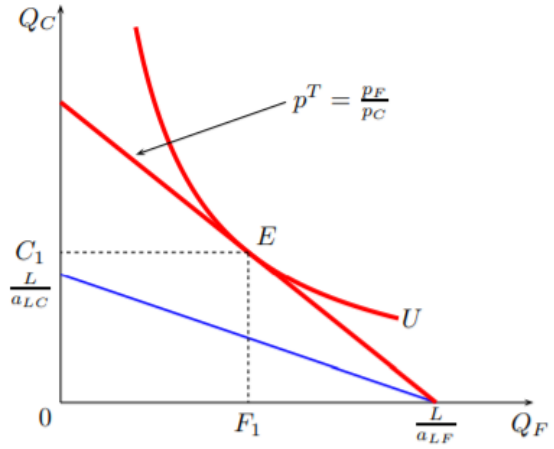
a) Based on the data in the table, draw a set of production possibilities frontier (PPF) of each country, and then a PPF of the world economy (assuming that it consists only these 5 countries).
b) Which countries will be specializing in the production of coffee, and which in the production of bananas, when the world price of bananas in relation to coffee will be 0.35? What would change if the world relative price of bananas was 0.3125?

Problem 6

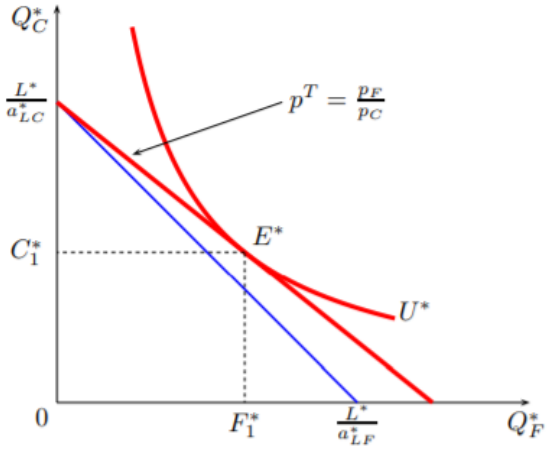
We analyze (graphically, using the charts below) the Ricardo model for two countries (Country and Abroad) under free trade conditions to determine the impact of the factors listed below on terms of trade and the level of wealth. These countries produce two goods - food (F) and clothing (C). Let's assume that the country has a comparative advantage in food production and that in the initial equilibrium both countries specialize completely. Let's also assume that each of the analyzed changes is small and does not change the structure of the specialization. Preferences are homothetic and the same in both countries. We analyze each case separately.

a) Increase in foreign labour endowment.
b) Technical progress in the Country, resulting in a decrease in unit labour input requirement in both sectors by the same percentage.
c) Technical progress resulting in a decrease in unit labour input requirement in the production of clothes by the same percentage in both countries.

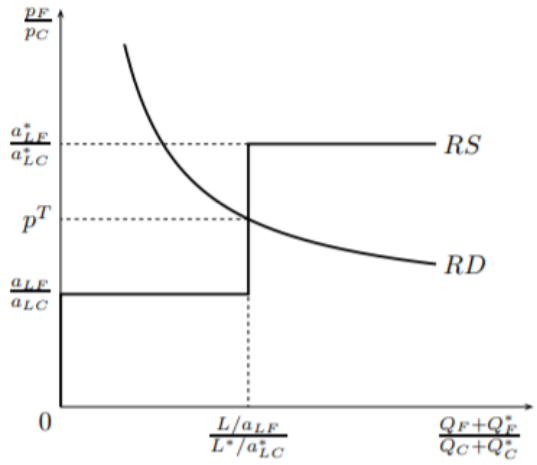
COUNTRY



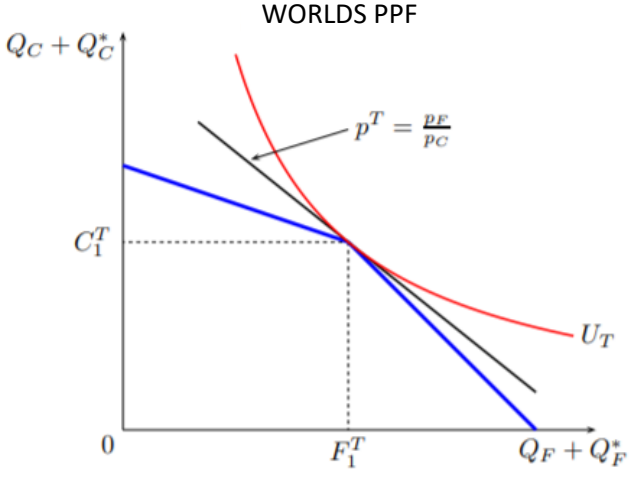
ABROAD



RS & RD



WORLDS PPF



Problem 7

Let's assume that two Italian regions - Lombardy and Tuscany are producers of four types of cheese. Suppose also that for their production they only need labour inputs, which unit requirements coefficients are given in the table below.

	Lombardy	Tuscany
Mascarpone	15	4
Mozzarella	20	8
Gorgonzola	25	14
Ricotta	40	26

a) Which type of cheese does Tuscany have the greatest comparative advantage? Which type of cheese has the least advantage?
b) Suppose these regions start trading. If the wage rate in Tuscany is **twice** as high as the wage in Lombardy, which goods will be produced in Lombardy and which in Tuscany?
c) Would the structure of specialization and exchange change if the relative wage increased to 3? What happens if the wage ratio drops to 2.5?
d) Let's return to the initial situation and assume that the pay in Lombardy is $w_L = 1$, while in Tuscany - $w_T = 2$. If there are transport costs between these regions of 5 for each unit of cheese, regardless of its type, how will this affect the exchange structure between them?