ECON 410: PROBLEM SET # 4

L.K. Raut Fall 1997

In this homework, we will first examine analytically the Ricardian theory of international trade, i.e., there is only one input of production (i.e., labor), all countries can have identical or same preferences or utility function, the basis of trade between countries is the technological differences. In other words, the comparative advantage in production arises from the technological differences.

Later we use the basic analytical insight from this model to study graphically only the basis of trade in Heckscher-Ohlin-Samuelson model, where the reason for comparative advantage is relative factor endowments.

We then examine what kind of trade pattern we observe between developed (sometimes refer as North) and less developed (sometimes refered as South) countries, when there are restricitons in movements of capital and labor. We then examine where the capital will flow and where the labor will flow and what will be the effects. We will also examine the implications of our analysis for developmental policies.

Consider a world with two economies, Mexico and U.S., each consumes two goods, cloth and wine. Production of goods require only labor input. The amount of labor that each country requires to produce an unit of each good is given in the following box:

	$cloth$	$wine$
$U.S.$	2	1
$Mexico$	5	2

Total labor available in the U.S is 100 units and in Mexico is 200 units. Suppose the community utility functions for each country are such that each country must consume a positive amount of both goods to have any positive utility and the utility functions are standard having indifference curves which are convex to the origin. For the above world with those two economies do the following exercises:

Q1.

(a) Draw the production possibility frontier(PPF) for each country.

(b) Suppose people from home country can go to the foreign country and can buy and sell goods at the autarky prices of the foreign country. Suppose the transportation cost is zero. Utilizing this fact and using the data from above example, argue that the U.S. will specialize in the production of clothes and Mexico will specialize in the production of wine. (there is a related concept called comparative advantage which you will learn in International trade course).

(c) Using wine as unit of account (i.e., normalize the price of wine to be 1), compute the autarky equilibrium prices of clothes (i.e., the price of cloth in the unit of wine), and wine for both countries. In autarky equilibrium, what will be the incomes of each country expressed in the unit of wine.

In the following exercises assume that the relative price of cloth in terms of wine in the international market is $p = 2.25$*, and use the* **graphical techniques:**

(d) Given above price ratio (price ratio here will mean the ratio of the prices of clothes and wine), if the producers of each country decides the amount of each good that they should produce to maximize their revenue (measured in the units of wine again), how much of which good will be produced by each country? What will be their revenue or income? What will be the optimal consumption of each country? How much of which good each country will export and how much of which good it will import (show this in the trade triangle). For each country compare the optimal consumption, income and the utility levels (represented by the indifference curves) in autarky with the optimal consumption, income, and utility levels that can be achieved with international trade. Show that both countries gained from trade.

Q.3 Draw the PPF that are used in Heckscher-Ohlin-Samuelson model of trade, explain the concepts of capital intensive and labor intensive technology. Exaplain how is the wage rate and rental rate are determined in autarky and what happens to them as the country opens up for trade. In your analysis explain the capital will flow from which country and why? Who benefits from capital flow?

Do problems 1,2,3,4, 7,8 from Chapter 12, pp.453-454, and also do problems 1-9, of Chapter 14, p.523.

Additional Homewrok problems, worked out in the class.

1. Before one analyzes the effect of International trade on growth in income or economic development, one must understand why countries trade with each other. In the class we have developed two such theories, namely (1) Ricardian and (2) Heckscher-Ohlin-Samuelsonian models of trade. In both models, we have seen that comparative advantage is the basis for trade.

   (a) What are the main assumptions of these two models?

   (b) What assumption leads to differences in comparative advantages of two countries in each of these two models?

   (c) Briefly summarize the major conclusions of the traditional theory (i.,e., above two theories) of free trade with regard to their theoretical effects on world and domestic economic growth, and world and domestic income distribution.

(d) What is the Prebisch-Singer thesis regarding the terms of trade between developed and developing countries?

2. Consider a world with two economies, Mexico and U.S., each consumes two goods, computer and wine. Production of goods require only labor input. The amount of labor that each country requires to produce an unit of each good is given in the following box:

	$computer$	$wine$
$U.S.$	2	3
$Mexico$	6	4

Total labor available in the U.S is 12 units and in Mexico is 24 units. Suppose the community utility function of the U.S.and Mexico are both identical, standard neoclassical so that the utility funciton has the property that each country must consume a positive amount of both goods to have any positive utility. For the above world with those two economies do the following exercises:

(a) Draw the production possibility frontier(PPF) for each country.

(b) Using wine as unit of account (i.e., normalize the price of wine to be 1), compute the autarky equilibrium prices of computers (i.e., the price of computer in the unit of wine), and wine for both countries. In autarky equilibrium, what will be the incomes of each country expressed in the unit of wine.

In the following exercises assume that the relative price of computer in terms of wine in the international market is $p_{c|w} = 1$ and $p_w = 1$.

(c) (you must do this problem graphically) Given above international prices of the goods, assuming that the producers of each country decides the amount of each good that they should produce to maximize their revenue (measured in the units of wine again), show how much of which good will be produced by each country? What will be their revenues or income? What will be the optimal consumption levels of each country? How much of which good each country will export and how much of which good it will import (show this in the trade triangle)?

(d) It has been often argued that free international trade between countries lead to grwoth in output. Use your numerical results to substantiate this statement.