

1 Basic concepts for review or self-study

We want to jump right into "general" models, but you must make sure to know some basic trade ideas. These notes will list these ideas and guide their review, or - in case you haven't taken international trade before - their study on your own.

1.1 Trade in a Small Economy

We talk of a "small economy" as one that doesn't have any market power in international markets, and hence doesn't affect international prices. This is the simplest case to study some of the issues of international trade, although it leaves aside the important issue of where the international prices (e.g., terms of trade) come from. Also, the basic ideas can be best understood in a world of two goods, so that we can use basic figures.

Imagine a PPF (production possibilities frontier) for our small economy, with two goods, X and Y. The PPF can be linear or concave to the origin. Why would it be concave rather than linear? There are two basic ideas: decreasing returns to scale in each industry (perhaps because of some fixed factor) or CRS with differing factor proportions. We will go over this briefly when we study the 2x2x2 (two goods, two factors, two countries) Heckscher-Ohlin model. For now, just draw a concave PPF with X on the horizontal axis and Y on the vertical axis.

Now imagine that we have a map of social indifference curves, which are convex to the origin (why?). The autarky equilibrium is simply given by the point at which there is tangency between the PPF and an indifference curve. This tangency gives the relative price of X, which is equal to the marginal rate of transformation and the marginal rate of substitution. As an exercise, think about why these two conditions ($p \equiv P_x/P_y = MRT$, $p = MRS$) must hold in equilibrium. Note that the equilibrium is pareto optimal (1st theorem of welfare economics).

Now suppose that international trade is allowed. This is simply reflected in the fact that now the country can exchange with the RW at some prices that are likely to be different from its autarky prices. Imagine for concreteness that $p^* > p$. Think about why this may arise: preferences, technology, endowments, etc.

What is the new equilibrium? The two conditions above must still hold, but at the new relative price p^* , which is now exogenous. This price can be exogenous because we no longer have the condition that supply equals demand. Draw a graph with the PPF and the social indifference curves that shows the new consumption and production points. The triangle formed by the price curve and these two points is called "trade triangle."

The value of imports is equal to the value of exports; there is trade balance. This must be the case because we are implicitly imposing the condition of no

capital flows, as we are restricting the consumption point to lay on the budget constraint given by a line with slope p^* that goes through the production point.

The gains from trade can be seen by noting that the indifference curve achieved must be superior to the one under autarky. Why must this be the case? There are two sources of gains from trade (GT): consumption gains and production gains. You should understand very well what these two sources of gains are. To do so, imagine that the country couldn't change its production point from the one in autarky. Note that there are still GT; these are completely based on the fact that consumers can respond to the different international prices and substitute Y for X along a budget line going through the autarky production point with slope p^* . What about production GT? A nice way to see them is to imagine Leontief indifference curves, so that there are no substitution possibilities. GT then arise only because of specialization in X , which displaces the budget line outwards, allowing the economy to reach a superior indifference curve.

1.2 The (2 good, two country) Ricardian Model

Read the first section of Chapter 1 in Feenstra. Make sure you understand the following ideas:

- Why is the PPF linear? What determines the slope of the PPF? Learn how to think about the slope of the PPF in terms of input coefficients, and also in terms of productivity parameters.

- If a good is produced, then there are zero profits (price equals marginal cost), and also the wage is equal to the value of the marginal product of labor.

- Autarky relative prices are completely determined by technology. Why is this the case? Why don't preferences matter?

- How does technology determine the relation between the autarky prices of the two countries? Why is absolute advantage (overall TFP) irrelevant in determining this relationship? Understand well that technology completely determines comparative advantage.

- How are equilibrium international prices determined? Understand the relative supply, relative demand diagram. How do preferences and size matter in determining these prices? Understand well that a country's size may adversely affect its terms of trade. The same thing happens if overall productivity increases.

- Note that if a small economy trades at all, it will necessarily completely specialize in the good in which it has a comparative advantage. This is a direct consequence of the linear PPF.

- Think about consumption and production sources of GT.

- Note that absolute advantage doesn't determine the pattern of trade. How is it possible for a country to have an absolute cost advantage (in terms of dollars or some common numeraire) if it has a productivity disadvantage? Think about the role of the wage here!

- A nice exercise is the following: draw a horizontal line where one can measure the relative wage of the two countries. In this line, mark three important points: one, the relative (Home vs Foreign) productivity of good X , and of good Y . If Home has an absolute disadvantage in both goods, then both relative productivities fall below one. If the wage was equal to one, then the absolute cost of both goods in Home would be lower than in Foreign and this clearly couldn't be an equilibrium. So the wage falls below one, and settles somewhere between the two relative productivities. In fact, the relative wage is completely determined by the relative productivities (in the sectors where the economies specialize) and the terms of trade: if Home specializes in X and Foreign in Y , and A_{iH} (A_{iF}) is the labor productivity of Home (Foreign) in good i , then

$$\frac{w_H}{w_F} = \left(\frac{A_{XH}}{A_{YF}} \right) p^*$$

where p^* is the international equilibrium relative price of X in terms of Y (i.e., the terms of trade of Home).

- Both rich (high productivity) and poor (low productivity) countries benefit from trade.
- Small countries can benefit more from trade. Why?
- Why do we not even mention the issue of "jobs" here? Are jobs destroyed or created by trade?

1.3 The two factor, two country (small-open economy) model

Read the first section of Chapter 1 in Feenstra. Make sure you understand the following points:

- For a small open-economy, prices are exogenous. The equilibrium conditions are the two zero profit conditions (ZPCs) and the two full employment conditions (four equations in four unknowns: factor prices - w, r - and output levels - y_1, y_2).

- **Factor price insensitivity (FPI)**. The ZPCs are two equations in two unknowns, i.e. the factor prices. Under certain conditions (no FIR, what is FIR?), these two equations have a unique solution, which implies that these two equations alone determine factor prices \rightarrow factor endowments have no impact on factor prices! This is FPI. Under what conditions does FPI hold? How can it be that factor supplies have no impact on prices (at least locally)? What is the difference relative to a model with only one good (i.e., the typical macro model)?

- **Factor price equalization (FPE)**: under certain conditions (which ones?), FPI implies that two open economies facing the same international prices have *the same* factor prices, hence FPE. Note the importance of this result: even in the absence of factor movements, trade can by itself lead to FPE.

- There are two important comparative statics results: first, the **Stolper-Samuelson Theorem** tells us how goods prices affect factor prices, and second,

the **Rybczynski Theorem** tells us how factor endowments affect outputs of the two goods. You should work in understanding the intuition behind these two results.

- Note also that the Stolper-Samuelson Theorem talks about real factor prices (in terms of both goods), so we can unequivocally say what happens to workers and capitalists as a result of changes in goods prices, independently of their consumption patterns (check out the "magnification effect").

- For the Rybczynski theorem, the way I like to derive it is by writing the full employment condition in intensive form. Letting k_i be the capital-labor ratio used in industry i (once we know the factor prices, then $k_i = k(w, r)$ is determined), k be the capital-labor ratio in the economy, and s_i be the share of labor used in industry i , then in equilibrium we must have

$$k_1 s_1 + k_2 (1 - s_1) = k$$

If $k_1 > k_2$ (i.e., industry 1 is capital intensive), then an increase in k leads to an increase in s_1 to restore balance in factor markets. Thus, an increase in the capital stock generates an expansion in the capital intensive industry and a contraction in the labor intensive industry in such a way that factor markets are in equilibrium even without a change in factor prices. Of course, this cannot happen in the standard one sector macro model.

- Note also that although the economy as a whole is better off, some people may be worse off. Formally, the gainers can compensate the losers and leave everybody better off with trade than in autarky. How can we be sure?