Basic of International Economics

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Basic of International Economics - Compendium

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Preface

During the entire post-war period, bilateral agreements as well as multilateral trade liberalization in the GATT/WTO has made the world economy ever more interdependent. In particular after the collapse of communism, ideologies that favoured national self-sufficiency have almost disappeared and countries have opened their economies to international trade, investments and competition and have in general gained from this.

However, one need only witness the recurring events of violent protest at meetings of organizations such as the World Economic Forum and the World Trade Organization to realize that a non-negligible part of civic society does not view the increasing internationalization and globalization with a positive attitude. Protesters are not simple bullies, but often well-educated people with a view of globalization and international economics quite different from that which is provided by the economics profession. At the same time, many textbooks offer advanced mathematical models and econometric studies on a perplexing plethora of topics within international economics, but fail to teach the basic lessons of the discipline. Undergraduates therefore may run the risk of passing exams without understanding fundamental problems in the field. As useful as they are, what is needed is therefore not another textbook with mathematical propositions.

Instead of providing advanced theory, the idea of this book is to give an easily accessible overview of basic international economics with the aim of giving readers a simple framework in which they can evaluate the many exciting developments that dominate current research, policy debates, and media coverage of the global economy. Most of the book can be understood by readers with no more than a basic understanding of economics while more advanced readers may use the book for gaining an overview of the topics and as a handbook in which they can find answers to questions simply and quickly. The language of the book is therefore kept as non-technical as possible, and all explanations focus on the basic mechanisms. It is my hope that readers from different parts of the universities and business schools as well as those without a degree can benefit from this book. In the course of reading the book, some may even be provoked to rethink their attitude towards globalization and similar developments in the world economy. This book can therefore also be seen as a primer and simple background for understanding the more advanced textbooks.

The book is divided into four main sections. Section one introduces the theory of trade in goods and services, and includes three chapters. Chapter one presents the theory of trade between countries with different characteristics and includes the theory of absolute and comparative advantages. Chapter two presents modern trade theories explaining trade between countries with similar characteristics. Chapter three closes the section by discussing the effects of various instruments in trade policy. Section two next turns to the movements of production factors and includes three chapters. Chapter four presents the Heckscher-Ohlin model and derives the factor price equalization theorem, which forms the basis for most discussions of capital mobility. Chapter five presents the background for capital movements and foreign direct investments while chapter six presents and discusses a theory of unilateral transfers of capital - i.e. foreign aid - that most policy prescriptions from international donors rely upon.

Section three of the book then turns the attention to economic policy in open economies, specifically looking at the short-run consequences. It is divided into three chapters. Chapter seven provides the needed background for understanding open economies by presenting simple exchange rate theory. Chapter eight introduces Mundell and Fleming's IS-LM model and uses it to analyse the effects of monetary and fiscal policy in small countries with either floating or fixed exchange rate systems. Chapter nine then outlines the effects of policies when countries are large. The final section of the book then analyses the effects of economic policy on long-run performance in open economies. This section is divided into two chapters. Chapter ten deals with the long-run inflation-unemployment nexus, while chapter eleven discusses the effects of international trade and investments on the growth rates of countries in the very long run, and the channels through which different factors work.

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Århus, July 26, 2005

Christian Bjørnskov

Section 1:
Theories of international trade in goods and services

1. Trade between countries with different characteristics

The earliest trade theorists were a group of people known as the 'mercantilists'. Their main idea was that a country's wealth can be measured as the amount of gold or other precious metals held by the country. To become richer, a country therefore simply had to accumulate gold. In the opinion of the mercantilists, the way to do that through trading with other countries had to be to import cheap raw materials and export final goods. As the final goods received a much higher price than the sum of raw materials going into them – the value added within the country – the country would get a net import of gold. If one tries to listen to trade political arguments today, most politicians will probably reveal themselves to be mercantilists.

1.1 Absolute advantages

However, the theory of the mercantilists was wrong. In the late 1770's, Adam Smith published his ground-breaking book called "An Inquiry into the Nature and Causes of The Wealth of Nations". Smith argued that countries have an *absolute advantage* in producing certain goods. For example, Ethiopia has an advantage in producing coffee, Chile has an advantage in producing copper as it has about a third of all known copper resources, and Denmark has for historical reasons an advantage in producing bacon and other pork products. To exemplify his theory, Smith made a two-country, two-good example similar to that outlined in Figure 1.1. The numbers are costs of producing one unit of a good, i.e. in country A it takes a worker two hours to produce a cell phone while it takes a worker eight hours to do the same in country B.

Figure 1.1:

	Cell phones	Potato chips
Country A	2	6
Country B	8	4

It is easy to see where the absolute advantages are in the example. In country A, workers take two hours to produce a cell phone while it takes eight hours in country B. In country B, on the other hand, it takes four hours for a worker to make a tonne of potato chips, which takes six hours in country A. Adam Smith therefore argued that both countries would benefit from trade if country A *specialized* in producing cell phones and country B specialized in producing potato chips. The difference to the mercantilist argument is therefore that even if country B specializes in producing a relatively simple good – potato chips – they still benefit from international trade. Hence, for countries to grow rich they would have to open up for international trade and international competition. However, he also acknowledged that producers of potato chips in country A would try to lobby for protection and limitations on imports of chips from country B, and producers of cell phones in country B would try to lobby for limitations on imports of cell phones from country A.

1.2 Comparative advantages

Smith made a strong case for free trade by his example of absolute advantages. However, one question continued to puzzle thinkers: What if a country does not have an absolute advantage? David Ricardo in 1817 proposed what is known as the theory of *comparative advantages* to explain how trade can benefit countries even if they do not have an absolute advantage. Making a small change in Smith's example above, the difference gets obvious in Figure 1.2.

Figure 1.2:

	Cell phones	Potato chips
Country A	2	4
Country B	8	10

Now, country A has an absolute advantage in producing both products. A worker takes two hours to produce a cell phone compared to four hours in country B, and eight hours to produce a tonne of potato chips compared to ten hours in country B. The puzzle was that according to the theory of absolute advantages, country A should specialize in both products. That would leave country B with no means to pay for imports from country A, which in turn would stop all trade between the two countries. However, Ricardo saw the possibility of arbitrage – that it would pay for a trader to buy a product in one country, sell it in the other country, use his profits to buy a product in that country and bring it home to his own country where he could sell what he bought in the other country with a profit.

In the example in Figure 1.2, a smart business man will realize that there is an opportunity. Consider buying a cell phone in country A, which costs the equivalent of two hours work – call that 2 Monetos. He travels to country B where he can sell his cell phone for any price below 8 Monetos – the price to be paid in country B. After that, he buys potato chips for the profits – 8-2=6 Monetos. The six Monetos can buy 6/10 tonnes of potato chips. He takes these chips home to country A and sells them for a price just below the going market price – 4 Monetos per tonne, by which he will make a profit of 4*6/10 = 2.4 Monetos.

The point of the example is that it will pay for people in country A to specialize in producing cell phones even if they also have an absolute advantage in producing potato chips. To see this, divide the costs of producing each good in both countries. In country A, one cell phone pays for 2/8 tonnes of potato chips, in country B one cell phone pays for 4/10 tonnes of chips. *Compared* to chips, cell phones are more expensive in country B than in country A, meaning that it pays for A to specialize in cell phones – its comparative advantage – while country B specializes in potato chips. That way, producers in A can get a higher price for their cell phones relative to potato chips than otherwise, and producers in B can get a higher price for their potato chips. In total, both countries are better off since the production of both products after trade has happened now take place where production is most efficient.

How to find comparative advantages

In the example in Figure1.2, divide the cost of producing one cell phone by the cost of producing one tonne of potato chips. Do this for both countries. For country A, you can exchange on 2 cell phones for 8 tonnes of chips, so the relative price is 2/8=0.25. In country B, you can exchange 4 cell phones for 10 tonnes of chips, so the relative price is 4/10=0.4. Hence, it is obvious as the relative price of cell phones – the price of cell phones *compared* to chips – is smaller in country A than in country B, that it pays for country A to specialize in producing cell phones and to buy its chips in country B. Country A has a comparative advantage in the product that has the lowest relative price in that country.

Within the theory of comparative advantages, the only factors that can stop the benefits of trade are either if countries for some odd reason should have exactly the same production structure, so no country would have an advantage in any product, or if there are costs to trading, for example transportation costs that outweigh the benefits of trading. To see the latter point, note that if potato chips are costly to transport, it might make it unprofitable for the business man to make the trade. However, the transportation costs would have to eat up *all* of his profit, the 2.4 Monetos per trade, to make international trade unprofitable. In order for this to happen, it has to cost more than 4 Monetos to transport one tonne of chips from country B to country A. In real life, this can explain the very small trade in items such as bricks and cement, but transportation costs are comparatively small for almost all other products. Indeed, one of the reasons for the increased trade since World War II is the drop in transportation costs.

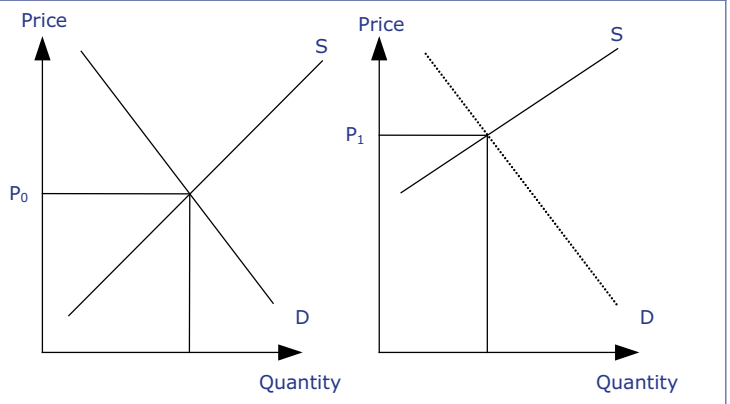
1.3 Where do comparative advantages come from?

The theory of comparative advantages has been called the most successful theory ever in the social sciences. It is often found that about half of the entire world trade can be explained by differences in comparative advantages, so the next question to be answered must be where the comparative advantages come from.

1.3.1 Factor endowments

The model of Heckscher and Ohlin outlined in chapter 4 was one of the first to deal with where comparative advantages come from. Their original observation was that some countries had a lot of capital in the form of machines, buildings and other production equipment while other countries had a large labour force at their disposal. In the left panel of Figure 1.3, the country has a high supply of the factor of production, for example labour. That means that the equilibrium price of labour, p_0, will be relatively low in that country. In the country in the right-hand panel of the figure, the supply of labour is relatively low, which naturally implies a higher equilibrium price of labour, or in other words, a higher wage level.

Figure 1.3:
The demand for a factor of production



The implication is that in countries with a lot of labour, labour is cheap and the production of goods that use a lot of labour is more profitable than production that uses less labour and relatively more capital or other inputs. Hence, the *relative price* of input factors can generate comparative advantages due to the *supply* of those factors, or in the words of Heckscher and Ohlin, countries' factor endowments. Countries with a lot of labour will have a comparative advantage in producing labour-intensive products while countries that have a lot of capital will have a comparative advantage in producing capital-intensive products since the price of the input factors differ.

1.3.2 Economies of scale

Another source of comparative advantage is scale economies. Imagine for simplicity that we have a situation where two countries do not have comparative advantages, as in Figure 1.4. Country A has absolute advantages in both products, but the relative price is the same in both countries. That means that inhabitants of country B would prefer to buy their goods in country A. Now imagine that there are economies of scale in the production of cell phones, such that an increase in production makes the *average cost* of producing a cell phone lower. In that case, a larger production of cell phones in country A will lead to a lower cost, i.e. a cost below 2, for example 1.5. Similarly, a decrease in the production of cell phones in country B will lead to an increase in average cost, for example to 3.5. Therefore, we end up in the situation in Figure 1.5 where country A now has a comparative advantage in producing cell phones and country B has a comparative advantage in producing potato chips. These comparative advantages arise from having economies of scale, i.e. that the average cost decreases with the size of production. The two countries that initially had similar characteristics have therefore developed in opposite directions and become countries with dissimilar characteristics. It is important to note that because the countries start out being identical, which of them develop which specialization can be *completely accidental*. Economies of scale and a host of other effects are also important in the more recent trade theory that explains trade between countries with similar characteristics, as will be outlined in Chapter 2.

Figure 1.4:

	Cell phones	Potato chips
Country A	2	3
Country B	8	12

Figure 1.5:

	Cell phones	Potato chips
Country A	1.5	3.5
Country B	8	12

1.4 Summary

The lessons of this chapter can be summarized as follows. Trade between dissimilar countries implies a positive welfare effect on both countries since they can exploit their absolute and comparative advantages. Only costs of transporting goods between countries can keep them from exploiting those advantages when their otherwise is free and uninhibited trade. Comparative advantages can in general come from many sources, but mostly from differences in factors endowments or from economies of scale in the production of certain goods.

2. Trade between similar countries

As we saw in chapter one, traditional trade theory focuses on explaining trade between dissimilar countries. Modern trade theory complements the traditional theories by providing explanations for trade between similar countries.

2.1 Competitive advantages

Firstly, if the market is characterized by less than perfect competition firms and countries can experience competitive advantages. As the previous chapter stressed, comparative advantages can come about as a result of economies of scale. Such economies of scale can be *internal* – i.e. that there are economies of scale *within* each firm as in the next example, or *external*, as they are in this example. External economies of scale can arise for a number of reasons.

1. *Economies of scale in auxiliary industry*. For example, if subsidiaries that deliver inputs (raw materials, intermediate goods) have internal economies of scale, the industry as a whole can gain lower average costs when the produced volume increases, as this will lead to lower average costs in subsidiary firms and therefore lower prices of whatever input the subsidiary industry produces.

2. *Competition in the subsidiary industry*. If output is low, the demand for raw materials and intermediate goods used in production will be low and can be met by relatively few firms. When production increases in an industry, the demand for raw materials and intermediate goods also increases, which will lead more firms to produce such goods. This increases competition in the subsidiary industry, which will in general result in lower prices. Through lower prices on inputs, the average costs of firms are reduced as when there are economies of scale in subsidiary industries.

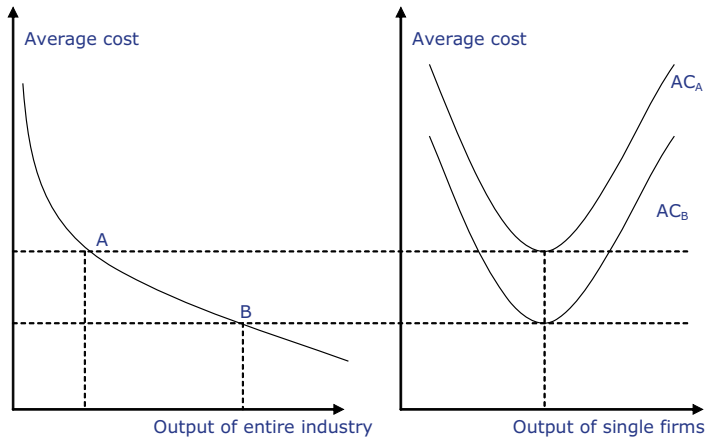
3. *Competition within the industry.* Often, a lack of domestic competition can have the effect of weakening firms' incentives to innovate and keep costs low. Competitive advantages can arise out of a high degree of competition in the domestic industry, which gives firms strong incentives to cut costs and improve their products and production processes. Again, this has the effect of lowering the average costs for all firms within an industry.

4. *Industry-specific learning*. Sometimes, industries that are situated in clusters – i.e. the firms are geographically close to each other - gains from producing more by learning from each other. They will often compete for the same employees, who, when they leave one firm for another, bring new information and ways to do things. Firms also learn from each other simply by observing what other firms within the industry do, which will give them new ideas and ways to cut costs.

5. *Training*. Firms within an industry often use the same types of employees. If the firms are geographically proximate, they will be able to draw upon the same pool of potential employees. Hence, if a worker has been trained in one firm, he can easily be used in another firm within the industry, making firms' access to labour easier and more flexible.

All of these examples have the same outcome as illustrated in Figure 2.1: they lead to a reduction of the average costs of all firms within the industry.

Figure 2.1:
External economies of scale

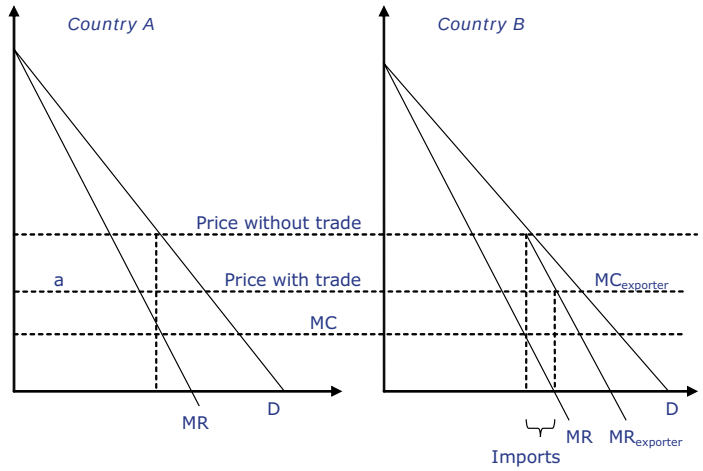


Imperfect competition can also do the trick, as illustrated by the following theories. Here, imperfect competition is defined as competition between companies that are too small to affect the price, i.e. they are price takers. However, they all make fairly but not exactly similar goods. A good example could be the competition between different brands of soft drinks such as Pepsi and Coca Cola, where the only difference is the taste.

2.2 The destruction of monopolies through trade

As is well known from standard economic theory, monopolies charge higher prices and produce smaller quantities than if they were subject to competition. International trade can destroy monopolies, as this section shows. Take as the starting point the situation in the left-hand side of Figure 2.2 where a firm is alone in the market. It faces the demand curve D, the fixed marginal cost MC and a marginal revenue curve MR. Production naturally takes place at MR=MC, i.e. the point where the cost of producing one additional item exactly outweighs the revenue gained from that item. The monopoly rent equals the difference between the marginal cost and the price – the profit of each single item – multiplied by the quantity produced, which equals the square marked *a*.

Figure 2.2:
Monopoly destruction through trade



When opening for free trade, i.e. removing barriers to trade such as quotas and tariffs, the monopolist in country A will wish to penetrate the market in country B, and vice versa for the a monopolist producer in country B. If, for, example, there are economies of scale in this type of production the producers can lower their average costs of production. When trade occurs, the market seizes to be a monopoly but is now a duopoly. The price will therefore fall although not as much as if the duopoly had occurred because a new firm was set up domestically, since we assume that there are transportation costs. These costs have the effect of increasing the marginal costs of producing for the foreign market, $MC_{exporter} > MC$.

The price of the product in both countries therefore falls to $P_{\text{with trade}}$, which is, of course, lower than the price without trade, which can be seen in the left-hand panel of the figure. Hence, both countries export to one another in similar quantities, i.e. although there is trade, the net trade is zero. Nevertheless, the openness to trade has generated substantial benefits for both countries as a monopoly has been destroyed.

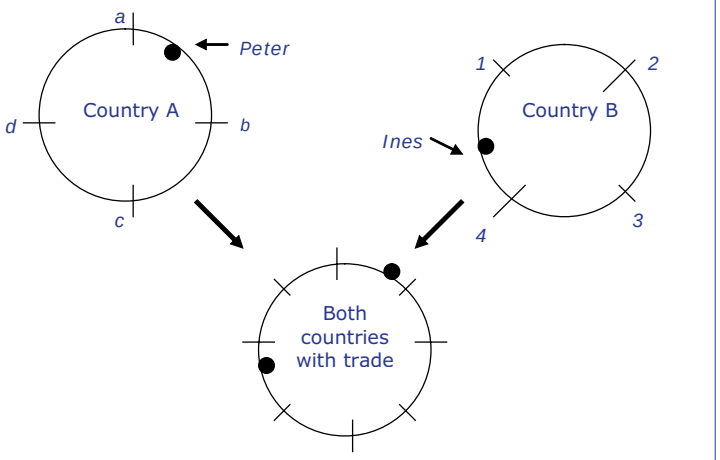
2.3 Trade in differentiated goods

A question often heard in debates on trade and globalization is why we trade so much in what appears to be similar goods? For example, many Danes buy German or Czech beer while many Germans and Russians buy Danish beer. As it appears, Denmark and Germany trade in exactly the same good – beer. The opponents of globalization often characterize this type of trade is unnecessary. However, even if trade takes place in apparently similar goods between apparently similar countries, it can have positive effects.

2.3.1 The Lancaster model

The welfare improving effects of trade can be illustrated by the Lancaster model in Figure 2.3. Imagine that different products can be placed on a *preference circle*, where people are situated. Country A produces four products, a, b, c and d while country B produces four other products, 1, 2, 3 and 4. These products can, for example, be soft drinks such as Coca Cola, Fanta, Pepsi Cola, etc. These products do not differ in quality, only in their taste, i.e. we say that they are *horizontally differentiated*. In country A Peter's preference is situated closest to product a, which he will therefore prefer to buy. In country B, Ines' preferences are closest to product 4, which she consequently will buy. But note that both Peter and Ines would ideally prefer to buy products that were situated exactly at their preference point, illustrated by the dots on the circles. Hence, the closer they can come to their true preferences the higher utility do they gain from buying the products.

Figure 2.3:
The Lancaster model

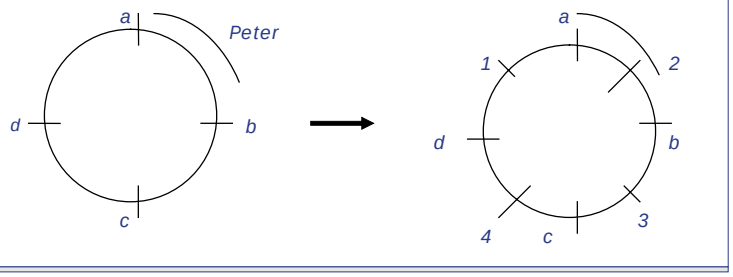


If we now open up for trade between the countries, Peter and Ines will both stop buying products a and 4. Instead, Peter will buy product 2, which is produced in country B and is thus an imported product. Ines will start buying product d, which is produced in country A and thus also an import. Both will be able to move closer to their true preferences because the supply of soft drinks has become more varied. The Lancaster model therefore makes a strong case for the welfare improving effects of trade in *similar* goods between *similar* countries.

2.3.2 The Dixit-Stiglitz model

A slightly different story is told by the Dixit-Stiglitz model of trade in similar goods, illustrated in Figure 2.4. Imagine now that Peter likes beer. Without trade, he can buy four products, a, b, c and d. He obviously prefers product a – which for example could be a Carlsberg - but would ideally like to be able to shift between products situated along the line going from the point a and downwards to the right. If we again open up to trade, Peter will be able to buy four new foreign types of beer. As his preferences are situated along the line segment, he will obviously still not buy product 4. But Peter will now be able to shift between buying a, the Carlsberg beer, and product 2, which might be a German Weissbier. He will therefore have become happier, not because he can come closer to his true preference, but because he will have the choice between a larger variety of beers that he like. Again, trade in similar goods between similar countries is welfare improving.

Figure 2.4:
The Dixit-Stiglitz model

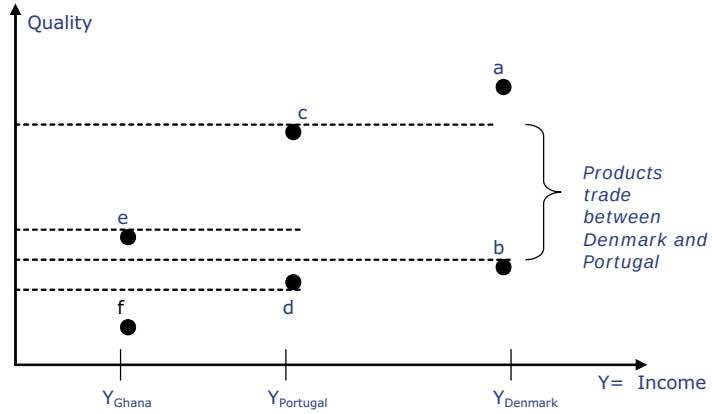


2.3.3 Similar goods with quality-differences

Finally, although traded goods may appear similar they need not be of the same quality. For example, consumers in a number of relatively poor countries buy cars that very few consumers in rich countries would prefer. We say that these goods are *vertically differentiated*. The model takes as its starting point that no product will be made in a country where no-one will buy that product. In other words, firms will only export products that they can also sell at home.

In general, when people get richer they demand higher-quality goods. This is illustrated in Figure 2.5 where the income in Denmark is distributed between the point a (the richest) and b (the poorest). Likewise, the Portuguese income is distributed between c and, and the Ghanaian income is distributed between e and f. The point of the figure is, that the lowest quality that the poorest Danes will be willing to buy is determined by the point b. As the poorest Portuguese are poorer than the poorest Danes, they will be willing to buy lower-quality goods at the point d.

Figure 2.5:
Trade with quality differences



Hence, products of a quality below the point b will not be imported to Denmark. And as the richest people in Ghana will be willing to buy goods of quality e, which is not very high compared to Danish standards, only a small part of the Danish population will be willing to buy Ghanaian products. More precisely, only Danes with an income between the points b and e will buy products made in Ghana. On the other hand, Danes with an income between b and c will be willing to buy Portuguese products.

The implication of this model is that countries will trade in goods with a quality that can be sold in both countries. This is the case for very few products in the case of Denmark and Ghana; hence the trade between Ghana and Denmark will be small. Conversely, many products can be sold in both Denmark and Portugal so the Danish-Portuguese trade will be big. One important consequence of this model should be noted here: when there are quality differences between goods, countries will trade more the more similar they are! This is contrary to the conclusions coming out of the standard theories of comparative advantages, which say that countries that are very dissimilar should trade more. The quality-difference model therefore complements models relying on comparative advantages by providing an explanation for why similar countries sometimes are found to trade much with each other.

2.4 Summary

A number of factors can lead to a substantial amount of trade between apparently similar countries. Differences in consumers' preferences can make trade welfare improving, even among similar countries, as can quality differences. Finally, research and development can generate products that are traded as producers in foreign countries for some time cannot produce the new products.

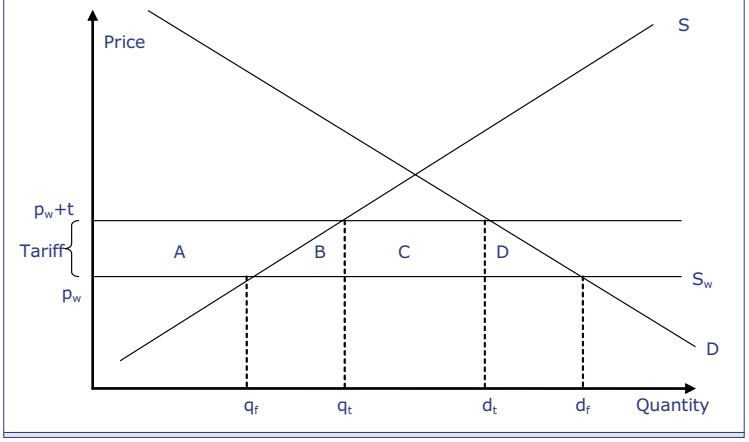
3. Trade Policy

As we have seen in the previous chapter, free trade is beneficial for the vast majority of countries. Most countries nevertheless restrict trade in various ways. This chapter outlines the most often used instruments of trade policy, i.e. the ways in which countries can erect barriers to trade. The following subsections explain the workings of tariffs, import quotas, tariff rate quotas, export subsidies, non-tariff barriers such as standards, and also contain two special cases where some form of protection against international competition might be the optimal choice.

3.1 Tariffs

Tariff protection is the one of the most used way of erecting barriers to international. A tariff is a price any importer has to pay for his product to enter the country. This raises the price of his product in the recipient country and therefore creates an advantage to domestic producers who do not have to pay the tariff. The economic effects can be shown in a simple supply and demand diagram as in Figure 3.1. We assume that the country in question is small, such that domestic producers cannot affect the world market price, p_w.

Figure 3.1:
The effects of a tariff



In the figure, the world price is p_w. The horizontal line S_w thus represents world supply, which in this figure is flat because domestic producers are too small to affect the world price. The supply from domestic producers is denoted S and the demand from domestic consumers is D. If the country was entirely closed to trade, the equilibrium price and output would be determined where D and S intersect. With free trade, i.e. without tariffs, the domestic producers have to take the world market price, which means that equilibrium domestic supply is at q_f, domestic demand is at d_f and the price equals the world market price. The import volume is therefore the difference between demand and supply d_f - q_f.

Imagine now that the government imposes a tariff t on imports. Domestic producers can now take the price p_w+t before they are subject to international competition, which means that their supply is expanded to q_t and the price that domestic consumers pay is increased to p_t. Imports decrease to $d_t – q_t$. This first of all means that producers gain area A since they now produce more and receive a higher price; the government gains the area C, which is the import volume multiplied by the tariff, i.e. the government's tariff revenue. Consumers, on the other hand, pay A+B+C+D, as they pay higher prices and buy less. The total welfare loss to society is therefore consumers' loss minus the gain to producers and government, i.e. the total loss is the two deadweight losses B and D. The first of these triangular losses, B, arise because society consumes the expensive domestically produce instead of the cheaper foreign products while the last of the losses, D, is a pure consumer loss that is not offset by income in other parts of the economy. Hence, tariff protection induces a loss of total welfare.

It is important to note that tariffs can be imposed in two ways: either as a percentage rate, or a specific duty; sometimes, countries use both at the same time. These duty schemes are often very complicated. For example, when American producers want to export chilled boneless beef products – for example steaks – to the EU, they are subject to paying a 12.8 % tax, as well as a specific duty of 3,034 euro per tonne. If, on the other hand, they are exporting frozen beef, they pay the same percentage tax but only 2,111 euro per tonne. Producers in Botswana, which has a preferential trade agreement with the EU, do not pay the percentage tariff but only the specific duty within a quota of imports. This specific arrangement, known as a tariff rate quota, is a combination of an import tariff and an import quota; we therefore turn to the effects of import quota in the following subsection.

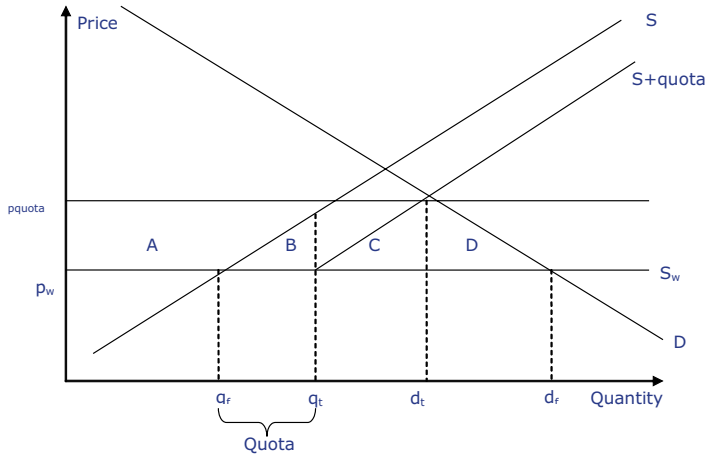
The difference between a percentage tariff and a specific duty comes about when competition changes. At a world market price of about 1000 euro per tonne, exporters in the US pay 303 % of the value of their beef in specific duties, and the total tariff is therefore approximately 316 % (app. 13% + 303%). Imagine now for simplicity that the world market price is reduced by 20% to 800 euro per tonne, which would increase the competition that European producers are subject to since it would mean that someone else in the world have become more efficient. The protection of a percentage tax remains the same – no matter what the world market price is, exporters still pay 12.8 % for beef. However, the protection of the specific duty would now increase, since it is equivalent to a percentage tariff of 3,034 euro divided by 800 euro = 379% instead of 3,034 divided by 1,000 euro = 303%. In relative terms, the protection against foreign competition has hence become stronger. As such, a specific duty is a tariff instrument that becomes stronger the stronger the foreign competition gets.

3.2 Import quotas

In opposition to tariffs, import quotas can be used to achieve a maximum level of imports, as imports here can never exceed the quota. On the other hand, the import volume with tariff protection always depends on the world market price. The effects of introducing an import quota, exemplified in Figure 3.2, are similar to those of a tariff. In the figure, the government decides on imposing a quota Q. The limited supply from efficient foreign competitors result in an equilibrium price p_q, which is higher than the world market price. The only real difference is the area C, called the quota rent, which the government can gain as revenue only if it sells the rights to the quota in an auction; otherwise the area is effectively given as a gift to foreign producers. Hence, if the government either does not sell the quota or for some reason sells it to a low price, the introduction of an import quota results in a larger welfare loss than a tariff.[1] It should be noted that the government, if it has sufficient information about the supply and demand relations in the market, can set the quota so it has the same effect as any tariff.

[1)] It should be noted that the use of import quota has been banned for all members of the World Trade Organization since the Uruguay Round Agreement in 1994. In principle, only countries that are not members of this organization continue to use import quotas.

Figure 3.2:
The effects of an import quota



3.3 Tariff Rate Quota

Tariff rate quotas, TRQ in short, are combinations of tariffs and quotas but in a special sense. As noted above, Botswana pays lower tariffs on beef exports to the EU than the US, but only up to a limit. For the first 19,000 tonnes of beef exported to the EU, only the specific duty is paid, but all exports above that limit have to pay both the specific and the percentage duties. A substantial part of the trade between developed and developing countries are subject to TRQs. The effects of this arrangement are illustrated in Figure 3.3 where $S_{preferential}$ is the supply curve of the countries that are covered by the TRQ. Figure 3.3 illustrates the case where the production in these countries is competitive. However, an often-encountered problem in the real world is that countries do not always fill their quotas, i.e. Botswana may export less than 19,000 tonnes of beef to the EU even when they have a TRQ and the TRQ is thus not binding. This situation is illustrated in Figure 3.4 where the supply curve from the country covered by the preferential agreement, which the TRQ is part of, $S_{preferential}$, intersects with the world market supply including the tariff before the country has filled its TRQ.

Figure 3.3:
The effects of a TRQ

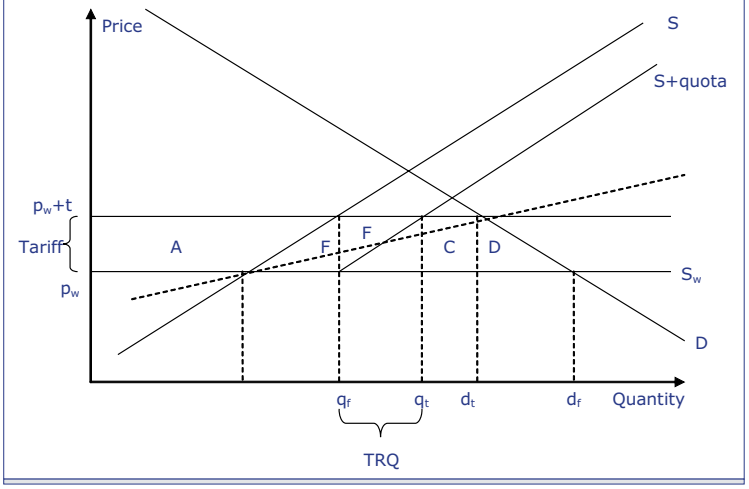
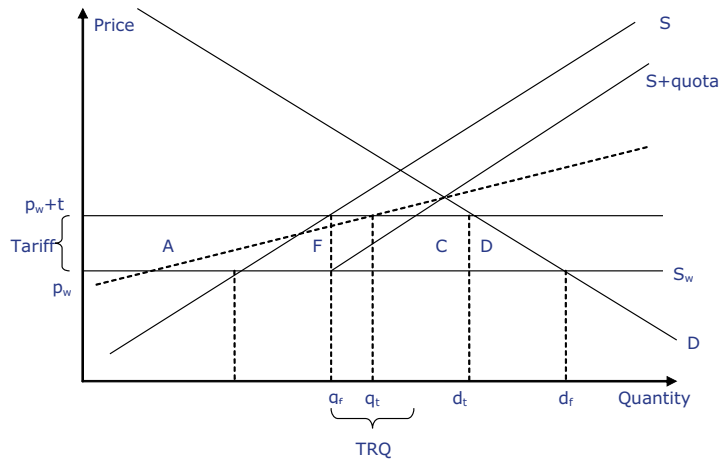


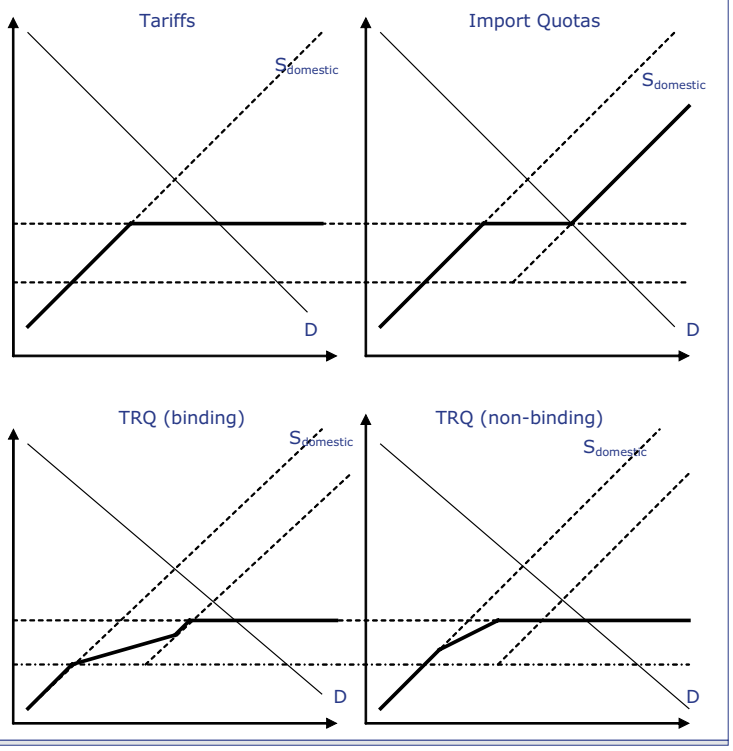
Figure 3.4:
The effects of a non-binding TRQ



The difference between tariffs and TRQs becomes clear when looking at the figures. It is identical to the situation with tariffs in Figure 3.1 with the exception that the tariff is not paid on imports within the TRQ, the difference between q_f and q_t. The area F is therefore a gain to be distributed between the importing and exporting country. If the rights to imports within the TRQ are sold by the government, they appear as government revenue like the area C in figure 3.2. If, on the other hand, they are given to the exporting country, areas F represent a transfer from the importing to the exporting country, which is the reason why many developed countries have endorsed the idea of regulating much of their trade with poor countries through TRQs. When the quota rent in area F goes to the developing country, it should be noted that this area is a transfer that works as an indirect form of development aid (See chapter 7).

It should be noted that the market conditions for each of the three cases can also be illustrated by drawing the *effective supply curves* that consumers face. This is done in Figure 3.5 below. The situation with an import tariff is illustrated in the upper left-hand panel. Consumers face the supply of domestic producers, $S_{domestic}$, until the supply curve intersects with the supply of foreign firms plus the value of the tariff, which gives a horizontal supply from abroad. The effective supply faced by consumers is therefore the solid line with a kink where the domestic supply curve meets the international supply. In the upper right-hand side panel, the situation is basically the same, because the quota defines the price that the domestic firms take for the product, denoted p_{quota} in Figure 3.2. Finally, the slightly more complicated situation with a filled TRQ is illustrated in the lower left-hand side panel. To trace the supply curve, one needs to combine the two scenarios above. The lower right-hand side panel depicts the case with a non-binding TRQ.

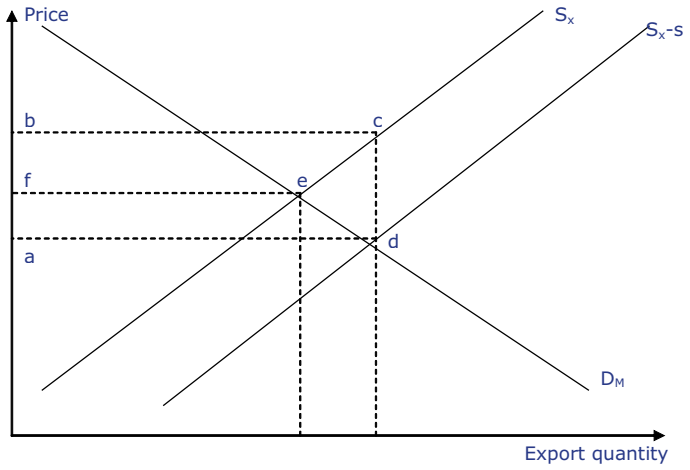
Figure 3.5:
Effective supply curves under different trade barriers



3.4 Export subsidies

Following the example above, European producers might also want to export beef to the US. In that case, the EU uses another instrument of trade policy: an export subsidy. For each tonne of chilled beef exported, the producer receives a large refund, implying that European producers can take a lower price for their goods and still make a profit. However, as the export subsidies are given by the government, consumers eventually have to bear the cost as their taxes need to be increased to cover the increased government expenditure. The effect of this type of arrangement is shown in Figure 3.6. The right-hand side of the figure depicts the market for imports to the large country. D^M is demand for the imported good and S^X is the supply of foreign produce.

Figure 3.6:
The effects of an export subsidy



The subsidy makes it possible for producers to take a lower price while remaining competitive, since the export subsidy covers what would otherwise be a profit loss. The export supply curve therefore shifts to the right, which has the effect of lowering the price to p_1. The size of the subsidy is the difference between p_0 and the price p_2 that they would otherwise have wanted to take for this quantity of export goods. The government therefore has to pay this subsidy multiplied by the export volume q_1, which corresponds to the area abcd. The area bcef is the income gain that producers receive, while the area adef is due to the lower market price. This is a transfer from the exporting country that gives the export subsidy, to consumers in the importing country, who enjoy a lower price. Finally, the area def is a deadweight loss that comes about because the less efficient producers in the exporting country take over some of the world's production of the good. In total, world welfare is lowered and the welfare of the exporting country even more so, as it transfers the area adef to the importing country. This is therefore an example of what is known as a 'beggar-thy-self' policy.

3.5 Non-tariff barriers to trade

A final point to before proceeding to the two special cases is that countries also use other, less transparent ways of protecting their producers against international competition. Requiring that products meet certain standards is one of these ways. Standards can be enforced in two ways: Either the producer, the exporting country or the importing country validates that the standard is met – known as a product standard – or the importing country requires that products be produced in a certain way, for example using a certain technology – known as process standards. An example of the first type is when food is tested for hazardous contents. As such, an extra cost is incurred on every item, i.e. this type of standard works the same way as a specific duty except when the importing country bears the cost. If, for example, a test costs 20 euro and 10% of all products are tested, this corresponds to a specific duty of 2 euro per item imported. The trade effects of such standards can therefore be analyzed in Figure 3.1.

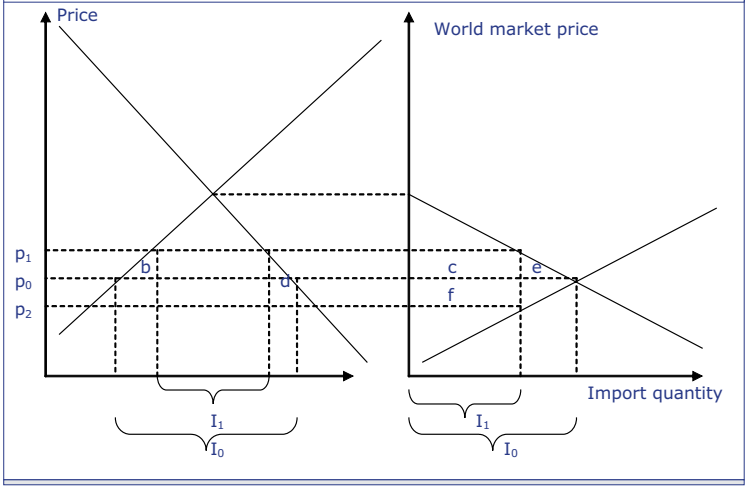
The second type is when an importing country requires that products – for example toys or footballs – are made with an 'environmentally friendly' technology or other specific production processes, which requires producers in the exporting country to undertake an investment in the new technology. In developing countries in particular, poor producers are often unable to undertake such investments, and the standard therefore works to ensure that no imports take place because no products can meet the process standard. To analyze the effects of this type of standard, one must simply know more specifically how production is undertaken in the exporting country and how large the required investments in the new technology are.

3.6 Special case 1: tariff protection in a large country

So far, we have assumed that the country introducing a tariff is small, i.e. that it cannot affect the world market price. Tariff protection might work differently in countries that are large enough to affect this price. This case is illustrated in Figure 3.7, which includes both the domestic market (the left half) and the market for import products in this country (the right half). Starting in the right half, an import tariff is imposed, which restricts the supply of imports. The import volume therefore decreases from I_0 to I_1. Contrary to the situation with a small country, this has an effect on the price to be paid in the receiving country, which increases from p_0 to p_1. In the right-hand side of the figure, it is obvious that the equilibrium world market price corresponding to this import level is not the old price, but p_2. The terms of trade for the large country – the ratio of import prices to export prices – thus changes.

The tariff is therefore $t = p_1-p_2$, i.e. the difference between the price with and without the tariff at this level of imports. It is this difference that generates the additional effects for a large country. The country still suffers the deadweight losses b and d that correspond to the deadweight loss e in the right-hand side of the figure where the government revenue of the tariff is c, which is paid by the consumers. However, as the world market price p_1 now is lower, which generates the additional gain f because import prices now are lower. The total welfare is therefore tariff revenue f minus the deadweight loss e. In the Figure, it is easy to see that with small tariffs, the deadweight loss e can be very small while at large tariffs, it becomes rather large.

Figure 3.7:
The effects of a tariff in a large country

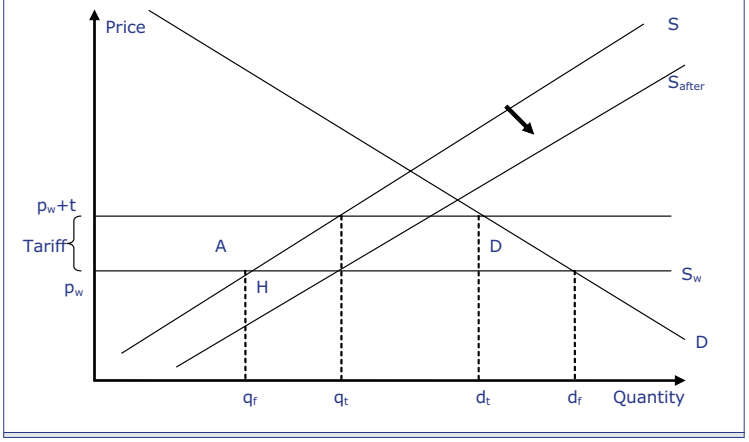


It thus appears that a small import tariff can be optimal for large countries since the welfare gain from improved terms of trade can more than compensate for the deadweight losses. It is nonetheless important to note that while the tariff may lead to increased total welfare, the rest of the world suffers from the tariff. This type of policy is therefore known as a 'beggar-thy-neighbour' policy. An important problem in this respect is, that the rest of the world therefore has an incentive to retaliate by introducing exactly identical policies. This will mean that world trade will be reduced and the gains from international specialization will not be realized. In the larger perspective, the optimal tariff rate for even large countries may therefore well be zero.

3.7 Special case 2: infant industry protection

The last argument that can be used to defend protecting domestic producers against foreign competition is the so-called infant industry argument. The inherent idea is that new industries need protection in a period in which they grow and develop. One of the premises supporting infant industry protection is that industries learn as they grow, which means that they in their first years become more efficient. If they are exposed to foreign competition, new industries and firms may never be large enough to be efficient. The other premise that supports this kind of protection is the existence of economies of scale. If an industry becomes larger, it becomes more cost efficient, meaning that it can sell its products at a lower price. In a start-up period, firms therefore may need protection from international competition before that have achieved economies of scale. Either way, the industry supply curve shifts to the right over time as illustrated in Figure 3.8, which compared to the situation in Figure 3.1 generates an additional gain, H, pertaining to the increased efficiency.

Figure 3.8:
Infant industry protection



Although these theoretical arguments are entirely valid in a narrow perspective, two problems present themselves in real life. Both arise from the fact that when learning and economies of scale are achieved, there is no reason to maintain the tariff. Firstly, it is difficult to ascertain when the full gain H is realized, i.e. that the industry is no longer infant. This is not least because the industry will always have an incentive to argue that this is not the case since they gain the area A due to the tariff. Secondly, it is not always sure that the efficiency gain will take place. Firms have the strongest incentives to work to be more efficient when they are subject to competition, but the tariff protection means that they become more shielded from international competition. The tariff meant to give them time to become efficient may therefore remove their incentives to becoming more efficient.

3.8 Summary

In small countries, there is always a welfare gain associated with reducing or removing barriers to trade, including import barriers and export subsidies. Although there are proper arguments for why large countries might gain a welfare improvement by imposing an import barrier, the same arguments pertain to other large countries that will have an incentive to retaliate. Hence, in the real world the optimum import tariff might be zero, even for large countries. Finally, there are good economic arguments for protecting an infant industry until it has become internationally competitive. However, even for this case there are counterarguments since protection in general weakens the incentives to invest in becoming more competitive.

Section 2:
The movement of production factors

4. The Heckscher-Ohlin model

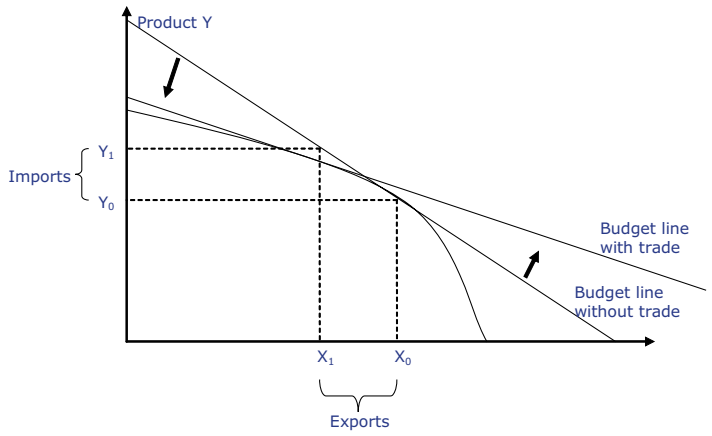
Two Swedish economists, Eli Hecksher and Bertil Ohlin, developed what is now one of the workhorse models in international economics to explain where comparative advantages can come from. The basic assumption in their model is that countries are not equally endowed with different factors of production. Some countries are fertile while others are not – the former are abundantly endowed with good land, some countries, such as India, Brazil or the Czech Republic, have a large and cheap workforce – they are abundantly endowed with cheap labour, and some countries have large and complex production facilities – i.e. they are well endowed with physical capital.

The production of goods all rest on the use of at least two of these factors, which gives rise to comparative advantages because different products require different mixes of production factors. Agricultural production usually needs land and labour to farm the land, and can be undertaken with relatively little capital other than simple tools such as ploughs etc. On the other hand, most modern cars are produced primarily by robots instead of men along the assembly line, i.e. they need a large amount of physical capital. There are thus differences in how *intensively* the production factors are used: agricultural production is *labour-intensive* while cars and most other industrial production is *capital-intensive*.

4.1 Comparative advantages through factor endowments

To illustrate the benefits of specialization in the Heckscher-Ohlin model, first draw the production possibility frontier as in Figure 4.1. This curve shows how much the economy can produce of two goods X and Y with whatever endowments of labour and capital that it has. Factor endowments also determine the relative price between the two goods, as the good that is produced using a scarce factor intensively will be relatively expensive. For example, typical developing countries are abundantly endowed with cheap labour but have comparatively little capital. Products such as cell phones, computers and cars that are produced using a large capital stock will be expensive in closed developing countries, because the low supply of capital will drive the price of capital – the interest rate – up. Conversely, rich countries are often well-endowed with capital but have high wages and therefore comparatively expensive labour. Products that are produced using labour intensively will therefore tend to be expensive. A relevant example of this type of product is agricultural produce, which developed countries often protect behind high tariff barriers. Consequently, the relative price of food is often substantially higher in rich countries than in developing countries.

Figure 4.1:
The benefits of specialization



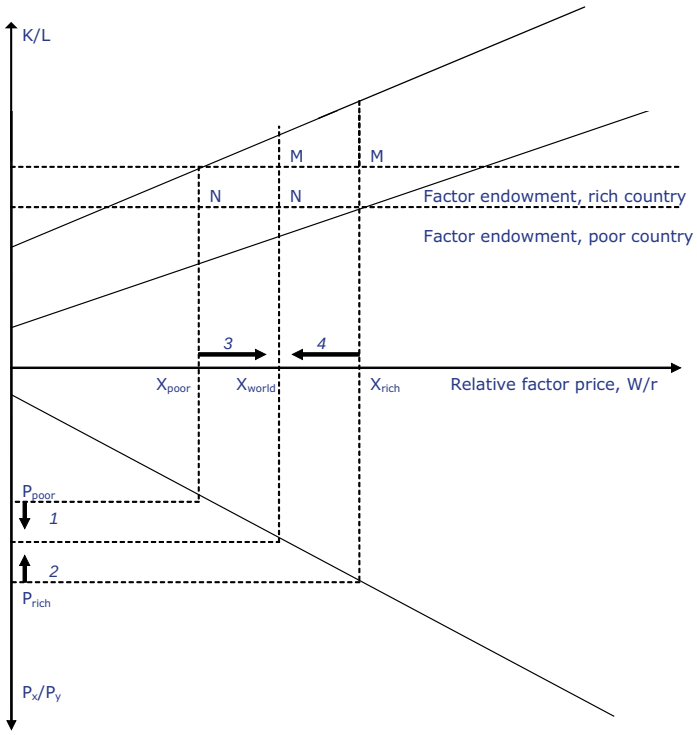
In the figure, a closed economy that does not trade with the rest of the world will produce the quantities X_0 and Y_0 of the goods, as this is where the budget line is tangent to the production possibility frontier. If the economy now opens up to trade, the relative price will have to be equal to that in the world market – otherwise smart business men will discover the profits that can be gained from arbitrage as outlined in Chapter 1. This tilts the budget line as the prices change. Foreign countries will here obviously have a comparative advantage in producing good Y while the country depicted in Figure 4.1 has a comparative advantage in producing X.

But note that when comparative advantages derive from factor endowments there will not be full specialization as in Ricardo's example in Chapter 1. Instead, the production of good X increases, resulting in an export of that product, while the production of good Y decreases, which results in an import of that good. However, note that the consumption of the two goods, X_1 and Y_1, now take place *outside* the production possibility frontier. The country is thus better off because it can specialize partially in the product where the factor endowments allow it to have a comparative advantage. Why the specialization is only partial is explained by the Heckscher-Ohlin model in the following.

4.2 The Heckscher-Ohlin model

When countries open up to trade, they consequently become richer. To see how that depends on their endowments of production factors, see Figure 4.2. Initially, the relative factor prices, W/r, are called X_{poor} for the poor country and X_{rich} for the rich country. In developing countries, labour is typically the abundant factor, which implies a high supply of labour, L, and therefore a low price on labour, the wage W. In developing countries that do not trade with the rest of the world, W/r is therefore often relatively low. Vice versa, the abundant factor in developed countries is capital, K, which means that the relative factor price W/r is high in these countries. In other words, a high capital-labour ratio, K/L; means a high relative factor price. The factor endowments are shown in the two horizontal lines in the figure. When using it, remember that production will necessarily have to take place *on* these lines; otherwise, one of the two factors, capital or labour, is underused. Where exactly on the line production takes place depends, among other things, on the underlying production functions; yet that is not important to the following argument.

Figure 4.2:
Factor price equalization



4.2.1 Factor price equalization

Initially, production takes place at the point N_0 in the poor country and at the point M_0 in the rich country. The corresponding relative prices of the two goods are P_{poor} and P_{rich}. The relative price is the ratio of the labour-intensive good (e.g. food) to the capital-intensive good (e.g. cars). Initially, food is therefore relatively cheaper in the poor country because production of it uses labour – the abundant factor in poor countries – intensively. Labour is the cheap factor and food is therefore logically the cheap product.

When the two countries open up for trade, smart business men will immediately realize the profits to be gained from arbitrage. They will, for example, be able to buy food in the poor country, sell it in the rich country, use the revenue to buy cars in the rich country and sell them with a considerable profit in the poor country. As the demand for food – the labour-intensive good – increases in the poor country and the demand for cars – the capital-intensive good – increases in the rich country, two things happen.

1. The increased demand pushes up the price for food in the poor countries and the price for cars in the rich country. This will bring about an increase in the relative price in the poor country (arrow 1 in Figure 4.2) and a decrease in the relative price in the rich country (arrow 2)

2. When demand for a good increases, so does the production of the good. In case of the labour-intensive good, the demand for labour increases *more* than the demand for capital, thereby leading to an increase in the relative factor price, W/r, which happens in the poor country (arrow 3). Likewise, the demand for capital increases more than the demand for labour in the rich country, which leads the relative factor price to decrease (arrow 4).

Logically, these developments will continue until the arbitrage gains are exhausted, which happens when the relative price of the two goods is equalized. As can be seen in the figure, when the relative prices of the goods are equalized, so are the relative factor prices.

4.2.2 Three theorems associated with factor price equalization

Out of this model come three extremely important and influential theorems.

- *The Heckscher-Ohlin Theorem*: Countries that are capital-abundant will export capital-intensive goods while countries that are labour-abundant will export labour-intensive goods. Each country exports goods that it produces relatively better than other countries.
- *The Factor Price Equalization Theorem*: When two countries open up for trade, the relative prices of the factors of production will become equal.
- *The Stolper-Samuelson Theorem*: the price of the input factor that is used intensively in the production of the good, whose price increases, will increase.

In other words, referring back to Figure 4.2, the Factor Price Equalization Theorem states that openness to trade will result in the relative factor price being X_{world} in both countries. The Stolper-Samuelson Theorem states that the relative price, W/r, will increase in the poor country because the demand for the labour-intensive good increases and the demand for labour therefore also increases (arrow 3). The Stolper-Samuelson Theorem likewise states that the relative price will decrease in the rich country, as the demand for capital increases due to an increased global demand for capital-intensive goods (arrow 4). The Heckscher-Ohlin Theorem, on the other hand, comes straight out of Figure 4.1. However, even very good economists sometimes get this theorem wrong! It is important to note that what is equalized is the *relative* factor price, which in the simple Heckscher-Ohlin set-up is the ratio of wages W to the interest rate, r (the 'wage' paid to capital owners). There is nothing in the model that suggests that the *absolute* prices will be equalized.

4.2.3 A potential disclaimer

A final point to note is that economists often find that the model is not necessarily a good explanation of why some countries trade with in certain goods. The Heckscher-Ohlin model assumes that all labour is equal. It is easy to realize that this is not true since some people are more productive than others. Instead of simple labour, a more reasonable assumption is that all *effective* labour is equal. Hence, the wage W is the one received by one unit of effective labour, L. One unit of labour per se will therefore receive the wage W divided by its effectiveness; or in other words, workers will be paid according to their productiveness. Therefore, it is also necessary to adjust the Heckscher-Ohlin model accordingly, so the ratio of W/r – the relative factor price, is really the ratio of the effective wage to the interest rate. A standard way of adjusting for this is to take into account the vastly different levels of education that exist across countries, since education increases the productivity of labour. Once this is taken into account, the Heckscher-Ohlin model provides a very satisfactory explanation of trade between countries with dissimilar characteristics.

4.3 Summary

The Heckscher-Ohlin model explains comparative advantages with the relative endowment of different factors of production, typically labour and capital. It states that countries will export products that are produced using the factor intensively with which the country is relatively abundantly endowed. Through free trade, the relative factor prices as well as the relative goods prices will be equalized. Nevertheless, it is important to take into account that not all labour is equally productive. We therefore need to supplement the standard model with factors such as education.

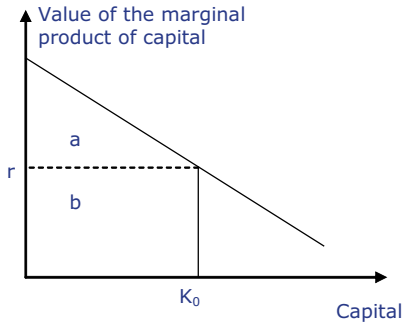
5. Free capital movements and foreign direct investments

The previous chapters have illustrated the overall welfare benefits of free trade in goods and services, i.e. of allowing goods to flow freely between countries. This chapter illustrates the benefits of allowing *capital* to flow freely to whatever country offers the highest returns to that capital. In other words, it traces the effects of what is known as *foreign direct investments* that are investments in production in foreign countries.

5.1 Basics of capital mobility

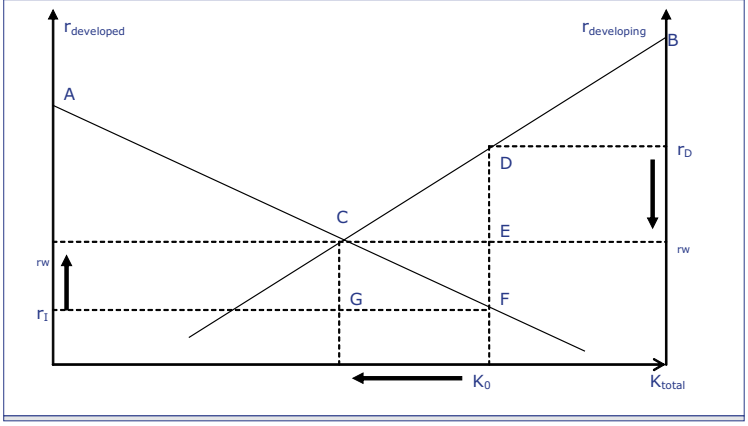
Figure 5.1 first of all illustrates the neoclassical theory of marginal productivity of capital. As there are decreasing returns to scale in any input factor, the value of the marginal product of capital must be decreasing, illustrated by the negative slope of the line in the figure. For any given interest rate, there is an equilibrium level of capital, K_0, for which the marginal product equals the interest rate. There is no idea in investing in capital beyond this point, as money in the bank – that receive the interest rate r, will be more profitable than capital above K_0. The owners of the capital will therefore receive the area b, which is equal to the interest rate, r, multiplied by the size of the capital stock, K_0. Necessarily, the rest of the revenue, the area a, befall the workforce as wages.

Figure 5.1:
The distribution of revenue



Relying on this very basic illustration, one of the ways that the benefits of capital mobility can be illustrated is Figure 5.2, where the interest rate of the developed (industrialized) country, r_I, is on the left-hand side axis and that of the developing country, r_D, is on the right-hand side axis. Initially, the interest rate is much lower in the developing country due to its much lower supply of capital. For simplicity, assume that the total capital stock of the world is fixed at K_{total}.

Figure 5.2:
Illustrating the benefits of capital mobility



Following the reasoning in Figure 5.1, the capital stock in the developed country is K_0 while the capital stock in the developing country is K_{total}-K_0. if we now allow capital to flow freely across country borders to wherever it receives the highest interest rate, some of the capital stock of the developed country will flow to the developing country where the interest rate is higher. This development will continue until the interest rates of the two countries are equalized at a common world interest rate, r_w. At that point, the developed country will have a capital stock of K_1 and the developing country will have the remaining capital stock, K_{total}-K_1. This development will first and foremost have distributional effects.

Capital owners in the developed country will have a smaller capital stock, but make a higher profit since the interest rate has increased. They will therefore tend to support that the developed country allows free capital movements. On the other hand, the triangle pertaining to workers, which was AFr_I before capital was made freely mobile, has decreased to the smaller area ACr_w. Labour unions in developed countries will accordingly tend to oppose free capital mobility.

The opposite thing happens in the developing country. Here, capital owners will face a lower interest rate and hence lower profits, which will make them oppose free capital mobility. On the other hand, workers in the developing country now gain the area BCr_w, which is larger than their previous wage income. Labour unions in developing countries will thus tend to support free capital mobility.

In total, however, the world is better off. The developed country losses the area K_0K_1CF when capital flees the country while the developing country will gain K_0K_1CD. It is therefore easy to see that the triangle CDF represents a global welfare gain due to capital flowing to wherever it earns higher returns. But whether that gain is actually realized depends on which groups have the most political power in the two countries.

Figure 5.3:
Benefits of capital mobility with risk

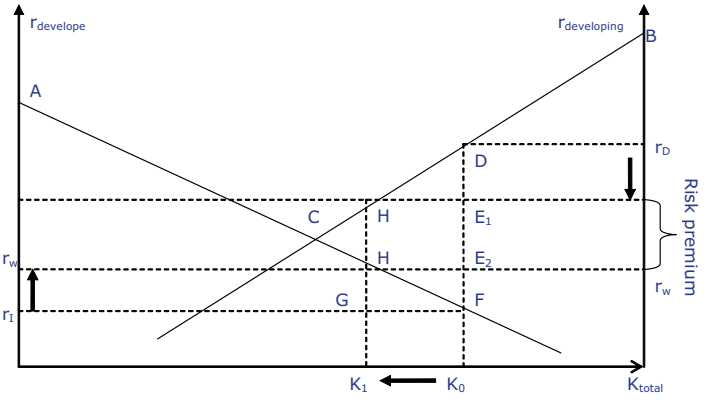


Figure 5.3 illustrates how risks can limit the benefits from allowing free capital mobility. If, as it has historically been the case in a number of developing countries, there is a risk of the government expropriating successful foreign firms, any investment comes with a risk that has to be incorporated in the decision whether to set up production in a foreign country or not. Another risk is associated with the exchange rate (see chapter 7 for exchange rate theory). If, for example, a firm chooses to invest in a foreign country, it will typically have to wait for a period of time before realizing the returns to its investment. In the meantime, the exchange rate between the currencies of the domestic and foreign countries may have changed, which also has to be included in the decision. What we arrive at is known as *the Fischer equation*.

$$r = r_w + rp + \Delta E$$

Here, rp is the risk premium, for example the probability that something will go wrong and the investment will be wasted, and ΔE is the expected change of the exchange rate, E. The last term is therefore the expected currency loss. If an investment in a foreign country yields a return higher than r, it will be worth undertaking. Hence, firms will invest until the Fischer equation is satisfied, which gives us the equilibrium in Figure 5.3. In the figure, it is also clear to see when comparing to Figure 5.2, that the gains from having freely mobile capital are limited by risk premia. Instead if realizing the full area CDF – the global welfare benefit – the gains are limited to the area H_2H_1DF. The loss associated with risk premia is therefore the 'missing' area, CH_1H_2.

5.2 Incentives for firms to invest in foreign countries

Another question is why firms invest in foreign countries instead of simply exporting to them, as every firm has two options if it wishes to sell its products in a foreign country: export the products or set up a production facility within the country. The list below outlines a set of important factors influencing the decision to either export or set up production in a foreign country.

5.2.1 Conditions for investing abroad

According to Dunning's so-called *eclectic paradigm*, three conditions are necessary but not sufficient for a firm to set up production in a foreign country:

1. The firm must have a set of *core competences*, i.e. the company must have ownership of specific factors that can be used internationally. International experience is often one of the central competences of firms that operate and produce internationally.

2. There must be l*ocation advantages* associated with moving production to a foreign country. One of the most frequently mentioned advantages is low wages but other location advantages include access to specific skills, and more easy access to information on local markets, such as the preferences of the population in that country. In addition, for example, Danish companies moving production to Malaysia will have relatively easy access to the South East Asian markets by exporting from Malaysia instead of transporting products halfway around the globe from production facilities in Denmark. In the same way, foreign direct investments are sometimes made in order to get around tariff barriers that make it too expensive to export.

3. There must be *internalization advantages*. Otherwise, it would probably be cheaper for the firm to outsource production to foreign firms instead of keeping production within the firm.

5.2.2 The Markusen model

To analyze these questions further, James Markusen's 1998 model (listed as further reading) operates with two types of labour: skilled and unskilled. It can easily be connected to e.g. the Heckscher-Ohlin model by noting that skilled labour is necessary in most capital-intensive types of production. The two types of labour are used to produce two goods, X and Y. Figure 5.4 assumes that trade costs are high, compared to production costs. As well as having two types of labour, there are two types of firms in both countries, country H (Home) and country F (Foreign).

- The production of Y takes place using a *constant returns to scale* technology and is intensive in unskilled labour. The market for good Y is characterized by perfect competition. This good can be thought of as relatively simple production such as steel.
- The production of X takes place using an *increasing returns to scale* technology and is intensive in skilled labour. The market for good X is characterized by imperfect competition. This good can therefore be thought of as cars.

Firms both have production facilities and a headquarter. Production facilities can be situated in one or both countries. There are six firm types:

1. Type *MH*: Firms producing the same good in more than one country, i.e. they are characterized by having horizontal production. Headquarters are situated in the home country, H.
2. Type *MF*: Firms producing the same good in more than one country, i.e. they are characterized by having horizontal production. Headquarters are situated in the foreign country, F.
3. Type *NH*: Firms producing a good in only one country. Headquarters are situated in the home H. These firms may or may not export to country F.

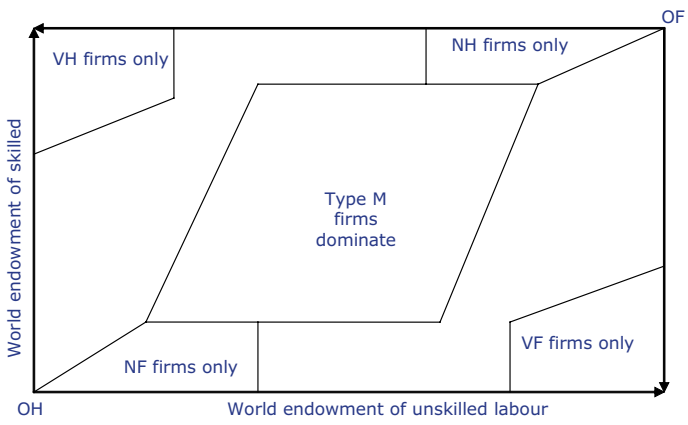
4. Type *NF*: Firms producing a good in only one country. Headquarters are situated in the home F. These firms may or may not export to country H.

5. Type *VH*: Firms producing one good in one country and another good in another country. Headquarters are situated in the home country, H. These firms may or may not export to country F.

6. Type *VF*: Firms producing one good in one country and another good in another country. Headquarters are situated in the home country, F. These firms may or may not export to country H.

When there are either substantial costs of transporting goods and/or substantial barriers to trade, firms will choose to operate as illustrated in Figure 5.4.

Figure 5.4:
Where would firms choose to operate?



Source of figure: Markusen (1998)

Starting in the lower left side of the figure, this is the situation characterized by the home country, H, having only a small share of both unskilled and skilled labour – i.e. it is a small country. Hence, the production of goods takes place primarily in type *NF* firms, that is, in firms producing and having their headquarters in the large foreign country, F. The opposite situation is depicted in the upper right corner of the figure, where it is the foreign country that is small and the home country that is large. Likewise, firms of type *NH* dominate in this situation. These outcomes are not surprising: after all, most production will take place in the larger country since it has the larger market.

In the upper left corner, another situation is depicted. Here, the home country, H, has a relatively large share of the skilled labour in the world and a relatively small share of unskilled labour. Vice versa, the foreign country, F, has a relatively small share of the skilled labour in the world and a relatively large share of unskilled labour. Hence, this situation corresponds to having a developed country – rich in skilled labour – and a developing country – rich in unskilled labour. The countries hence have different comparative advantages (see Chapter 1). The developed country H has a comparative advantage in producing good X (cars) while the developing country F has a comparative advantage in producing good Y (steel). Firms producing both will therefore integrate their production vertically, having production facilities in country F make steel, which is transported to country H and used in producing cars. The situation in the lower right corner is simply a mirror image of this situation with country F the developed country and country H the developing country.

In the middle of the figure, the two countries are fairly similar with respect to their factor endowments. Given that there are either substantial barriers or costs to trade, this situation implies that type M firms will dominate as firms will have a strong incentive to produce the same goods in both countries to overcome the barriers to trade while they do not have an incentive to integrate vertically since there are no real differences in factor endowments and hence no real differences in comparative advantages between the countries.

5.5 Summary

Capital mobility can – just like free trade in goods and services – give rise to considerable welfare gains for society. Risks associated with e.g. political intervention can reduce the gains from letting capital flow freely. Finally, individual firms may or may not choose to set up production in foreign countries, depending on their core competences, location advantages and internalization advantages, and the recipient countries' comparative advantages.

Further readings:

Dunning, John H. 1988. *Explaining International Production*. London: McMillan.

Markusen, James R. 1998. Multinational Firms, Location and Trade. *World Economy*, vol. 21, pp. 733-756.

6. The two-gap model of foreign aid

A much-discussed element of globalization that is often left out of standard textbooks and lectures is that of foreign aid. When international organizations and donors calculate how much aid is needed to reach some goal, they almost always rely on some version of what has become known as *the two-gap model*. When, for example, the United Nations Development Programs assesses that to reach the United Nations' Millennium Development Goals a doubling of the current foreign aid is needed, this calculation comes out as a result of a model that in its essence is similar to the one outlined in the following. It must be stressed that this model, even though it is still used by some of the world's most renowned agencies, is wrong. This chapter therefore also briefly outlines what is wrong with the model and what other things can (and do) go wrong when foreign aid is given to developing countries.

6.1 The model

To understand the two-gap model, we need a little math. The model can be expressed very simply in the following way. First of all, economic growth g is led by the share of income devoted to investments, I/Y:

$$g = \frac{1}{\mu}\frac{I}{Y}$$

The coefficient μ is the ICOR, the incremental capital-output ratio, which is defined as K/Y or in other words, how productive capital is. Investments can come from two sources, either being financed by savings, S, or flowing in from abroad. In the latter case, they have to be paid for in foreign currency, which means that they become financed through the balance of payments surplus, exports E minus imports, M. Therefore, investments are given by:

$$I = S + E - M$$

Growth g, which in the simple two-gap model is driven entirely by investments, can therefore be expressed in the following way when one combines the terms above:

$$g = \frac{1}{\mu}\frac{S+E-M}{Y} = \frac{1}{\mu}[s+e-m]$$

Where minor case letters denote the ratio of savings to income, s=S/Y etc. Now imagine that there is some growth target g_{target} which is above the current growth given by g. The growth target obviously corresponds to an investment target, i_{target}. Having 'too slow' growth logically means that there is an *investment gap*, that can only be filled by transfers from abroad. This first of the two gaps in the model is therefore filled by foreign aid. How much aid as a percentage of GDP is needed to fill the gap, i.e. to reach the growth target, can be calculated as follows:

$$g_{target} - g = \frac{1}{\mu}\left[i_{target} - i\right] = \left[s + e - m + AID\right] \Leftrightarrow$$
$$AID = \mu\left[g_{target} - g\right] - \left[\tilde{s} - s\right] - \left[\tilde{e} - e - \tilde{m} + m\right]$$

This amount of aid fills the investment gap and therefore allows the country to reach its growth target in the two-gap model. Here, it is also obvious where the investment gap comes from: either it is a result of a *savings gap* (the middle bracket) or it is a result of a shortcoming of the balance of payments, a *balance of payments gap* (the last bracket). Both these gaps serve to reduce investments, leading to the first type of problem in the two-gap model, that of *investment-limited growth.* One of the other recommendations coming out of the two-gap model is therefore to conduct public policies that increase savings, s, and improve the balance of payments, e-m.

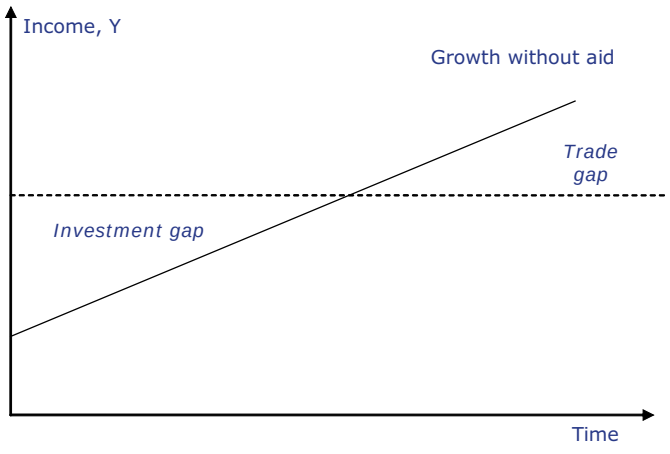
The second gap can also come from a further assumption of the model. The model assumes that a certain amount of raw materials are used in all production. All income therefore has β a share of raw materials in it that need to be imported, M_{raw}. Hence, income can be written as.

$$Y = ß\ M_{raw}$$

Likewise, imports can be written as the sum of imported raw materials, M_{raw}, and imported capital goods that are needed in all investments, $M_{capital}$, so $M= M_{raw} + M_{capital}$. From this relation comes the second gap of the two-gap model, which is a *trade gap*: the economy cannot at the same time invest enough raw materials to sustain the current level of production and invest enough capital goods to sustain the level of investments that leads to the desired growth target. The second problem that can arise in the two-gap model is consequently that of *trade-limited growth*.

Hence, a developing country might – in the logic of the two-gap model – either 1) import raw materials to fuel production and thereby not import enough capital goods to fuel investments, which slows down growth, or 2) import enough capital goods to fuel investments and thereby get into a situation where the production is limited by an insufficient import of raw materials! In this situation, the economy hits one of the two gaps. Within the logic of the model, these gaps can only be closed by foreign aid, as illustrated in a very simple way in Figure 6.1.

Figure 6.1:
The two-gap model



How to use the two-gap model

The two-gap model is used to calculate 'how much' foreign aid is needed to reach some development goal. The simple example in the following shows how to calculate the aid needed to reach a target growth rate. Imagine that the ministry of finance in Zambia in 1970 wanted to calculate how much aid would be needed for the country to reach a status as a middle-income country, which would correspond to the present (2005) level of income in countries such as Lithuania or Botswana. It is easy to calculate that starting from the Zambian per capita income in 1970 of 1335 US dollars (in purchasing power parities), the country would have to grow about 6% per year. With an ICOR around 3.5 – the usual assumption in these models – and no balance of payments deficit, we can use the equation above to reach how much aid is needed. Firstly, we need to answer how high the investment rate needs to be. With an ICOR, μ, of 3.5, we reach the conclusion that the investment rate has to be 21% for the country to reach its growth target.

$$g = 6\% = \frac{1}{\mu}\frac{I}{Y} = \frac{1}{3.5}i \Leftrightarrow i = 3.5 * 6\% = 21\%$$

Next, savings rates in developing countries are often quite low; hence they cannot finance this level of investments. During the period 1970-2000, the average savings rate of Zambia was approximately 10% of GDP. So, the savings gap is 21%-10%=11% of GDP. In other words, the two-gap model says that with an ICOR of 3.5, a savings rate of 10% and a growth target of 6%, the country simple needs to receive 11% of its GDP in foreign aid during a 30-year period to reach its desired status as a middle income country.

As stressed below, something is seriously wrong with the two-gap model. Zambia's average growth rate in the period 1970-2000 was not 6%, it was -1.3%. As such, the country is actually poorer today than 35 years ago. This negative development has taken place in spite of the country receiving on average 15% of its GDP in foreign aid, which according to the two-gap model would have been more than enough to propel it into the class of middle-income countries.

Data sources: World Development Indicators, 2004; Penn World Tables.

6.2 What is wrong with the two-gap model?

A number of economists have criticized the two-gap model. The critique of the model as such can be summarized in three points:

6.2.1 There are no decreasing returns to scale

One of the standard assumptions in economics is that there are decreasing returns to scale in any factor of production. The two-gap model does not include this assumption as it instead assumes that the returns to investments are constant. Hence, it assumes that μ, the incremental capital-output ratio, is constant, and thus that every bit of capital has the same the same effect no matter how large the capital stock of the country is.

6.2.2 All aid is spent on investments

The two-gap model implicitly assumes that all foreign aid is spent on investments. But, as emphasized in section 6.3, governments and politicians can have strong incentives to spend foreign aid on consumption instead if investments. It thus follows that the more that foreign aid is spent on consumption the less it contributes to economic growth.

6.2.3 There are no opportunities for lending money

The third feature that can be questioned in this model is that the gaps can only be filled by foreign aid. The model thus assumes that developing countries cannot borrow money in the international markets. But, or example, if growth is 10% and the interest rate that has to be paid on the loan is 7% taking out a loan is clearly profitable for the economy. Even within the model, only the fraction of aid that is actually spent on investments will help growth.

That the assumption that developing countries cannot borrow money is wrong is easy to see. Haiti, for example, has an external debt of roughly 1.2 billion US dollars, which corresponds to that each Haitian owes approximately 150 US dollars to foreign banks and agencies. Nicaragua, as another example, has a foreign debt of about 840 US dollars per inhabitant although it has had significant parts of its international debts cancelled more than once. Hence, developing countries can and do borrow very substantial sums of money in the international markets.

6.3 Fungibility

Politicians often stress that we need to give aid to 'good' projects so as to make it work. However, in all but the poorest countries there is the problem of *fungibility*. The expression, of course, comes from the Latin word for a sponge, fungus. As all children know, it does not matter where you put water on a sponge; the water gets distributed evenly through it. So is it with foreign aid.

The problem of fungibility can be illustrated by an example. Say that the Danish development agency DANIDA chooses to support a schooling project in Tanzania. If DANIDA finances the building of new schools and the equipment for those schools, the government of Tanzania can do one of three things: 1) they can leave their expenditures on education unchanged; 2) they can invest more in education, thereby following up on the Danish project; or 3) they can reduce expenditures on education since DANIDA has taken over responsibility for some of the Tanzanian schooling and use the money for other purposes. In other words, whether the Danish aid money *in reality* is financing schooling in Tanzania or some other purpose is entirely decided by the Tanzanian government. Whether foreign aid is given to schooling, building a harbour or some third project does not matter, as everything in the final calculation is equivalent to giving money to the government. How effective aid is in reaching international goals such as poverty reduction, primary education, and clean water therefore also depends on what the government of any developing country wishes to spend its budget on.

6.4 Political responses

In general, it is therefore not obvious if aid is actually used to invest in 'good' things or spent entirely on popular consumption or counterproductive projects. A similar problem can occur when foreign aid is given as a response to crisis. Politicians can spend the foreign aid to overcome the crisis, but they can alternatively use the money to compensate groups for their losses during the crisis. If they choose the latter option, this can in some circumstances serve to prolong the crisis.

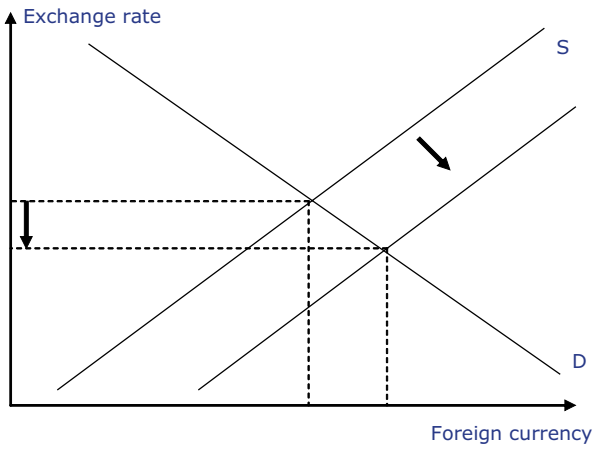
In general, one of the potential problems of foreign aid is that it can lead to a postponement of reforms. This problem was first realized by Peter Bauer, a Hungarian-British economist who at first became very unpopular for claiming that there could be inherent problems with foreign aid, but later has received recognition for his insights.

Consider a simple example. In Chapter 3, we saw that tariffs will benefit domestic producers at the expense of consumers. If consumers can organize, they will tend to put pressure on politicians to remove the tariffs, which will allow the country to trade more and exploit its comparative advantages. If a country with high barriers to trade receives foreign aid, that aid can be used for productive investments, as the two-gap model assumes, but can also be used to compensate consumers for their losses due to the trade barriers. If aid is used for the latter purpose, the political pressure for removing tariff barriers will be alleviated; hence, foreign aid leads politicians to postpone or cancel reductions in tariffs. However, we also know, as is outlined in Chapter 11, that trade leads to faster growth. As such, if politicians choose to use foreign aid to compensate dissatisfied consumers or other groups in society and thereby postpone reforms, the growth rate might suffer from receipts of aid instead of benefit from foreign aid.

6.5 Dutch Disease

Another potential problem with foreign aid is that it by its very nature entails a flow of capital into the developing country. When aid is given to a country, it needs to be converted to the domestic currency to be spent in the country. This implies that the supply of foreign currency increases, which means that the domestic exchange rate *appreciates* as illustrated in Figure 6.2 (see also Chapter 7 on exchange rate theory). In other words, large inflows of foreign aid can imply a worsening of the international competitiveness. Hence, even if aid does good in some parts of the economy, it might decrease the size of the export sector and lead to a balance-of-payments problem since the net export decreases. It is worth noting that such balance of payments problems are sometimes used to justify giving more aid to developing countries.

Figure 6.2:
Dutch Disease



6.6 Summary

In summary, the two-gap model implies that foreign aid will lead to faster economic growth. In reality, however, effect of foreign aid is ambiguous. The model that most international organizations still use to calculate the effect of aid fails to account for the fungibility of aid, its political effects, its effects on international competitiveness, and also fails to incorporate one of the most standard assumptions of economics.

Further readings:

Chenery, Hollis and Alan Strout. 1966. Foreign Assistance and Economic Development. *American Economic Review*, vol. 56, pp. 679-732.

Easterly, William. 2003. Can Foreign Aid Buy Growth? *Journal of Economic Perspectives*, vol. 17, pp. 23-48.

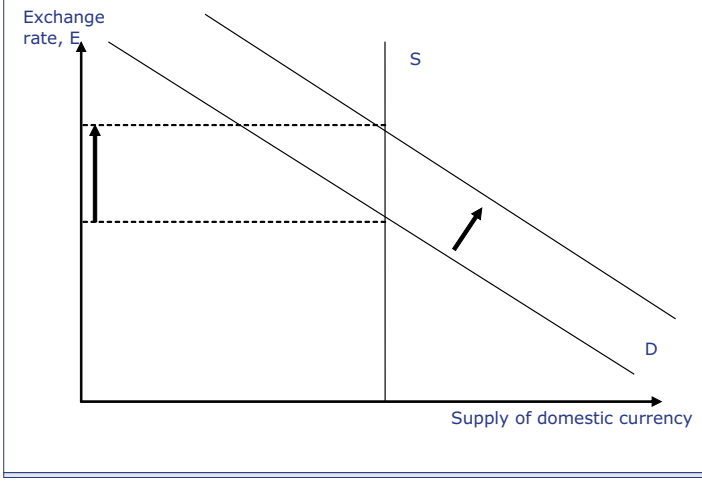
Section 3:
Economic policy in open economies in the short run

7. Simple exchange rate theory

This chapter looks at simple exchange rate theory and what determines the exchange rate, E. As the market for foreign currency is like any other market – the exchange rate is simply the price of buying one unit of the domestic currency - it can be illustrated using simple supply and demand curves. However, there is one caveat as one needs to be careful with what is analyzed: am I drawing the market for *domestic* or *foreign currency*?

Figure 7.1 shows the market for domestic currency in which the central bank decides on the supply. Changing the supply is typically done by *Open Market Operations*, called OMO. If the central bank wishes to limit the money supply, it sells bonds in the open market, thereby drawing money out of the market, and if it wishes to increase the money supply, it buys bonds. In Figure 7.1, the demand for the domestic currency is the demand from foreign economic agents.

Figure 7.1:
Supply and demand for domestic currency



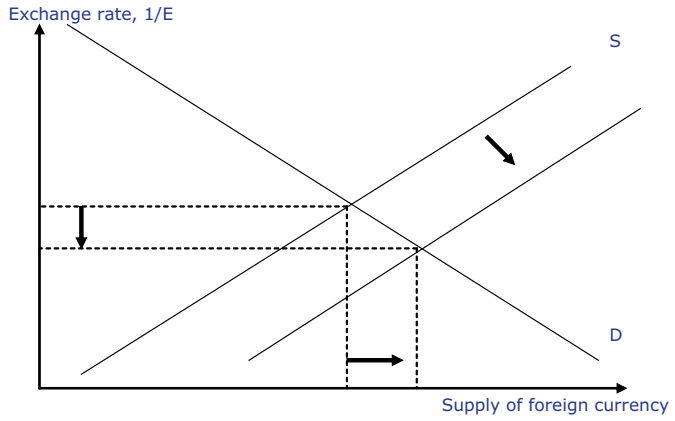
The figure quite clearly shows that the exchange rate E – the price that foreign agents pay for e.g. one Danish Krone or Slovenian Tollar – is determined by the demand for the currency when the central bank has fixed the money supply. If the demand for Kroner goes up, the exchange rate *appreciates*, as shown in the figure. This implies that Danish goods become more expensive abroad. If the demand goes down, the Krone rate *depreciates*. It is important to note that this can also be drawn in a figure showing the exchange rate of the foreign currency, which is simply the reciprocal 1/E of the exchange rate of the domestic currency.

One of the important things to note when it comes to the exchange rate is which kind of *exchange rate regime* the country has chosen. In reality, there is a wide range of different regimes but for simplicity, economists usually only analyze the two extremes: the *fixed* exchange rate regime and the *floating* exchange rate regime.

7.1 Floating exchange rates

The case of floating exchange rate regimes is illustrated in Figure 7.2, which depicts the market for foreign currency – i.e. it provides the alternative illustration to that given in Figure 7.1. The exchange rate shown in Figure 7.2 is therefore the price of the foreign currency, which is 1/E. In the figure, the supply of foreign currency increases. This might happen if domestic goods become comparatively cheap abroad and foreign consumers therefore wish to buy domestically produced goods for which they need the domestic currency. In a floating exchange rate regime, the increased supply of the foreign currency depreciates the foreign currency (1/E) and - vice versa – leads to an appreciation of the domestic currency (E).

Figure 7.2:
The effect increased supply of foreign currency in a floating-rate regime

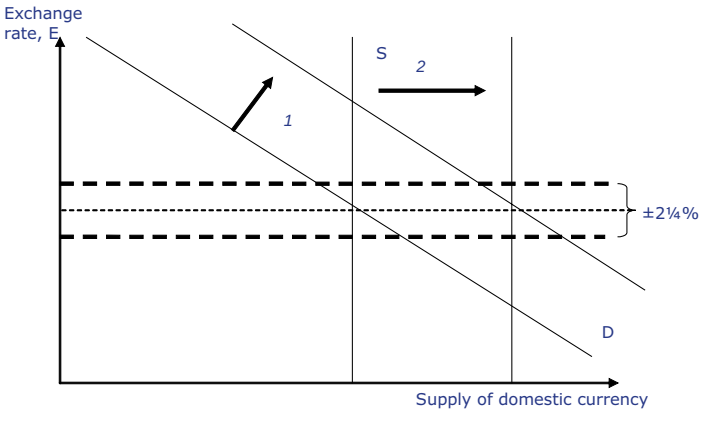


7.2 Fixed exchange rates

Contrary to floating exchange rates, a number of countries have chosen to fix their exchange rates. Typically, this is done by officially stating that the domestic currency will be *pegged* to one of the large currencies such as US dollars or the Euro. A peg means, for example, that the Danish Krone should always have an exchange rate of 7.44 kroner per euro. In reality, the Krone is allowed to float within a band of ±2¼% of the peg, as is illustrated in Figure 7.3.

The specific characteristic in fixed rate regimes is that the monetary policy – the money supply – now comes to have only one purpose: to keep the exchange rate fixed. In other words, economists talk of the monetary supply being *endogenized*, meaning that it is entirely determined by fluctuations in the demand for the currency. The central bank thus does not allow the exchange rate to appreciate or depreciate as would happen if the country had a floating exchange rate (see Figure 7.2).

Figure 7.3:
The response to increase money demand in a fixed-rate regime



If, as in Figure 7.2, the demand for Danish Kroner increases for some reason, for example when Germans become richer and therefore buy more Danish goods (arrow 1), the central bank has to increase the supply of the Danish currency. Otherwise, the exchange rate would appreciate. The central bank therefore increases the supply of Kroner enough to move the equilibrium exchange rate well within the band of 2¼% of the target exchange rate, as delimited by the dotted lines. This is the way that the central bank holds the exchange rate fixed.

7.3 Summary

To summarize this short chapter, the exchange rate is the price of one unit of currency and behaves like any other price. The only difference is that we have to take into account the exchange rate regime chosen by the country: does it have a fixed or floating exchange rate? If the currency floats, we can analyze it as any other price, but if it is fixed, we have to change the supply of money whenever the demand changes so as to make sure that the exchange rate remains the same.

8. Economic Policy in a Small Open Economy – the Short Run

For most of the 20th century, politicians have used economic policy in order to reach certain goals in society, first and foremost the goal of reducing unemployment. Most of these policies can be categorized under two headings: fiscal and monetary policy. During the century, a number of economists developed what is now known as the IS-LM model to analyze these policies in the short run. This model is widely used; hence we will use it in this chapter and the next to outline how to analyze the effects of economic policy in economies that are integrated into the world economy - in short, in *open* economies.

Before turning to the analysis, it is necessary to stress what is meant by the *short run* and a *small* economy. Here, as most places, the short run simply means the 1-2 years period in which prices do not change. As the IS-LM model is a short-run model, it is therefore assumed throughout this chapter that prices and wages are fixed. In the next chapter, we will relax this assumption enabling us to look at the long run. A small economy is defined as a country that is too small to exert any substantial effect on international demand and supply and therefore cannot influence international prices.

8.1 The IS-LM model

The model consists of two equilibrium conditions, represented by two curves, the IS and the LM curve, drawn in a diagram with the national income, Y, on the x-axis and the real interest rate, r, on the y-axis. The IS curve derives from the national accounting identity, which in open economies can be written as follows, where NX is net exports, which is defined as exports minus imports, X-IM:

$$Y = C + I + G - T + NX$$

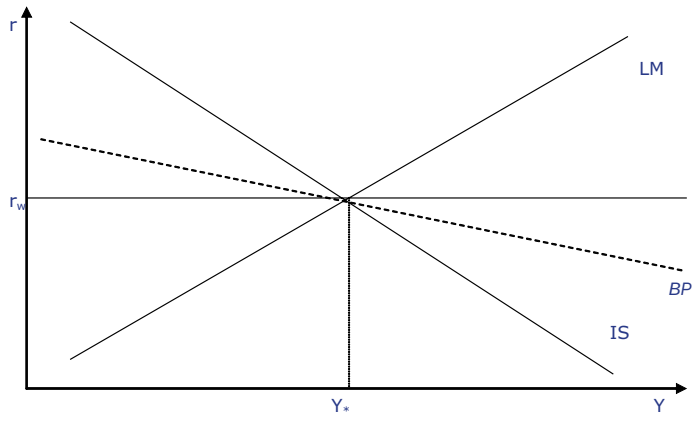
The IS-curve depicts all equilibria in *the market for goods and services*. As investments, I, depend negatively on the interest rate – when the real interest rate is increased, loans become more expensive and investments that need to be financed by loans therefore decrease – the IS curve is downward-sloping in the IS-LM figure. As government expenditures, G, and taxes, T, are part of the IS-relation, this curve is moved whenever the government conducts *fiscal policy*, which by definition consists of altering either G or T.

The LM-curve that depicts equilibria on *the market for loans and savings*, on the other hand, is upwards-sloping. The reason is that when income is increased, people desire to buy more, which by definition increases the demand for money. Since the real interest rate is the price of money – the income foregone when one keeps money in the pocket instead of keeping them in a bank account that pays the interest rate – Y and r are positively related. Hence, when income goes up, the interest rate also goes up due to the increasing money demand, unless the money supply is changed. The LM-relation can be written as below, where L is a function of r capturing the demand for money. Changing the money supply, M, amounts to conducting *monetary policy* while the price level, P, by assumption does not change in the short run. The full IS-LM model is shown in figure 8.1.

$$M / P = Y L(r)$$

The figure also shows a dotted line, which is the Balance-of-Payments line. When the equilibrium (where the IS and LM-curves intersect) moves to the right and upward, the balance of payments is worsened while the opposite happens when the equilibrium point moves to the left and down. The reason for this effect is that when consumers become richer, i.e. when Y increases, they will tend to spend more on luxury goods that are typically produced abroad. The assumption that this always happens – that the income elasticity of imports is larger than the elasticity of exports – is known as the Marshall Lerner condition. Naturally, when the international competitiveness of the economy changes (see below), so does the BP-line; otherwise, the BP-line does not move.

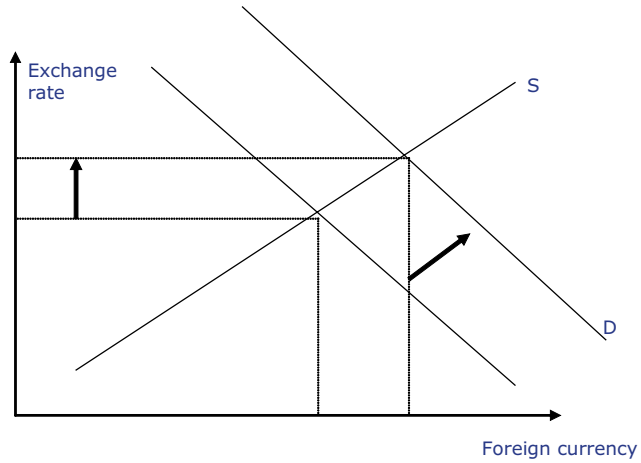
Figure 8.1:



The difference from using the IS-LM model in a closed economy versus and open economy is that the relevant real interest rate is the world interest rate, r_w. The reason that an open economy cannot have a real interest rate (much) different from the world market interest rate is the following.

Imagine that your country for some reason conducts *expansionary* monetary policy. In other words, the government increases the money supply, which leads to a lower interest rate. It now has an interest rate below the world interest rate, meaning that any rational person will move his savings out of the country because the savings will earn a higher interest abroad. In order to move savings, Danes and Slovenians need to convert their Danish Kroner or Slovenian Tollar into for example Euro, which creates a higher demand for foreign currency. The demand for foreign currency in Figure 8.2 therefore goes from D_0 to D_1.

Figure 8.2:



As can easily be seen in the figure, the increased demand for foreign currency will tend to depreciate the exchange rate, i.e. Danish Kroner (or Slovenian Tollar) become less expensive. That also means that Danish (or Slovenian) products have become less expensive in the world market – the countries have become more *internationally competitive* (see Box), which leads to an increase in exports. Conversely, foreign goods have become more expensive and imports therefore decrease. In total, the exchange rate depreciation has led to an increase in net exports, NX. As these effects arise as a result of initial interest rate differences, this is another way to derive the Fischer equation in Chapter 5.

How to measure international competitiveness

International competitiveness is most often measured by the *real exchange rate*, R, defined as:

$$R = E\ P_{foreign} / P$$

Here, E is the nominal exchange rate, $P_{foreign}$ is the foreign price level, and P is the domestic price level. R therefore is a measure of competitiveness since it provides an indicator of how expensive foreign goods are, converted to the domestic currency – the term $E\ P_{foreign}$ – relative to how expensive the domestic goods are, measured by the domestic price level, P. If the exchange rate of the domestic currency depreciates, i.e. that E increases, the competitiveness of the economy is increased because foreign goods have become relatively more expensive. The same happens when the foreign price level goes up while the opposite happens when the domestic price level goes up, as is important to note when moving to analyses of the long run.

Now, go back to Figure 8.1. If we start at an interest rate below r_w, we now know that we get an increased NX. That affects the IS-curve positively, which in the figure will show as the curve moves to the right. This move only stops when the domestic interest rate is equal to r_w. The difference between closed and open economies is therefore that there are effects on the exchange rate that in turn influences the international competitiveness and thus also net exports. An important decision for any country is therefore what *exchange rate regime* to chose: A fixed or a floating exchange rate?

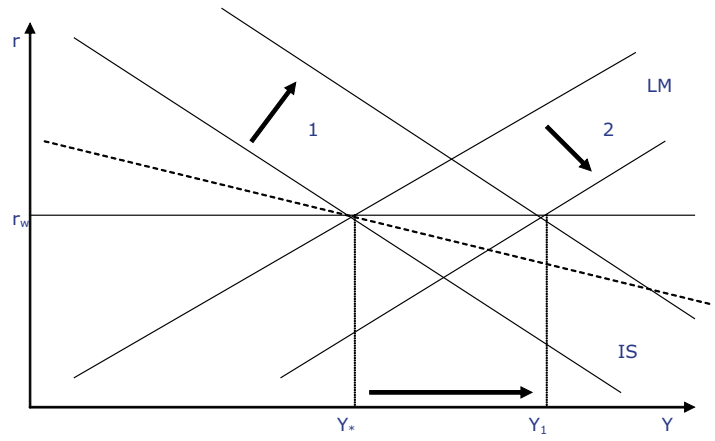
8.2 Fixed or floating exchange rates

One of the reasons for having an interest rate below the world market rate for a very short period of time is that the country has conducted expansionary monetary policy, i.e. moved the LM-curve. As we have seen above, that leads to an exchange rate depreciation, which by definition can only happen if the country has a floating exchange rate. If the country instead, like Denmark, has a fixed exchange rate a depreciation has to be countered. The only way to do so in the short run is by decreasing the money supply, which will move the interest rate upwards. The response in a country with a fixed exchange rate regime to expansionary monetary policy is thus monetary *contraction*. In other words, if a country has chosen having a fixed exchange rate the country has declined the possibility to use monetary policy! In the following, we will see that if a country chooses a floating exchange rate it effectively rules out the use of fiscal policy.

8.3 Fiscal policy in the short run

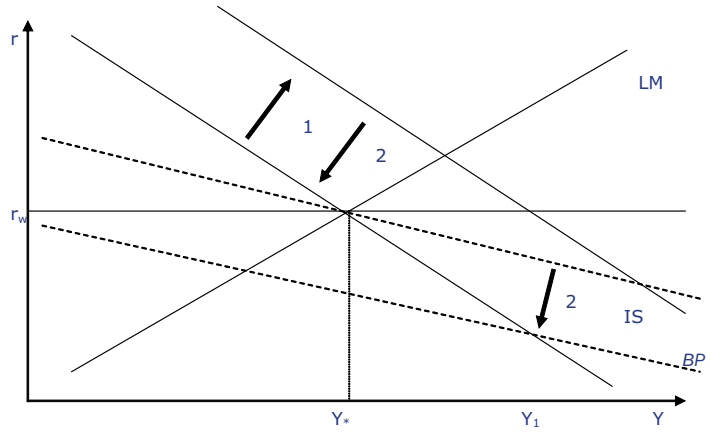
Fiscal policy is conducted by changing government expenditures and revenue, G and T. In Figure 8.4, we conduct expansionary fiscal policy, which many governments have used to encourage economic activity and to fight unemployment. The first thing to happen (arrow 1) is that government increases its expenditures or lowers taxes, which will increase activity in the economy. Since money demand increases, the interest rate will increase. In a fixed exchange rate regime this gives rise to the second effect (arrow 2) where the central bank must intervene by increasing the money supply in order to keep the interest rate equal the world market rate. In total, income has increased to Y_1 and unemployment has therefore decreased. However, since people have become richer the net exports have declined, and the balance of payments have therefore worsened, which can be seen in the figure as the equilibrium is now situated above the BP-line.

Figure 8.4:
Fiscal policy with a fixed exchange rate



If we instead have a floating exchange rate regime, the effects of fiscal policy in the short run are quite different as illustrated in Figure 8.5. Firstly, the government for example increase expenditures, which pushes the interest rate above r_w (arrow 1). This causes an inflow of capital since it is now profitable for foreigners to move the savings to our country where the interest rate is higher than in the world market. To move their savings, people need to buy our currency, i.e. the demand for our currency increases, which leads to an appreciation of the exchange rate. The appreciation means that our goods have become more expensive abroad and that imports have become cheaper. In other words, the net exports and balance of payments decrease, which is what happens in the next step (arrow 2). Incomes have not increased, but the structure of the economy has, as government consumption now takes up a larger part of the income and the export sector has declined. In order to increase unemployment, fiscal policy is therefore ineffective under a floating exchange rate regime.

Figure 8.5:
Fiscal policy with a floating exchange rate

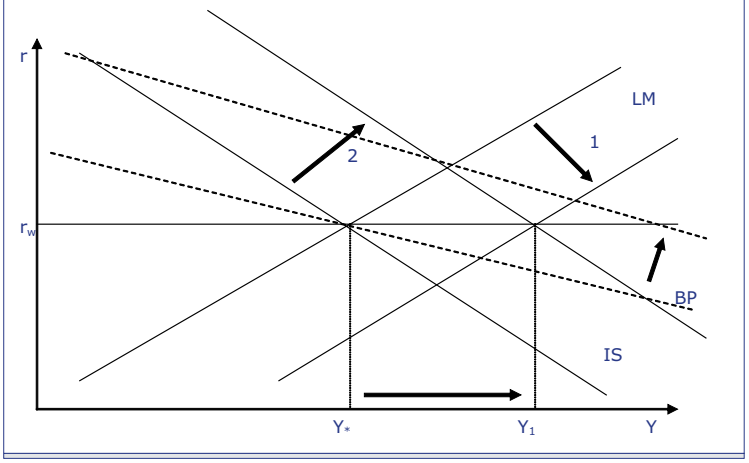


8.4 Monetary policy in the short run

Monetary policy is instead conducted by affecting the money supply, which is usually controlled by the central bank. In real life, the money supply is controlled through the so-called open market operations where the central bank buys or sells bonds and therefore increases money supply (when buying) or decreases money supply (when selling). The effects of conducting monetary policy in a fixed exchange rate regime have already been analyzed above. We say that under a fixed exchange rate regime, the monetary policy is *endogenized*, meaning that its only purpose is to hold the domestic interest rate equal the world market rate at any point in time, so to avoid that the exchange rate is put under pressure. In other words, countries choosing to fix their exchange rate therefore renounce the possibility of using monetary policy.

In a floating exchange rate regime, monetary policy can be used as illustrated in Figure 8.6. The first step, which is done actively by the central bank, is to increase the money supply, M, and thereby move the LM-curve to the right (arrow 1). This has the effect of decreasing the interest rate so it is now below r_w. People will therefore have an incentive to move their savings abroad, for which purpose they need to sell their domestic currency (e.g. kroner) to buy foreign currency. As can easily be seen in figure 8.2, this leads to a depreciation of the domestic exchange rate, which means that domestic products become cheaper abroad and foreign products become more expensive at home. In other words, the depreciation makes the economy more internationally competitive. As the net exports increase, the IS-curve moves to the right until the domestic interest rate $r=r_w$ (arrow 2). Since the net exports increase – exports increase and imports decrease – it also means that the BP-curve moves upwards, i.e. that the balance of payments is bettered (arrow 3).

Figure 8.6:
Monetary policy with a floating exchange rate



8.5 Summary

In summary, this chapter shows how to use the IS-LM model to analyze economic policy in a small open economy in the short run. The important thing to remember is that every movement also affects the exchange rate. Whether the exchange rate can move or not is determined by the exchange rate regime chosen by the country. Moving from a closed to an open economy means that it is impossible to use both fiscal and monetary policy at the same time. In countries with a fixed exchange rate, monetary policy only has one goal – to make sure that the exchange rate stays the same – and can therefore not be used. In countries with a floating exchange rate, fiscal policy has no effect since it leads to an appreciation of the currency, which makes the economy less internationally competitive. Small open economies therefore face a tough choice: to fix their exchange rate and rely only on fiscal policy, or to have the exchange rate float and rely only on monetary policy.

9. Economic Policy in a Large Open Economy – the Short Run

In the preceding chapter, we looked at a small open economy. This chapter extends the analysis to a *large* open economy, defined as a country that is sufficiently large in terms of population and wealth to exert an influence on international prices. Such economies are for example the United States, Japan and the European Union when the union behaves as a 'country'. The analyses are the same as in chapter 8 with two exceptions: 1) most large economies have floating exchange rates, hence we will not look at the special case when a large economy has a fixed exchange rate; and 2) whenever a large economy conducts economic policy, it has spill-over effects on the rest of the world. We will therefore in all analyses need to assume that there is a large economy and a second 'economy' to represent the rest of the world.

9.1 Fiscal policy in the short run

Figure 9.1 shows the effects of expansionary fiscal policy in a large open economy, which we refer to as the "US" while the rest of the world is referred to as the "EU". Starting in the left-hand panel of the figure, the US starts by conducting expansionary fiscal policy (arrow 1). This has the effect of increasing the US interest rate, which therefore leads to an inflow of capital from the rest of the world, the EU. In a small open economy, that would lead to an appreciation of the exchange rate until the interest rate again equalled the world rate. In a large open economy, on the other hand, the effect is sufficiently large to affect the world market interest rate. Due to the appreciation, the interest rate falls again, but not to the initial level. Instead, the US fiscal policy has increased the income such that the *global* demand for money has increased. Therefore, the world market interest rate also increases.

Since the interest rate leads to a capital inflow, the money supply in the US goes up while the money supply in the EU – the rest of the world – goes down. Capital is simply being redistributed between the US and the EU until the interest rates have been equalized. Due to the increased demand for US dollars when capital flows to the US, the exchange rate depreciates following the Fischer equation (Chapter 5), implying that the US competitiveness deteriorates. This means that the US net exports, NX, deteriorates and - vice versa - that the EU NX improves. Note that this is logically necessary since US imports and EU exports are the same! The change in competitiveness and NX leads the US IS-curve to move to the left and the EU IS-curve to move to the right.

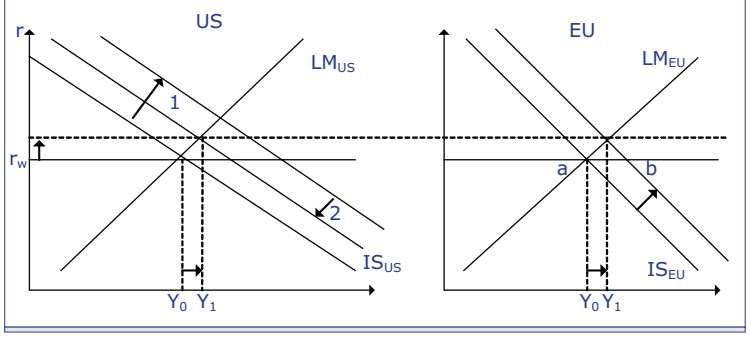
The net effect is that the world interest rate has gone up and US incomes have increased from Y_0 to Y_1. However, the appreciation of the exchange rate – the loss of competitiveness – implies that the effect of the fiscal expansion is limited. The net effect in the rest of the world is positive since the US policy leads to an improvement of competitiveness, which moves the IS-curve to the right. Hence, the EU income increases from Y_0 to Y_1. This is the effect of fiscal policy that is referred to when commentators speak of the US or Germany being the locomotives of the international economy. However, the situation is much different with monetary policy.

9.2 Monetary policy in the short run

Figure 9.2 shows the effects of expansionary monetary policy in a large open economy. Here, the US starts by conducting expansionary monetary policy, which moves the LM-curve (arrow 1). As the US interest rate is now below the EU rate, we know from the Fischer equation (Chapter 5) that the US exchange rate must depreciate because the demand for US dollars has decreased. The following depreciation means that the US competitiveness is improving, which leads to larger exports and smaller imports, i.e. an improvement in the balance of payments. The improvement in NX can be seen as the IS-curve moves to the right (arrow 2). The net result is an increase in income from Y_0 to Y_1 and an improvement in the balance of payments at a lower world interest rate.

However, as the US competitiveness has improved, the competitiveness of the EU and the rest of the world must necessarily have deteriorated. The improving US net exports are therefore mirrored by the deteriorating EU exports. As NX is part of the IS-curve, the EU loss of international competitiveness can be seen as the EU IS-curve moves to the left. The loss of competitiveness consequently causes a decline in the EU income from Y_0 to Y_1. The US monetary expansion has caused a deterioration of the EU income. As such, expansionary monetary policy by a large economy is a *beggar-thy-neighbour* policy, meaning that one country has become richer at the expense of another country.

Figure 9.1:
Fiscal policy in a large country



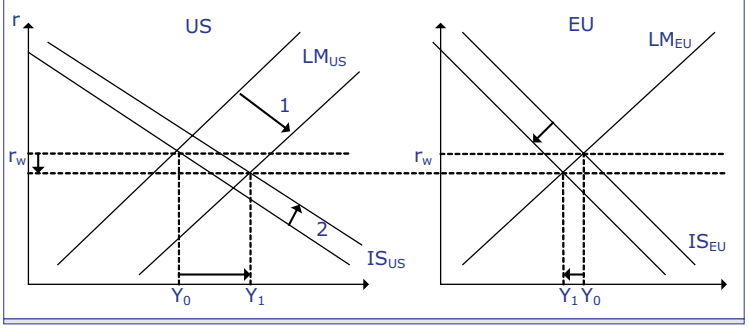
9.3 International political coordination

As we have seen, the monetary policy of a large economy can have adverse consequences for the rest of the world. International coordination can therefore be desirable, but only if the countries pursue similar goals. If, in Figure 9.2, both the US and the EU wish to combat unemployment, both could benefit from agreeing to conduct a monetary expansion. This would allow the EU to move to point b instead of the equilibrium at point a, because the interest rates would be the same from the onset and no country would therefore experience a change in its international competitiveness.

If, on the other hand, the EU wishes to combat unemployment while the US wants to combat inflation, which can arise out of too low unemployment (see Chapter 10), a US monetary contraction might be desirable to the world as such since it would also imply an improvement of EU competitiveness. On the other hand, if the EU conducts expansionary fiscal policy to combat unemployment, we know from Figure 9.1 that it will have a positive effect on the US level of activity. This would therefore be against the wishes of the US government.

A final problem is that countries must not only agree on coordinating, they also have to keep their promises. If, for example, the EU has an unemployment problem and the US therefore promises that it will not conduct monetary policy (which will have negative effects in the EU), the EU might plan to make a fiscal expansion. This will have a positive effect on the US economy. But the US can afterwards break its promises and make a monetary expansion that will have an additional positive effect on the US economy, but a negative effect on the EU economy. The US therefore has an incentive to promise not to conduct policy and, once the EU has made its move, do it anyway. One of the challenges of international policy coordination will therefore always be to make *binding agreements* such that no country will have an incentive to break the agreement.

Figure 9.2:
Monetary policy in a large country



A good example of such a binding agreement is the European Growth and Stability Pact. Signatories to the pact guarantee that they will not have budget deficits of more than 3% of GDP. In other words, they promise not to conduct too expansionary fiscal policy since this type of policy always implies spending more than is gained in taxes, i.e. running a budget deficit. At the time of writing, four EU countries have chosen to be in violation of this pact, showing how difficult it is to make such agreements truly binding.

9.4 Summary

This chapter shows how economic policy works in the short run for large countries. Fiscal policy has spill-over effects as it leads to a deterioration of international competitiveness, which logically corresponds to an improvement of competitiveness in the rest of the world. This improvement causes income to increase in other countries. Monetary policy, on the other hand, is a beggar-thy-neighbour policy because it leads to an improvement of international competitiveness, and is therefore harmful to the rest of the world. There may thus be benefits from coordinating economic policy internationally.

Section 4:
Economic policy in open economies in the long run

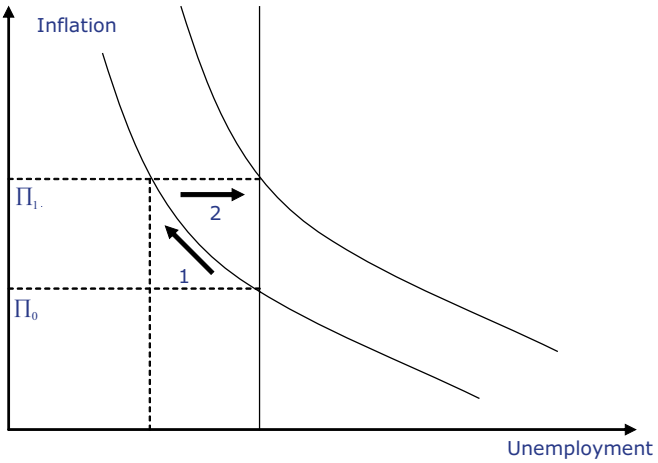
10. Connecting the short and long run – the Phillips curve

In the preceding chapters, we have analyzed the effects of economic policy in the short run. This chapter briefly outlines what connects the short and long run, which basically outlines firms' and individuals' behaviour in the labour market. The workhorse theory used to analyze the effects of policy on wages is called the Phillips curve, named after the British economist A.W. Phillips who discovered the relation between unemployment and inflation. We here use the expectations-augmented Phillips curve.

10.1 The basic relation

Imagine the situation where the government attempts to combat unemployment by, for example, conducting expansionary fiscal policy. This of course increases aggregate demand in society, which causes unemployment to decreases since firms have to employ more people to meet the increasing demand. But as in any other market, the price in the labour market also goes up whenever the demand for labour increases. In other words, when the demand for labour increases and unemployment therefore decreases, wages, W, are pushed upwards. This increases the costs to firms that will therefore tend to increase prices. In other words, the reduced unemployment rate leads to inflation, which corresponds to the first arrow in Figure 10.1. The arrow also to some extent comes about as more people enter employment and therefore earn a wage, which tends to increase the demand for goods; this increased demand thus also leads to a higher price level.

Figure 10.1:
The expectations-augmented Phillips curve



However, when the unemployment rate goes down those in employment will have a reduced risk of losing their jobs. They can therefore risk asking for a higher wage. In addition, the higher demand for goods makes firms demand a larger labour force, i.e. the demand for labour increases. Both factors lead the labour force to ask for higher wages next time wages are negotiated. Since prices have increased, people will also have a concrete incentive to ask for higher wages as their *real wage*, W/P, has decreased. The demands for faster wage increases therefore come about because workers have a reasonable *expectation* that inflation will also be higher in next period. In the equation below, this is captured in the left-hand side by the term π_{t-1}, which is inflation in period t-1, i.e. last period. This is also the inflation level that workers think will be relevant next period. The actual inflation level is π_t. As such, the expectations-augmented Phillips curve states that the difference between actual unemployment in year t, u_t, and the NAIRU or natural rate of unemployment, u_N, depends on how much higher actual inflation is to workers' expectation of it.

$$\prod_t - \prod_{t-1} = -\alpha (u_t - u_N)$$

In the longer run, firms will tend to employ fewer workers because wages have gone up – labour has become more expensive – and the unemployment rate therefore falls again (arrow 2). However, it does so at a higher inflation rate due to the following argument. In wage negotiations, people will ask for a wage raise that at least covers the rise in the costs of living, i.e. the increase in prices. In other words, workers will ask for a wage raise that is at least as high as the inflation rate; otherwise, their real wage W/P will decrease. When inflation increases, as is the case in the figure, workers will tend to demand higher raises, as they expect the higher inflation to persist. As such, as can be seen in the equation above the economy is stuck with its natural rate of unemployment but a higher level of inflation. The only long-run result of the fiscal policy has been to increase the level of inflation.

The net outcome is that even if policy can lower unemployment in the short run – as is evident in the IS-LM analysis – it is fixed at a rate called the *natural unemployment rate*. If unemployment was to stay under that rate, which is called u_N in the figure and the equation, inflation would necessarily have to increase indefinitely to offset the increasing demands in wage negotiations. The natural unemployment rate is therefore also called the *Non Accelerating Inflation Rate of Unemployment*, or in short, the *NAIRU*. Because all production needs labour, it follows that in the longer run any economy will converge towards the level of production that is consistent with the size of the labour force. Hence, even if economic policy can affect income, Y, in the short run, it is not possible to affect it in the longer run!

10.2 The Phillips point

The Phillips point is the point – denoted by A in the figure - towards which the economy converges in the longer run no matter what kind of policy is conducted by the government.

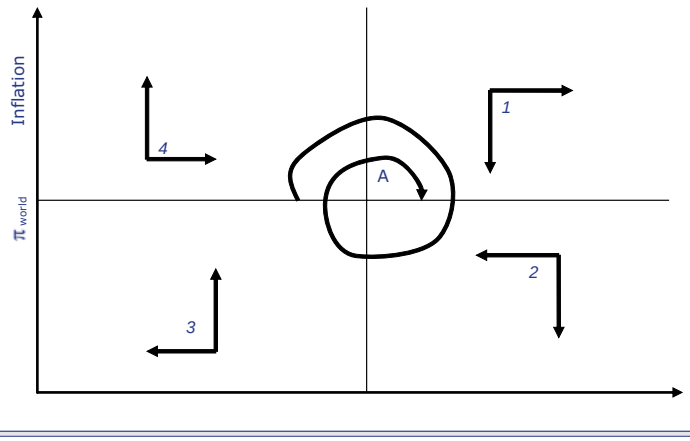
How does the law of one price work?

To see why price will tend to be equal across countries, consider a border region between two countries. If, for example, beer is cheaper in Germany than in Denmark, people north of the border will take the short and therefore relatively inexpensive drive to Germany to buy beer instead of buying it in Denmark. This will increase the demand for beer in Germany, which will drive up the price of beer in Germany. Logically, the demand for beer in Denmark will decrease, which will cause a decline in the Danish price of beer. People will continue to have an incentive to drive across the border to buy beer until the difference in beer prices is so small that the drive to Germany outweighs the difference. The prices of beer in Germany and Denmark are therefore (almost) equalized due to arbitrage or border trade. The only factors that can keep prices from being equalized are transport costs – the drive across the border – and if Danes have to pay a tariff to import German beer.

The law of one price therefore holds particularly well when we look at changes in prices. If, for some reason, prices in Denmark increase – Denmark experiences inflation - buying German beer will become more attractive. More Danes will drive across the border to buy beer, which will cause German prices to increase, i.e. it will cause German inflation.

To see the point that policy does not matter in the long run, start in the upper right-hand quadrant. Here, inflation is above the world inflation rate, π_{world}, and unemployment is above the NAIRU. Hence, from the Phillips curve we know that inflation will be decreasing but we also know that because prices will persistently be increasing faster than in other countries, the international competitiveness is deteriorating. The net effect is that inflation will decrease but unemployment will increase due to the loss of exports, as is indicated by the arrows (1). Eventually, inflation becomes so low that we move into the lower right-hand quadrant. Here, unemployment is still above the NAIRU, which means that inflation will be decreasing. However, the inflation rate is now below the world inflation, implying that the economy will gain international competitiveness. Due to the increasing exports, jobs are created and the unemployment rate therefore decreases, as indicated by the arrows (2). At some point, the unemployment rate passes the NAIRU and we move into the lower left-hand quadrant. Here, the inflation rate is still below the world inflation, but unemployment is below the NAIRU. Following the Phillips curve, inflation will now be increasing while the economy still gains international competitiveness (domestic inflation is below world inflation). Hence, the development follows the arrows (3). Finally, in the upper left-hand quadrant the inflation has risen to be above the world inflation due to the low unemployment, implying that the economy begins to lose competitiveness. Jobs are therefore disappearing due to falling exports, which means that the unemployment rate is increasing, as indicated by the arrows (4). The economy will therefore in the very long run be spiralling towards the equilibrium point where unemployment is the NAIRU – the natural rate of unemployment, and the inflation rate equals the world inflation rate.

Figure 10.2:
The Phillips point



As such, the Phillips point describes the equilibrium combination of inflation – the world inflation rate – and unemployment – the NAIRU – that the economy converges towards at any point in time. In the long run, there can be no differences in international competitiveness – the law of one price must hold (see Box) – and unemployment will thus be determined by the NAIRU. It is important to note that the equilibrium level of employment also implies that there is an *equilibrium level of income* in the medium to longer run. Fiscal and monetary policy will therefore only under very specific circumstances lead to a *permanently* higher level of income (see Chapter 11).

The Phillips point implies, for example, that when a government conducts expansionary fiscal policy to combat unemployment, we know from earlier chapters that it will have an effect in the short run. In the figure above, however, we can see that fiscal policy will move the economy from the equilibrium in A towards the upper left corner where a development will begin following arrow 4. In the longer run, fiscal policy thus creates inflation and a deterioration of international competitiveness. If governments increase their spending permanently, we can thus conclude that since the income level does not increase, investments must decrease as people probably wish to continue spending what they are used to. In the long run, government spending can therefore *crowd out* investments.

10.3 Summary

To summarize, the Phillips curve shows how unemployment and inflation are related. It implies that policies intended to combat unemployment will always lead to higher inflation, which can persist for some time. By noting that higher inflation tends to lead to a deteriorating international competitiveness, we can see that the Phillips point describes the equilibrium combination of unemployment and inflation.

Further readings:

Phillips, Alban W. 1958. The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957. *Economica*, vol. 25, pp. 283-299.

Phelps, Edmund S. 1967. Phillips Curves, Expectations of Inflation and Optimal Employment over Time. *Economica*, vol. 34, pp. 254-281.

11. Effects on the growth in the very long run

This last chapter gives a very brief overview of the very simplest basics of growth theory, providing a framework within which one can understand these basics. Economic growth theory has been rapidly developing for the last 20 years, so the chapter can of course not give more than a very simple overview of the factors related to international economics that most economists agree are important for growth. To get a 'feel' for the realities, this chapter provides simple plots of the relations using a sample of 88 countries between 1970 and 2000.

11.1 The basic framework

To exemplify where economic growth can come from, let us begin with a standard Cobb-Douglas production function with the inputs capital, K, effective labour, HL – where H measures how effective the average worker is, often denoted his 'human' capital - and a technology parameter A. The production function shows how much is produced in the economy, i.e. how much income Y is generated, when the inputs K and HL are used.

$$Y = AK^{\alpha}(HL)^{\beta}$$

First, we are usually not interested in how much is produced in an economy *per se*, but how much income is produced *per person*. Therefore, we divide by N, which is the total population. We also assume that a fraction λ of the population is employed. Hence, L= λN. We denote Y/N=y, which is the average income in the economy.

$$\frac{Y}{N} = \frac{AK^{\alpha}(HL)^{\beta}}{N} = \frac{AK^{\alpha}(H\lambda N)^{\beta}}{N} \Leftrightarrow$$
$$y = AK^{\alpha}(H\lambda)^{\beta} N^{\beta-1}$$

To make things easier to analyze, we take logarithms on both sides of the equation:

$$\log y = \log A + \alpha \log K + \beta(\log \lambda + \log H) - (1-\beta)\log N$$

To arrive at an equation for growth, we simply need to take the difference between income in 1970 and income in 2000, for example. Hence, the growth of income between 1970 and 2000 can be written (in logarithms) as:

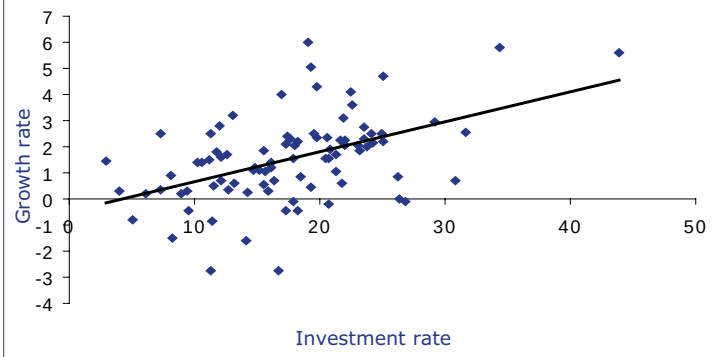
$$\begin{aligned}\log y_{2000} - \log y_{1970} = &\{\log A_{2000} - \log A_{1970}\}_1 \\ &+ \alpha\{\log K_{2000} - \log K_{1970}\}_2 \\ &+ \beta\{\log \lambda_{2000} - \log \lambda_{1970}\}_3 \\ &+ +\beta\{\log H_{2000} - \log H_{1970}\}_4 \\ &- (1-\beta)\{\log N_{2000} - \log N_{1970}\}_5\end{aligned}$$

As is obvious in the equation, the effects on growth can in this very simple way be divided into five areas, as indicated by the numbered brackets. In the following, we describe the two areas that can be affected by policy: Investments in physical capital, K, and investments in 'human' capital or education, H.

11.2 Investments

First and foremost, the second bracket above contains the difference between the stock of physical capital in 2000 and 1970, which is the amount of investments. It should be noted that virtually all empirical studies of economic growth identify the investment rate as one of the most important determinants of the growth rate. The relation between investments and growth can even be seen in Figure 11.1 below, which plots the average investment rate against the average growth rate between 1970 and 2000 for 88 countries for which we have good information.

Figure 11.1:
Growth and investments



The figure clearly shows that investments are important to growth, an insight which can also be gained by looking at the equation above, where the investment rate is the accumulation of capital, K. as all production is undertaken using some form of physical capital – buildings, machinery etc. – it is hardly surprising that capital accumulation leads to an expansion of output and hence income growth. One of the main questions in the growth literature therefore is what affects the investment rate?

A partial answer to this question is to be seen in Figures 11.2 and 11.3 that plot the investment rate against the two main features of interest in international economics and in this compendium: openness to trade, measured as the volume of trade as a share of GDP (and corrected for country size), and government expenditures – an indicator of fiscal policy – measured as government's share of GDP.

Figure 11.2 shows that international trade is associated positively with the investment rate. Hence, not only does trade lead to *static* gains as seen in Chapters 1 and 2, it also leads to *dynamic* gains. By being exposed to international competition, domestic firms will have a strong incentive to invest in new production facilities for (at least) three main reasons: 1) they might be able to export to other countries; 2) they need to invest in more efficient facilities to be able to compete with foreign firms; and 3) as some prices are lowered by international competition, consumers gain purchasing power, which means that they will wish to buy more; firms therefore need to invest in new capacity. However, if tariffs are removed on imports such as capital equipment produced abroad, investments also become cheaper and therefore more likely. Thus, both free imports and free exports can lead to a higher investment rate.

Figure 11.2:
Investments and trade

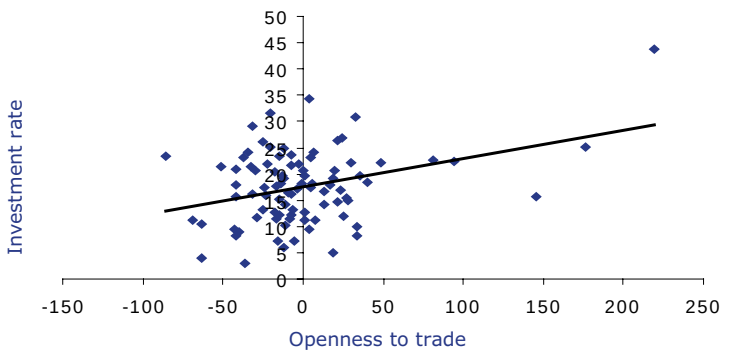
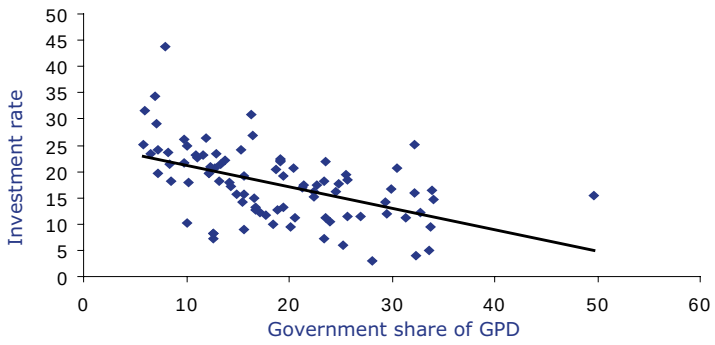


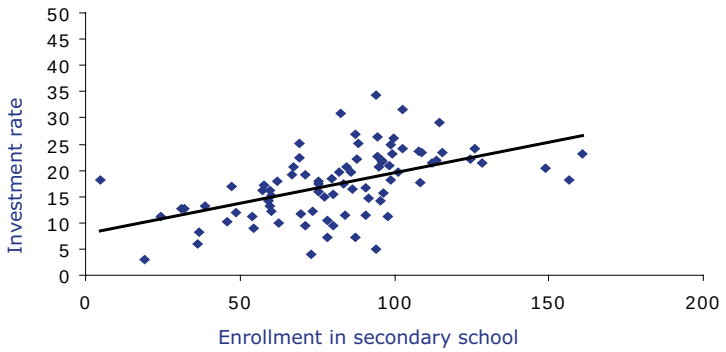
Figure 11.3 plots the association between governments' share of GDP – i.e. fiscal policy – and the investment rate. A priori, this relation is ambiguous as the government could well be spending on public investments. However, in chapter 10 we saw how fiscal policy could not affect the level of income in the long run, but only crowds out investments, as can be seen in the figure. Consequently, as investments lead to growth and government spending tends to crowd out investments, too much government spending must be detrimental to growth.

Figure 11.3:
Investments and government



Finally, education – denoted H – in the simple equation above – is also clearly associated with the investment rate. Education can thus lead to growth by spurring on investments. As workers become better educated, they also become more productive and probably more innovative - better at rationalizing work tasks etc. Hence, better educated workers increase the returns to investments and therefore lead to a higher investment rate.

Figure 11.4:
Investments and education



11.3 Other growth factors

Usually, government involvement leads to poor economic performance, but the effect depends on the *structure* of government spending. As we have seen above, education is an important factor of growth; hence *public investments in education* should lead to higher growth. Likewise, public investments in physical infrastructure such as roads, ports and airports cause transportation costs to decrease, which furthers trade and therefore leads to higher growth.

Finally, when features such as education, employment, investments and population growth are taken into account, what is left is the t*otal factor productivity*, TFP, which is also sometimes known as the Solow residual. Logically, when we have controlled for increases in the inputs to production, what is left is the improvements in the efficiency with which the inputs are used. What causes TFP is then the question.

Most economists agree that improvements in TFP are influenced by improvements in technology, which may account for as much as half of long-run economic growth. Technological improvements, in turn, have as a precondition that people are sufficiently educated to come up with improvements as well as use the new technology when it is accessible. Hence, the *level of education* may matter crucially for TFP growth just as it matters for simple investments. A sufficient level of education is necessary to undertake investments in technological advances, investments what is popularly termed *research and development*, R&D.

Foreign direct investments, FDI, can also lead to higher TFP, as foreign firms not only bring new investments. They also often bring new technology, new management techniques, now ways of organizing work, and broadly speaking new ideas. All these factors are likely to affect how efficiently the economy uses its input factors.

11.4 Summary

The ultimate goal of most countries is to grow rich. This chapter provides a very simple overview of basic growth theory, outlining which factors that could affect the growth rate. Investments are positively affected by international trade, as is the efficiency with which production factors are used, the total factor productivity. Government involvement in the economy (fiscal policy) on the other hand has a negative long-run effect by crowding out investments. However, public investments in education will probably be beneficial for growth.

Further readings:

Barro, Robert J. 1991. Economic Growth in a Cross-Section of Countries. *Quarterly Journal of Economics*, vol. 106, 407-443.

Solow, Robert M. 1956. A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics*, vol. 70, 65-94.

Wacziarg, Romain. 2001. Measuring the Dynamic Gains from Trade. *World Bank Economic Review*, vol. 15 (3), page 393-429.