International Macroeconomics

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Goals and instruments in an open economy

In a closed economy, the policymakers—that is, the central bank (which is in charge of monetary policy) and the Treasury (which is in charge of fiscal policy)—can exclusively focus on the 2 goals of price stability and 'high' economic activity ...

However, no economy in the world—not even North Korea—is entirely closed ...

The degree of openness—which is typically measured by the sum of exports plus imports as a percentage of GDP—varies very widely across the world ...

On the one hand, you have countries/economic areas such as the U.S. and the Euro area, which are pretty close, in the sense the most of their trading takes place within the area ...

... that is: among U.S. states, and among Euro area states, respectively, with comparatively little trade taking place with foreign countries ...

On the other hand, you have countries such as (e.g.) the United Kingdom, or Singapore, for which a significant fraction of its GDP is traded internationally ...

Bottom line: in general, the assumption of a closed economy is, in general, unrealistic, especially after the dramatic liberalization which started at the beginning of the 1980s (that is: globalization ...)

So in general macroeconomic equilibrium means, today, two things ...

- **internal balance: a steady growth of the domestic economy consistent with a high rate of economic activity, and a low unemployment rate, and**
- **external balance: the achievement of a desired trade balance or desired international capital flows, and more generally, of an equilibrium in the balance of payments ...**

Remember: the balance of payments is equal to the sum of the trade balance and of the capital account (that is: of the net capital flows into the country ...)

In principle, it is possible to have equilibrium in the balance of payments if (say) a trade balance deficit is accompanied by a surplus in the capital account of equal absolute magnitude (or vice-versa) ...

However, this can't go on forever ...

Why is that? In order to understand why, just look at the relationship between the U.S. and China ...

For several years now, the U.S. has been running a deficit in the balance of trade with China—that is: it has imported from China more than it has exported there ...—which has been largely financed *via* capital flows from China (that is: China buying U.S. Treasury bills, mortgage-backed securities, etc.) ...

This is unsustainable, for the simple reason that what this means is that China is financing current U.S. consumption by accumulating U.S. financial assets (that is: claims on future U.S. GDP) which one day the U.S. will have to pay ...

So the bottom line is that

(*i*) in the short-run you can certainly finance a trade deficit *via* a capital inflow from abroad, and in this way you're going to maintain equilibrium of the balance of payments ...
(*ii*) but in the long-run this is not really a sound economic strategy ...

Now, let's see the tools of macroeconomic policy ...

The tools of macroeconomic policy

There are two main tools of macroeconomic policy ...

- **Monetary policy: under 'normal' circumstances—that is: over the entire post-WWII period, up until the current crisis—it had to do with the use of a short-term interest rate in order to keep inflation under control, and output close to 'potential' ...**

  Since 2008, it has also involved, in several countries—first and foremost, U.S. and U.K.—(electronically) creating money in order to buy financial assets (e.g., mortgage-backed securities, etc. ...) to stimulate stagnant economies ...
- **Fiscal policy: it has to do with government spending and taxation ...**

Different from monetary policy, the nature of fiscal policy has not changed at all during the current crisis: it had to do with taxing and spending before the crisis, and it still has to do with taxing and spending ...

However, there has been a major change along another dimension ...

Before the crisis, fiscal policy was regarded as *passe'* ...

Why?? Mostly, because of the following two reasons:

(*i*) fiscal policy is slower to react to macroeconomic developments than monetary policy ...

A central bank can react instantly to macro developments, cutting rates within a few hours, whereas to change fiscal policy you often have to go through the Parliament ...

(*ii*) Precisely because fiscal policy goes through Parliament, it is subject to any kind of deleterious political dynamics ...

Is this just the worrying of 'purist' economists??

Not really: just look at the confusion in the U.S. with the negotiations about the 'fiscal cliff' ...

In the summer of 2011 the U.S. lost the AAA rating from Moody's precisely because of the confusion of the process concerning its fiscal policy ...

So the pre-crisis position—that is: '*For the purposes of macroeconomic stabilization, just forget about fiscal policy, it's too slow and messy: the real thing is monetary policy left to unelected technocrats* ...' (e.g., Bernanke, Draghi, ...)—had a very strong rationale ...

But then, why have things changed?? Simply because we have reached the 'zero lower bound'—that is: interest rates are essentially stuck at zero, and can't go lower—which means that conventional monetary policy can't provide any further stimulus ...

And so, fiscal policy—although messy and 'dirty'—has got back in fashion, simply because, within the current circumstances, it provides another way to stimulate the economy ...

Monetary and fiscal policies are used to achieve overall macroeconomic equilibrium ...

What does that mean?

Macroeconomic equilibrium

Macroeconomic equilibrium requires equilibrium in three major markets:

- **goods' markets equilibrium: the quantity of goods and services supplied must be equal to the quantity demanded;**
- **money market equilibrium: the quantity of money supplied must be equal to the quantity demanded;**
- **balance of payments equilibrium: the current account deficit (surplus) must be equal to the capital account surplus (deficit), so that the official settlements balance equals zero ...**

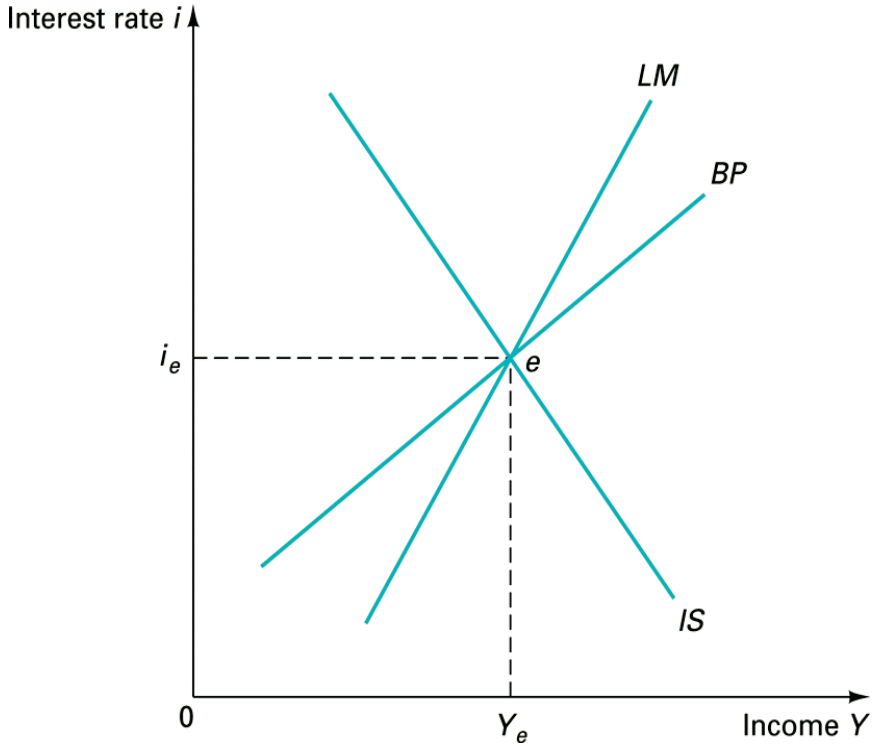
  To put it differently, a trade balance deficit (say) must be financed *via* a capital inflow, so that the balance of payments is in equilibrium ...

As I previously pointed out, the most glaring example of this logic is in the 'symbiotic relationship' between the U.S. and China ...

For many years now, the U.S. has been buying tons of goods from China—thus running a trade balance deficit—and this has been largely financed by huge capital inflows (that is: China buying U.S. Treasury bills ...)

So let's see the *'IS-LM-BP'* model, which allows to analyze all this within an internally consistent framework ...

The *IS–LM–BP* model



We'll see that, within the *IS-LM-BP* model, overall macroeconomic equilibrium is represented by a combination of GDP and the interest rate that puts in equilibrium the goods market, the money market, and the balance of payments ...

So let's start by seeing the derivation of the *IS* curve, the *LM* curve, and the *BP* curve ...

The *IS* curve

The *IS* curve shows the combinations of the interest rate (*i*) and GDP (*Y*) which put in equilibrium the goods market, holding other things (first and foremost, the price level) constant ...

Equilibrium occurs when 'leakages' from aggregate demand—savings (*S*), taxes (*T*), and imports (*IM*)—equal 'injections' into aggregate demand—investment (*I*), government spending (*G*), and exports (*EX*)—that is:

$$S + T + IM = I + G + EX$$

Intuition: savings, taxes, and imports represent purchasing power which is 'taken out' of aggregate demand, one way or the other ...

- **Savings, because the purchasing power, instead of being used for consumption, is saved, and therefore subtracted from aggregate demand;**
- **Taxes, because the purchasing power is appropriated by the government;**
- **Imports, because instead of consuming domestic goods, we consume foreign goods, and therefore this purchasing power is subtracted from domestic aggregate demand ...**

By the same token, investment, public expenditure, and exports are obvious injections (that is: additions) to aggregate demand for domestically produced goods ...

In order to have equilibrium on the goods' market, the equality on the previous slide must always hold ...

Deriving the *IS* curve

The essence of the *IS* curve is a negative relationship between GDP and the interest rate when the goods' markets are in equilibrium ...

Let's see why is that ... Assumptions are the following:

- **savings (*S*) and imports (*IM*) depend positively on income: the greater GDP (=income), (*i*) the more we save, and (*ii*) the more we import from abroad: both assumptions are pretty much incontroversial ...**
  - **taxes (*T*), public expenditure (*G*), and exports (*EX*) are independent of income;**
  - **key: investment (*I*) depends negatively on interest rate ...**

    Why is that??

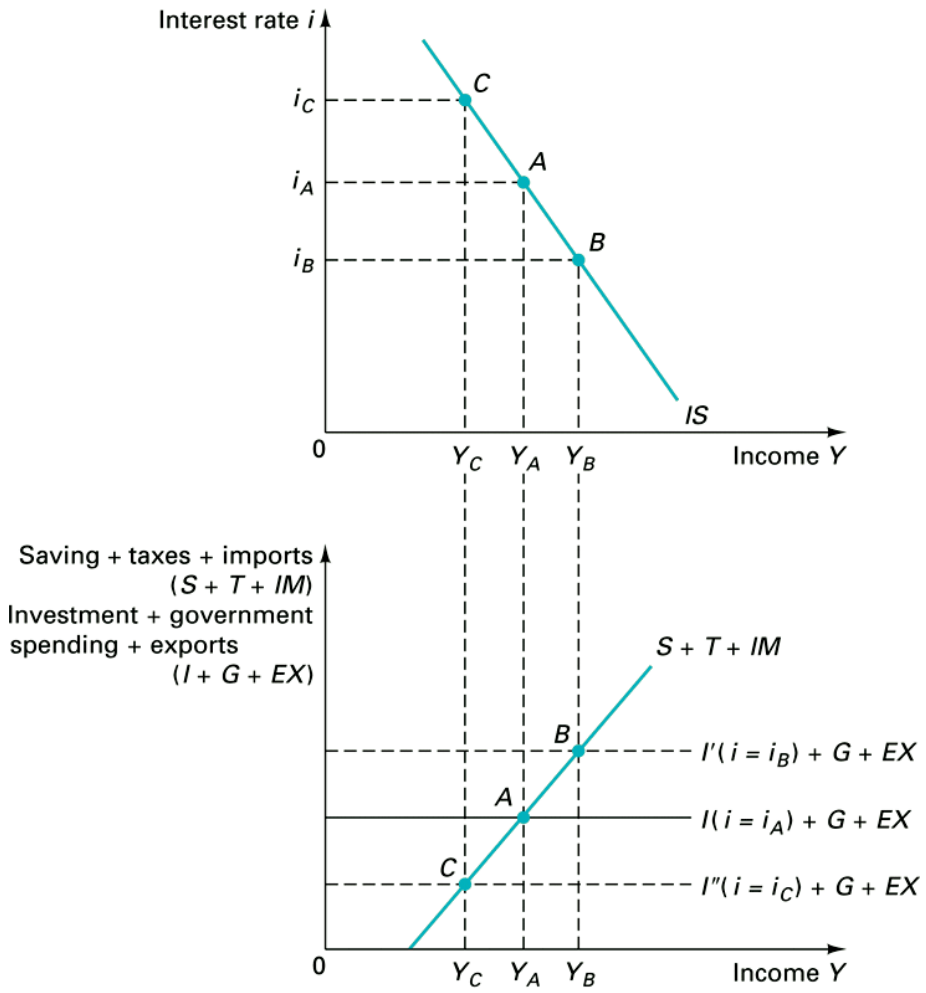
Because investment can be financed in 2 ways:

(*i*) by borrowing (say, from a bank) at the interest rate *i*, which means that the higher the interest rate, the less you borrow, and therefore the less you invest ...

(*ii*) using retained earnings (that is, your profits): the higher the interest rate, the more you have an incentive to buy financial assets (say: Treasury bonds) rather than invest in your firm ...

Either way, the higher the market interest rate, the less you invest, and therefore, the lower aggregate investment ...

Now, let's see the determination of the equilibrium ...



Let's start from the bottom panel …

The line ($I + G + EX$) does not depend on GDP, and is therefore horizontal …

However—and this is key—when the interest rate falls, you invest more, and therefore the line shifts upwards …

This means that you move from equilibrium *A* to equilibrium *B*, with a lower interest rate and a higher GDP (see top panel)…

That's the entire reason why the *IS* curve—which depicts the combinations of GDP and interest rates which keep the goods' market in equilibrium—is downward sloping ...

Symmetrically, if you start at *A* in the bottom panel, and you have an increase in the interest rate, this discourages investment, and therefore the line (*I* + *G* + *EX*) shifts downward …

For a given (*S* + *T* + *IM*) curve, which is upward-sloping, this means that you move from *A* to *C*, with a higher interest rate and a lower GDP …

... and therefore, in the top panel, you likewise move from *A* to *C*, thus 'tracing out' a downward-sloping *IS* curve ...

Before looking at the derivation of the *LM* curve, let's consider the role played by the price level in determining the position of the *IS* curve ...

Suppose the price level in the economy increases by 10%: what's going to happen to the *IS* curve? Let's see ...

In the relationship

$$S + T + IM = I + G + EX$$

savings (*S*), taxes (*T*), public expenditure (*G*), and investment (*I*) are not affected, but exports (*EX*) and imports (*IM*) are: An increase in the domestic price level makes domestic goods less competitive on world markets ...

As a result, imports increase, exports decrease, and—for every level of the interest rate—aggregate demand for domestic goods decreases, which means that GDP decreases ...

What does this imply for the position of the *IS* curve? It implies that an increase (decrease) in the price level causes a shift to the left (right) of the *IS* curve, because for every value of the interest rate aggregate demand for goods—and therefore GDP—is going to be lower ...

Let's now see the *LM* curve ...

The *LM* curve

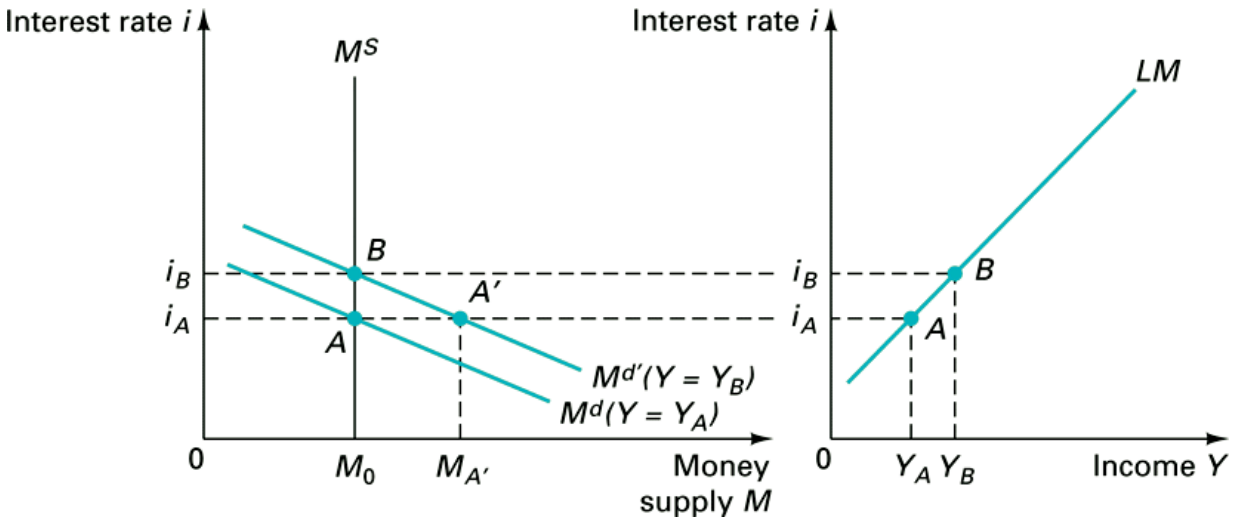
The *LM* curve depicts the combinations of *i* and *Y* which put in equilibrium the money market ...

Equilibrium on the money market occurs at the intersection of the money supply curve and the money demand curve ...

Assumptions underlying the derivation of the *LM* curve are the following:

(*i*) The money supply is determined by the central bank, and is therefore exogenous ...

This means that in the *M*-*i* space the money supply curve is vertical (see the M^S curve in the left-hand side figure in the next slide) ...



(*ii*) The money demand curve is downward-sloping in the *M*-*i* space ...

Why is that? Because the higher the interest rate, the greater the opportunity cost of holding money—which does not pay an interest—as opposed to bonds, which do pay an interest …

So when the interest rate increases, people switch part of their money holdings into bonds, and money demand decreases …

Now, let's see the derivation of the *LM* curve, that is: why is the *LM* curve upward-sloping?

For a given interest rate, money demand depends on income: the greater your income, the more money you're going to demand …

This means that an increase in GDP is going to shift money demand up and to the right, which, for a given amount of money supplied by the central bank, leads to an increase in the interest rate ...

On the left-hand side figure in the previous slide we therefore move from *A* to *B* ...

... and likewise, we move from *A* to *B* in the figure in the right-hand side: an increase in GDP leads to an increase in money demand, and therefore the only way to keep the money market in equilibrium for a given amount of money supplied by the central bank is through an increase in the interest rate ...

Finally, the position of the *LM* curve is determined, among other things, by

- **the amount of money supplied by the central bank, and**
- **the price level ...**

Consider the figure on the left-hand side in slide 23: an increase in the amount of money supplied by the central bank causes a movement of the economy down along the money demand curve ...

Therefore, money increases and the interest rate decreases ...

This means that, in the right-hand side figure, for every level of GDP the interest rate decreases, thus causing a downward shift in the *LM* curve ...

What about the price level?

For every level of GDP and the interest rate, an increase in the price level is going to cause an increase in money demand ...

Why is that??

Intuition: we demand money not just for the sake of it, but in order to buy goods and services ...

This implies that if (e.g.) the price level doubles, other things equal we will demand twice as much money ...

This implies that—in the figure on the top of slide 23—an increase in the price level causes

- **an increase in money demand for every level of GDP, so that, for a given money supply, the interest rate increases;**
- **in turn, this causes the *LM* curve to shift up and to the left**

Bottom line, mnemonics to remember what shifts the position of the *LM* curve:

- **for given output and price level, an increase in the money supply causes a fall in the interest rate and a shift in the *LM* curve down and to the right ...**
- **for given output and money supply, an increase in the price level causes an increase in money demand and therefore in the interest rate, and ultimately a shift in the *LM* curve up and to the left ...**

Element in common (useful 'trick' to remember all of this): ultimately, what matters is the real quantity of money—that is: the money stock, *M*, divided by the price level, *P* ...

Under this respect, changes in *M* and changes in *P*, are, in a sense, 'equivalent', because they both affect the real quantity of money in opposite directions ...

Therefore, for

- **the equilibrium on the money market, and**
- **the position of the *LM* curve in the *Y*-*i* space,**

an increase (decrease) in *M* is equivalent to a decrease (increase) in *P*, because the two have exactly the same effects ...

The *BP* curve

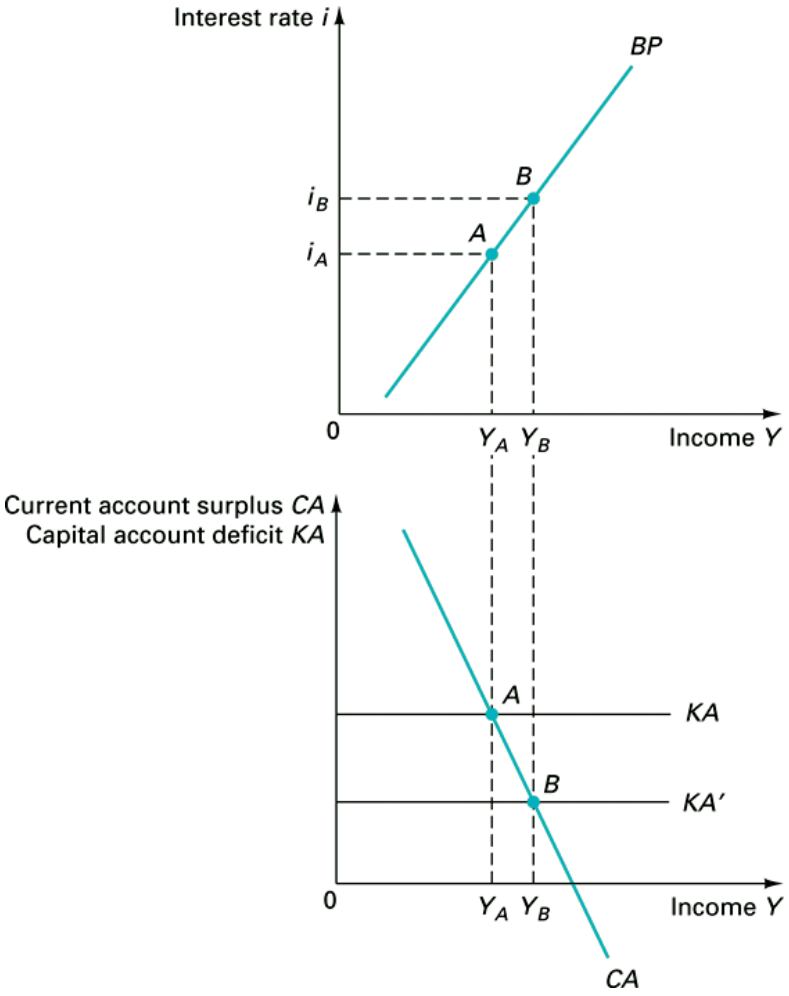
The *BP* curve shows the combinations of *Y* and *i* which put the balance of payments in equilibrium—that is: the surplus (deficit) of the trade balance is matched by an equal deficit (surplus) of the capital account—for given price level, exchange rate, etc. ...

The essence of the *BP* curve is that it is upward-sloping in the *Y*-*i* space ...

The intuition behind this is straightforward: if GDP increases, other things equal we are going to import more, which is going to cause a deficit in the trade balance ...

If we want to keep the balance of payments in equilibrium, we need to raise the interest rate to attract capital from abroad ...

That's the entire reason why the *BP* curve is upward sloping ...



Let's see this graphically …

In the bottom panel,

(*i*) the current account line is downward-sloping, because as income increases, imports rise and the current account surplus falls …

(*ii*) The capital account line is horizontal since the capital account is determined by *i*, not by *Y* …

When GDP increases from Y_A to Y_B, imports increase, and the current account surplus (*CA*) decreases ...

To keep the balance of payments in equilibrium, we need the capital account deficit (*KA*) to decrease, which requires an increase in the domestic interest rate ...

In turn, the increase in the interest rate shifts the *KA* curve from *KA* to *KA'*, and the economy moves from *A* to *B* ...

This means that the combination of GDP and interest rate that keeps the balance of payments in equilibrium—see top panel—is upward-sloping, and the economy therefore moves from *A* to *B* ...

Next, we are going to see the workings of the *IS-LM-BP* model with fixed and flexible exchange rates: before doing that, a brief discussion of some key assumptions underlying what we are going to see ...

We will consider the comparative effectiveness of monetary and fiscal policies for the purpose of affecting—and therefore stabilizing—real activity ...

A key assumption underlying the entire discussion is that of perfect capital mobility, that is: there are no obstacles to the free flow of capital among countries ...

... which in practice means that—if you want—you can buy (e.g.) *Google* stocks, Norwegian government bonds, etc. etc. ...

There are two things to stress here ...

- **The assumption of perfect capital mobility is a pretty realistic depiction of how the world is currently working ...**
- **However, it is important to keep in mind that**

  (*i*) this is the result of the wave of financial liberalization which started in the early 1980s, and which was one of the key aspects of globalization, but ...

  (*ii*) ... historically, the extent of financial (and trade) flows openness has fluctuated pretty wildly ...

  Trade and capital flows were extremely free during the first period of globalization, between (roughly) the end of the 1870s—that is: the beginning of the Classical Gold Standard regime—and World War I ...

Then, during the Great Depression of the 1930s, trade and capital flows were dramatically restricted, and the world moved pretty close to an autarkic situation ...

Trade flows were progressively liberalized over the post-WWII period, and the same thing happened for capital flows starting from the early 1980s ...

All of this discussion is to bring home the point that the assumption of perfect capital mobility which is key in what follows

(*i*) is a pretty accurate description of what is going on today, but
(*ii*) perfect capital mobility is not 'God-given', and for some historical periods it does not represent a good description of what was going on ...

The *IS–LM–BP* model with fixed exchange rates and perfect capital mobility

The 'punchline' to keep in mind: under fixed exchange rates and perfect capital mobility

(*i*) monetary policy is ineffective for the stabilization of economic activity, whereas
(*ii*) fiscal policy is highly effective ...

Let's see why this is the case ...

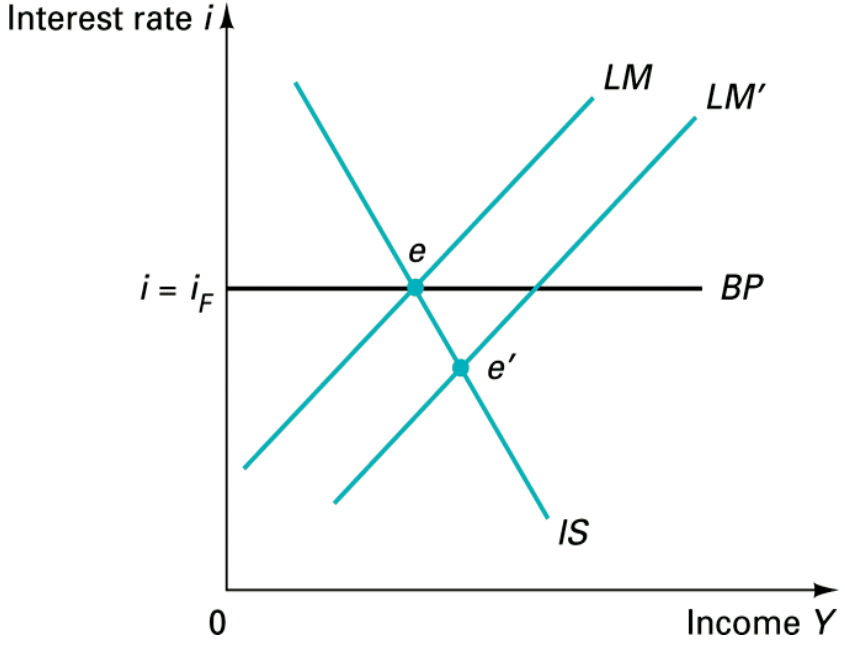
The key reason is that under fixed exchange rates, perfect capital mobility

(*i*) completely 'nullifies'—that is: kills off—the impact of monetary policy, whereas
(*ii*) it 'helps' fiscal policy to achieve its goals ...

Monetary policy with fixed exchange rates and perfect capital mobility

With fixed exchange rates and perfect capital mobility, the central bank is not free to conduct monetary policy independent of the rest of the world ...

Why is that? Because given perfect capital mobility, the domestic interest rate and foreign interest rate are equal, and the *BP* line is horizontal at $i = i_F$ ...



If the central bank increases the money supply, then the *LM* curve shifts to the right, resulting in a higher *Y*, and a lower *i* ...

But that's not the end of the story: the lower *i* causes a capital outflow and pressure on the domestic currency to depreciate ...

But within a fixed exchange rate system, that's not feasible by definition ...

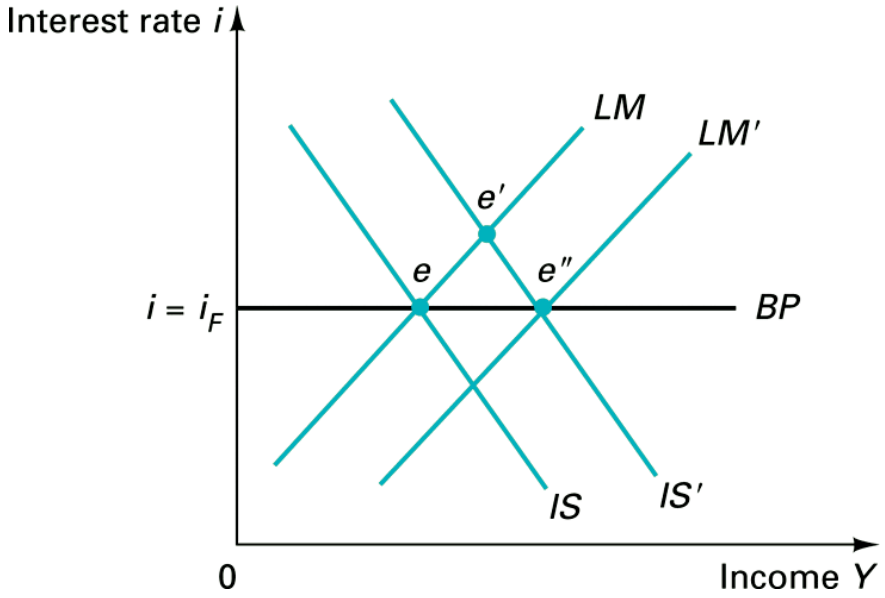
What does that mean? It means that, in order to maintain the fixed exchange rate, the central bank sells foreign currency to buy domestic currency ...

This reduces the money supply and shifts the *LM* curve back to the original position, so that the initial equilibrium is ultimately restored ...

Bottom line: under fixed exchange rates and perfect capital mobility, monetary policy is ineffective in changing *Y*, because any attempt on the part of the central bank to expand the money supply is ultimately undone by the need to defend the fixed exchange rate parity ...

Now let's see fiscal policy ...

Fiscal policy with fixed exchange rates and perfect capital mobility



As before, *BP* curve is horizontal at the initial equilibrium interest rate (point *e*)...

An increase in government spending shifts the *IS* curve to the right, resulting in both higher *i* and higher *Y* (point *e'*) ...

But once again, that's not the end of the story ...

The increase in *i* causes a capital inflow, and puts pressure on the domestic currency to appreciate ...

So you see what we're getting at: the mechanism is now exactly the opposite of what we saw in the previous case ...

In order to defend the exchange rate parity, the central bank must buy foreign currency with domestic currency ...

This causes an increase in the money supply, and shifts the *LM* curve to the right ...

The new equilibrium (point *e''*) is at the original interest rate but at a higher income level ...

Bottom line: under fixed exchange rates and perfect capital mobility, fiscal policy is highly effective in changing *Y*, because the capital inflow triggered by the increase in the interest rate caused by the fiscal expansion leads to a monetary expansion, which compounds the effect of the initial fiscal expansion ...

Now let's see all this under floating exchange rates ...

The *IS–LM–BP* model with flexible exchange rates and perfect capital mobility

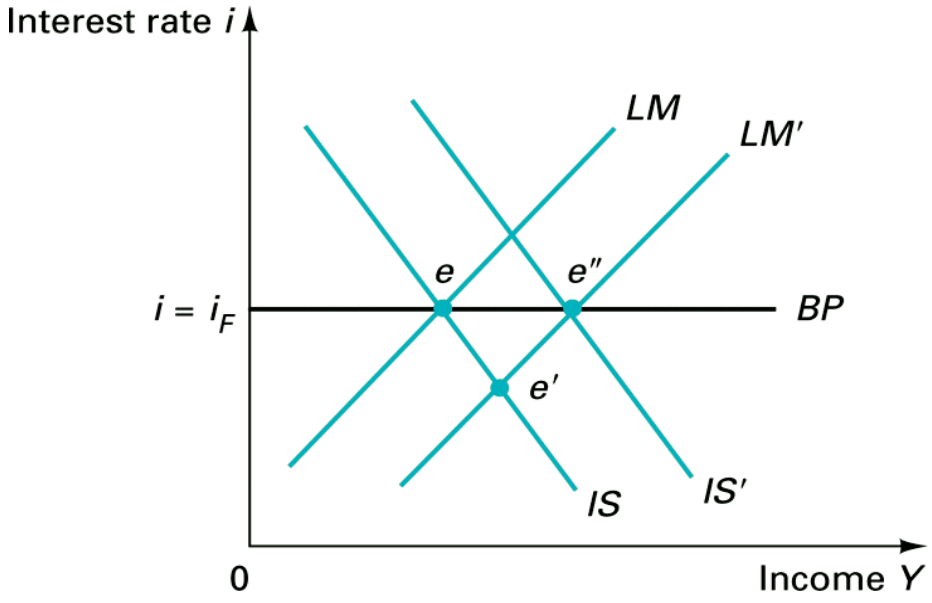
Here the 'punchline' to keep in mind is the opposite of what we saw under fixed exchange rates: under floating exchange rates and perfect capital mobility

(*i*) monetary policy is highly effective at stabilizing economic activity, whereas
(*ii*) fiscal policy becomes ineffective ...

The key reason is that under flexible exchange rates, perfect capital mobility

(*i*) entirely kills off the impact of fiscal policy, through the channel of exchange rate movements, whereas
(*ii*) the very same channel 'helps' monetary policy to achieve its goals, by compounding its impact ...

Monetary policy with flexible exchange rates and perfect capital mobility



The *IS–LM–BP* model with flexible exchange rates and perfect capital mobility is also called the Mundell-Fleming model ...

As usual, *BP* curve is horizontal at the initial equilibrium interest rate (point *e*)...

An increase in money supply shifts the *LM* curve to the right, resulting in a lower *i* and higher *Y* (point *e'*) ...

But once again, *e'* is not the end of the story ...

The lower *i* causes a capital outflow, and a depreciation of the domestic currency ...

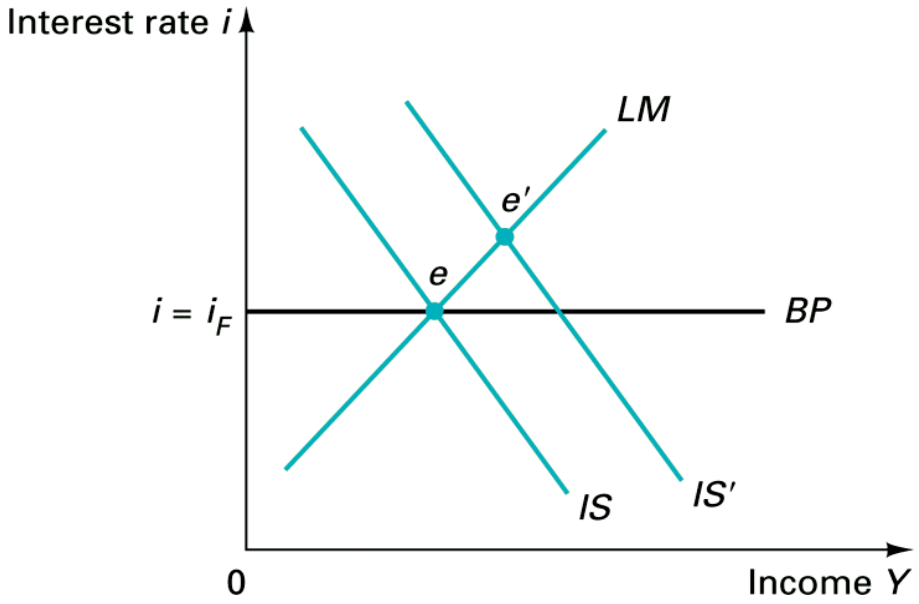
The depreciation of the domestic currency makes domestic goods relatively cheaper compared to foreign goods, it stimulates exports, and it discourages imports ...

This shifts the *IS* curve to the right: the new equilibrium settles at the original *i* but at a higher income (point *e''*) ...

A simple way to interpret the difference between what we just saw and the corresponding inability of monetary policy to affect GDP under fixed exchange rates is that,

- **under fixed exchange rates, domestic monetary policy is not independent—that is: it is constrained by world financial markets—whereas**
- **under flexible exchange rates, domestic monetary policy keeps its independence ...**

Fiscal policy with flexible exchange rates and perfect capital mobility



***BP* curve is horizontal at the initial equilibrium interest rate (point *e*)...**

An expansionary fiscal policy shifts the *IS* curve to the right, thus resulting in higher GDP and interest rate (point *e'*) ...

The higher *i* causes a capital inflow, and the domestic currency appreciates ...

The appreciation shifts the *IS* curve back to the original equilibrium *i* and *Y*, thus completely nullifying the initial impact of the fiscal expansion ...

The bottom line is that under floating exchange rates and perfect capital mobility fiscal policy is entirely ineffective because there is complete 'crowding out'—that is: the increase in government spending is exactly offset by a decline in private spending ...

On the other hand, monetary policy is highly effective in changing *Y*, because the capital outflow triggered by the decrease in the interest rate caused by the monetary expansion leads to an exchange rate depreciation, which compounds the effect of the initial monetary expansion ...

Now, two important assumptions—fixed prices, and the assumption that the interest rate is exogenous to the domestic country—need to be discussed in some detail ...

World interest rate is exogenous to the domestic country

This is the key assumption behind a central element of what we've seen up until now: the *BP* curve is horizontal at the world interest rate ...

What this means in practice is that the economy we are considering is too small to affect the world interest rate ...

... and so you see what's the limitation of all this: the entire analysis holds for a 'small open economy' such as the U.K. or Singapore, which can't affect, with its own behaviour, the global interest rate ...

... but it holds to a much lesser extent for countries such as the U.S. or China ...

For example, movements in U.S. interest rates have a significant impact on the level of world interest rates, to the point that the U.S. Federal Reserve is sometimes said to be setting monetary conditions for the world ...

Price level is fixed

The assumption that the price level is fixed is a reasonable approximation for the short run ...

... but in the medium-to-long run prices move ...

So a more realistic model, capable of keeping track of the ultimate, long-term impact of monetary and fiscal actions in open economies must account for price level dynamics ...

These models have been developed by the so-called New Open Economy Macroeconomics, which has (among the other things) prices which are sticky in the short-run, but can be changed in the medium-to-long run ...

Let's now turn to the open economy multiplier ...

The open economy multiplier

The open economy multiplier has to do with the impact, on GDP, of changes in the autonomous components of expenditure (that is: the components of expenditure which do not depend on income) ...

Remember the assumptions we made:

- **investment, public expenditure, taxes, and exports are independent of the level of GDP ...**
- **... whereas savings and imports depend on GDP:**

$$\text{Savings: } S = s \bullet Y \qquad \text{Imports: } IM = m \bullet Y$$

where s is the marginal propensity to save and m is the marginal propensity to import ...

Remember the equation in which the equilibrium of the economy is described in terms of equality between injections to and leakages from domestic aggregate demand ...

$$S + T + IM = I + G + EX$$

Substituting, we have:

$$sY + T + mY = I + G + EX$$

which gives us the following expression for GDP as a function of the autonomous components of expenditure:

$$Y = (I + G + EX - T)/(s + m)$$

The term $1/(s+m)$ is the open economy multiplier ...

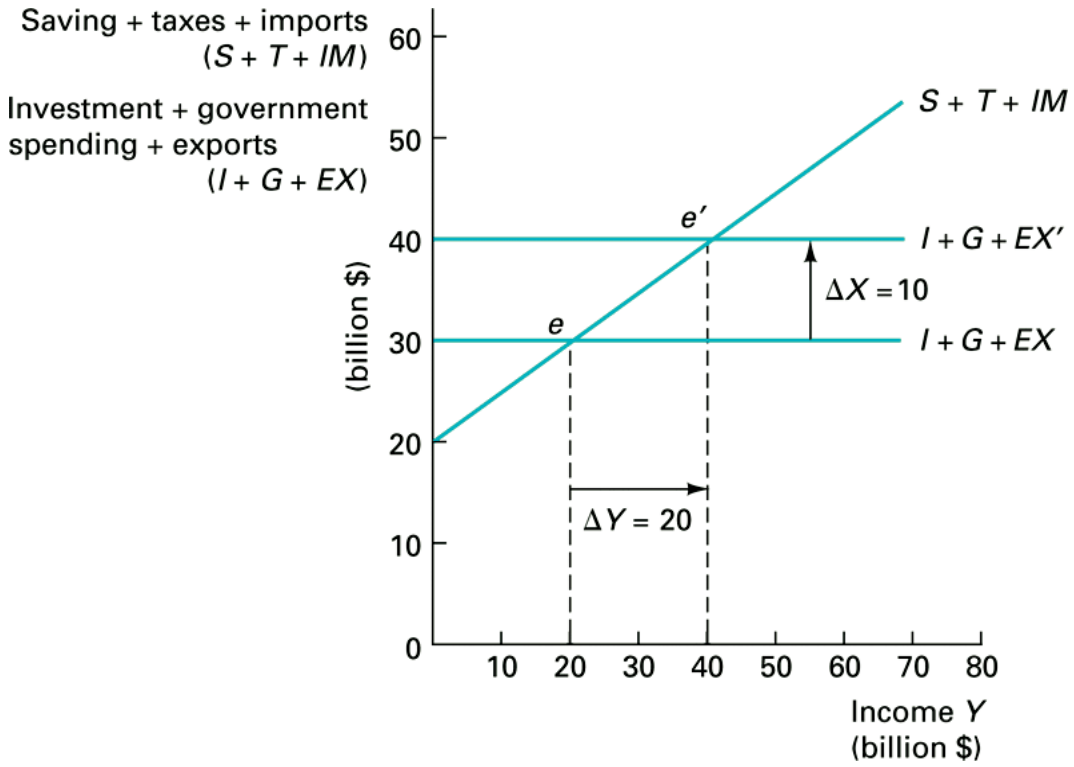
Since *s* and *m* are fractions smaller than 1, the multiplier is expected to be greater than 1 ...

Thus, an increase in *I*, *G*, or *EX* would cause the equilibrium GDP level to rise by more than the initial change in spending ...

If exports increase, the incomes of factors employed in the export industry—both capital and labor—will rise ...

Then, workers will increase their spending on goods and services, thereby stimulating production, and further increases in income and spending, which is the essence of the multiplier effect ...

Let's see a graphical example of all this, focusing (e.g.) on an increase in exports ...



We start at the initial equilibrium *e*, and we have an exogenous increase in exports …

This shifts the line (*I* + *G* + *X*) upwards, and moves the economy along the curve (*S* + *T* + *IM*)—which is unchanged—up to the new equilibrium *e'*

Next, let's move to theories of the balance of payments …

Basic theories of the balance of payments

Topics we'll cover include:

- **The 'elasticities approach to the balance of trade' ...**

  Intuition: the impact of a devaluation on the trade balance—that is, the difference between what we sell to foreigners and what we buy from them—crucially depends on how 'elastic' (that is, responsive) to changes in relative prices imports and exports are ...

  When we devalue the exchange rate (that is: we make the Swiss Franc 'cheaper' in terms of Dollars or Euros):

  (*i*) we have to pay more Francs for our imports, and
  (*ii*) foreigners have to pay less Dollars or Euros for their imports (that is: our exports) ...

As a result, *ceteris paribus* our imports decrease, and our exports increase, and—as a pretty general rule—in the long run our trade balance improves ...

Why do I say 'in the long run'???

Because in the short run, we may have a perverse effect, the so-called 'J-curve' effect ...

- **The 'J-Curve' effect: even if a devaluation ultimately ends up improving the trade balance, in the short-run it may lead to a deterioration ...**

  This sounds bizarre, but actually it is not bizarre at all: we'll see that there are strong reasons why we should in fact expect this to happen ...

- **A good question is: *'Under which conditions is a devaluation going to ultimately improve the trade balance?'***

  The answer is provided by the so-called 'Marshall-Lerner conditions' ...

  The 'Marshall-Lerner conditions' state that a devaluation is going to improve the trade balance if and only if the sum of the elasticities of the demand for imports and of the demand for exports is greater than one ...

- **The 'monetary approach to the balance of payments'**

  The elasticity approach I previously mentioned (*i*) is a theory of the patterns of trade as determined by goods' relative prices, and (*ii*) it only pertains to trade in goods (that is: it ignores capital flows) ...

Ignoring capital flows might be justified if these flows were small ...

... but in practice they are enormous, so you can't just 'pretend' that they are not there ...

If you do that, you're going to miss an important part of the overall picture ...

'Monetary approach to the balance of payments' (MABP) looks at things from a fuller perspective: the balance of payments—that is: the sum of the trade balance and of the transactions in financial assets—depends on the international distribution of money ...

Logic is very simple: suppose Switzerland has an excess of money supply over money demand—that is: a disequilibrium on the money market ...

What's going to happen?? One obvious possibility is that this excess of money supply over money demand causes an increase in inflation ...

In a closed economy, that's the only possibility ...

... but in an open economy there's a more realistic possibility: we will use the excess of money to buy financial assets from abroad ...

This is going to cause the Swiss Franc to depreciate, and in turn this is going to affect our patterns of trade ...

Bottom line ...

- **Elasticity approach looks at the trade balance as the result of the patterns of international competitiveness, which can be altered simply by changing the nominal exchange rate ...**
- **The MABP looks at the impact of disequilibria on the money market, and how this ultimately impacts upon the patterns of trade ...**

  Taking also into consideration monetary factors is crucial in order to understand what is going on in today's world ...

  As I will discuss, this is key in order to understand (e.g.) the impact of the 'quantitative easing' policies pursued by the U.S. Federal Reserve: one way these policies work is *via* the impact they have on the exchange rate ...

The 'elasticities approach to the balance of trade'

The elasticities approach examines how changing relative prices of domestic goods and foreign goods resulting from a change in the exchange rate will affect the balance of trade of a given country ...

For example, the relative price effect of a Japanese yen devaluation should increase U.S. demand for Japanese goods (as the $ price of Japanese goods fall) and decrease Japanese demand for U.S. goods (as the yen price of U.S. goods rise).

How much quantity demanded changes in response to the relative price change is determined by the price elasticity of demand ...

What is the price elasticity of demand?

The price elasticity of demand

The price elasticity of demand measures the responsiveness of quantity demanded to a change in the product's price ...

The coefficient of elasticity of demand is equal to the percentage change in quantity demanded divided by the percentage change in price, that is:

$$\varepsilon_d = \%\ \Delta Q / \%\ \Delta P$$

Similarly, we can compute a price elasticity of supply ...

If the % change in quantity demanded exceeds (is less than) the % change in price, then demand is said to be elastic (inelastic) ...

Why is it important to know the price elasticity of demand??

Because the price elasticity of demand uniquely determines whether your revenues increase or decrease when you change the price of your goods—in the present context, whether a country's devaluation of the exchange rate is going to increase the value of its exports, thus improving the trade balance ...

Intuition: if I cut my price by 0.1%, and demand for my product (say) doubles—that is: demand is very elastic—I am certainly going to increase my revenues ...

On the other hand, if the demand for my good is not very sensitive to price changes, when I increase the price, the demand does not change much, and I increase my profits ...

Are there important real-world examples of this effect?

Yes, there are several ...

A simple example is oil ...

Since oil's derived products are needed for transportation, heating, etc., and many of these activities cannot be stopped just because oil is more expensive, increases in the price of oil typically lead to small and delayed decreases in its demand ...

That's why the oil price shocks of the 1970s were so damaging to the world economy ...

Same logic holds in the case of a devaluation of the Swiss Franc with respect to other currencies: if we devalue the Franc by 1%, and our exports jump by 10%, we certainly increase our revenues and the trade balance improves ...

Let's be more specific about the conditions under which a devaluation improves the trade balance ...

The Marshall-Lerner conditions

Question: ***'Under which conditions is a devaluation of the nominal exchange rate going to improve our trade balance?'***

The answer is very intuitive: a devaluation of the nominal exchange rate is going to improve our trade balance if and only if the demand curve for our imports, and the demand curve for our exports, are sufficiently responsive to changes in relative prices ...

That is: if they are sufficiently 'elastic' ...

In particular, the Marshall-Lerner conditions specify that the sum of the elasticity of the demand for our imports, and of the demand for our exports, must be greater than one ...

The 'Marshall-Lerner conditions' are very intuitive ...

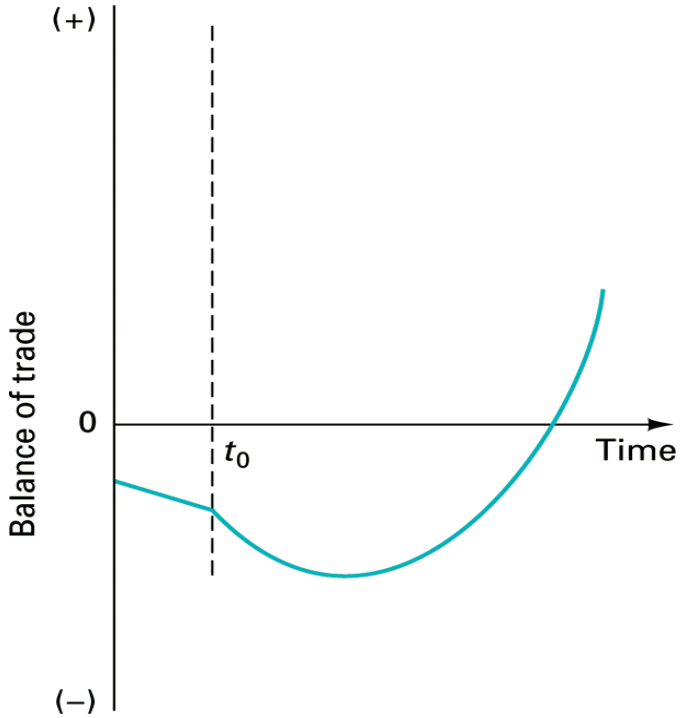
Remember that within the elasticities approach the key causal chain is:

Change in the nominal exchange rate ➔
➔ Change in relative prices of domestic and foreign goods ➔
➔ Change in the demand for our imports and our exports ➔
➔ Change in the trade balance ...

So the key issue is whether the demand for our imports and exports are sufficiently 'responsive' to relative price changes—that is: if they are sufficiently elastic ...

The 'Marshall-Lerner conditions' give you a precise numerical threshold: the sum of the two elasticities must be greater than one ...

The J curve



A strictly practical issue: even if a devaluation of the exchange rate ultimately improves the trade balance (e.g., after 1-2 years), in the short run it may cause a deterioration ...

That is: we may see something like what we see in the figure at the left ...

The J curve refers to the time pattern of the trade balance following a devaluation: after the devaluation, the balance of trade deteriorates for a while before improving ...

What are the causes of the J-curve effect? Two:

- **the 'currency contract period', and**
- **the 'pass-through effect' ...**

The ‘currency contract period’

The ‘currency contract period’ refers to the time period immediately following a devaluation, when contracts signed before the devaluation are settled ...

The effect of fixed contracts on the balance of trade depend on the currency in which the contract is denominated ...

In particular, suppose that

- **the contracts for our imports are all denominated in foreign currency, and**
- **the contracts for our exports are all denominated in Swiss Francs ...**

What does it happen after a devaluation of the Swiss Franc?

Let's see ...

- **The value of our exports in Swiss Francs does not change following the devaluation ...**

  Why?? Because the contracts were signed in Swiss Francs, and so the value we get from selling them abroad is unaffected by the fact that we devalue the Franc ...

- **The value of our imports increases—so we have to pay more Swiss Francs for them than before the devaluation ...**

  Why?? Because the contracts were signed in foreign currency, and so we have to pay more Swiss Francs for them, because the Franc is worth less than before ...

As a result, our trade balance necessarily worsens ...

This is an extreme example: in practice, for both imports and exports, some contracts are denominated in domestic currency, and some in foreign currency ...

As a result, the J curve effect may or may not be there, and if it is there it may be stronger or weaker ...

But it is important to understand that the J curve effect is not some bizarre result of a devaluation: there is a strong economic logic behind it ...

The currency contract period lasts, by definition, until the contracts for exports and imports that had been signed before the devaluation expire—so it may last for some time, but then it ultimately dies out ...

The ‘pass-through’ effect of a devaluation

The ‘pass-through effect’ has to do with the way in which the impact of the exchange rate devaluation is reflected into domestic prices ...

Why should this be the case? Because as the devaluation raises the price of our imports,

- **domestic firms which produce goods which compete with imported goods can increase their price too ...**

  Without devaluation, by increasing their price they would have lost market share in favour of imported goods ...

  ... but since the devaluation increased the price of imported goods, they can raise their prices too ...

If they raise their price by less than the increase in the price of imported goods caused by the devaluation, they are going to 'kill two birds with one stone': they raise their price and they increase market share, so they unambiguously gain ...

- **The devaluation is going to increase the price of imported inputs, such as oil, metals, etc. ...**

  This is going to increase the cost of production, and ultimately this is going to increase the entire price level in our economy ...

  In the long run, the positive effect of the devaluation on the trade balance may well be entirely eliminated by the pass through of the change in the exchange rate on domestic prices ...

This means that the effects of a devaluation may well be turn out to be largely or almost entirely temporary ...

That is: a devaluation gives the economy a 'temporary boost'—it stimulates it, and it improves the trade balance—but ultimately, the effects fade away ...

In the limit, if

(*i*) the pass through were full and instantaneous, and
(*ii*) there were no currency contract period (so that goods were traded on spot markets),

a devaluation of the exchange rate would have no effect at all on the trade balance ...

In reality, the effect is typically temporary ...

For example, before entering the European Monetary Union, Italy relied, over a period of several decades, on successive devaluations of the Lira in order to stimulate the economy and improve its trade balance ...

Why do I say 'successive devaluations'? Because the effects only lasted a few years, and then they were eliminated by the pass through—that is: inflation ...

So, every few years Italy had to devalue the exchange rate once again, in order to regain competitiveness ...

The 'monetary approach to the balance of payments'

As we said, the elasticities approach only focuses on the trade balance—that is, on trade in goods ...

The MABP, on the other hand, looks at both the trade balance and the financial account (that is, trade in financial assets) ...

The basic premise is that any balance of payments disequilibrium is based on monetary disequilibrium, or the difference between the amount of money people want to hold and the amount supplied by monetary authorities ...

The original formulation of the MABP was due to David Hume in 1752: at that time, the monetary system was based on gold—that is: gold was money, and this held for all major countries ...

Further, all currencies were linked by a system of fixed exchange rates ...

David Hume's original formulation of the MABP

Hume pointed out that, if the stock of gold in England were to be cut in half overnight

- **eventually (say, after a few years) the price level in England would equally decrease by 50 per cent ...**
- **In a world of fixed exchange rates, this would make English goods much more competitive on world markets ...**
- **England's exports would increase, its imports would decrease, and the trade balance would improve ...**
- **As a result, gold would flow into England (for the simple reason that, as we said, gold was money, and it was therefore used for payments), and the stock of money would increase ...**
- **This would cause the price level to increase again, until it got back to the original level ...**

This is what happens in a world of fixed exchange rates ...

... but the world we live in is not a world of fixed exchange rates: in general, currencies are floating—although the floating is usually managed by central banks—and exchange rates therefore reflect to a greater of lesser degree market forces ...

... that is: they are largely determined on foreign exchange markets ...

So, how does the analysis change in such a world? In order to understand how it changes, let's consider a real-world example: the impact of 'quantitative easing' policies on the part of the U.S. Federal Reserve to push the U.S. economy out of the doldrums ...

A real-world example of the impact of money market disequilibria on the exchange rate

Over the last few years, the U.S. Federal Reserve has dramatically increased the money supply in order to try to stimulate the U.S. economy out of its torpor ...

This has created an imbalance in the U.S. money market, with a significant excess of money supply over money demand ...

If the U.S. were on a fixed exchange rate system—such as the Gold Standard Hume was writing about—

- **this would cause an increase in the U.S. price level, U.S. goods would become less competitive, and the mechanism described by Hume would cause a trade deficit, a money outflow, and ultimately would reduce the money supply ...**

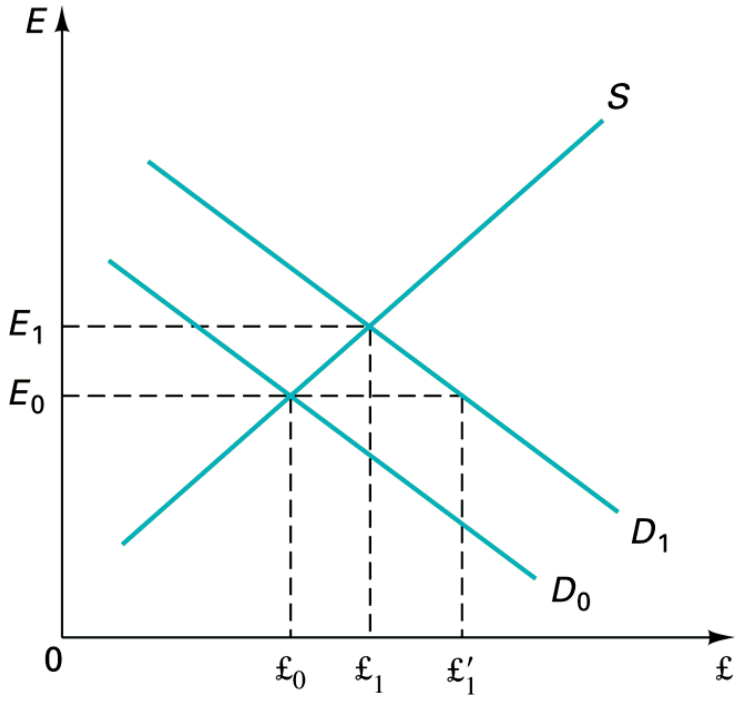
- **Part of the original excess of money would also be used by U.S. firms and individuals to buy up foreign assets, but, by definition of a fixed exchange rate regime, this would not cause any change in the exchange rate ...**

In a world of floating exchange rates, the same things happen, with the key difference that the financial flows—that is: U.S. firms and individuals buying up foreign assets—cause the dollar to depreciate ...

In turn, by the same arguments we discussed when we spoke about the elasticities approach, this will impact upon the trade balance, discouraging U.S. imports and stimulating U.S. exports ...

So the basic forces at work are the same, only difference is that now part of the adjustment happens *via* the exchange rate ...

Determination of the exchange rate on the foreign exchange market



So let's see in detail the determination of the exchange rate on the foreign exchange market ...

Suppose the foreign country is the United Kingdom ...

Demand curve for pounds is downward-sloping ... Why? Because the more the pound is worth in (say) Swiss Francs, the less people demand it ... Intuition: think of yourself taking a holiday in London ...

If the pound is cheap compared to the Swiss Franc, you're going to spend a lot of money, that is: you will demand a lot of pounds, so that you can spend them there ...

By same token, supply curve for pounds is upward-sloping ...

The more the pound is worth in Swiss Francs, the more people will sell pounds on the foreign exchange market in exchange for Swiss Francs ...

Now, back to the previous example about U.S. policies of quantitative easing ...

Given the disequilibrium on the U.S. money market caused by the FED's policies of monetary expansion, demand for pounds is going to increase for a given supply curve ...

... and this is going to cause an appreciation of the pound and therefore a depreciation of the dollar ...

... which is going to stimulate U.S. exports and cut down U.S. imports ...

Managed exchange rates

In reality, no currency floats freely—that is: no exchange rate is uniquely determined by market forces ...

All exchange rates are, to a greater or lesser extent, managed by the respective central banks ...

Let's talk about 2 real-world examples ...

First, the ceiling established by the *Swiss National Bank* for the Swiss Franc against the Euro ...

In the summer of 2011, the demand for Swiss Francs on the part of operators looking for a 'safe haven' for their money because of the Eurozone crisis caused the Swiss Franc to reach levels that were damaging the Swiss economy, making its exports uncompetitive on world markets ...

As a result, the *SNB* introduced a ceiling to the exchange rate of the Franc against the Euro: at the exchange rate of 1.20 Francs for 1 Euro it would sell unlimited amounts of Francs ...

What does it mean in terms of the demand-supply diagram we saw before? It means that the supply curve for Swiss Francs against the Euro has become horizontal at 1.20 ...

This is an extreme example of a managed exchange rate ...

Second example: the managing of the Renminbi against the dollar ...

For a long time, China has kept the exchange rate of the Renminbi against the U.S. dollar artificially low in order to boost its exports to the United States ...

How did it achieve this? In terms of the demand-supply diagram we saw previously, quite simply by buying lots of dollars and selling lots of Renminbis ...

So the basic mechanism is the same as that used by the *Swiss National Bank* to prevent a massive appreciation of the Franc against the Euro ...

Key point to stress: these are extreme examples, but to a greater or lesser extent, the vast majority of exchange rates are managed ...