

International Macroeconomics

Lecturer: Luca Benati

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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 **2008/2009 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**?

No: just look at (e.g.) 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 ...’*—had a very **strong rationale** ...

But then, **why** have **things changed**? Simply **because** we have **reached** the (effective) **‘zero lower bound’**—that is: **interest rates** are **stuck** either **at zero**, or a little bit lower than that, and **can’t go lower**—which means that **conventional monetary policy can’t provide any further stimulus ...**

Further, there is currently a huge debate about whether pushing interest rates (further) into negative territory is going to provide additional stimulus, or it is going to be counterproductive ...

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 **demande**d;
- **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** ...

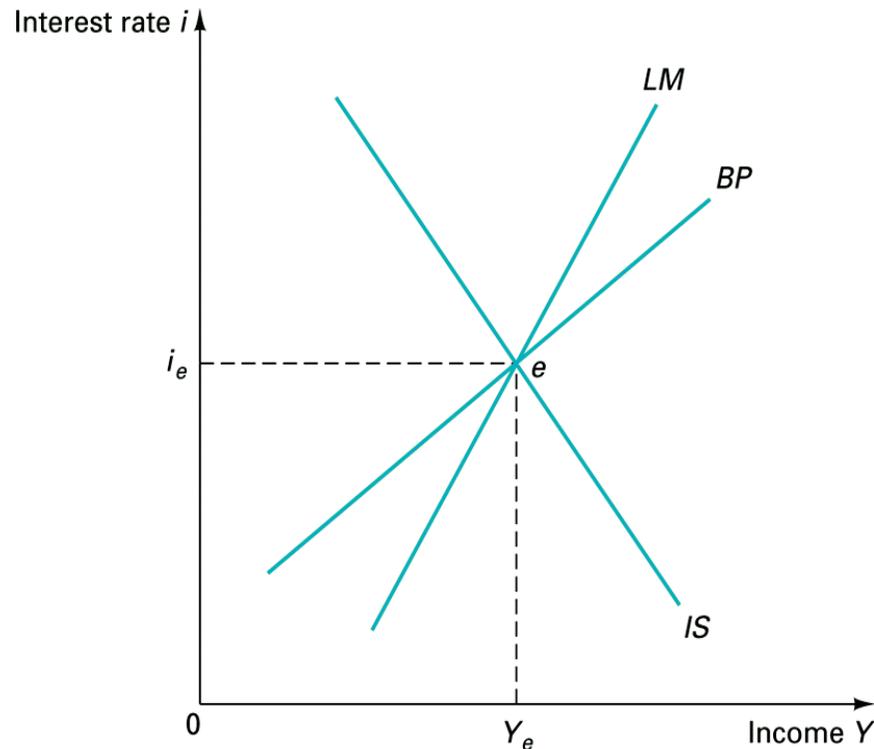
To put it differently, a **trade balance deficit** (say) **must** be **financed** *via* a **capital inflow**, so that the balance of **payments** is in **equilibrium** ...

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 huge amounts 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 uncontroversial ...
- **taxes** (*T*), **public expenditure** (*G*), and **exports** (*EX*) are **independent of income**;
- **key**: **investment** (*I*) depends **negatively** on **interest rate** ...

Why is that??

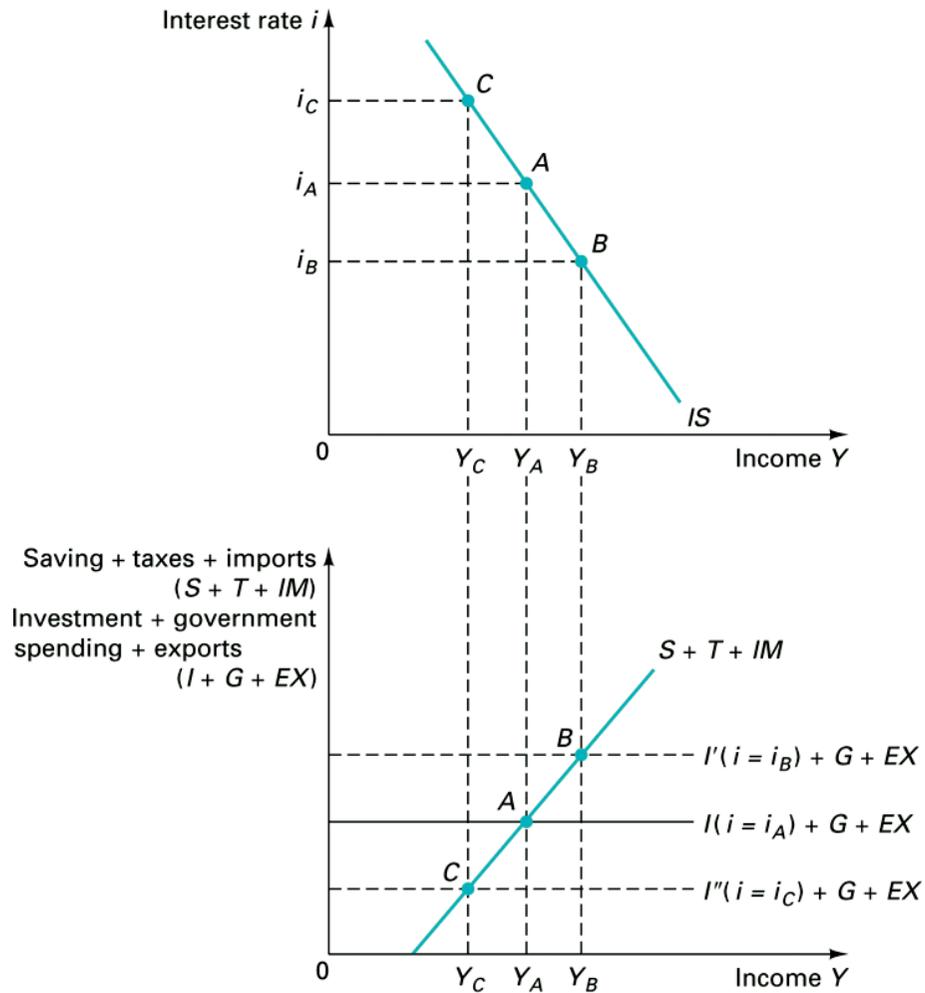
Because **investment** can be **financed** in **2 ways**:

(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

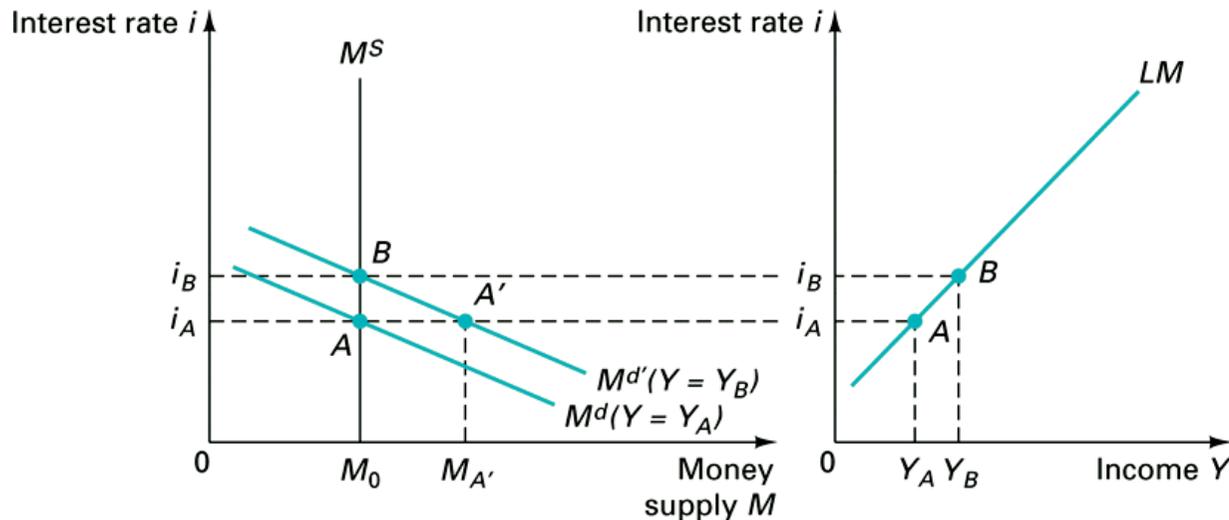
The LM curve depicts the combinations of i and Y which put in equilibrium the money market ...

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 24**: 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 24—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

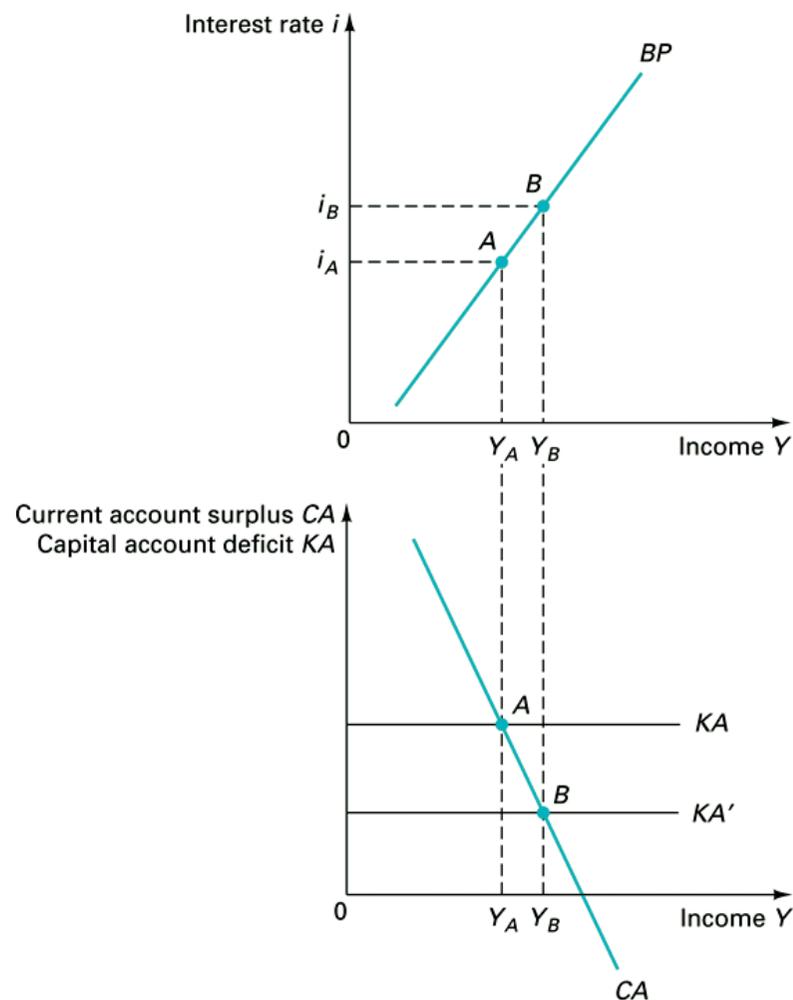
The *BP* curve shows the combinations of Y and i which put the balance of payments in equilibrium—that is: the surplus (deficit) of the trade balance is matched by an equal deficit (surplus) of the capital account—for given price level, exchange rate, etc. ...

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**

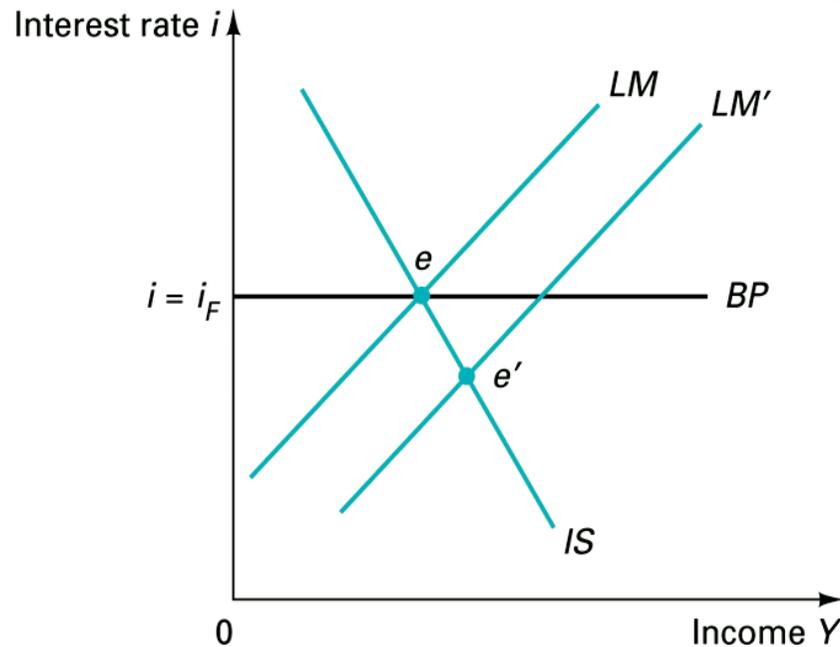
(i) completely ‘**nullifies**’—that is: **kills off**—the **impact** of **monetary policy**, whereas

(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 ...

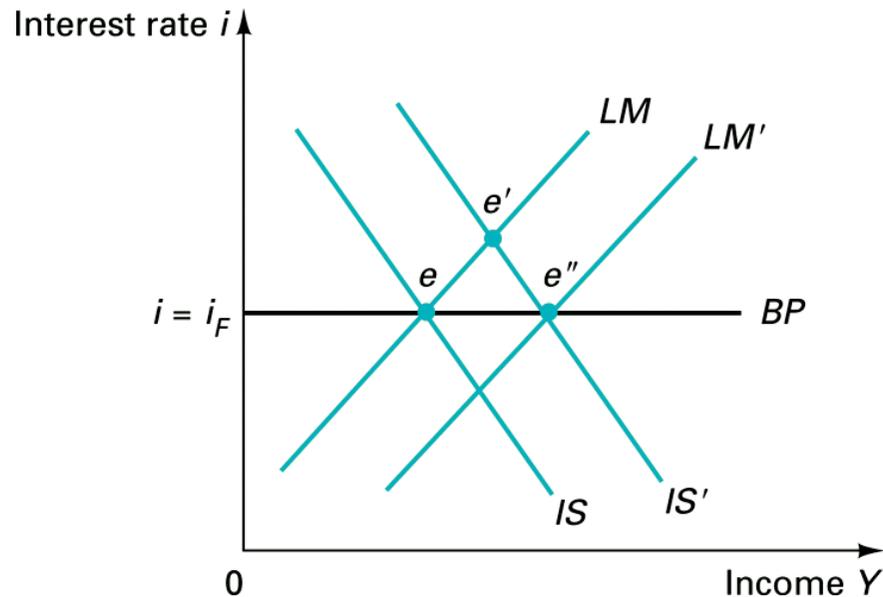
What does that mean? It means that, in **order to maintain the fixed exchange rate**, the **central bank sells foreign currency to buy domestic currency** ...

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

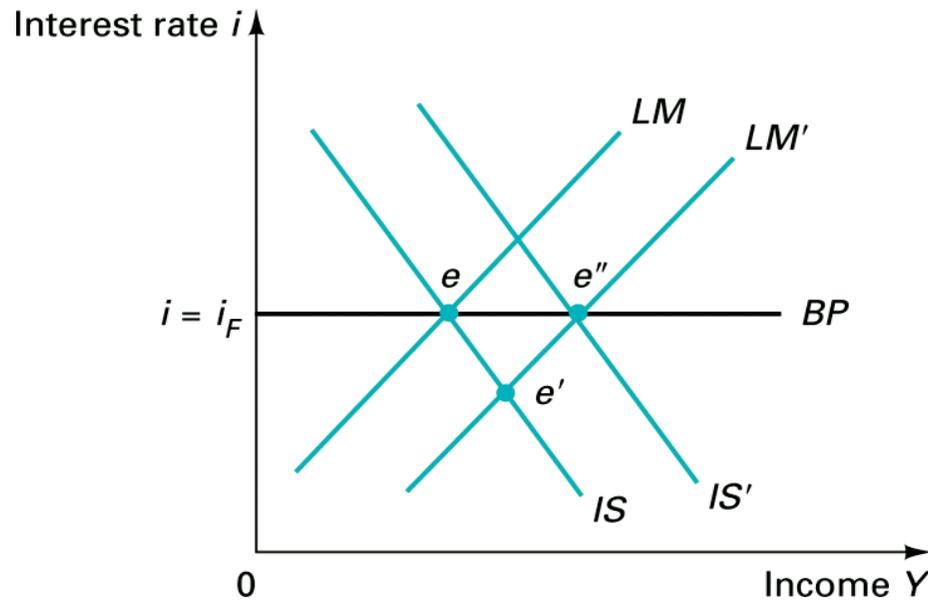
(ii) **fiscal policy** becomes **ineffective** ...

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 ...

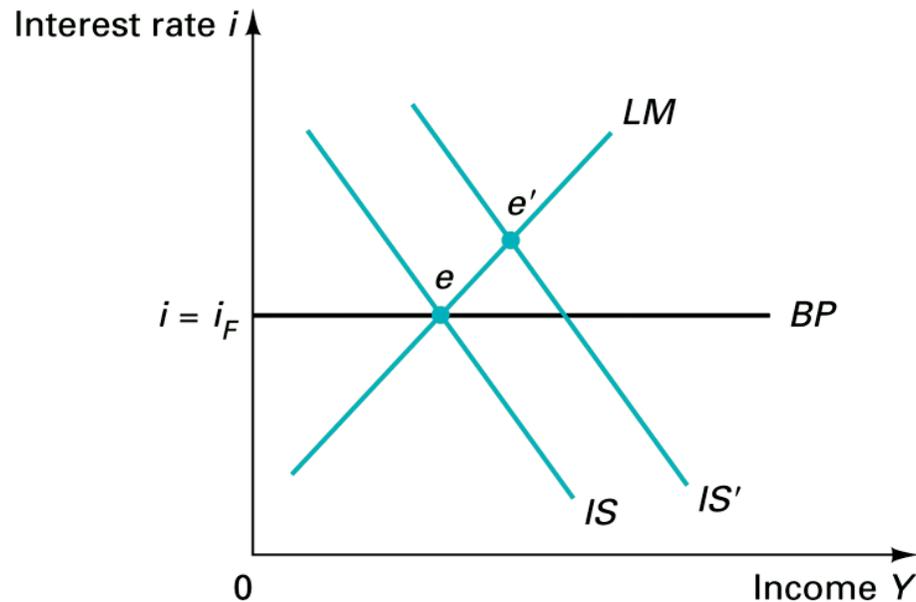
The **depreciation** of the **domestic currency** makes **domestic goods** relatively **cheaper** compared to **foreign goods**, it **stimulates exports**, and it **discourages imports** ...

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 exchange rate appreciation causes exports to decrease and imports to increase, which 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**:

$$\text{Savings: } S = s \cdot Y \quad \text{Imports: } IM = m \cdot Y$$

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** ...

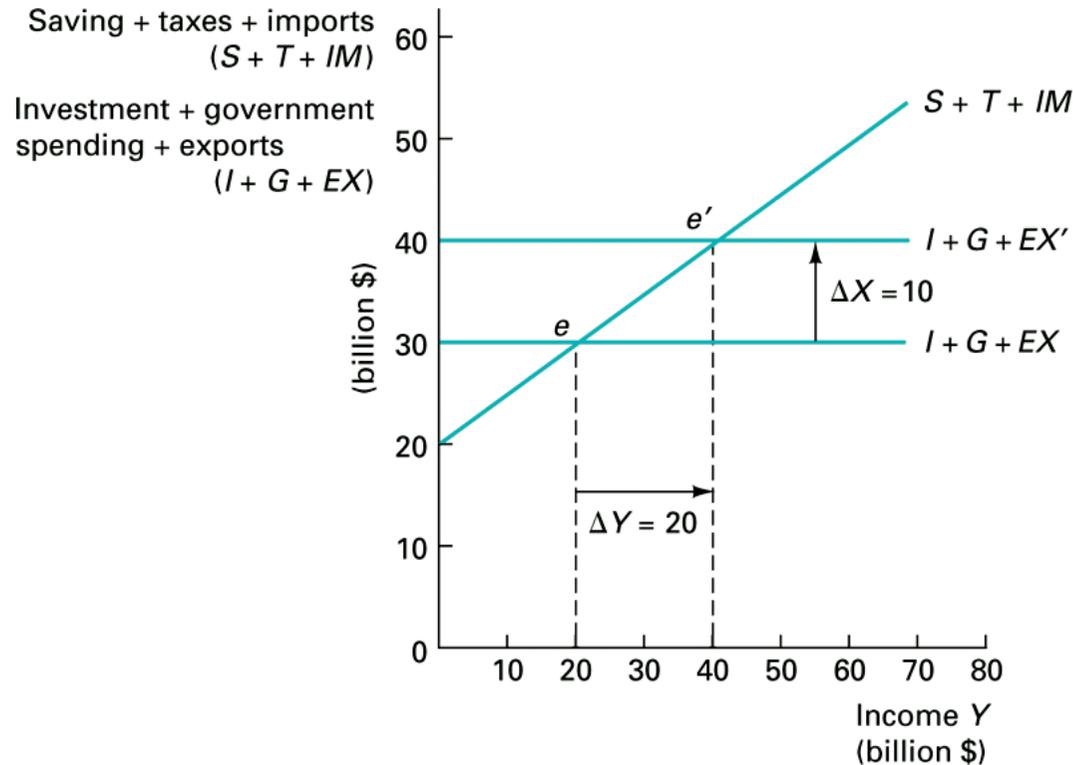
Since s and m are fractions **smaller than 1**, the **multiplier** is expected to be **greater than 1** ...

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** →

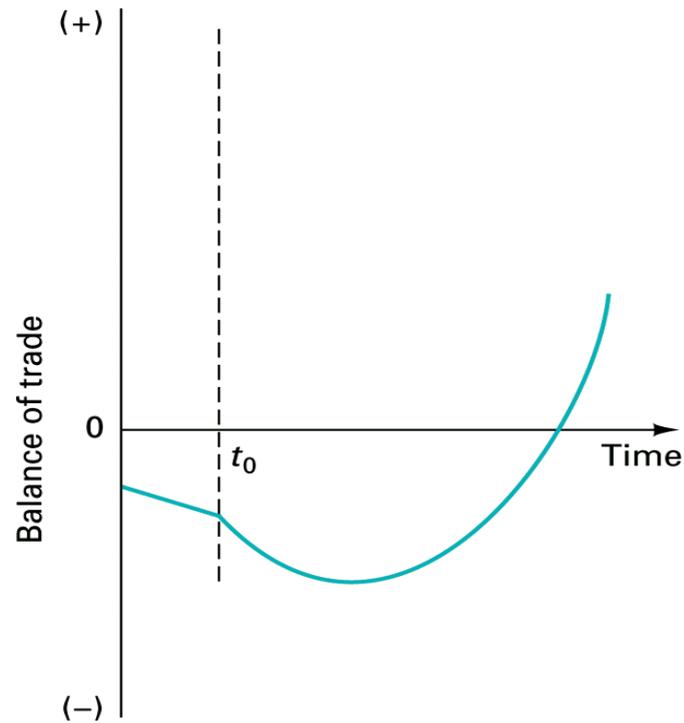
→ **Change in the demand for our imports and our exports** →

→ **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 decade**, the **U.S. Federal Reserve** has dramatically **increased** the **money supply** in order to try to **stimulate** the **U.S. economy** ...

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** ...

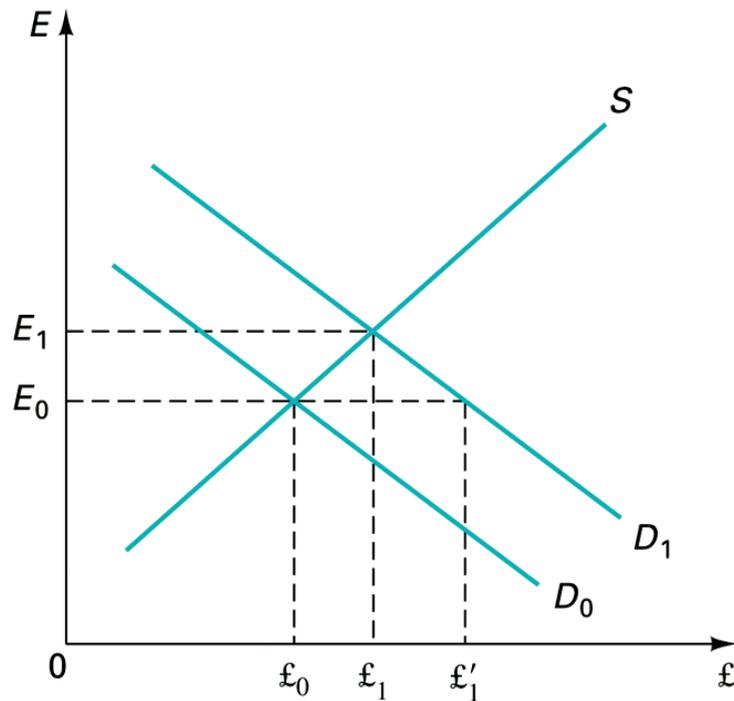
- **Part** of the original **excess** of **money** would also be used by **U.S. firms** and **individuals** to **buy up foreign assets**, but, by definition of a **fixed exchange rate** regime, this would **not** cause any **change** in the **exchange rate** ...

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** had 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** ...

In the past, **China** had kept for a **long time** 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** ...