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Q1

a) The monetarists view on long run expectations of the exchange rate is that the PPP holds. Thus the exchange rate is determined by absolute

Ja ✓

$$E_{\$/€} = \frac{P_{US}}{P_E}$$

where $E_{\$/€}$ is the exchange rate between US$ and €, P_E is the price level in the European Monetary Union and P_{US} is the price level in the US. The PPP says that the exchange rate is determined by the ratio of the two price levels. It furthermore says that a goods and services basket in the US has to cost the same as in the EMU.

$$P_E \cdot E_{\$/€} = P_{US} \quad \text{(law of one price)}$$

The price level is determined by the factors nominal money supply M^S and money demand M^D (nominal). $M^D = L(Y, R) \cdot P$ the money demand is a function of the liquidity preferences $L(Y, R)$ and the price level. The nominal money supply is set by the central bank. In equilibrium those two have to be equal

$$M^S = M^D = P \cdot L(Y, R)$$

Solving this for the price level gives

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$$P = \frac{M^S}{L(Y,R)}$$

2.

In the long ~~run~~ run the liquidity preferences are assumed to be constant since in the long run output Y and the interest R are at their long-run level. So only changes in the money supply can change the price level in the long-run.

$$E_{\$/€} = \frac{P_{US}}{P_E}$$

or P_E goes down

When the price level P_{US} goes up, E will go up and the \$ will depreciate against the €. The \$ will appreciate if P_{US} goes down or P_E increases.

Another theory is the real exchange rate. It does not depend on the PPP to hold. The real exchange rate $q_{\$/€}$ is denoted by

$$q_{\$/€} = \frac{E_{\$/€} \cdot P_E}{P_{US}}$$

It is thus the ratio of two basket in the same currency.

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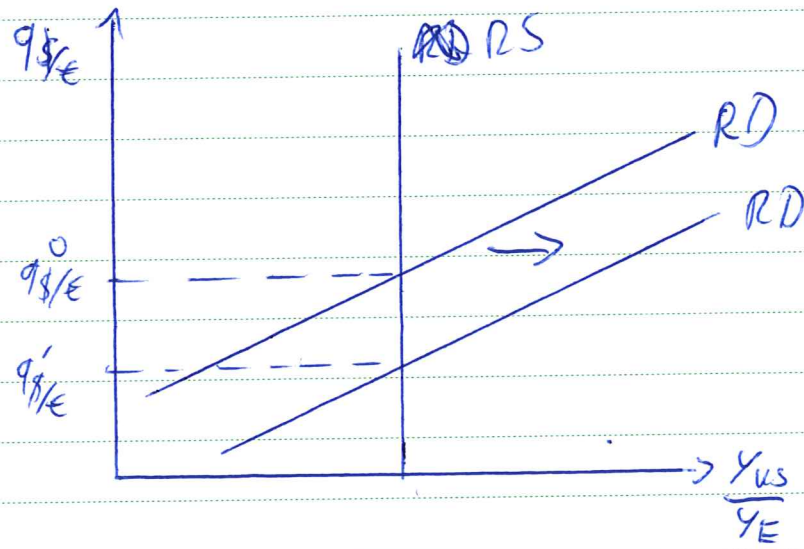
The real ~~is~~ exchange rate is determined by relative demand and supply.

RD: relative demand for US goods (and services)
The demand for US goods increases when the real exchange rate goes up (~~$~~ depreciates), thus it is upwards sloping

RS: relative supply of US goods
The supply of US goods ~~in~~ the long run is influenced by the factors supply and productivity. The ~~relative~~ real exchange rate does not have ~~an~~ an impact, thus it is ~~a~~ constant



positive
~~A~~ A demand shock can now move the relative demand to the right ~~thus~~ and lead to a real appreciation of the $.

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Rewriting the formula for the real exchange rate

$$\frac{P_{US}}{P_E} \cdot q_{\$/€} = E_{\$/€}$$

So a real appreciation of the dollar can lead to a nominal appreciation of the exchange rate, ceteris paribus.
If $q_{\$/€} = 1$ the assolut PPP holds.

and uncertainty

Furthermore, also factors like a country's stability (stable economic situation for investments) can influence the expected exchange rate. See the depreciation of the GBP after their Brexit-votum. (spot and expected ex. rate depreciated).

Jeg mener burde skrevet litt mer presist om forventa. Siden det er det samlet er spurt etter.

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Q1 b)

~~The It is best to show~~ How a shift in the expected exchange rate influences the exchange rate is best to show in the Forex-model.

see page 8 *

3 equations

3 endogenous: $RR_\$$, $RR_€$, $E_{\$/€}$

$RR_\$ = R_\$$ (RR$) the return to domestic investments in the US is determined by the US interest rate ($R_\$$) $RR_\$$: rate of return to $-investments

$RR_€ = R_€ + \frac{E^e_{\$/€} - E_{\$/€}}{E_{\$/€}}$ $E^e_{€}$

(RR€) the return to investments in foreign currency (€) for a US investor is determined by the European interest rate ($R_€$) and the expected change in the exchange rate between $ and €

$RR_€ = RR_\$$ In equilibrium no arbitrage should be possible and thus the two rate of returns have to be equal

$E^e_{\$/€}$: expected exchange rate between $ and €

$E_{\$/€}$: spot rate — " —

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~~Plugging~~ Plugging equation (1) and (2) into (3) gives us the uncovered interest parity (UIP)

$$R_{\$} = \ell_{€} + \frac{E^{e}_{\$/€} - E_{\$/€}}{E_{\$/€}}$$

It says that ~~the US~~ in equilibrium the US interest rate has to equal the €-interest rate plus the expected change of the exchange rate

Next, lets look at a ~~graph~~ graph the ~~US interest rate~~ US rate of return (ror) is constant at the level of the US interest rate.
The ~~ro~~ €-ror is a convex, downwards sloping curve

$$\frac{\partial R_{€}}{\partial E_{\$/€}} = \frac{-1 E_{\$/€} - (E^{e}_{\$/€} - E_{\$/€})}{E^{2}_{\$/€}} = \frac{-E^{e}_{\$/€}}{E^{2}_{\$/€}} < 0 \quad \rightarrow \text{downwards sloping}$$

$$\frac{\partial^{2} R_{€}}{\partial E^{2}_{\$/€}} = \frac{0 - 2E_{\$/€} \cdot (-E^{e}_{\$/€})}{E^{4}_{\$/€}} > 0 \quad \rightarrow \text{convex}$$

the graph thus looks the following

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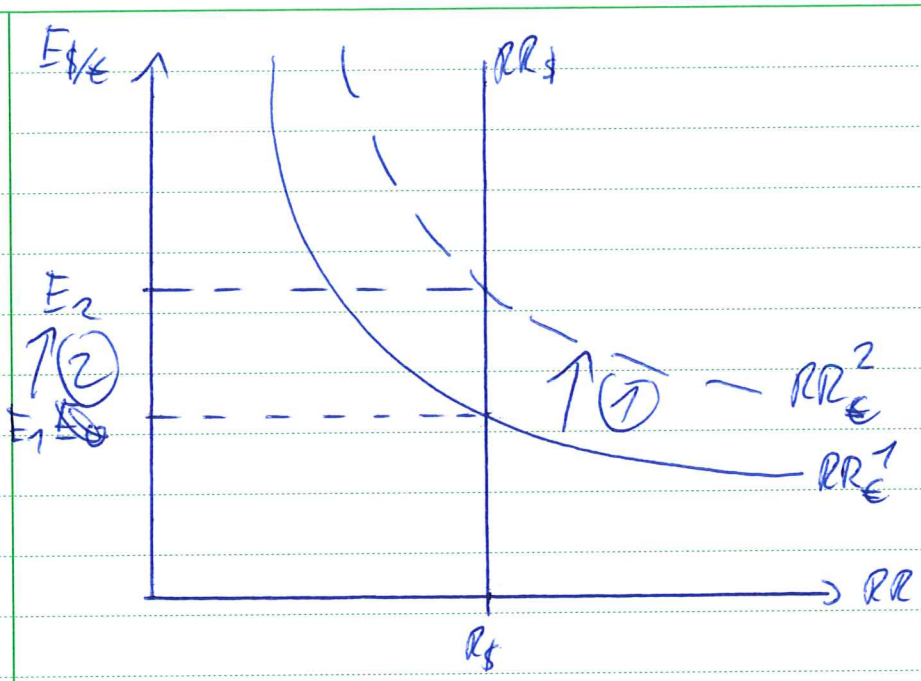

✓ From now on for simplicity $E = E_{\$/€}$ and $E^e = E^e_{\$/€}$

~~A shift in E^e leads to an upwards shift~~
To analyze how the shift ~~effects the~~ in E^e effects E, I will assume an expected depreciation of the \$, thus $E^e \uparrow$. This increase will shift the expected €-ror upwards since

$$\frac{\partial RR_€}{\partial E^e} = \frac{1}{E_{\$/€}} > 0 \quad (1)$$

In the graph this is depicted by the dotted line $RR^2_€$.
Since the US interest did not change, the exchange rate also has to depreciate ~~the~~ E (from E_1 to E_2) for the UIP to hold ~~again~~ (2) and establish the forex market equilibrium.

ja, men dette svaret er litt langdrygt

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The increase in ~~the~~ E^e makes $-investments less

$$R_{\$} = R_{€} + \frac{E^e - E}{E}$$

attractive. Thus investors start to invest their money in € -assets and this demand leads to an appreciation of the € and thus a depreciation of the $

For page (5) (X)

- The model does not take into account risk and liquidity of different assets in different currencies, just the rate of return
- ~~Assumes~~ Assumes PPP to hold

Furthermore,

$\frac{\partial E}{\partial R_{\$}} \leq 0$ → dollar appreciation

$\frac{\partial E}{\partial R_{€}} > 0$ → dollar depreciation

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Q1c)

To analyze ~~the effects~~ the overshooting of the exchange rate, the money market equilibrium will be derived next.

As mentioned in Q1a) ~~the~~ money demand has to equal money supply: $M^D = M^S$

M^S: real money supply M^D real money demand
P: price level $L(Y,R)$ liquidity preferences

Money demand is given by

$$M^D = P \cdot L(Y,R)$$

→ L shifts ~~out~~ up wards if Y increases

$\frac{\partial L}{\partial Y} > 0$ when households have a higher income they also want to hold more liquidity

$\frac{\partial L}{\partial R} < 0$ when the interest rises, the opportunity costs of holding liquidity increases, making it less attractive to hold liquidity

Money supply is ~~set~~ by the central bank at

M^S

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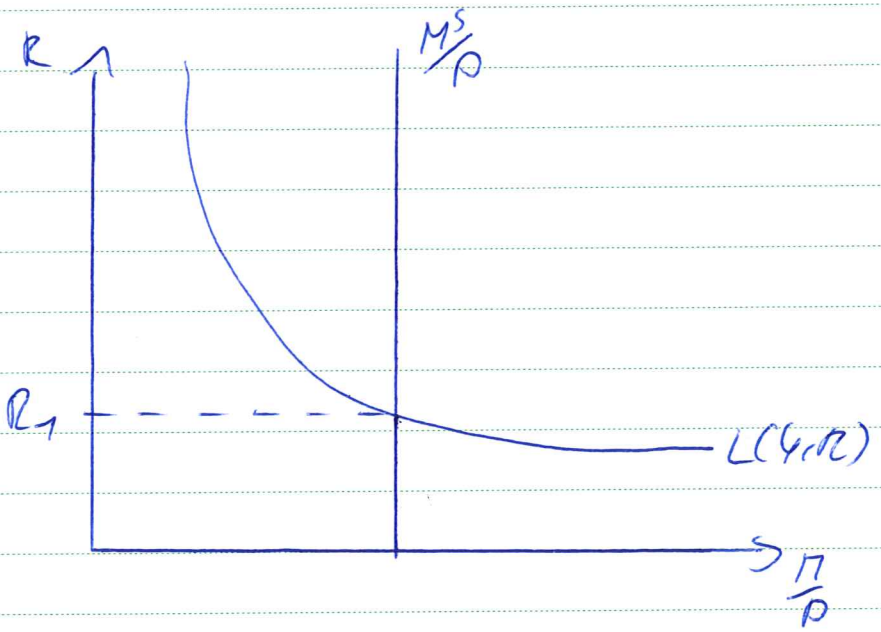
The equilibrium in the money market is given by

$$M^S = M^D = P \cdot L(Y, R)$$

$$\frac{M^S}{P} = L(Y, R)$$



$\frac{M}{P}$ is the real money stock

$L(Y,R)$ is a decreasing $\left(\frac{\partial L}{\partial R} < 0\right)$, convex function, since at some point ~~the effect of~~ an increase in R has no more effect on the liquidity preferences

When money demand and supply are in equilibrium the interest rate R_1 is established.

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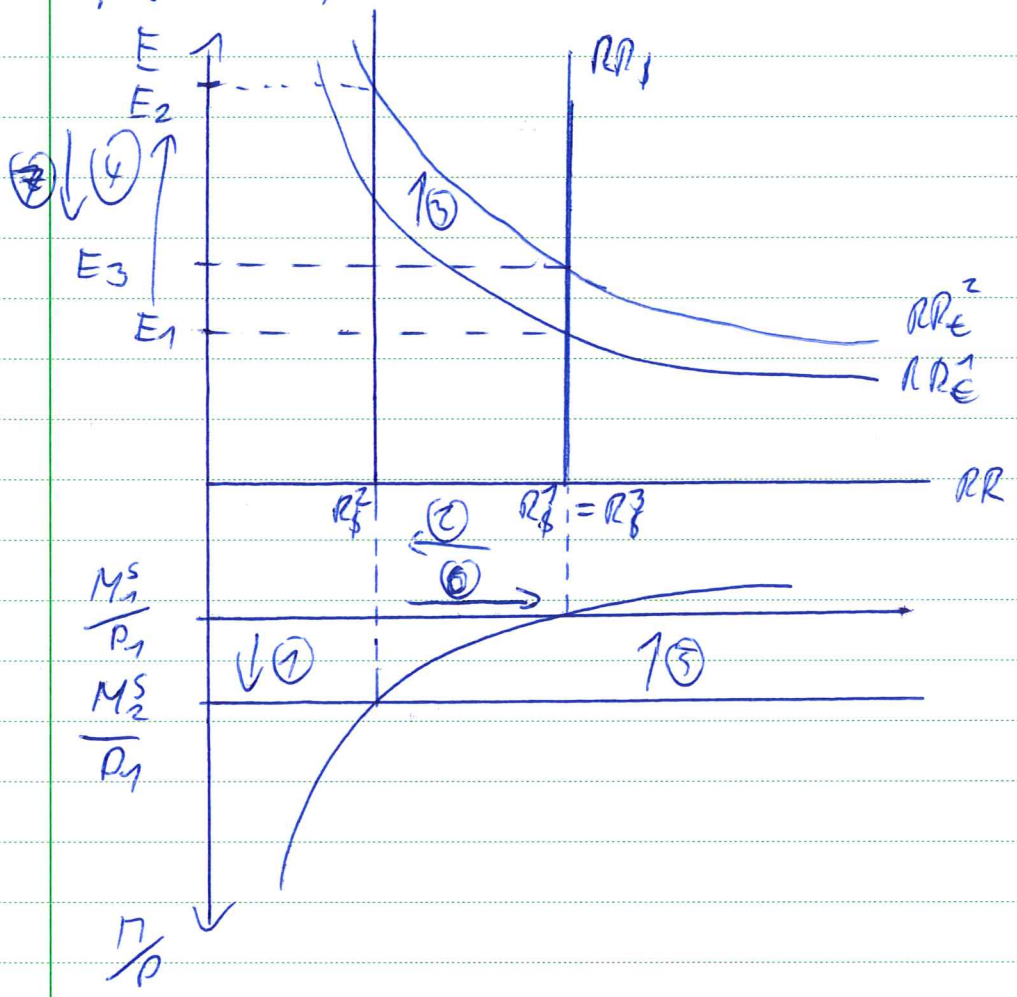
Turning the money market graph 90° and attaching it to the forex market gives the forex-money-market-model:



~~If the~~ In this case the money market is the US money market, whereas the forex market is between the US and the EMU.

An increase in US money supply by the Fed will, in the short run, increase the real money from M_1^S/P_1 to M_2^S/P_1.

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At the start, the money market as well as the forex market are in equilibrium. The equilibrium in the money market establishes the US-interest rate $R_\$$. This interest rate and the €-ror lead to an exchange rate of E_1.

An increase in US money supply ($M^S \uparrow$) by the Fed will, in the short run, increase the real money supply from $\frac{M^S_1}{P_1}$ to $\frac{M^S_2}{P_1}$ (1) since prices do not change in the short run.
Because the liquidity preferences did not change, there is now an excess supply of money. People want to reduce their money holding, thus they start buying bonds. This increases the bond prices and pushes the return down to $R^2_\$$ from $R^1_\$$ (2).

Because of the neutrality of money in the long-run expectations of the exchange rate depreciate. Since In the long-run prices will increase because of

$$P = \frac{M}{L(r, Y)}$$ and the exchange rate will depreciate

since $$E_{\$/€} = \frac{P_{US}}{P_E}$$

This increase in E^e shifts the €-ror upwards (3) from $RR^1_€$ to $RR^2_€$ and leads to a short run exchange rate of E^2. Thus the $ depreciates against the € from E^1 to E^2. (4)

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As mentioned before, ~~the~~ in the long-run prices will increase. Because of the ~~real~~ money neutrality the price level will increase up to the level P_2 so that

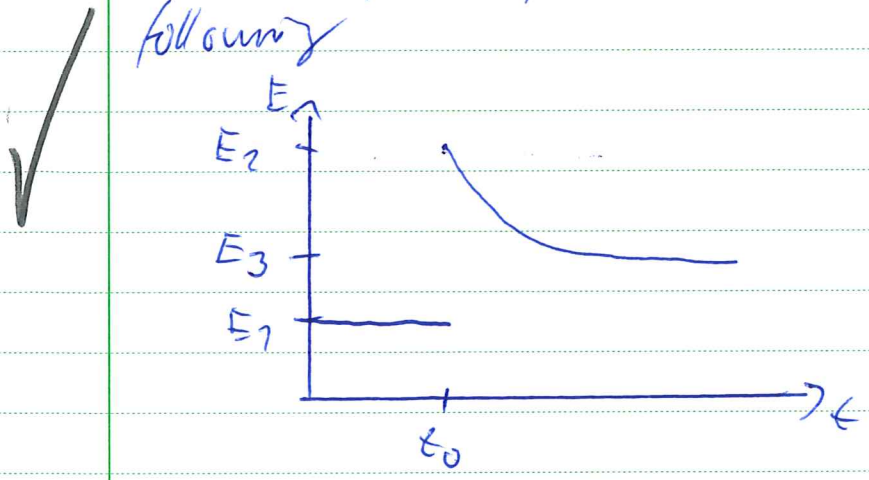
$$\frac{M_1^S}{P_1} = \frac{M_2^S}{P_2} \quad (5)$$

Thus shifting back real money supply to its initial value.

This will decrease the US interest rate, thus, for the UIP to hold the exchange rate must appreciate to E_3 (7)

[to its former level $R_\$^3 = R_\$^1$ (6)]

~~But~~ Because prices change slower than expectations, the exchange rate first overshot its long-run equilibrium. In the long-run the exchange rate will appreciate again to its new long-run equilibrium E_3. The time path for the overshooting looks as following



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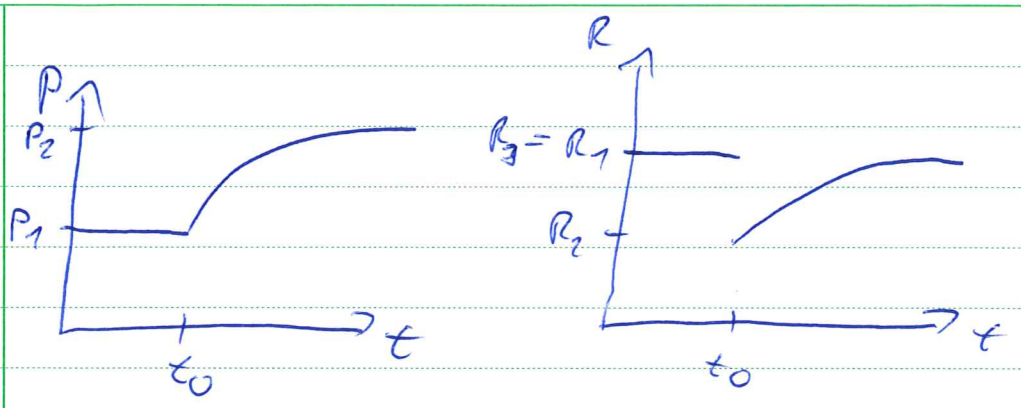

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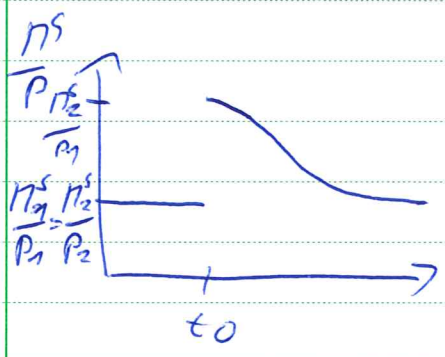

Shifts to the right when: G↑, T↓, MS↑, E↑, P*↑, α↑

Q2

To analyze the following questions ~~first~~ lets first derive the AS-AD model.

Starting with the demand function AD

$$Y = F\left(\overset{+}{G}, \overset{-}{T}, \overset{+}{\frac{M^S}{P}}, \overset{+}{\frac{E \cdot P^*}{P}}, \overset{+}{\alpha}\right)$$

where G: Government spending
T: taxes
$\frac{M^S}{P}$: real money stock
$\frac{E \cdot P^*}{P}$: real exchange rate
α: demand shock parameter

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To understand the intuition behind a price increase on demand lets ~~take~~ look at the Marshall-Lerner-condition. An increase (real depreciation) of the real exchange rate has 3 effects on the current account. $CA = EX - IM$

1) It makes exports relatively cheaper for foreigners, thus it will increase $EX\uparrow$ and $CA\uparrow$

2) ~~CA~~ It makes imports relatively more expensive, thus ~~the~~ imports will decrease $IM\downarrow \rightarrow CA\uparrow$

3) It makes existing imports more expensive thus $IM\uparrow \rightarrow CA\downarrow$

The first two effects are quantity effects, the last one is the price effect. It is now assumed that the quantity effect is ~~the~~ larger than the price effect, thus ~~an~~ a real depreciation will lead to an increase in the current account and thus increase Y.

Now lets look at the effect of P on ~~the~~ demand

When P increases $\frac{E \cdot P^*}{P}$ will decrease and by the first described mechanism Y will go down.
An increase in P also leads to ~~an~~ a decrease in the real money supply $\frac{M^S}{P}\downarrow$ ~~and~~. This will lead to ~~an~~ a ~~decrease~~ increase in the interest rate (see Q1) ~~and~~ $R\uparrow$

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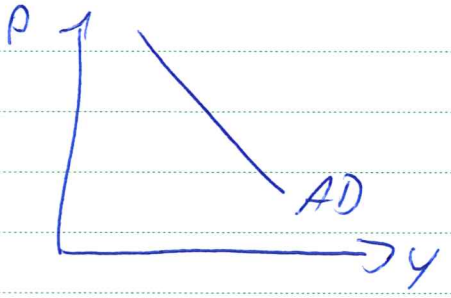
and thus discourage investments I↓. This leads to a lower aggregate demand Y↓.

Thus, there is a negative relationship between P and Y.



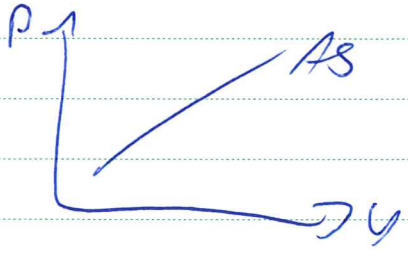
The supply function (AS) is given by

$$y = f\left(\frac{\bar{w}}{p}, \beta^{+}\right)$$

shifts to the right, when w↓, β↑

w = wage
p = price level → $\frac{w}{p}$: real wages
β = technology / supply shock parameter

If P increases, real wages will go down $\frac{w}{p}$↓ thus firms will hire more worker and output will go up. This relationship leads to an upwards sloping AS-curve



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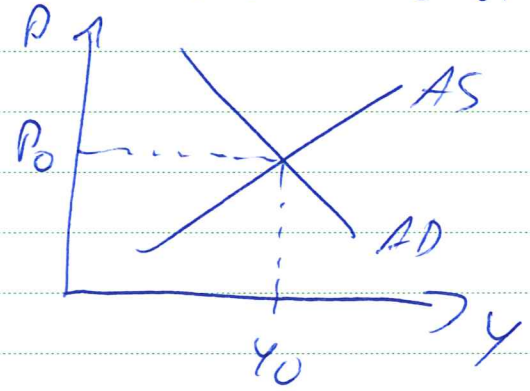
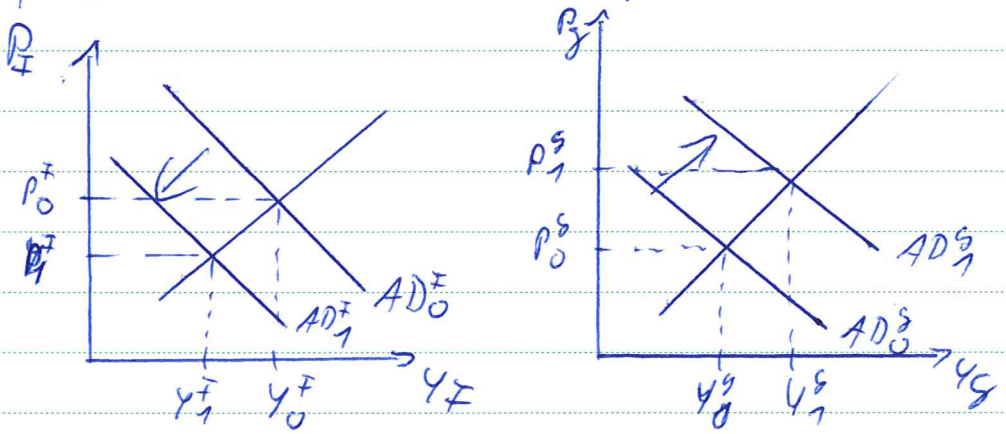
The equilibrium is at the point where both curves intersect (P_0, Y_0)



a) Lets look at the two countries France and Germany. France ~~eff~~ experiences a negative demand shock, whereas Germany experiences a positive one. For ~~example~~ by ~~decreased~~ increased foreign demand. This will shift the AD-curve.



France now has a lower output ~~&~~ $Y_1^F < Y_0^F$ and a lower price level $P_1^F < P_0^F$.
Germany has a higher output ~~and a~~ $Y_1^G > Y_0^G$ and a higher price level $P_1^G > P_0^G$.

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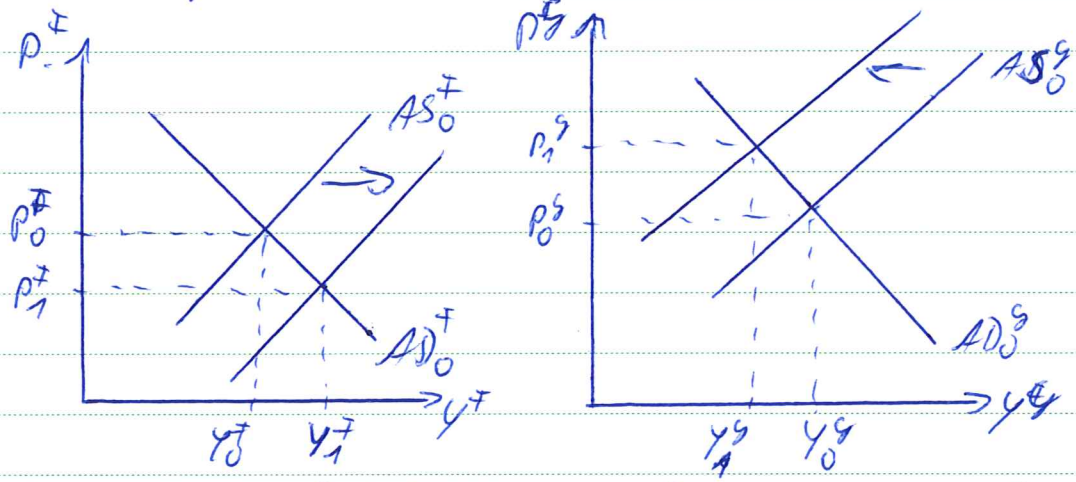
Because the countries are in a monetary union (MU) they cannot use monetary policy to counteract the asymmetric shocks.

A supply shock on the other hand will shift the country's AS - curves



Lets again say that France experiences the negative shock, whereas in Germany it is positive.
France will end up with a higher output $Y_0^F < Y_1^F$ and a lower price level $P_0^F > P_1^F$
Germany's output goes down $Y_1^G < Y_0^G$ and its price level goes up $P_0^G < P_1^G$.

Because the two countries are in a monetary union they now cannot use monetary policy to counteract the asymmetric shocks, but only fiscal policy (see Q2c). The automatic adjustment mechanism (labor mobility, wage adjustment) can also help to counteract the asymmetric shocks (Q2b)

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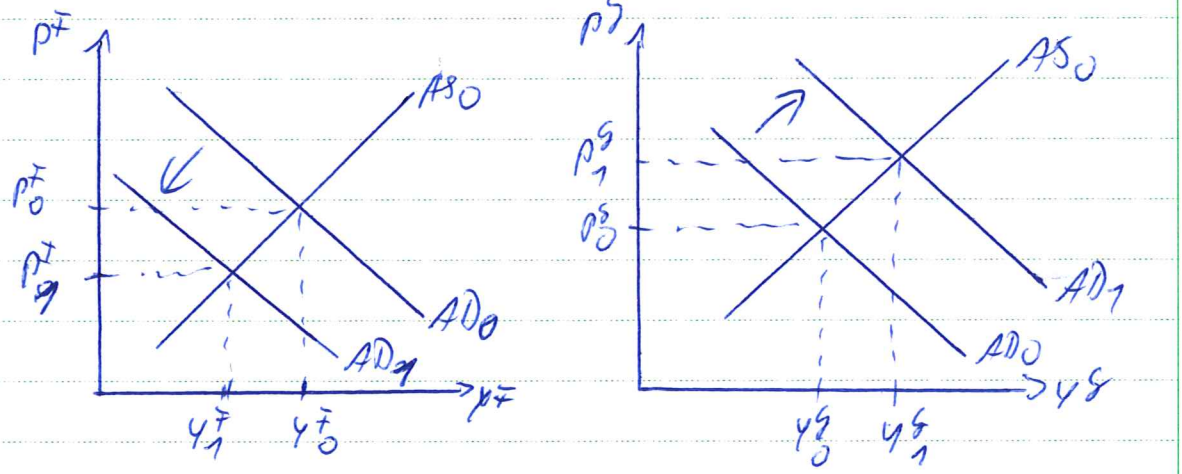
Q25

To analyze how adjustment mechanisms in a MU can reduce the macroeconomic effects of shocks, lets assume asymmetric demand shocks. A negative in France and a positive in Germany. As seen in Q26 this leads to the following graphs.



After the negative shock in France there ~~was~~ now is a lower production/output and unemployment. In Germany the higher output leads to people working overtime and an increased demand for workers.
In this case unemployed workers from France can move to Germany to fill the demand-supply gap for workers. In this case both countries would end up in the state where they are after the shock. Germany has a higher price level and higher output, whereas France has a lower price level and lower output. The problem with this adjustment mechanism is that labor mobility can be limited for example by the ~~foreign~~ language barrier.

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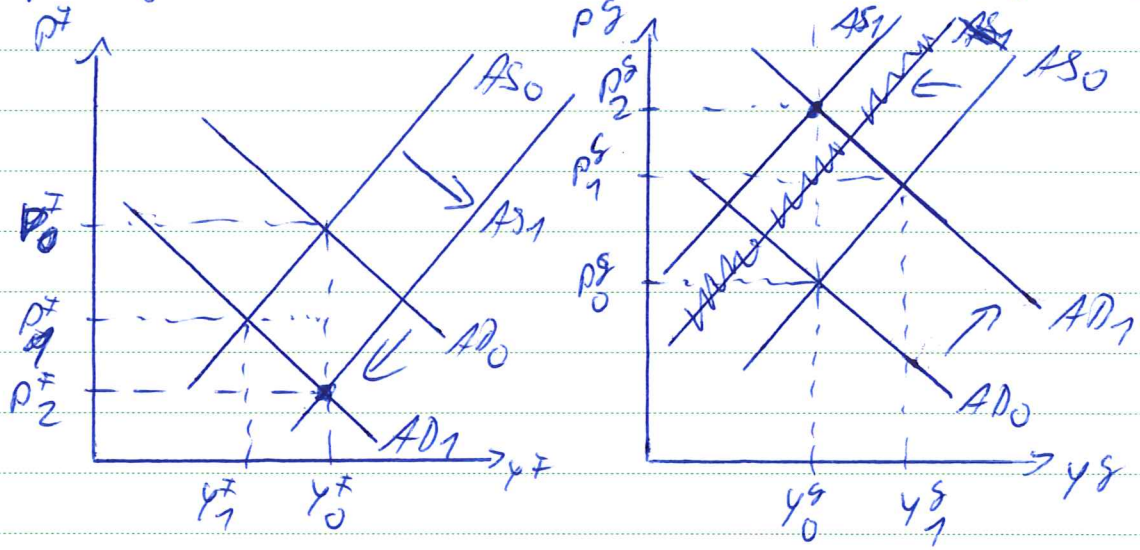
Furthermore, people and countries are not indifferent to changes in their price level.

A further adjustment mechanism is the adjustment of wages. Lets look at the same scenario again



The ~~new higher price level and the~~ fact that people are working overtime can lead to increases in the ~~real wage~~ wages ~~and~~ in Germany can thus shift the AS-curve to the left. ~~Now~~ Now German output is back at its initial point, but German price level is even higher than immediately after the shock

$P_2^G > P_1^G > P_0^G$

In France the unemployment can lead to a decrease in wages and thus shifts the AS-curve to the right. The output is then back at its initial value but the price level decreased further

$P_2^F < P_1^F < P_0^F$.

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Once more, the

The problem with this adjustment mechanism is that countries are not indifferent to changes in their price level. Furthermore, wages ~~are~~ are not fully flexible.

If there are symmetric shocks, this adjustment mechanism won't take place, since either both countries experience unemployment ~~or~~ ~~over~~ "over-employment / overproduction.

In conclusion, the adjustment mechanisms can help to contribute to macroeconomic balance, however they can also lead to large changes in the price level and ~~or~~ or keep the economy at the ~~out~~ higher/lower output and price level after the shock.

Også andre forhold kan trekkes inn

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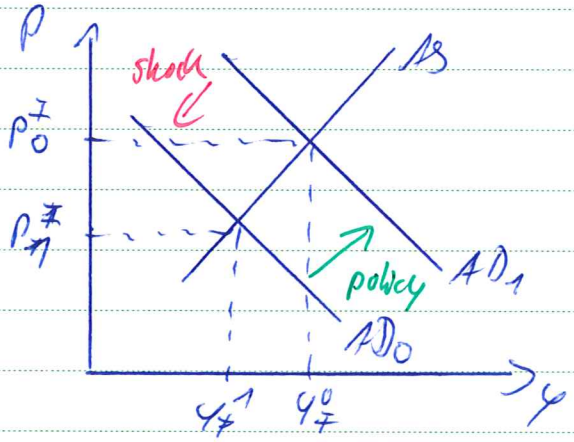
(Q2c)

Again, I will look at a demand shock.
In case of an asymmetric demand shock, the country experiencing the negative shock could increase government spending ~~thus shifting~~ and/or decrease taxes, thus shifting the AD-curve ~~back~~ back to its initial level.



This would bring the economy back to its initial price level P_0^2 and output level Y_0^2.

The country that experienced a ~~negative~~ positive shock could do the opposite.

Another solution that establishes the initial equilibria is that the country with the positive shock (Germany) pays transfers to ~~the~~ one with the negative shock (France). This could also be seen as a French tax reduction and a ~~tax~~ German tax increase.

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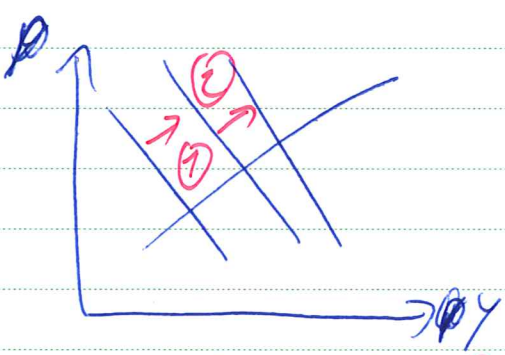
If both countries experience a negative demand shock, they can also use monetary policy to counteract the symmetric shock. The ECB would then increase r^s ↑ which would lead to an increase in I ↑ and thus shift the AD-curves (effect described at beginning) of both countries, counteracting the negative demand shock.

Government's ability to solve the negative demand shock by increasing ~~government~~ government spending G↑ or decreasing taxes T↓ can be ~~limited~~ limited if they already have very high debt.

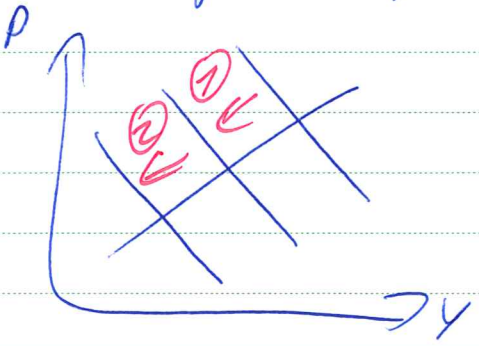
In this case the market could question their ability to solve the ~~problem~~ problem. This could lead to capital outflows. This would lead to an increase in the interest rate r↑, pushing down I↓ and shifting the AD-curve even further, thus amplifying the shock.

The country with the positive demand shock could experience the opposite effect, capital inflows, because it now has a booming economy.

Skal jo tilfredsstille en intertemporal budsjettbet.



positive demand shock (1) and amplification (2)



negative demand shock (1) and amplification (2)

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In a monetary union, asymmetric shocks cannot be counteracted by monetary policy, only symmetric ~~But outside a monet~~ shocks can.
But outside a MU a country can use fiscal as well as monetary policy to counterbalance shocks. Both ~~policy~~ policies as shown before will shift the AD-curve back to the right after a negative shock

MP: ~~RS~~ $\pi^e \uparrow \rightarrow \frac{\pi^e}{\rho} \uparrow \rightarrow R \downarrow \rightarrow I \uparrow \rightarrow$ shift AD

FP: $G \uparrow \rightarrow$ shift AD

and thus restore ~~their~~ the initial ~~level~~ price level and level of output.

Furthermore, a country could change its labor market regulations to increase employment ~~or~~ try to increase productivity thus shifting the AS-curve to the right. This can be done inside and outside a monetary union.