

The questions written in red are voluntary

Justify all your answers

Question 1. Money multiplier model (20%). The European Central Bank (ECB) has adopted several measures to counteract the adverse economic impact on the eurozone of the coronavirus pandemic. One of those measures reads as follows.

“We are being temporarily less strict about the amount of funds, or ‘capital’, that banks are required to hold as a buffer for difficult times.”

<https://www.ecb.europa.eu/home/search/coronavirus/html/index.en.html>

- (i) What concept in the money multiplier model would correspond to ‘the amount of funds ... that banks are required to hold’?

The concept is the reserve requirements (also acceptable the reserve ratio).

- (ii) Explain how the money multiplier process represented in the model would be affected by the ECB measure.

The money multiplier process involves the cycle ‘loans → expenditure → revenue → deposits → loans → ...’

Reserve requirements (and the reserve ratio) have an impact on the step ‘deposits → loans’: lowering the reserve requirements allows banks to make more loans per unit of deposits. As a result, the multiplier process is magnified: more loans generate more expenditure, that gives rise to more revenue, that creates more deposits...

- (iii) Explain how the ECB measure would affect the money multiplier.

It has been argued in (ii) that the multiplier process is magnified. This means that the outcomes of the process are larger; in particular, the ECB measure will increase the amount of deposits the process generates. More deposits means higher M1 and, hence, since M0 has not changed, a larger money multiplier.

Question 2. Liquidity market model (25%). The European Central Bank (ECB) has adopted several measures to counteract the adverse economic impact on the eurozone of the coronavirus pandemic. One of those measures states the following.

“The €750 billion Pandemic Emergency Purchase Programme (PEPP) aims to lower borrowing costs and increase lending in the euro area. This in turn should help citizens, firms and governments get access to funds they may need to weather the crisis.

We buy several different kinds of assets in this programme. For example, when we buy bonds directly from banks, we make more funds available that they can lend to households or businesses. We can also buy companies’ bonds, giving them an additional source of credit. Both kinds of purchases help boost spending and investment, with the aim of supporting economic growth.”

<https://www.ecb.europa.eu/home/search/coronavirus/html/index.en.html>

- (i) To what concept explained in the course does the PEPP correspond? Justify your answer.

As the measure itself asserts, ‘We buy several different kinds of assets in this programme’. Therefore, through the PEPP, the central bank buys financial assets. The concept representing this activity is ‘open market operation’ (of the expansionary kind).

- (ii) Explain what kind of monetary policy the PEPP represents.

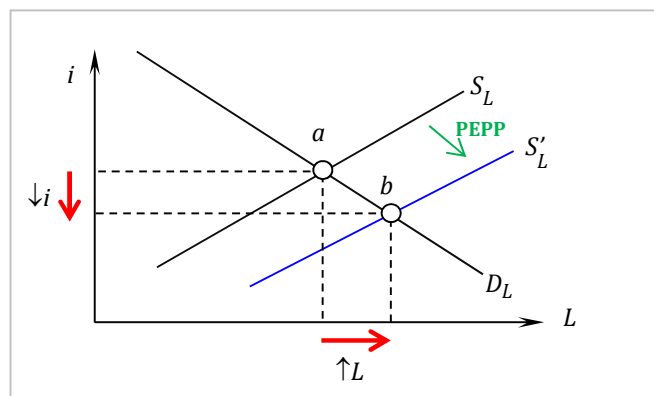
A central bank buying financial assets is an example of an expansionary monetary policy: assets enter the central bank and liquidity flows from the central bank to the economy.

- (iii) Show, in a graphical representation of the liquidity market model, the effect (on both the interest rate and the volume of liquidity) of a measure like the PEPP. Identify which functions change and explain why. Explain as well if the changes found in your analysis are consistent with the aim of the PEPP, namely, ‘to lower borrowing costs and increase lending’.

The PEPP increases the supply of liquidity (as explained in (i)) and, in the model, is represented by a shift to the right of the supply of liquidity function.

The result of this shift is a fall in the interest rate (which represents the main borrowing cost) and a rise in liquidity (a higher lending), so the effects of the PEPP that the model predicts are consistent with the aim of the PEPP.

The PEPP does not change the demand for liquidity function, but through a smaller interest rate it does change the volume of the demand for liquidity.



Another of those measures holds that

“In times of great uncertainty, banks may find it harder to secure funds for short-term needs. We aim to help smooth over any temporary funding issues for solvent banks by offering immediate borrowing options at favourable rates. This support helps banks continue granting loans to citizens and firms in need.”

- (iv) To what concept explained in the course does 'offering immediate borrowing options at favourable rates' correspond? Justify your answer.

The concept of 'standing facilities' captures all those instruments that allow banks to immediately borrow from, or lend to, the central bank directly. More specifically, the measure described would correspond to the lending facility (through which banks can meet immediate needs for liquidity).

Question 3. Currency market model (25%). The European Central Bank (ECB) has adopted several measures to counteract the adverse economic impact on the eurozone of the coronavirus pandemic. One of those measures reads as follows.

“Central banks around the world hold reserves of currencies that are not their own. This is because their domestic banks also do business in these currencies, and thus sometimes require foreign-currency loans in the course of daily business.

In times of great uncertainty, customers’ demand for foreign currency assets can increase. If banks do not have enough foreign currency reserves on hand to meet increased demand, markets can become unstable. So central banks have established so-called currency swap lines. These swap lines let central banks of one country exchange their national currency reserves for those of the central bank of another country – thus ensuring that central banks can meet increased demand.

We have recently reactivated swap lines and enhanced existing swap lines with central banks across the globe...”

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- (i) Explain why ‘In times of great uncertainty, customers’ demand for foreign currency assets can increase’.

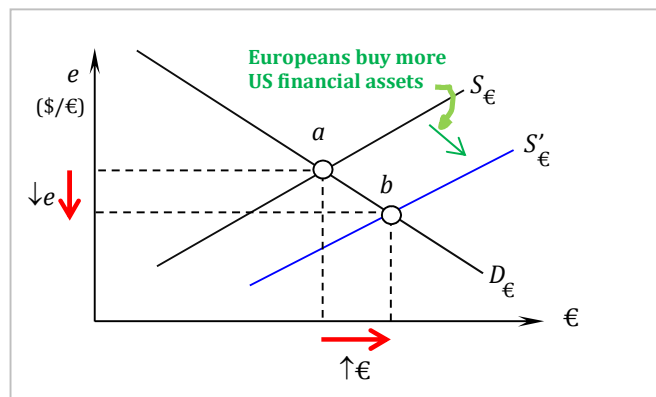
There are many admissible justifications of the claim. A simple one is that, under great domestic uncertainty, at least by comparison, foreign economies may look safer to domestic investors. This argument is less solid if uncertainty is global.

- (ii) Show, in a graphical representation of the currency market model in which the euro is the domestic currency and the dollar the foreign currency, the effect on the exchange rate of Europeans willing to purchase more American financial assets.

If Europeans would like to purchase more American financial assets, they will demand more dollars to buy the assets. And to buy the dollars they have to sell euros. In sum, the supply of euros function shifts to the right.

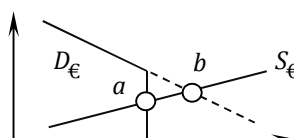
Since it is just Europeans that would like to buy more abroad, the decision plans by Americans (captured by the demand for euros function) remains unchanged.

The shift to the right of the supply of euros function causes a fall in the exchange rate. Since this exchange rate is measured in \$/€, the exchange rate fall means that the euro depreciates against the dollar.



- (iii) Assuming that banks are the main suppliers of foreign currency in normal circumstances, represent in the currency market model the fact that European banks have a limited amount of dollars to sell.

If banks are the main suppliers of dollars and the amount supplied has a maximum, it could be interpreted that the demand for euros function is initially decreasing but, reached the maximum amount, it becomes vertical.



If the demand for euros function is ‘broken’ due to a lack of dollars, the equilibrium will be reached at a . The purpose of the swap lines is to remove that restriction by granting banks access to more dollars. Thus, with central bank support, the equilibrium will be reached at a point like b , where more euros (and hence more dollars) are exchanged. Why is b more desirable than a ? Because the extra dollars in b with respect to a allow Europeans to buy abroad what they intend to buy.

- (iv) Represent in the currency market model the fact that the European Central Bank makes use of a swap line with the Federal Reserve to compensate a possible insufficient supply of dollars by European banks.

In this situation the ECB would sell euros to buy dollars (the currency that the ECB cannot create) and the Federal Reserve would do the opposite. That the ECB activates a swap line would mean that the supply of euros function would shift to the right (since the ECB supplies euros and demands dollars).

- (v) Extend the analysis in part (ii) assuming that ‘the great uncertainty’ also affects Americans.

This question involves replicating the analysis in (ii) from the American perspective. Therefore, Americans interested in buying more European financial assets would imply a shift to the right of the demand for euros function. Combining this change with the shift to the right of the supply of euros functions from (ii), the result is that more euros change hands in the market but the effect on the exchange rate is uncertain: if the demand shift is stronger than the supply shift, the euro appreciates; if it is weaker, the euro depreciates; and if both shifts have the same intensity, the exchange rate remains constant.

- (vi) Show, in a graphical representation of the currency market model in which the euro is the domestic currency and the dollar the foreign currency, the effect of a swap line in which the European Central Bank buys dollars from the Federal Reserve.

The answer to (iv) also answers (vi): the supply of euros function shifts to the right (the ECB sells euros to buy dollars) and the exchange rate falls (meaning that the euro depreciates against the dollar).

Question 4. AS-AD model (30%). The European Central Bank (ECB) has adopted several measures to counteract the adverse economic impact on the eurozone of the coronavirus pandemic. Some of those measures consist of the following.

“We have kept our key interest rates at historically low levels so borrowing costs remain low.

Our rates impact how much it costs to take out a loan. Low rates make it easier for people and companies to borrow funds, and should support spending and investment.

We have increased the amount of money that banks can borrow from us and made it easier for them to borrow specifically to make loans to those hardest-hit by the spread of the virus, including small and medium-sized firms.”

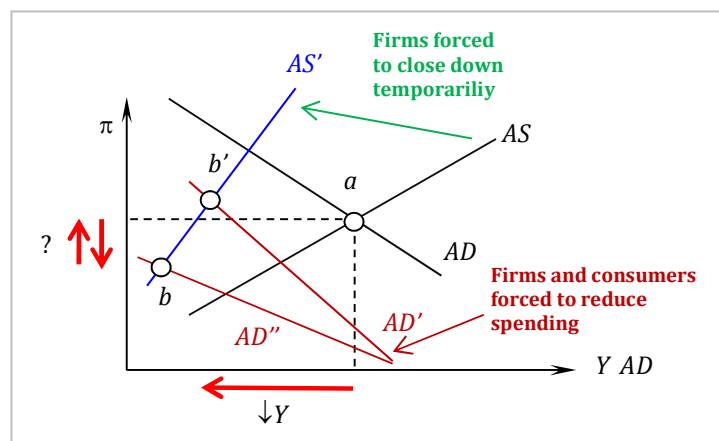
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- (i) Show, in a graphical representation of the AS-AD model, the effect on the inflation rate and GDP of a two-month general lockdown (justify the shifts in AS or AD).

The lockdown is, at the same time, a negative supply shock and a negative demand shock. The AS function shifts to the left because a large percentage of production activities cease: it is just like closing down firms. The AD function shifts to the left because a large percentage of expenditure is not made: it is like a fraction of consumers and firms disappearing.

The effect on GDP is clear: the supply shock and the demand shock both reduce GDP. The effect on the inflation rate is, theoretically, uncertain. In practice, the shock to demand is likely to be more intense than the shock to supply, in which case the inflation rate will fall.

In the graph below, the macroeconomic equilibrium moves to a to b rather than from a to b' : the AD' function represents the case in which the supply shock is the most intense, whereas the AD'' represents the case in which the demand shock is the most intense.



- (ii) Show, in a graphical representation of the AS-AD model, the effect on the inflation rate and GDP of lowering borrowing costs for consumers and making it easier for banks to make loans to firms (justify the shifts in AS or AD).

The two measures facilitate spending and production and, therefore, they represent positive shocks to supply (firms need credit to finance production activities) and demand (a sizeable proportion of consumption and investment is credit-based). The situation is the reverse of what occurs in (i): the AS function and the AD function both shift to the right. As a result, GDP necessarily expands, whereas the effect on the inflation rate is uncertain (if the AD expansion dominates the AS expansion, the inflation rate would go up – this situation would be represented by the graph above, with the AS function moving from AS' to AS and the AD function from AD'' to AD).

- (iii) Show, in a graphical representation of the AS-AD model, the effect on the inflation rate and GDP of an increase in the transfers that the government pays to firms and workers (justify the shifts in AS or AD).

In terms of the AS-AD model, the analysis of (iii) is identical to the analysis in (ii): the government transfers to firms constitute a positive supply shock, while the transfers to workers constitute a positive demand shock (the workers are consumers). Therefore, the AS and the AD functions both shift to the right.

A difference with respect to the analysis in (ii) comes from the way in which the government transfers are financed. In this issue is taken into account, then the demand shock could actually be less positive than initially presumed. For instance, if the transfers are financed with additional taxes, those taxes could lower consumption (and hence AD); if the transfers are financed by issuing debt, the government demand for liquidity could increase the interest rate and that increase, in turn, could lower consumption and investment (and therefore AD).

(iv) Let the general lockdown be expected to last five more months. Show, in a graphical representation of the AS-AD model, the effect on the inflation rate and GDP of that expectation: (a) first taking into account only the reaction of the private sector; (b) adding next the likely response of the public sector; and (c) adding finally the behaviour of the foreign sector.

(a) This expectation will reinforce the negative shock on supply and demand: more firms will be forced to close down definitively and consumers may cut spending to what is essential, which in turn will force more firms to close down, which will rise unemployment and hence induce more consumers to cut spending.

(b) The likely reaction of the public sector is to increase transfers to support firms (subsidies, postponing tax payments) and consumers (basic income proposal, extending in time unemployment benefits). This reaction will, in part, neutralize the negative effect on the AS and the AD functions. The problem is that this solution can only be temporary: the transfers made by the government just move the problem to the future (if economic activity recovers, the government will be able to collect taxes to pay the debt incurred by increasing transfers now).

Another public sector reaction comes from monetary policy: central banks will flood the economy with liquidity and reduce as much as possible interest rates. The presumed effect of these policies is an AD expansion (and also an AS expansion, as firms could survive thanks to access to easy and abundant credit).

(c) As explained in (a), consumption will fall. That includes consumption of foreign goods. Therefore, imports will decrease (paradoxically, in the AS-AD model, this boosts AD – because $AD = C + I + G + EX - IM$, so a fall in IM implies a rise in AD).

The interest rate fall makes financial investment by foreigners less attractive. That would lower the demand for the domestic currency and cause a depreciation of the domestic currency. That depreciation would contribute to expand EX (and therefore AD).

If the lockdown is global, the rest of the world will also reduce their imports, which are the economy's exports (for instance, the economy will receive fewer tourists). That reduction will reinforce the AD contraction (Spain now, where tourism contributes to GDP more than 10%).

Question 5. Suppose that the government of a country decrees that every person entering the country (be that person a foreigner or a national) must endure a two-week lockdown, as a measure to prove that the person is COVID-free.

Explain, with the help of graphical representations, the effect of this measure on the interest rate, the exchange rate, the inflation rate and GDP (and, through Okun's law, the unemployment rate).
