

Open Economy Macroeconomics: The IS-LM-BP Model

When we open the economy to international transactions we have to take into account the effects of trade in goods and services (i.e. items in the current account) as well as trade in assets (i.e. items in the capital account). Opening the economy to international trade in goods and services means that we have to take into account the increased demand for our goods by foreigners (our exports), as well as the decreased demand for our goods that occurs because we purchase foreign goods (i.e. our imports).

Total expenditures in an open economy are $C + I + G + NX$, where NX -- net exports -- is equal to the level of exports (X) less the level of imports (V). Thus, our exports (X) represent spending by foreigners on domestic goods so they increase the level of domestic output. Imports (V), on the other hand, represent spending by domestic residents on foreign goods, so they decrease the level of (domestic) production. To analyze the effect of exports and imports on the equilibrium level of output, it is important to understand the various factors which determine the levels of exports and imports.

Exports represent foreign demand for our goods and services. Foreign purchases of goods and services depend, among other things, on foreign income levels (just as our purchases of goods and services depend on our income levels). We assume that foreign income levels are constant, thus, foreigners demand a constant amount of our goods. Whether foreigners buy our goods, or some other country's goods, or their own goods, depends on the relative prices of those goods. The lower our relative price, the more of our goods they will purchase. The exchange rate is an indicator of the relative price of our goods to foreigners. We will use " e " as the domestic price of foreign currency (i.e. how many dollars must be given up to receive 1 unit of foreign currency). Let's say that e is initially 1.5. If $e \downarrow$, then a domestic resident will have to give up fewer dollars to get an additional unit of foreign currency ($e_1 < e_0$); foreigners, on the other hand, will need to give more of their currency to receive \$1. A decrease in e , also called a revaluation under fixed exchange rates or an appreciation under flexible exchange rates, allows domestic residents to buy the same amount of foreign goods using less domestic currency. If $e \uparrow$, domestic residents will need to give more currency to receive one unit of foreign currency. An increase in e , also called a devaluation under fixed exchange rates or a depreciation under flexible exchange rates, means domestic residents must give up more currency to buy the same amount of foreign goods. If e increases (i.e. our currency devalues -- it is worth less), foreigners don't have to give up as much of their currency to purchase the same quantity of our goods, therefore, the relative price of our goods to foreigners has fallen: they purchase more of our goods. Thus, an increase in e causes exports to increase. An increase in e causes imports to fall (because foreign goods are relatively more expensive).

To sum up, exports are determined by foreign income levels (which we assume to be constant) and the exchange rate. An increase in e causes X to increase. A decrease in e

causes X to fall. If e is unchanged, X is constant. Imports (V) are domestic purchases of foreign goods. Imports represent expenditures on foreign goods instead of domestic goods. Thus, the level of domestic production does not have to be as high when we import goods and services. The domestic demand for goods and services is determined by the domestic level of income: a higher level of income means a higher level of consumption -- consumption of both domestic and foreign goods. Thus, an increase in (domestic) income increases the level of imports. Similar to the case of exports, whether we purchase domestic goods or foreign goods depends on the relative prices of the goods. The exchange rate is an indicator of those relative prices. An increase in e (a depreciation in the value of the domestic currency) means that domestic residents have to give up more domestic currency to receive the same quantity of a foreign good. Thus, the relative price of that foreign good has risen and therefore, less of it will be purchased by domestic residents. So, an increase in e will cause a decrease in imports: a higher e raises the relative cost of foreign goods and therefore reduces V . Conversely, a decrease in e lowers the relative price of foreign goods and therefore increases V . Thus, imports are determined by domestic income levels and the exchange rate. An increase in Y or a decrease in e causes V to increase. A decrease in Y or an increase in e causes V to decrease.

The effect of opening the economy to trade in goods and services, is that the IS curve needs to be specified for a given exchange rate. The IS curve still depicts the combinations of i and Y for which the level of total expenditures equals the level of production, but now, in addition to being determined by the interest rate, total expenditures are also determined by the exchange rate (since the exchange rate affects the level of NX). Under a fixed exchange rate regime, the IS curve is fixed (unless there is a change in government spending or tax rates, or the government devalues or revalues the currency). Under a flexible exchange rate regime, the price of foreign exchange fluctuates to equate the demand and supply of foreign exchange. Thus, e changes on a frequent basis.

Whenever e changes, the IS curve shifts. If e increases (the domestic currency depreciates), X increases, V falls, thus, NX increases, which means total expenditures have risen, therefore the IS curve shifts to the right. If e falls (the domestic currency appreciates), X falls, V rises, thus NX falls and the IS curve shifts to the left. When discussing the effects of various policies (fiscal and monetary), you must be certain of the exchange rate regime: you get different answers with a flexible regime than with a fixed regime.

To examine the effect of trade in financial assets (i.e. capital flows) we need to construct a BP curve. The BP curve shows the various combinations of interest rates and income levels for which the Current Account (CA) and the Capital Account (KA) offset each other (i.e. the Balance of Payments is in equilibrium). The Current Account (for our

purposes, the CA is equivalent to the level of net exports) is determined by the domestic level of income (which affects V), the (constant) foreign level of income (which affects X), and the exchange rate (which affects both V and X). As the domestic level of income rises, imports rise while exports stay constant. Thus, as income rises (with e remaining unchanged), NX falls, therefore the CA falls. The Capital Account is determined by the factors that affect capital flows between countries: the rate of return on comparable assets. By assuming that foreign interest rates (i^*) are constant and that there are no expectations that the exchange rate will change, a rise in domestic interest rates will attract capital here (K inflow) while a fall in domestic interest rates will attract capital to foreign countries (K outflow).

The derivation of the BP curve is undertaken in figure 1:

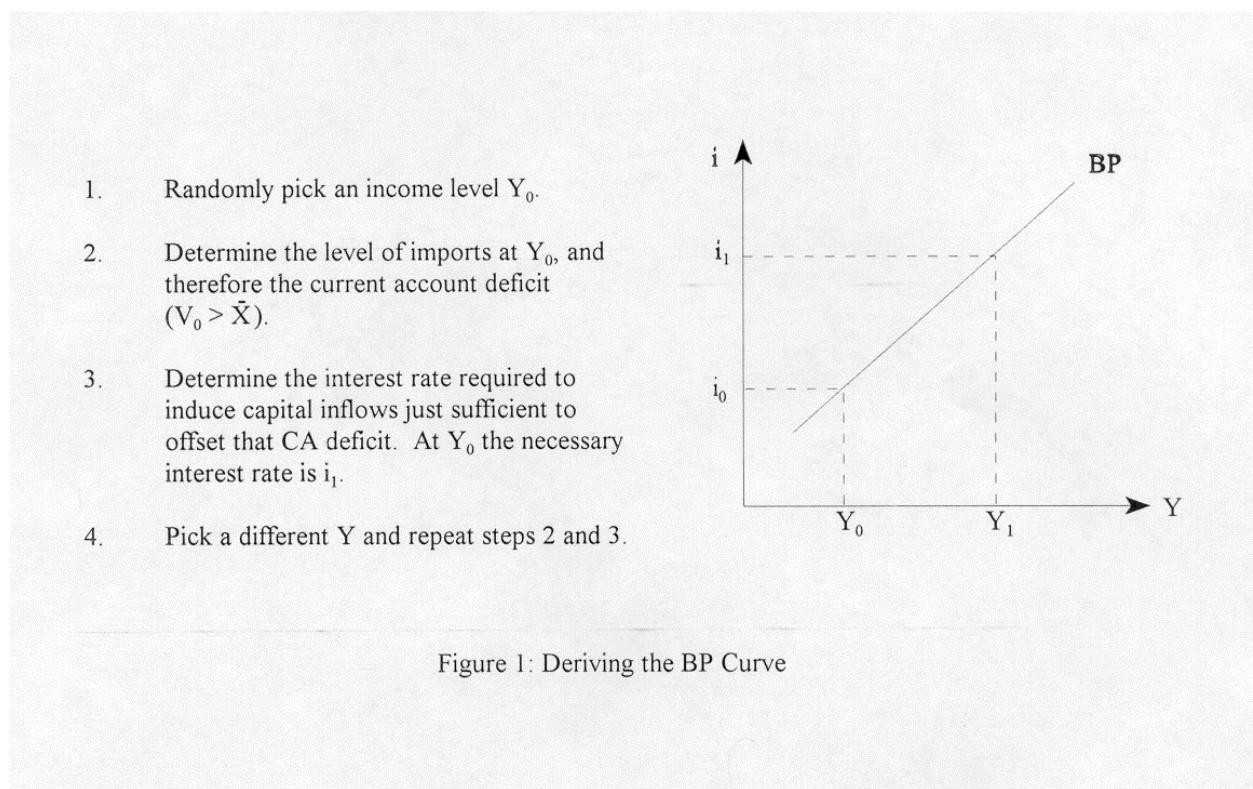


Figure 1: Deriving the BP Curve

The BP curve is drawn for a given exchange rate and a given foreign interest rate. To derive the BP curve, start with a specific level of income, Y_0 . At that income level, imports are V_0 . The CA ($X - V$) is, therefore, $X - V_0$. Assume this is negative (i.e. $V_0 > X$), which means there's a deficit in the CA. To offset the deficit in the CA, there has to be a KA surplus (i.e. K inflows). Assume that a domestic interest rate i_0 attracts sufficient capital inflows K_0 to exactly offset the Current Account deficit. Thus, at the interest rate i_0 and the income level Y_0 the Current and the Capital Accounts offset each other, and these represent, therefore, one point on the BP curve.

Consider a higher income level, Y_1 . At Y_1 , since income is higher, consumption is higher: consumption of our goods and consumption of foreign goods. Thus, at Y_1 there are

imports of $V_1 > V_0$. Since X is fixed (foreign income is constant and e is fixed), the CA is in even greater deficit than it was at income Y_0 . To offset this greater deficit in the CA, there need to be greater capital inflows than what occurred at i_0 . To induce more capital inflows, we need a higher domestic interest rate (remember i^* is constant). Assume that the interest rate i_1 induces capital inflows of K_1 which are just sufficient to completely offset the CA deficit. Thus, i_1 and Y_1 are another combination of i and Y for which the BoP is in equilibrium, and therefore they represent another point on the BP curve.

The slope of the BP curve has 3 ranges, characterizing the degree of capital mobility in the economy. The BP is perfectly horizontal when capital is perfectly mobile. This situation occurs when financial assets are perfect substitute across countries. Any small deviation in the domestic interest rate from the foreign interest rate results in an infinite amount of capital flows. If the domestic interest rate is lower than the foreign interest rate, there are an infinite amount of capital outflows. If the domestic interest rate is higher than the foreign interest rate, there are an infinite amount of capital inflows. Obviously, whenever there are an infinite amount of capital flows, there is very strong pressure on the exchange rate to change. Under a fixed exchange rate regime, the Central Bank will have to buy or sell sufficient quantities of domestic currency to counteract this pressure on the exchange rate. Under a flexible exchange rate regime, the price of foreign exchange will adjust.

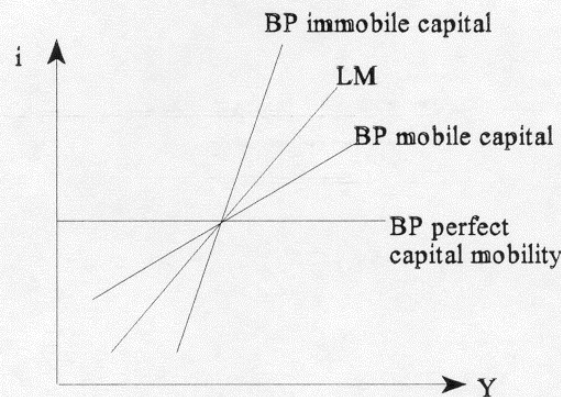


Figure 2: Asset Substitutability and the BP Curve

When capital is mobile (but not perfectly mobile) the BP curve is not perfectly horizontal, but is flatter than the LM curve (note that capital mobility in this and the following instance is relative to the LM curve). Assets are not perfect substitutes across

countries. Immobile capital occurs when the BP curve is steeper than the LM curve. As you will see below, the degree of capital mobility has a bearing on the outcome of various fiscal and monetary policies.

One final point regarding the BP curve has to do with what happens when the economy is above (or to the left) of the curve, and what happens when the economy is below (or to the right) of the curve. If the internal equilibrium (the intersection of the IS-LM curves) is above the BP curve, then the domestic interest rate is inducing greater capital inflows than are necessary at that level of income to maintain the Balance of Payments in equilibrium. The greater than necessary capital inflows represent an additional credit, which means the BoP is in surplus (under a fixed exchange rate regime, or in incipient surplus -- a surplus about to happen -- under a flexible exchange rate regime) when the internal equilibrium is above the BP curve. Conversely, if the internal equilibrium is below the BP curve, there are insufficient capital inflows at that level of income to maintain a BoP equilibrium. In both of these cases there will have to be an adjustment made so that there is simultaneous equilibrium in the internal and the external sectors.

The adjustment to an overall equilibrium (i.e., an equilibrium in the internal and external sectors) depends on the exchange rate regime. Under fixed exchange rates, the Central Bank stands ready to buy and sell sufficient quantities of the domestic currency to keep the exchange rate fixed at an agreed upon level. Thus, the BP curve never moves under fixed exchange rates: the adjustment is done through monetary policy (i.e. movements in the LM curve). Under flexible exchange rates, the price of foreign exchange is allowed to adjust to get the economy simultaneously to internal and external equilibrium.

When the exchange rate changes, this affects the level of net exports: as e increases (i.e. the domestic currency depreciates), NX rises. The change in e , and its effect on NX , affects both the IS and the BP curves (subject to the qualification below). As NX rises, the level of total expenditures increases, therefore the IS curve shifts to the right. Simultaneously, as NX rises, the Current Account improves (i.e., the Current Account equals the level of net exports: as NX rises, the CA rises -- becomes less negative). As the CA improves, the economy does not need as high a level of capital inflows at each income level as it did before, therefore, the BP curve simultaneously shifts to the right.

The one qualification about the BP curve shifting to the right when the exchange rate depreciates (i.e., e increases) has to do with the case of perfect capital mobility. When capital is perfectly mobile, if the internal equilibrium is below the BP curve, there is pressure on the exchange rate to depreciate (i.e., there is an infinite amount of capital outflows as investors seek to earn the higher rate of return they can earn on foreign assets). As e increases (depreciates), the level of NX rises, therefore, the CA-improves. The improvement in the CA is a finite number, whereas the capital outflows are an infinitely large number. Thus, under the case of perfect capital mobility, the BP does not shift when the exchange rate changes.

To recap, the rules for shifts in the curves are as follows:

IS: The IS shifts right when there is an expansionary fiscal policy change or the exchange rate depreciates (i.e., e increases). The IS curve shifts left when there is a contractionary fiscal policy change or when the exchange rate appreciates.

LM: The LM shifts right when there is an expansionary monetary policy change. It shifts to the left when there is a contractionary monetary policy change.

BP: Fixed: The BP does not shift, regardless of the degree of capital mobility. The Fed must increase or decrease the money supply to counter any surplus or deficit in the Balance of Payments.

Flexible:

- *Perfect:* The BP does not shift (Capital flows overwhelm the change in the Current Account). The change in the exchange rate affects Net Exports and therefore the IS curve.
- *Mobile:* The change in the exchange rate affects NX, and therefore the Current Account. The IS and the BP both shift (in the same direction).
- *Immobile:* same as for mobile.

As a further reminder, recall that the slope of the BP depends on the substitutability of assets across countries: If

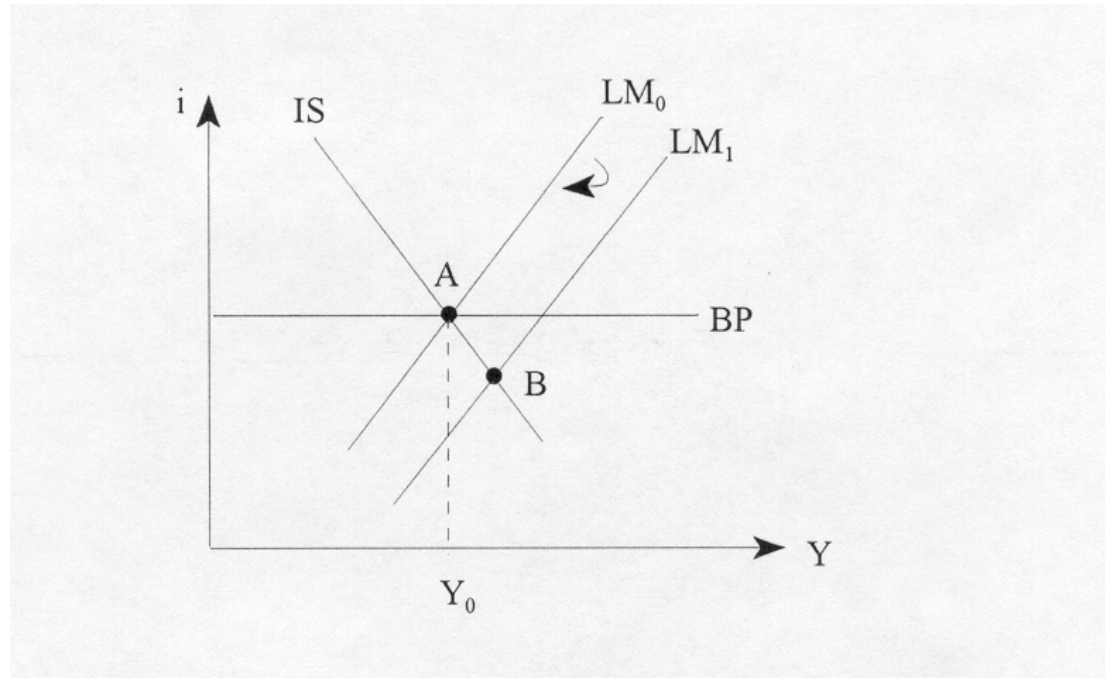
assets are perfect substitutes, the BP curve is horizontal at the foreign interest rate: any deviation of the domestic rate of interest from the (constant) foreign interest rate leads to infinite capital flows as investors try to take advantage of the differences in returns (if $i > i^*$, there will be infinite capital inflows as foreign investors seek U.S. assets; if $i < i^*$, there will be infinite capital outflows as domestic investors seek to rid themselves of domestic assets in order to acquire the higher returning foreign assets).

Here, now, are the 12 relevant cases:

Case 1: Fixed Exchange Rates, Perfect Capital Mobility, Increase in Money Supply

The increase in the Money supply shifts the LM curve to the right, the economy goes from point A to point B. At B, there are infinite capital outflows as domestic investors seek to purchase higher returning foreign assets. These investors are exchanging their unwanted dollars for foreign exchange. The Federal Reserve has agreed to maintain the exchange rate at e_0 , and therefore buys up the unwanted dollars and sells foreign exchange. As the Fed buys the dollars, the money supply is decreased: the LM curve moves to the left, coming to rest at its initial position. The economy moves back to A. There is no change in Y or i from this monetary policy. In abbreviated notation (acceptable on tests) this would be: $\uparrow M_s \rightarrow$ LM right: A to B. At B: deficit in the BoP - infinite K outflows. To relieve the pressure on the exchange rate, the Fed buys \$ and sells foreign exchange : $\downarrow M_s \rightarrow$ LM left, back to A. No change in Y and i .

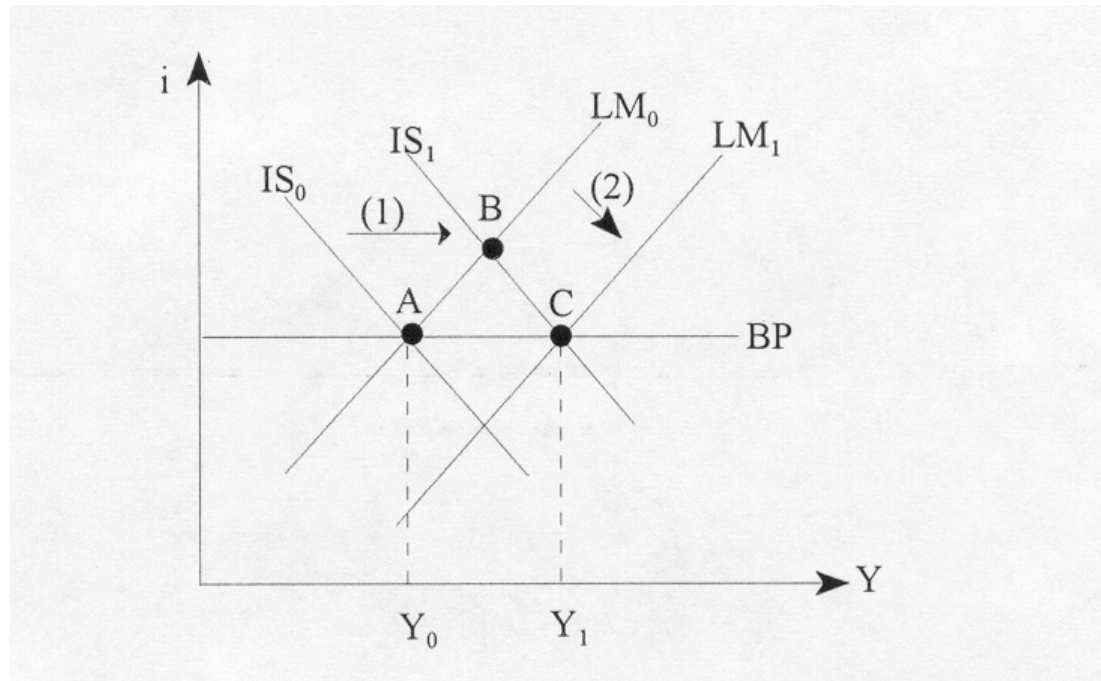
Moral: Monetary policy is ineffective in altering the level of domestic output under fixed exchange rates and perfect capital mobility.



Case 2: Fixed Exchange Rates, Perfect Capital Mobility, Increase in G

The increase in G means an increase in Total Expenditures, therefore the IS curve shifts to the right and the economy goes from point A to point B. At B, there are infinite capital inflows as foreign investors seek to purchase higher returning domestic assets. These investors are exchanging their foreign currency for dollars. The Federal Reserve has agreed to maintain the exchange rate at e_0 , and therefore buys up the unwanted foreign exchange and sells dollars. As the Fed sells the dollars, the Money supply is increased: the LM curve moves to the right and the economy goes from point B to point C. There is a large change in Y from this fiscal expansion. In abbreviated notation (acceptable on tests) this would be: $\uparrow G \rightarrow \uparrow TE \rightarrow IS \text{ right: } A \text{ to } B \text{ at } B: \text{BoP surplus due to infinite } K \text{ inflows. To maintain the fixed } e, \text{ Fed sells } \$ \text{ and buys For. Ex. } \rightarrow \uparrow M_s \rightarrow LM \text{ right: } B \text{ to } C. \uparrow Y \text{ from } Y_0, \text{ to } Y_1.$

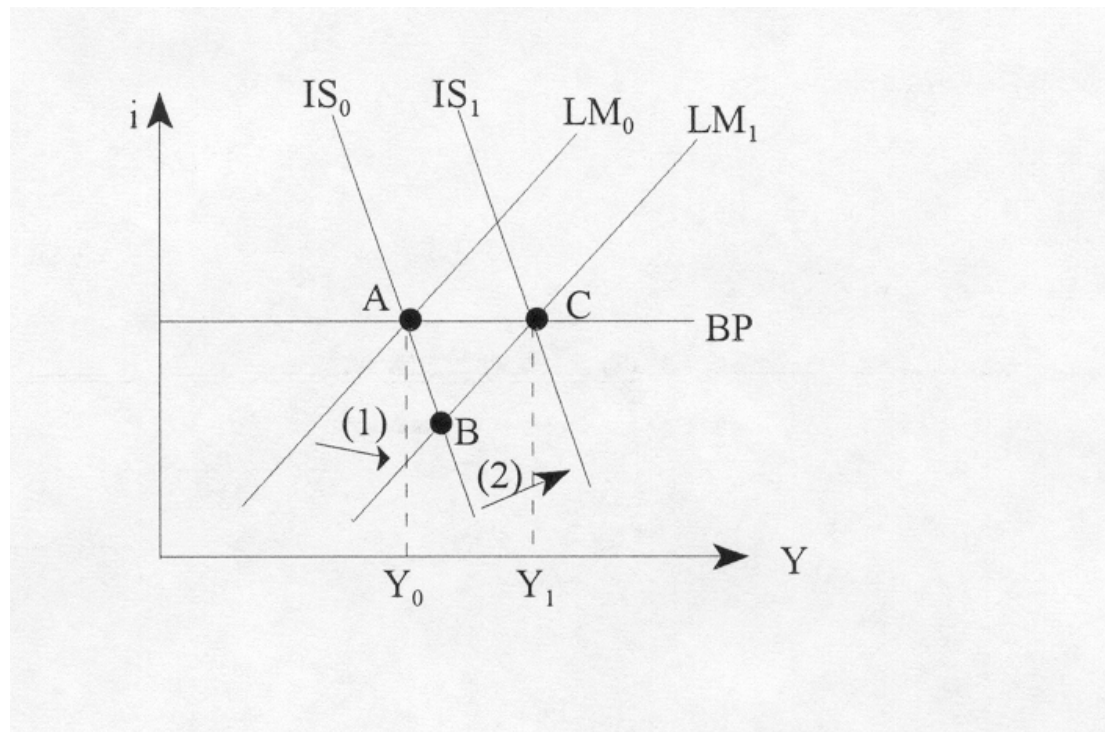
Moral: Fiscal policy is extremely effective in altering the level of domestic output under fixed exchange rates and perfect capital mobility.



Case 3. Flexible Exchange Rates, Perfect Capital Mobility, Increase in Money Supply

The increase in the Money supply shifts the LM curve to the right, the economy goes from point A to point B. At B, there are infinite capital outflows as domestic investors seek to purchase higher returning foreign assets. These investors are exchanging their unwanted dollars for foreign exchange. This decreased demand for dollars causes the value of the dollar to fall on foreign exchange markets (i.e. the dollar depreciates, e increases). As e increases, Net Exports increase as domestic goods become relatively cheaper on international markets. As NX increases, Total Expenditures rise and the IS curve shifts to the right. The exchange rate will continue to depreciate, and the IS curve will continue to shift to the right until the capital outflow is halted (i.e. until the domestic interest rate equals the foreign interest rate). The new equilibrium is at C, where domestic output has increased. In abbreviated notation (acceptable on tests) this would be: $\uparrow M_s \rightarrow$ LM right: A to B at B: infinite K outflows: $\uparrow e$ (depreciates) as $e \uparrow \rightarrow \uparrow NX \rightarrow \uparrow TE \rightarrow$ IS right: B to C. $\uparrow Y$ from Y_0 to Y_1 .

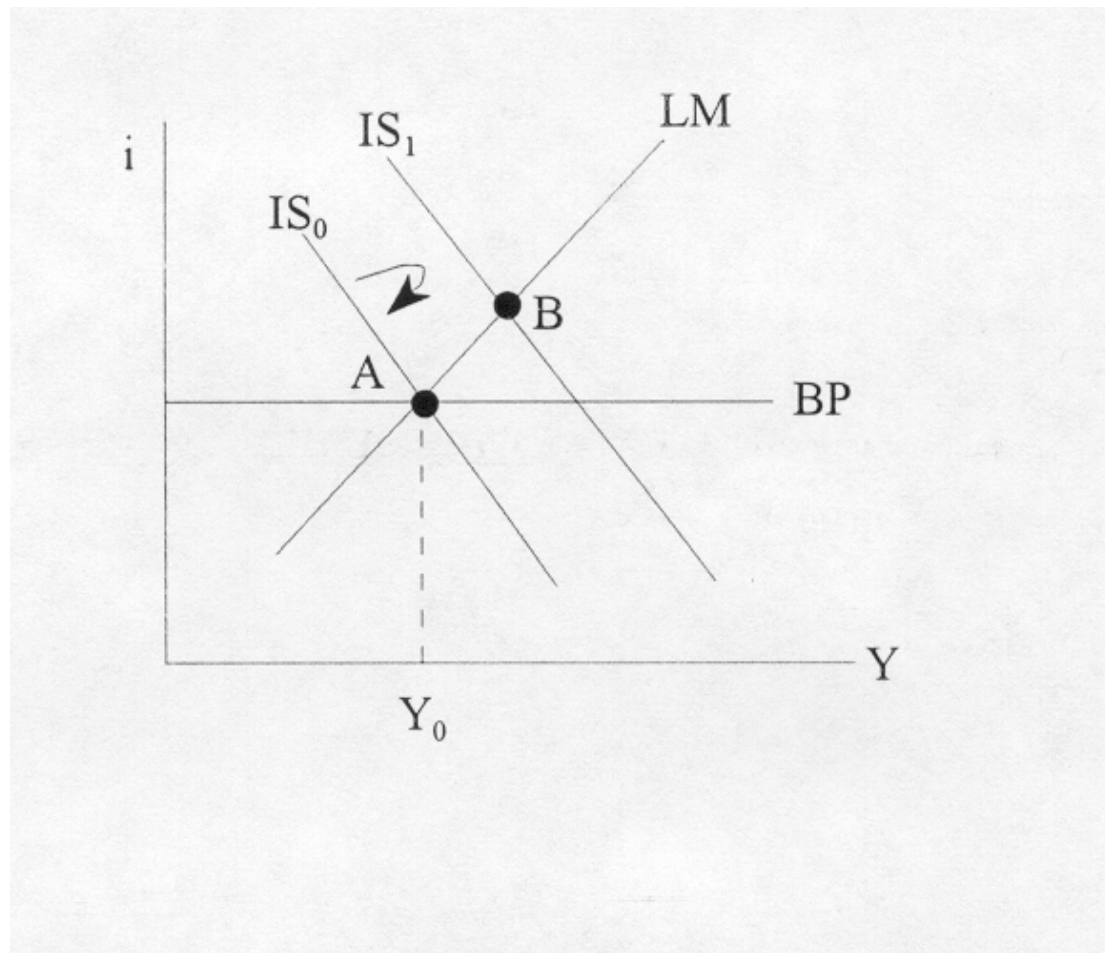
Moral: Monetary policy is extremely effective in altering the level of domestic output under flexible exchange rates and perfect capital mobility.



Case 4: Flexible Exchange Rates, Perfect Capital Mobility, Increase in G

The increase in Government spending means there's an increase in Total Expenditures, therefore the IS curve shifts to the right and the economy goes from point A to point B. At B, there are infinite capital inflows as foreign investors seek to purchase higher returning domestic assets. These investors are exchanging their currency for the more desirable dollar. This increased demand for dollars causes the value of the dollar to rise on foreign exchange markets (i.e. the dollar appreciates, e decreases). As e decreases, Net Exports decrease as domestic goods become relatively more expensive on international markets. As NX decreases, Total Expenditures fall and the IS curve shifts to the left. The exchange rate will continue to appreciate, and the IS curve will continue to shift to the left until the capital inflow is halted (i.e., until the domestic interest rate equals the foreign interest rate). The new equilibrium is at the same level of output as the initial level: the economy moves back to A. In abbreviated notation (acceptable on tests) this would be: $\uparrow G \rightarrow \uparrow TE \rightarrow IS \text{ right: } A \text{ to } B$. At B : infinite K inflows $\rightarrow \downarrow e$ (appreciates) as $e \downarrow \rightarrow \downarrow NX \rightarrow \downarrow TE \rightarrow IS \text{ left: back to } A$. No change in Y.

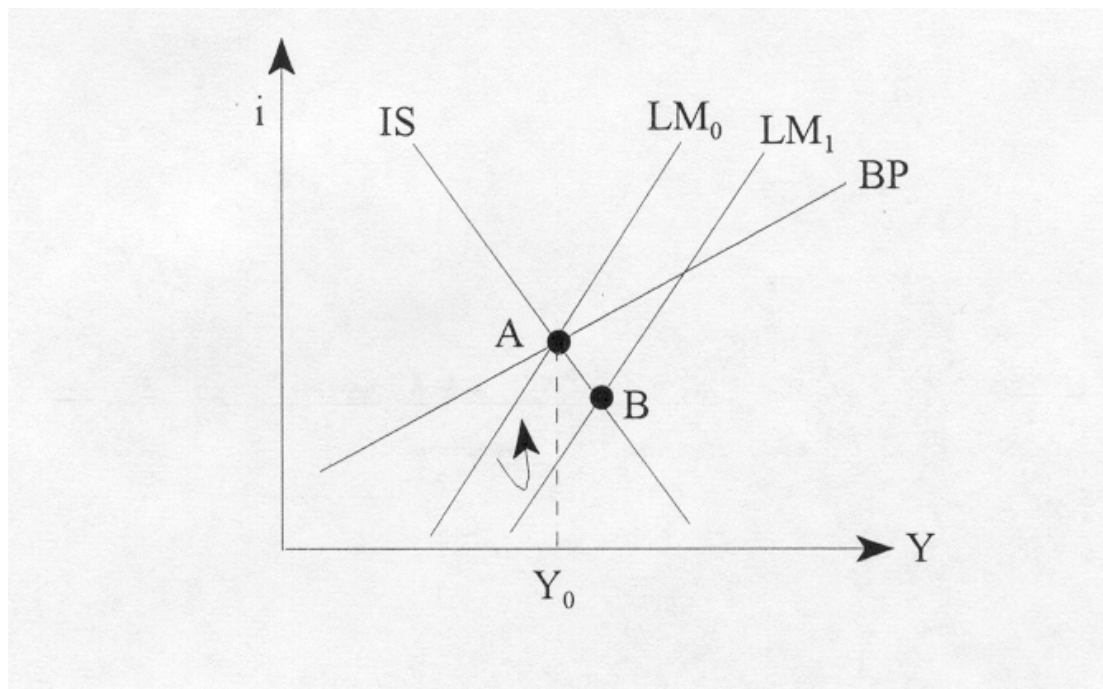
Moral: Fiscal policy is ineffective in altering the level of domestic output under flexible exchange rates and perfect capital mobility.



Case 5: Fixed Exchange Rates, Mobile Capital (BP flatter than LM), Increase in Money Supply

The increase in the Money supply shifts the LM curve to the right, the economy goes from point A to point B. At B, there is a deficit in the Balance of Payments because the level of capital inflows is insufficient to offset the deficit in the CA that prevails at B. The deficit in the BoP means there is pressure on the exchange rate to depreciate (there are unwanted dollars on the foreign exchange market). The Federal Reserve has agreed to maintain the exchange rate at e_0 , and therefore buys up the unwanted dollars and sells foreign exchange. As the Fed buys the dollars, the Money supply is decreased: the LM curve moves to the left, coming to rest at its initial position. The economy moves back to A. There is no change in Y or i from this monetary policy. In abbreviated notation (acceptable on tests) this would be: $\uparrow Ms \rightarrow LM \text{ right: } A \text{ to } B$ - at B: BoP deficit (below the BP curve). To maintain the fixed e , Fed buys \$ and sells For Ex. $\rightarrow \downarrow Ms \rightarrow LM \text{ left: back to } A$ No change in Y and i

Moral: Monetary policy is ineffective in altering the level of domestic output under fixed exchange rates with mobile capital.

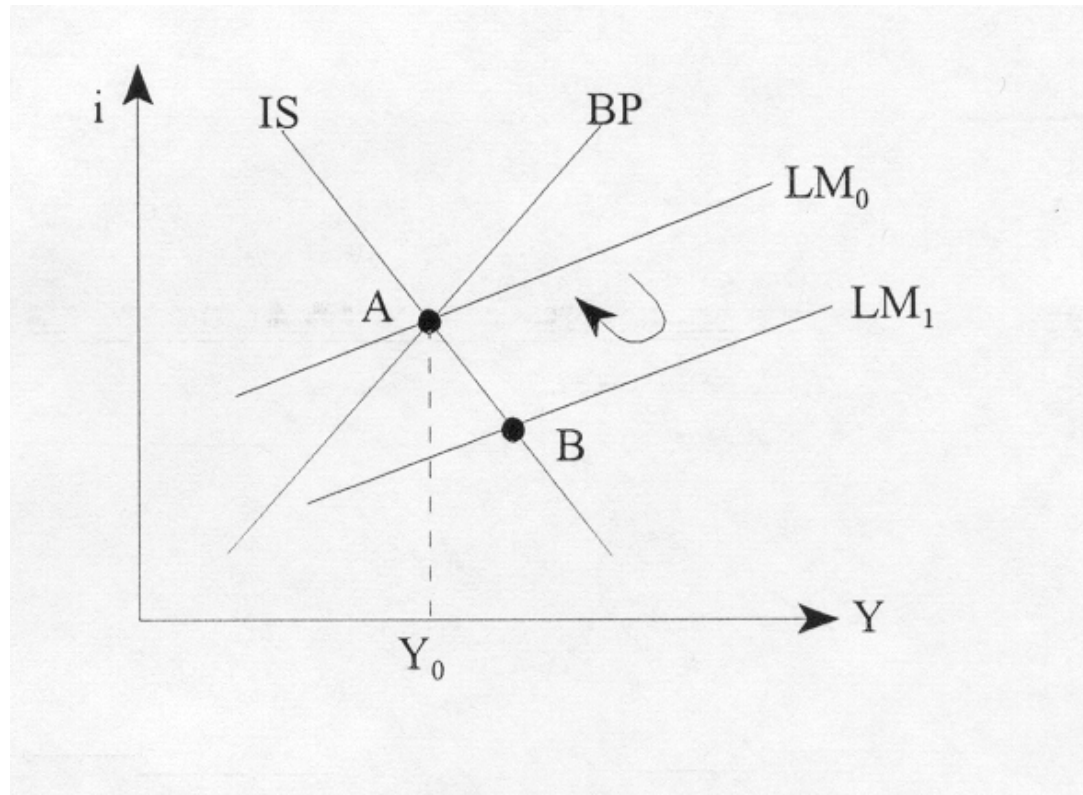


Case 6: Fixed Exchange Rates, Immobile Capital (BP steeper than LM), Increase in Money Supply

The description for this case is the same as for Case 5. The increase in the Money supply shifts the LM curve to the right, the economy goes from point A to point B. At B, there is a deficit in the Balance of Payments because the level of capital inflows is insufficient to offset the deficit in the CA that prevails at B. The deficit in the BoP means there is pressure on the exchange rate to depreciate (there are unwanted dollars on the foreign exchange market). The Federal Reserve has agreed to maintain the exchange rate at e_0 , and therefore buys up the unwanted dollars and sells foreign exchange. As the Fed buys the dollars, the Money supply is decreased: the LM curve moves to the left, coming to rest at its initial position. The economy moves back to A. There is no change in Y or i from this monetary policy. In abbreviated notation (acceptable on tests) this would be:

$\uparrow M_s \rightarrow LM \text{ right: } A \text{ to } B$; at B: BoP deficit (below the BP curve). To maintain the fixed e , Fed buys \$ and sells For. Ex. $\downarrow M_s \rightarrow LM \text{ left: back to } A$. No change in Y and i

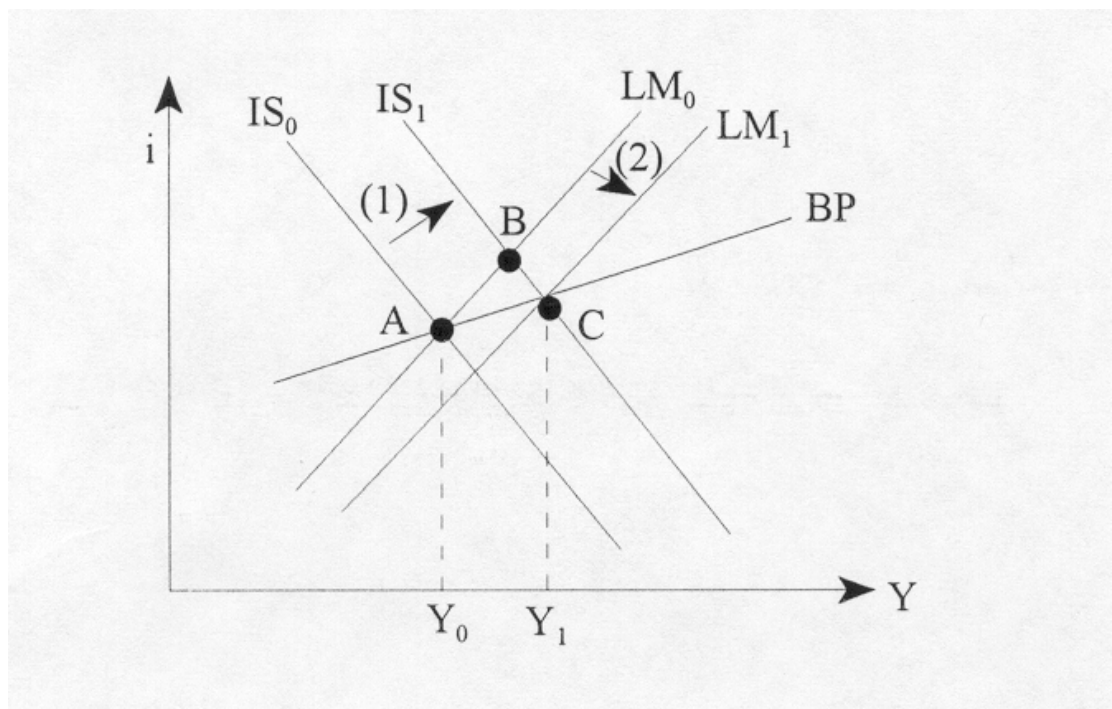
Moral: Monetary policy is ineffective in altering the level of domestic output under fixed exchange rates with immobile capital.



Case 7: Fixed Exchange Rates, Mobile Capital (BP flatter than LM), Increase in G

The increase in Government spending means there's an increase in Total Expenditures: the IS curve shifts to the right and the economy moves from A to B. At B, there is a surplus in the Balance of Payments because the level of capital inflows is more than sufficient to offset the deficit in the CA that prevails at B. The surplus in the BoP means there is pressure on the exchange rate to appreciate (there's an increased demand for dollars on the foreign exchange market). The Federal Reserve has agreed to maintain the exchange rate at e_0 , and therefore satisfies this demand for dollars by selling dollars and buying foreign exchange. As the Fed sells the dollars, the Money supply is increased: the LM curve moves to the right, the economy moves from B to C. There has been an increase in the domestic level of output from the expansionary fiscal policy. In abbreviated notation (acceptable on tests) this would be: $\uparrow G \rightarrow \uparrow TE \rightarrow IS \text{ right: } A \text{ to } B$; at B: BoP surplus (above the BP curve). To maintain the fixed e , Fed sells \$ and buys For. Ex. $\rightarrow \uparrow Ms \rightarrow LM \text{ right: } B \text{ to } C$. $\uparrow Y$ from Y_0 to Y_1 .

Moral: Fiscal policy is effective in altering the level of domestic output under fixed exchange rates with mobile capital, but not as effective as if capital had been perfectly mobile.

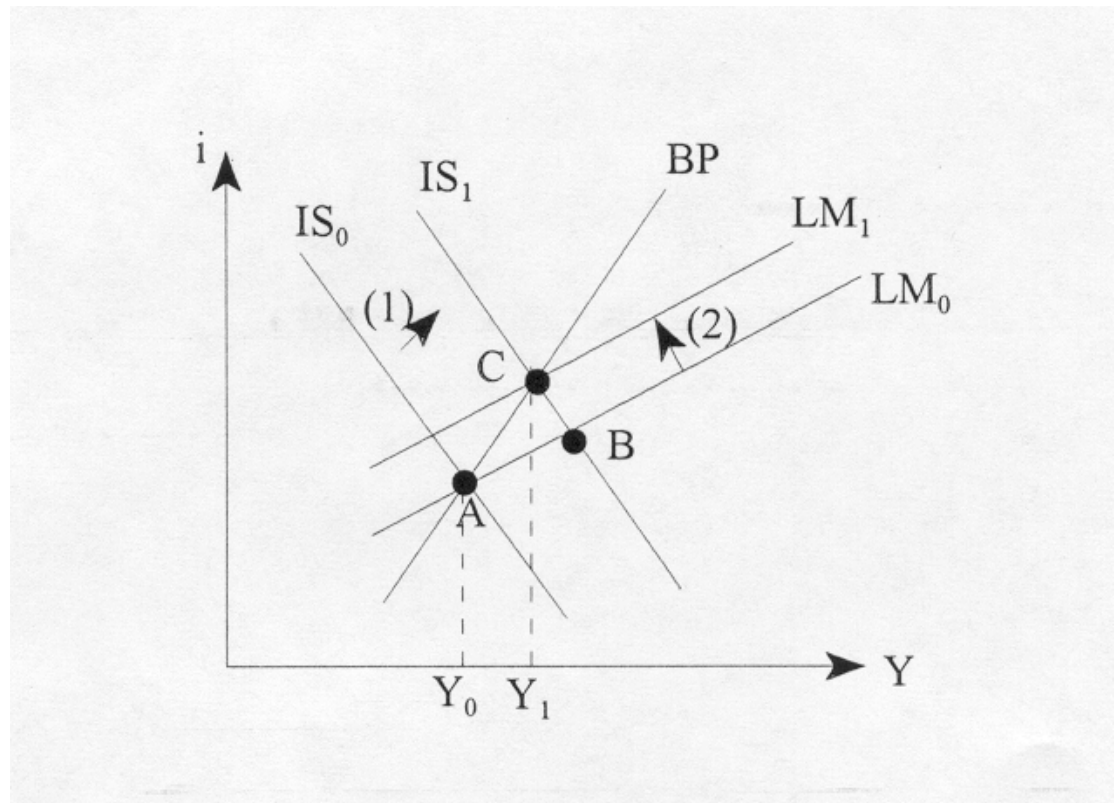


Case 8: Fixed Exchange Rates, Immobile Capital (BP steeper than LM), Increase in G

The increase in Government spending means there's an increase in Total Expenditures: the IS curve shifts to the right and the economy moves from A to B. At B, there is a deficit in the Balance of Payments because the level of capital inflows is insufficient to offset the deficit in the CA that prevails at B. The deficit in the BoP means there is pressure on the exchange rate to depreciate (there are unwanted dollars on the foreign exchange market). The Federal Reserve has agreed to maintain the exchange rate at e_0 , and therefore buys up the unwanted dollars and sells foreign exchange. As the Fed buys the dollars, the money supply is decreased: the LM curve moves to the left, the economy moves from B to C. There has been an increase in the domestic level of output from the expansionary fiscal policy. In abbreviated notation (acceptable on tests) this would be:

$\uparrow G \rightarrow \uparrow TE \rightarrow IS$ right: A to B; at B: BoP deficit (below the BP curve). To maintain the fixed e , Fed buys \$ and sells For. Ex. $\rightarrow \downarrow M_s \rightarrow LM$ left: B to C. $\uparrow Y$ from Y_0 to Y_1 .

Moral: Fiscal policy is effective in altering the level of domestic output under fixed exchange rates with immobile capital, but not as effective as if capital had been mobile or perfectly mobile.



Case 9: Flexible Exchange Rates, Mobile Capital (BP flatter than LM), Increase in Money Supply

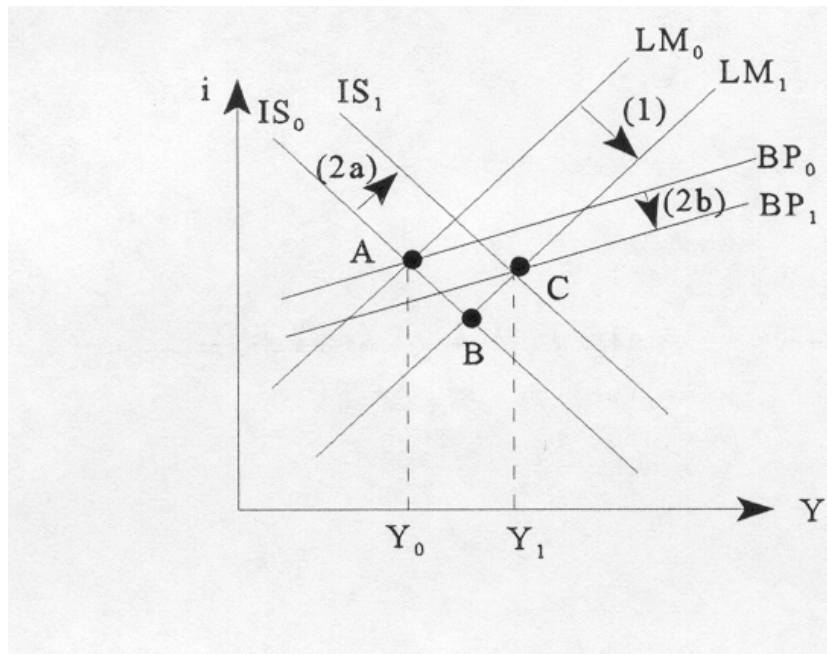
The increase in the Money supply shifts the LM curve to the right, the economy goes from point A to point B. At B, there is an incipient (incipient means about to happen—in reality, it never quite happens) deficit in the Balance of Payments because the level of

capital inflows is insufficient to offset the deficit in the CA that prevails at B. The incipient deficit in the BoP means the exchange rate is depreciating (there are unwanted dollars on the foreign exchange market). As the exchange rate depreciates (e increases), Net Exports increase because the relative price of domestic goods on international markets has fallen. As NX rises, it has two effects that occur simultaneously: 1) Total Expenditures increase therefore the IS curve moves right, and, 2) the Current Account improves therefore the BP curve moves right. These shifts are labeled 2a and 2b, respectively, in the above diagram. Note that the cases with flexible exchange rates and non-perfectly mobile capital differ from the perfect capital mobility case. In the latter, the BP curve does not shift because the capital in/out flows are infinite, and therefore they overwhelm the effect that the change in NX has on the CA. The new equilibrium occurs at C, where the economy has had an increase in Y . In abbreviated notation (acceptable on tests) this would be: $\uparrow M_s \rightarrow LM$ right: A to B; at B: incipient BoP deficit (below the BP curve) $\rightarrow \uparrow e$ (depreciates) As $e \uparrow \rightarrow \uparrow NX$

\rightarrow (2a): $\uparrow TE \rightarrow IS$ right;

\rightarrow (2b): $\uparrow CA \rightarrow BP$ right. Together, these cause the economy to move from B to C: $\uparrow Y$ from Y_0 to Y_1 .

Moral: Monetary policy is effective in altering the level of domestic output under flexible exchange rates with mobile capital.



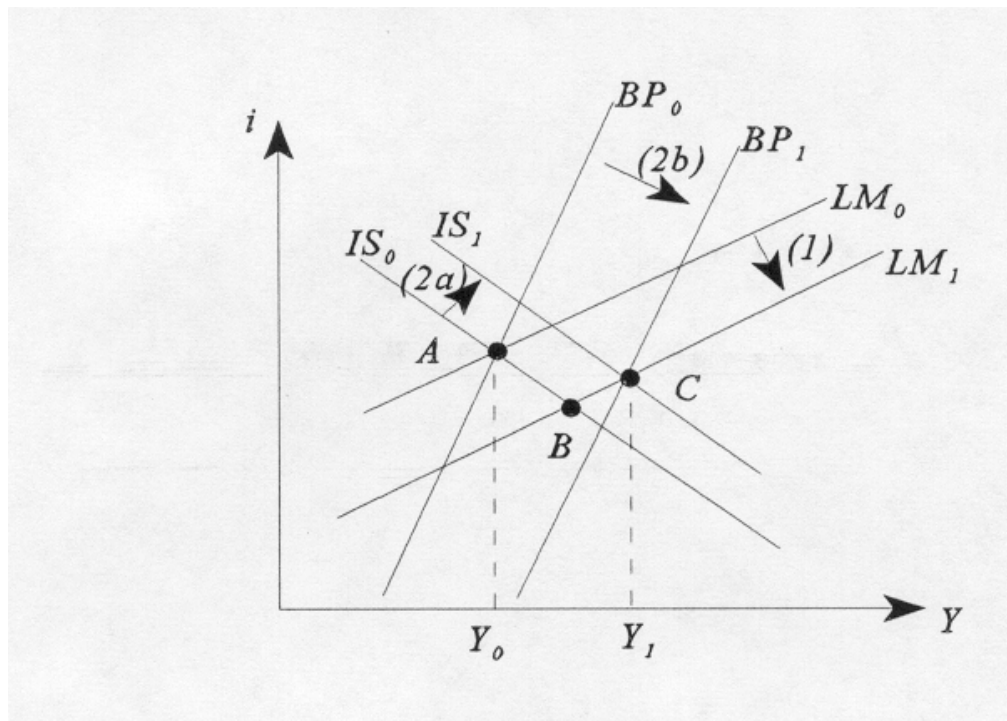
Case 10: Flexible Exchange Rates, Immobile Capital (BP steeper than LM),

Increase in Money Supply This case is descriptively the same as case 9. The increase in the Money supply shifts the LM curve to the right, the economy goes from point A to point B. At B, there is an incipient deficit in the Balance of Payments because the level of capital inflows is insufficient to offset the deficit in the CA that prevails at B. The incipient deficit in the BoP means the exchange rate is depreciating (there are unwanted dollars on the foreign exchange market). As the exchange rate depreciates (e increases), Net Exports increase because the relative price of domestic goods on international markets has fallen. As NX rises, it has two effects that occur simultaneously: 1) Total Expenditures increase therefore the IS curve moves right, and, 2) the Current Account improves therefore the BP curve moves right. These shifts are labeled 2a and 2b, respectively, in the above diagram. Note that the cases with flexible exchange rates and non-perfectly mobile capital differ from the perfect capital mobility case. In the latter, the BP curve does not shift because the capital in/out flows are infinite, and therefore they overwhelm the effect that the change in NX has on the CA. The new equilibrium occurs at C, where the economy has had an increase in Y . In abbreviated notation (acceptable on tests) this would be: $M_s \rightarrow LM \text{ right: } A \text{ to } B$; at B: incipient BoP deficit (below the BP curve) $\uparrow e$ (depreciates). As $e \uparrow \rightarrow \uparrow NX$

$\rightarrow (2a): \uparrow TE \rightarrow IS \text{ right};$

$\rightarrow (2b): \uparrow CA \rightarrow BP \text{ right. Together, these cause the economy to move from B to C: } \uparrow Y \text{ from } Y_0 \text{ to } Y_1.$

Moral: Monetary policy is effective in altering the level of domestic output under flexible exchange rates with immobile capital.



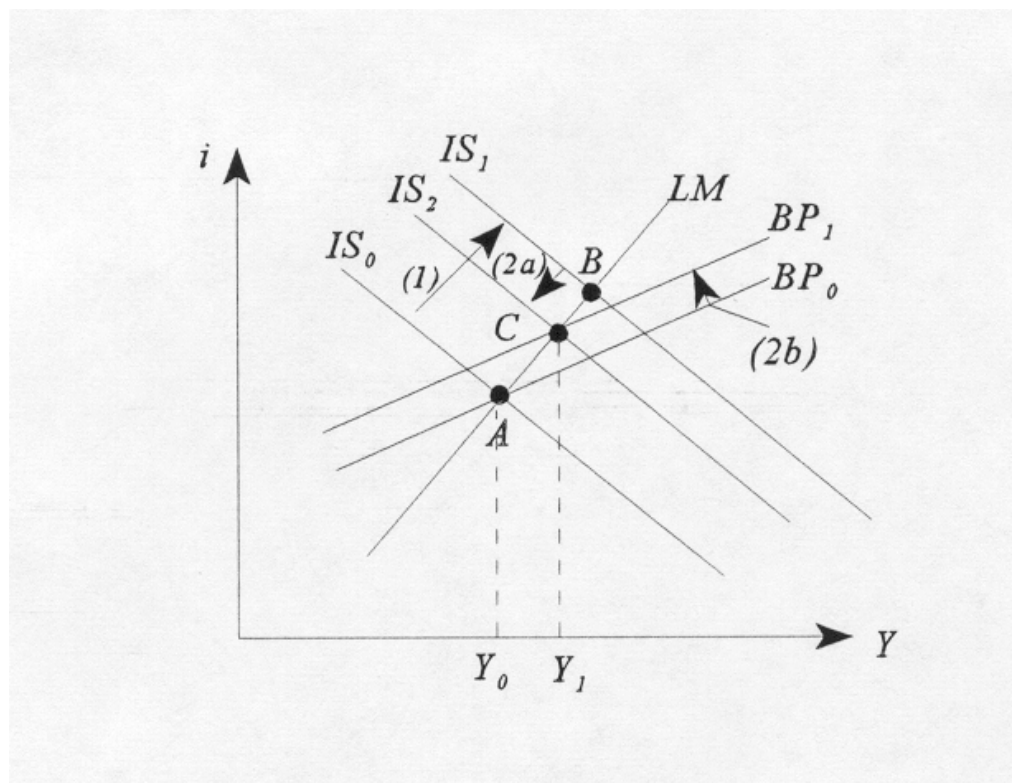
Case 11: Flexible Exchange Rates, Mobile Capital (BP flatter than LM), Increase in G

The increase in Government spending means there's an increase in Total Expenditures: the IS curve shifts to the right and the economy moves from A to B. At B, there is an incipient surplus in the Balance of Payments because the level of capital inflows is more than sufficient to offset the deficit in the CA that prevails at B. The incipient surplus in the BoP means the exchange rate is appreciating (there is an increase in demand for dollars on the foreign exchange market). As the exchange rate appreciates (e decreases), Net Exports decrease because the relative price of domestic goods on international markets has risen. As NX falls, it has two effects that occur simultaneously: 1) Total Expenditures decrease therefore the IS curve moves left, and, 2) the Current Account worsens therefore the BP curve moves left. These shifts are labeled 2a and 2b, respectively, in the above diagram. Note that the cases with flexible exchange rates and non-perfectly mobile capital differ from the perfect capital mobility case. In the latter, the BP curve does not shift because the capital in/out flows are infinite, and therefore they overwhelm the effect that the change in NX has on the CA. The new equilibrium occurs at C, where the economy has had an increase in Y . In abbreviated notation (acceptable on tests) this would be: $\uparrow G \rightarrow \uparrow TE \rightarrow IS \text{ right: } A \text{ to } B$; at B: incipient BoP surplus (above the BP curve): $\downarrow e$ (appreciates) As $e \downarrow \rightarrow \downarrow NX$

→ (2a): \downarrow TE \rightarrow IS left;

→ (2 b): \downarrow CA \rightarrow BP left. Together, these cause the economy to move from B to C: Y from Y_0 to Y_1 .

Moral: Fiscal policy is more effective in altering the level of domestic output under flexible exchange rates with mobile capital than with perfect capital mobility.



Case 12: Flexible Exchange Rates, Immobile Capital (BP steeper than LM), Increase in G

The increase in Government spending means there's an increase in Total Expenditures: the IS curve shifts to the right and the economy moves from A to B. At B, there is an incipient deficit in the Balance of Payments because the level of capital inflows is

insufficient to offset the deficit in the CA that prevails at B. The incipient deficit in the BoP means the exchange rate is depreciating (there are unwanted dollars on the foreign exchange market). As the exchange rate depreciates (e increases), Net Exports increase because the relative price of domestic goods on international markets has fallen. As NX rises, it has two effects that occur simultaneously: 1) Total Expenditures increase therefore the IS curve moves right, and, 2) the Current Account improves therefore the BP curve moves right. These shifts are labeled 2a and 2b, respectively, in the above diagram. Note that the cases with flexible exchange rates and non-perfectly mobile capital differ from the perfect capital mobility case. In the later, the BP curve does not shift because the capital in/out flows are infinite, and therefore they overwhelm the effect that the change in NX has on the CA. The new equilibrium occurs at C, where the economy has had an increase in Y . In abbreviated notation (acceptable on tests) this would be: $\uparrow G \rightarrow \uparrow TE \rightarrow IS \text{ right: A to B; at B: incipient BoP deficit (below the BP curve): } \uparrow e \text{ (depreciates) As } e \uparrow \rightarrow \uparrow NX$

$\rightarrow (2a): \uparrow TE \rightarrow IS \text{ right;}$

$\rightarrow (2b): \uparrow CA \rightarrow BP \text{ right. Together, these cause the economy to move from B to C: } Y \text{ from } Y_0 \text{ to } Y_1.$

Moral: Fiscal policy is more effective in altering the level of domestic output under flexible exchange rates with immobile capital than with mobile capital or perfect capital mobility.

