

International Economics

dr Wioletta Nowak

Lecture 5

- **The exchange rate and its determination**
- **Components and determinants of balance of payments**
- **Equilibrium, disequilibrium and adjustment in balance of payments**

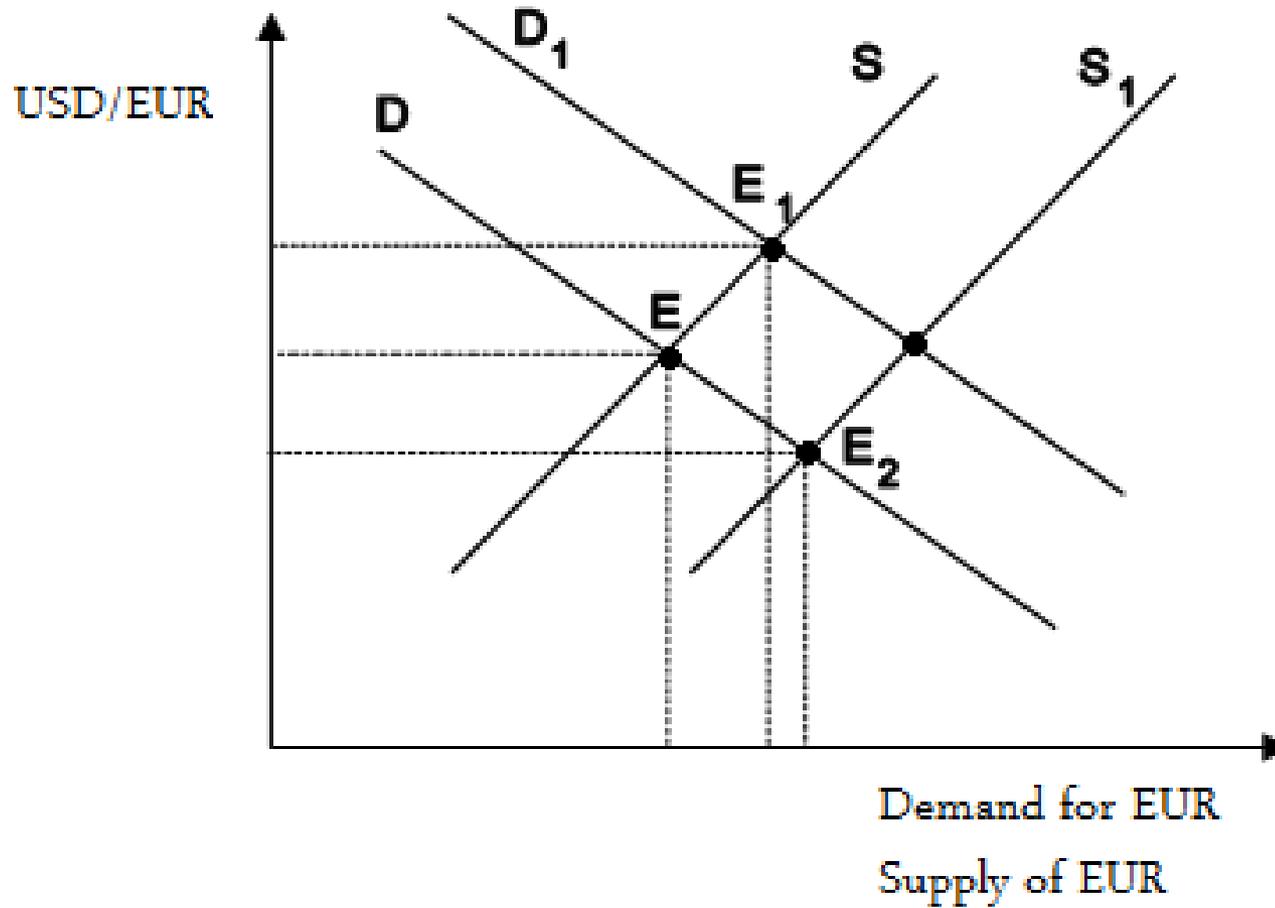
The exchange rate and its determination

- The exchange rate between two currencies describes how much one currency is worth in terms of the other.
- The currencies are quoted to 4 decimals.
- **Types of exchange rate:** floating exchange rate, fixed exchange rate

Floating exchange rate

- **Floating exchange rate** - currency is set by the foreign-exchange market through supply of and demand for a given currency relative to other currencies.
- Floating exchange rates change freely and are determined by trading in the foreign-exchange market.

Floating exchange rate

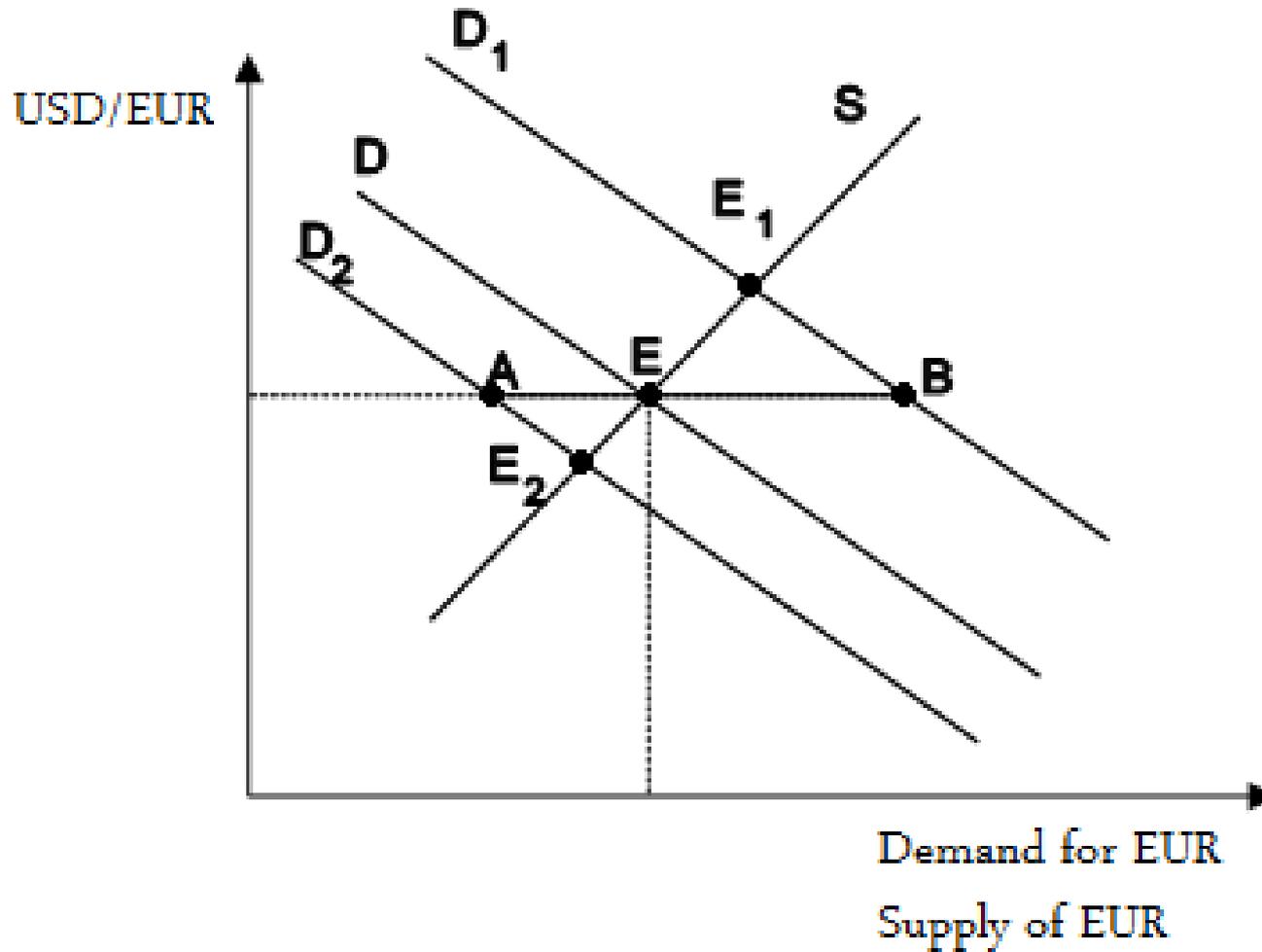


- **Currency depreciation** – the loss of value of a country's currency with respect to one or more foreign reference currencies.
- **Currency appreciation** refers to an increase in value of a country's currency.
- **Devaluation** – deliberate downward adjustment to a country's official exchange rate relative to other currencies. In a fixed exchange rate regime, only a decision by a country's government (central bank) can alter the official value of the currency.
- **Revaluation** – calculated adjustment to a country's official exchange rate relative to a chosen baseline. The baseline can be anything from wage rates to the price of gold to a foreign currency. In a fixed exchange rate regime, only a decision by a country's government (i.e. central bank) can alter the official value of the currency.

Fixed exchange rate

- **Fixed exchange rate** - the government (or central bank) ties the official exchange rate to another country's currency (or the price of gold).
- In order to keep currencies trading at the prescribed levels, government monetary authorities actively enter the currency markets to buy and sell according to variations in supply and demand.

Fixed exchange rate



Fixed exchange rate

- Fixed rates provide greater certainty for exporters and importers.
- Lower exchange risk → encourage trade
- Exchange rate volatility ↑ → trade ↓ ?
- Time-series evidence showed little effect
- Cross-section evidence - small and less developed countries

Fixed exchange rate

- This also helps the government to maintain low inflation, which in the long run should keep interest rates down and stimulate trade and investment.

The Balance of Payments (BOP)

- The balance of payments is a statistical statement that summarizes transactions between residents and nonresidents during a specific time period, usually a year.
- Inflows of foreign currency are counted as a positive entry.
- Outflows of foreign currency are counted as a negative entry.
- BOP reflects all payments and liabilities to foreigners (**debits**) and all payments and obligations received from foreigners (**credits**).

The Balance of Payments (BOP) comprises

The Current Account

The Capital Account

The Financial Account

The Current Account

- It shows flows of goods, services, primary income, and secondary income between residents and nonresidents.
- The current account balance shows the difference between exports and income receivable and imports and income payable (exports and imports refer to both goods and services, while income to both primary and secondary income).

The Current Account

- **The trade balance** measures a country's imports and exports.
- This is the largest component of the current account, which is itself the largest component of the balance of payments.

The Current Account

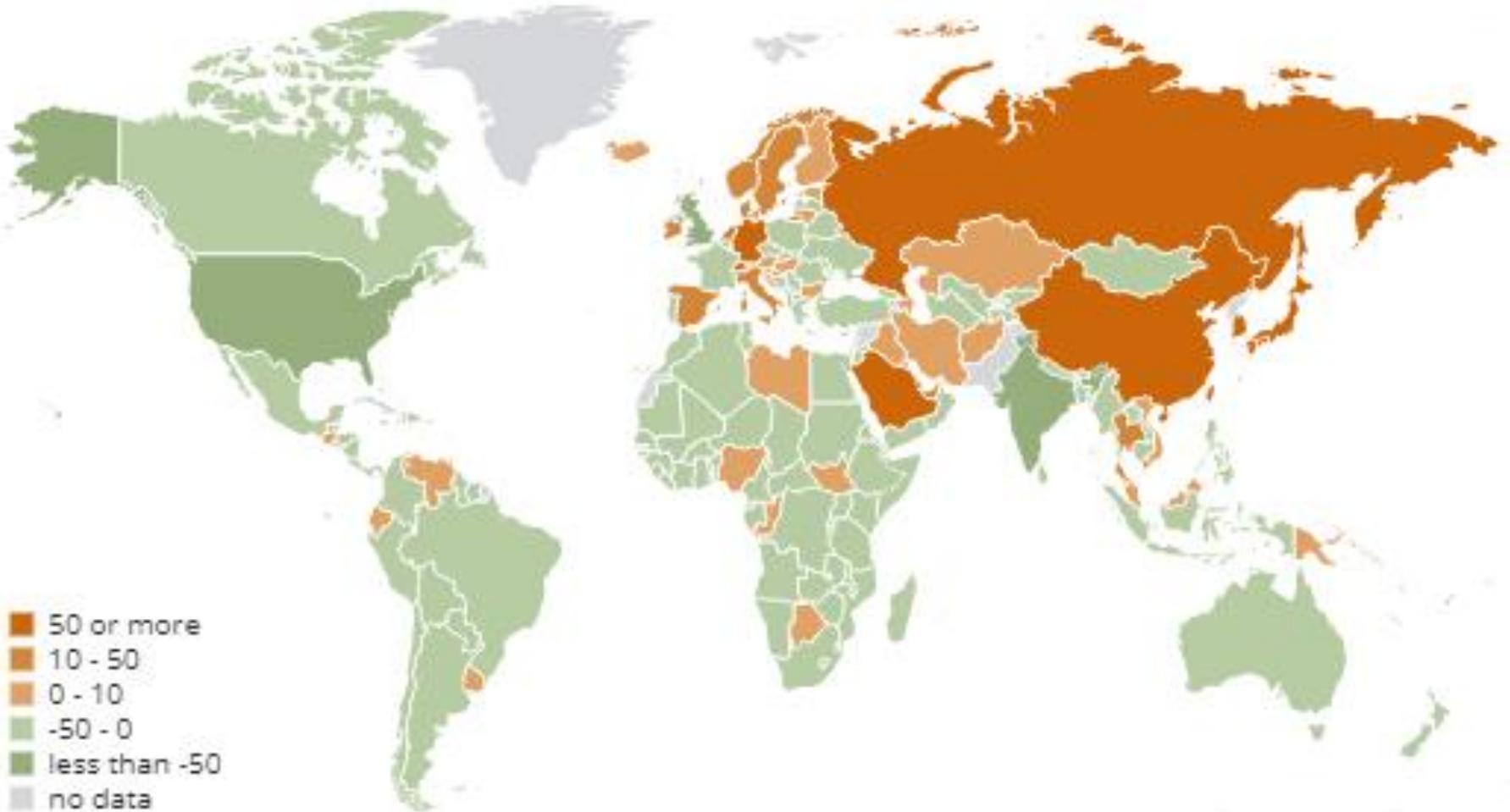
- **The primary income account** – income is provided in return for providing temporary use to another entity of labour or financial resources (interest, profits, dividends, wages).
- **The secondary income account** – redistribution of income when resources for current purposes are provided by one party without anything of economic value being supplied as a direct return to that party. Examples include remittances, current international assistance, government transfers to UN, EU.

The Current Account

- **The current account** is the net change in current assets from trade in goods and services (balance of trade), net factor income (such as dividends and interest payments from abroad), and net unilateral transfers from abroad (such as foreign aid, grants, gifts, remittances etc).

Current account balance, 2019

(IMF, Billions of U.S. dollars)



Current account balance (% of GDP), 2017

Source: <https://data.worldbank.org>

Country	% of GDP	Country	% of GDP
Dominica	40.6	Afghanistan	-24.0
Macao SAR, China	33.3	Lebanon	-23.1
Papua New Guinea	26.9	Bhutan	-21.4
Singapore	18.8	Mozambique	-20.4
Brunei Darussalam	16.7	Seychelles	-19.7
Malta	13.8	Sao Tome and Principe	-18.6
Eswatini	12.5	Maldives	-18.0
Botswana	12.3	St. Vincent and the Grenadines	-17.2
Thailand	11.0	Liberia	-17.2
Netherlands	10.6	Bahamas, The	-16.3

Current account balance, 2008

- In 2008, the USA, Spain, Italy, Greece and France had the highest absolute current account deficits, with the USA alone accounting for 44% of the total global deficit.
- In 2008, China, Germany and Japan had the greatest absolute surpluses (together these three countries accounted for 46% of the total surplus), alongside Saudi Arabia and Russia.
- Current account imbalances have resulted in macroeconomic crises: the 1997/98 Asian crisis, the 1994/95 Mexican "Tequila" crisis, the Russia crisis of 1998.

The Capital Account

- **The capital account** shows credit and debit entries for nonproduced nonfinancial assets and capital transfers between residents and nonresidents.
- It measures financial transactions that don't affect a country's income, production, or savings.
- The capital account is the smallest component of the balance of payments.

The Capital Account

- It records **acquisitions and disposals of nonproduced nonfinancial assets**, such as
 - land sold to embassies,
 - sale/transfers of patents,
 - trademarks (franchises) and copyrights,
 - sale of leases and licenses,
 - sale of drilling rights,
- and **transfers of ownership of fixed assets** (the provision of resources for capital purposes by one party without anything of economic value being supplied as a direct return to that party).

The Financial Account

- **The financial account** shows net acquisition and disposal of financial assets and liabilities.
- The financial account = long-term foreign direct investment (increase in foreign ownership of domestic assets – increase of domestic ownership of foreign assets) + short-term portfolio investment (which includes trade in bonds and stocks – inflows and outflows of debt and equity) + other investment (which includes transactions in currency and bank deposits, hot money flowing in/out of banking system).

The Financial Account

- The financial account measures:
 - 1) changes in domestic ownership of foreign assets and
 - 2) foreign ownership of domestic assets.
- If foreign ownership increases more than domestic ownership does, it creates a deficit in the financial account.
- This means the country is selling off its assets, like gold, and corporate stocks faster than it is acquiring foreign assets.

- A balance of payments **deficit** means the country imports more goods, services and capital than it exports. It must borrow from other countries to pay for its imports.
- In the short-term, that fuels the country's economic growth.
- In the long-term, the country becomes a net consumer, not a producer, of the world's economic output. It will have to go into debt to pay for consumption instead of investing in future growth.
- If the deficit continues long enough, the country may have to sell off its assets (natural resources, land, commodities) to pay its creditors.

- A balance of payments **surplus** means the country exports more than it imports. Its government and residents are savers.
- A surplus boosts economic growth in the short term. Exports boost production in factories, allowing them to hire more people.
- In the long run, the country becomes too dependent on export-driven growth.

The Balance of Payments (BOP)

- The sum of the balances on the current and capital accounts represents **the net lending (surplus) or net borrowing (deficit)** by the economy with the rest of the world.
- This is conceptually equal to the net balance of the financial account.
- The financial account measures how the net lending to or borrowing from nonresidents is financed.

The Balance of Payments (BOP)

- The last component of the balance of payments is **net errors and omissions** and principally exists to correct any possible errors made in accounting for the three other accounts.
- These errors are common to occur due to the complexity of the calculations and difficulty in obtaining measurements.

The balance of payments

Current account	Credits	Debits	Balance
Goods	462	392	70
Services	78	107	-29
Goods and services	540	499	41
Compensation of employees	6	2	
Interest	13	21	
Distributed income of corporations	36	17	
Reinvested earnings	14	0	
Primary income	69	40	29
Current taxes on income, wealth, etc	1	0	
Net nonlife insurance premiums	2	11	
Net nonlife insurance claims	12	3	
Current international transfers	1	31	
Miscellaneous current transfers	1	10	
Secondary income	17	55	-38
Current account balance			32

Capital account			
Acquisitions/disposals of nonprod. assets	0	0	
Capital transfers	1	4	
Capital account balance			-3
Net lending (+) / net borrowing (-) (from current and cap. accounts)			29
Financial account	Net acquisition of financial assets	Net incurrence of liabilities	Balance
Direct investment	-4	8	
Portfolio investment	17	7	
Financial derivatives (oth. than reserves) and Employee Stock Options	3	0	
Other investment	42	22	
Reserve assets	8	0	
Total changes in assets/liabilities	66	37	29
Net errors and omissions			0

Source: <https://www.nbp.pl>

Balance of Payments, Poland

mn USD

	2013	2014	2015	2016	2017
Current Account	-6 744	-11 444	-2 659	-2 458	602
Balance on goods	-453	-4 291	2 464	3 263	1 539
Goods: exports	198 107	210 628	191 023	196 340	228 046
Goods: imports	198 560	214 919	188 559	193 077	226 507
Balance on Services	10 145	12 046	12 111	15 458	20 304
Services: Credit	44 629	48 723	45 098	49 713	58 738
Services: Debit	34 484	36 677	32 987	34 255	38 434
Balance on Primary Income	-15 896	-18 649	-16 284	-19 645	-21 112
Primary income: credit	15 263	15 443	12 560	12 290	13 036
Primary income: debit	31 159	34 092	28 844	31 935	34 148
Balance on Secondary Income	-540	-550	-950	-1 534	-129
Secondary income: credit	8 028	7 884	6 443	6 093	6 889
Secondary income: debit	8 568	8 434	7 393	7 627	7 018
Capital Account	11 964	13 305	11 331	4 884	6 798
Capital account: credit	12 620	14 340	12 025	5 670	7 333
Capital account: debit	656	1 035	694	786	535

Financial account	-6 018	-6 350	753	1 401	-1 383
Direct investment - assets	-3 411	6 799	4 913	13 923	4 210
Equity and investment fund shares	-351	4 337	3 684	8 015	1 661
Debt instruments	-3 060	2 462	1 229	5 908	2 549
Direct investment - liabilities	795	19 776	15 065	18 321	10 673
Equity and investment fund shares	-2 638	11 758	12 628	11 181	9 819
Debt instruments	3 431	8 018	2 437	7 140	854
Portfolio investment - assets	2 162	5 866	11 035	-5 936	1 217
Equity securities	1 185	2 613	9 997	-6 240	107
Debt securities	977	3 253	1 038	304	1 110
Portfolio investment - liabilities	2 399	3 616	7 859	-2 224	6 014
Equity securities	2 648	3 146	4 117	-2 639	1 487
Debt securities	-249	470	3 742	415	4 527
Other investment - assets	1 559	4 453	5 153	2 777	6 408
Monetary authorities	1	2	1	245	-245
General government	58	-5	41	243	19
Monetary Financial Institutions	-1 001	859	67	345	594
Other sectors	2 501	3 597	5 044	1 944	6 040
Other investment - liabilities	3 369	316	-2 419	16 111	-12 454
Monetary authorities	1 888	-1 480	-50	16 732	-11 177
General government	2 843	2 503	-34	-104	-730
Monetary Financial Institutions	193	1 278	-1 902	-2 130	-2 777
Other sectors	-1 555	-1 985	-433	1 613	2 230
Financial derivatives	-710	-64	-978	184	-1 197
Official reserve assets	945	304	1 135	22 661	-7 788
Net Errors and Omissions	-11 238	-8 211	-7 919	-1 025	-8 783

Financial account

2013	2014	2015	2016	2017
-6 018	-6 350	753	1 401	-1 383
310	17 118	21 101	10 764	11 835
6 563	23 708	20 505	32 208	4 233
-710	-64	-978	184	-1 197
945	304	1 135	22 661	-7 788

Current Account + Capital Account = Financial Account

Current Account + Capital Account – Financial Account = - Net Errors and Omissions

Current Account + Capital Account – Financial Account + Net Errors and Omissions =0

Balance of Payments, Poland

mn USD

	2013	2014	2015	2016	2017
Current Account	-6 744	-11 444	-2 659	-2 458	602
Capital Account	11 964	13 305	11 331	4 884	6 798
Financial account	-6 018	-6 350	753	1 401	-1 383
Net Errors and Omissions	-11 238	-8 211	-7 919	-1 025	-8 783

Types of BOP disequilibrium

- **Cyclical** caused by trade cycles.
- **Structural** – when structural changes take place in some sectors of economy.
- **Fundamental** – countries suffers chronic and continuous disequilibrium year after year.
- **Temporary** – short term factors account for it.

Causes of disequilibrium in BOP - Economic factors

- Imbalance between exports and imports. Import of services.
- Large scale development expenditure which causes large imports.
- In principle, there is nothing wrong with a trade deficit. It simply means that a country must rely on foreign direct investment or borrow money to make up the difference.
- In the short term, if a country is importing a high volume of goods and services this is a boost to living standards because it allows consumers to buy more consumer durables.
- The deficit might also be the result of importing much needed capital equipment that will boost a country's productive capacity in the long run.

Dangers from running persistent trade deficits

- A deficit leads to lower aggregate demand and therefore slower growth; persistent trade deficits undermine the standard of living.
- Trade deficit can lead to loss of jobs in home-based industries.
- A trade deficit can lead to currency weakness and higher imported inflation.
- Currency weakness can lead to capital flight / loss of investor confidence.
- Countries may run short of vital foreign currency reserves.

Causes of disequilibrium in BOP - Economic factors

- High domestic prices (high rate of inflation) which lead to imports.
- Decline in competitiveness/export sector.
- Cyclical fluctuations (like recession, a phase of boom) in general business activity.
- Recession in other countries.
- Borrowing money to invest.
- Financial flows to finance current account deficit.
- New sources of supply and new substitutes.

Causes of disequilibrium in BOP – Social factors

- Changes in fashions, tastes and preferences of the people.
- Demonstration effect - when the people of underdeveloped countries come in contact with those of advanced countries, they start adopting the foreign pattern of consumption. Due to this reason, their imports increase and it leads to an adverse balance of payments for underdeveloped country
- High population growth in poor countries adversely affects their BOP because it increases the needs of the countries for imports and decreases their capacity to export.

Causes of disequilibrium in BOP – Political factors

- Political instability and disturbances cause large capital outflows and reduce inflows of foreign capital.
- Frequent changes in the government, inadequate support to the government in parliament also discourage inflows of capital.

Causes of disequilibrium in BOP

- Natural calamities such as floods, earthquakes and diseases cause disequilibrium in balance of payments as they adversely affect agriculture and industrial production in the country.

Measures to correct disequilibrium in BOP

- Export promotion.
- Restrictions and import substitution.
- Devaluation of domestic currency - It means fall in the external (exchange) value of domestic currency in terms of a unit of foreign exchange which makes domestic goods cheaper for the foreigners.
- Inflation discourages exports and encourages imports.

Measures to correct disequilibrium in BOP

- Exchange control - government can control foreign exchange by ordering all exporters to surrender their foreign exchange to the central bank and then ration out among licensed importers.

Causes of current account surpluses

- Export-oriented growth: Some countries have set out to increase the capacity of their export industries as a growth strategy. Investment in new capital provides the means by which economies of scale can be exploited, unit costs driven down and comparative advantage can be developed.
- Foreign direct investment: Strong export growth can be the result of a high level of foreign direct investment where foreign affiliates establish production plants and then export from this base.

Causes of current account surpluses

- Undervalued exchange rate: A trade surplus might result from a country attempting to depreciate its exchange rate to boost competitiveness.
- Keeping the exchange rate down might be achieved by currency intervention by a nation's central bank, i.e. selling their own currency and accumulating reserves of foreign currency.
- One of the persistent disputes between the US and China has revolved around allegations that the Chinese have manipulated the Yuan so that Chinese export industries can continue to sell huge volumes into North American markets.

Causes of current account surpluses

- High domestic savings rates: Some economists attribute current account surpluses to high levels of domestic savings and low domestic consumption of goods and services (China/the United States).
- Some countries have a low share of national income taken up by imports – perhaps because of a range of tariff and non-tariff barriers.

Significance of current account surpluses

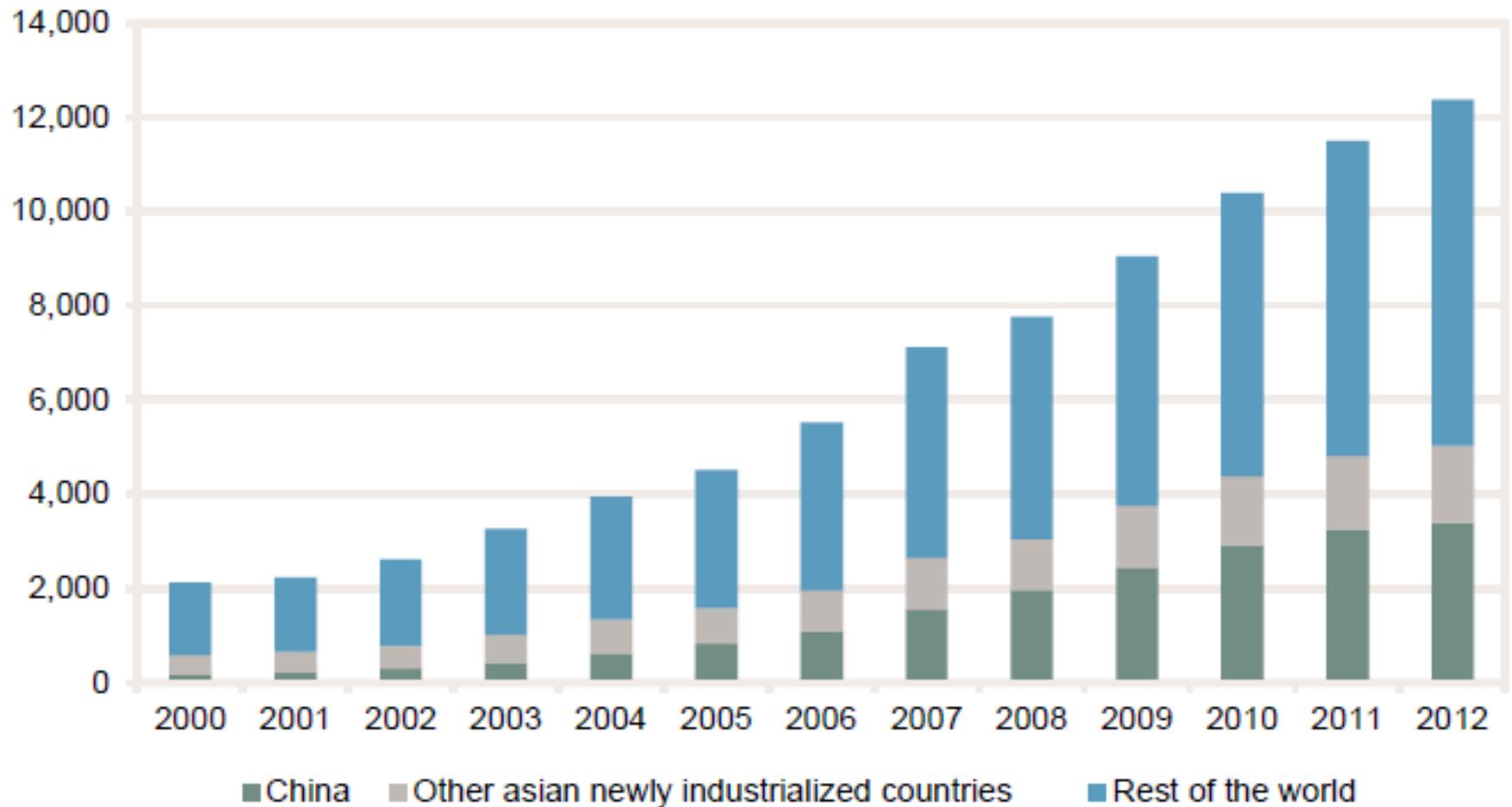
- Contributor to GDP i.e. net external demand is positive.
- Accumulation of foreign exchange reserves.
- Might cause demand-pull inflationary pressure.
- Pressure on the currency to appreciate
- Allows a country to be a net exporter of capital.

The imbalances in surplus countries

Source: Raschen, M., 2014. „The Problem of Balance of Payments Imbalances”, KFW Economic Research, 44.

- The high current account surplus of **China** is closely related to exchange rate policy and the resultant increase in forex reserves. China alone holds 27 % of the world's forex reserves.
- China and Asian countries: After the Asian crisis currency market interventions: the central banks took over part of the net inflow of foreign currency from export transactions and did not make them available for imports.
- This policy led to an undervaluation of the currencies. It stimulates exports and dampens imports.
- In China, the substantial undervaluation of the renminbi over a long period prompted an excessive expansion of the export economy and led to production sectors manufacturing substitutes for imports. The exchange rate controlled by the central bank.
- China: export subsidies and curbs on import, promotion of the country's own companies.

Global forex reserves (USD billion)



Foreign currencies, gold, special drawing rights, reserve position at the IMF.
Hong Kong, India, Indonesia, Korea, Malaysia, Singapore, Thailand.

Source: Raschen, M., 2014. „The Problem of Balance of Payments Imbalances”, KFW Economic Research, 44.

The imbalances in surplus countries

Source: Raschen, M., 2014. „The Problem of Balance of Payments Imbalances”, KFW Economic Research, 44.

- **Germany** – relatively moderate wage development, wage stagnation (wage restraint implemented in the early 2000s), a price advantage, low domestic demand, low demand for imports.
- In **Japan** the current account surplus before 2008 was principally a consequence of high income from extensive foreign direct investment (FDI) as well as portfolio investment abroad (surplus in the primary income balance), 2004 the yen depreciation led to a surplus in the balance of trade.
- **Saudi Arabia** - oil exporting country benefited from an increase in the volume extracted and exported as well as from a sharp rise in the oil price.

The imbalances in deficit countries

Source: Raschen, M., 2014. „The Problem of Balance of Payments Imbalances”, KFW Economic Research, 44.

- The **US** dollar is the most important international trading and reserve currency.
- The US current account deficits – a way in which enough dollars were introduced into international circulation for the enormous increase in global trade.
- In the early 2000s, due to the weak economic situation, a long-term expansionary monetary policy was implemented and increasing capital inflow from emerging economies was observed.
- Low interest rates and liquidity expansion resulted in increase in private consumption (the property boom).
- **Greece, Ireland, Portugal and Spain** - excessive private consumption.

The Balance of Payments adjustment

- **Elasticity approach** to balance of payments adjustment - the effect of exchange-rate changes and the price elasticity of demand for exports and imports in international trade. Devaluation makes exports cheaper in foreign currency and imports more expensive in domestic currency.
- Marshall-Lerner condition: if the sum of price elasticities of demand for exports and imports in absolute terms is greater than unity, devaluation will improve the country's balance of payments.

The Balance of Payments adjustment

- **Absorption approach** (the Keynesian approach): if a country has a deficit in its balance of payments, it means that people are ‘absorbing’ more than they produce.
- Domestic expenditure on consumption and investment is greater than national income.
- BOP can be improved by either increasing domestic income or reducing the absorption.
- Devaluation increases exports and reduces imports, thereby increasing the national income.

The Balance of Payments adjustment

- **Monetary approach:** the excess of money supply over money demand reflects the balance of payments deficit.
- The excessive money holdings are utilized by the people in the purchase of foreign goods and securities.
- If the supply of money falls short of the demand for money, the country will have a balance of payments surplus. People try to acquire the domestic currency through the sale of goods and securities to the foreigners.

The Balance of Payments adjustment

- Fixed exchange rate
- Trade surplus: central bank intervention, revaluation, decrease in interest rate, increase in aggregate demand (fiscal policy tools)
- Trade deficit: central bank intervention, devaluation, increase in interest rate
- Floating exchange rate

- The Mundell-Fleming model
- Effectiveness of monetary and fiscal policy
- The Mundell-Fleming trilemma (impossible trinity)

- Mundell-Fleming model is a standard open macroeconomic theory that tries to describe the effects of fiscal and monetary policies.
- Main assumptions of the model:
 - Small open economy
 - Short term analysis – constant prices and wages
 - An extended version of the IS-LM model with balance of payments
- Domestic goods market equilibrium (IS curve)
- Money market equilibrium (LM curve)
- Foreign exchange market equilibrium (BP curve)

Domestic goods market equilibrium – **IS** curve

$$Y = AD = C + I + G + (E - X)$$

$$C = C_a + MPC \cdot (Y - T) \qquad T = T_a + t \cdot Y$$

$$C = C_a - T_a \cdot MPC + MPC \cdot (1 - t) \cdot Y$$

$$E = a_1 \cdot Y^F + a_2 \cdot R^F \qquad I = I_a - b \cdot i$$

$$X = MPI \cdot Y - m_2 \cdot R^F \qquad G = G_a$$

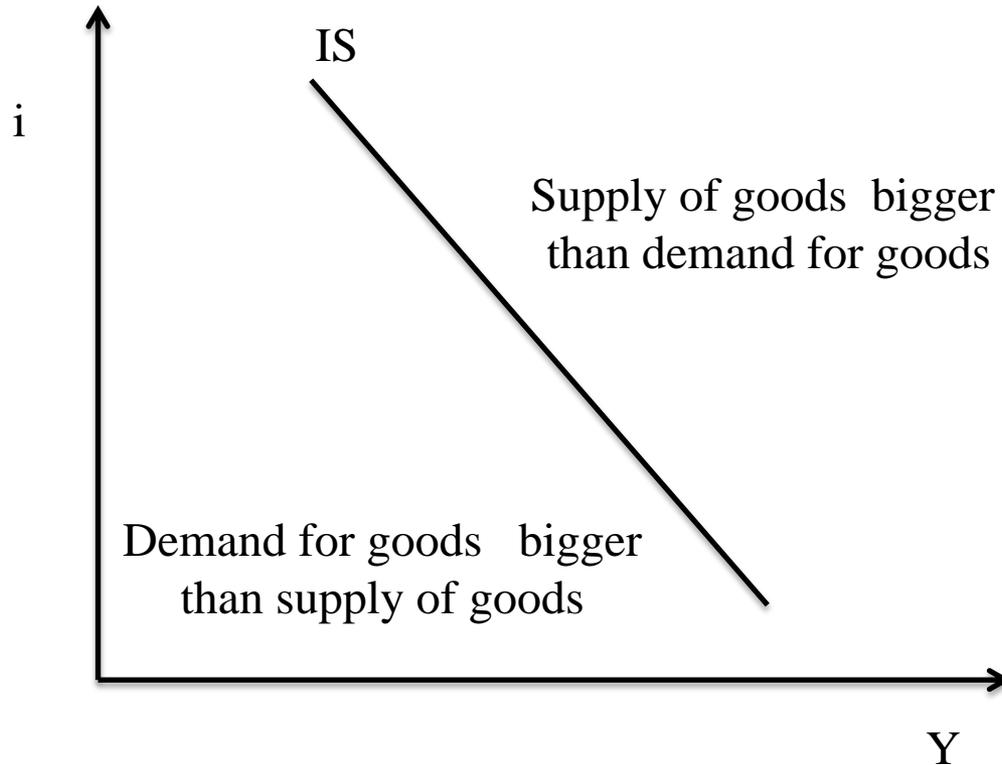
$$R^F = \frac{P^F}{P} e^F$$

$$m_I = \frac{1}{1 - MPC \cdot (1 - t) + MPI}$$

$$AD_a = C_a - T_a \cdot MPC + I_a + G_a$$

$$i = -\frac{1}{m_I \cdot b} Y + \frac{AD_a}{b} + \frac{a_1}{b} \cdot Y^F + \frac{a_2 + m_2}{b} \cdot R^F$$

Domestic goods market equilibrium – IS curve



The IS curve shows the combinations of levels of income and interest at which goods market is in equilibrium, that is, at which aggregate demand equals income.

The exogenous shocks that shift the IS curve include:

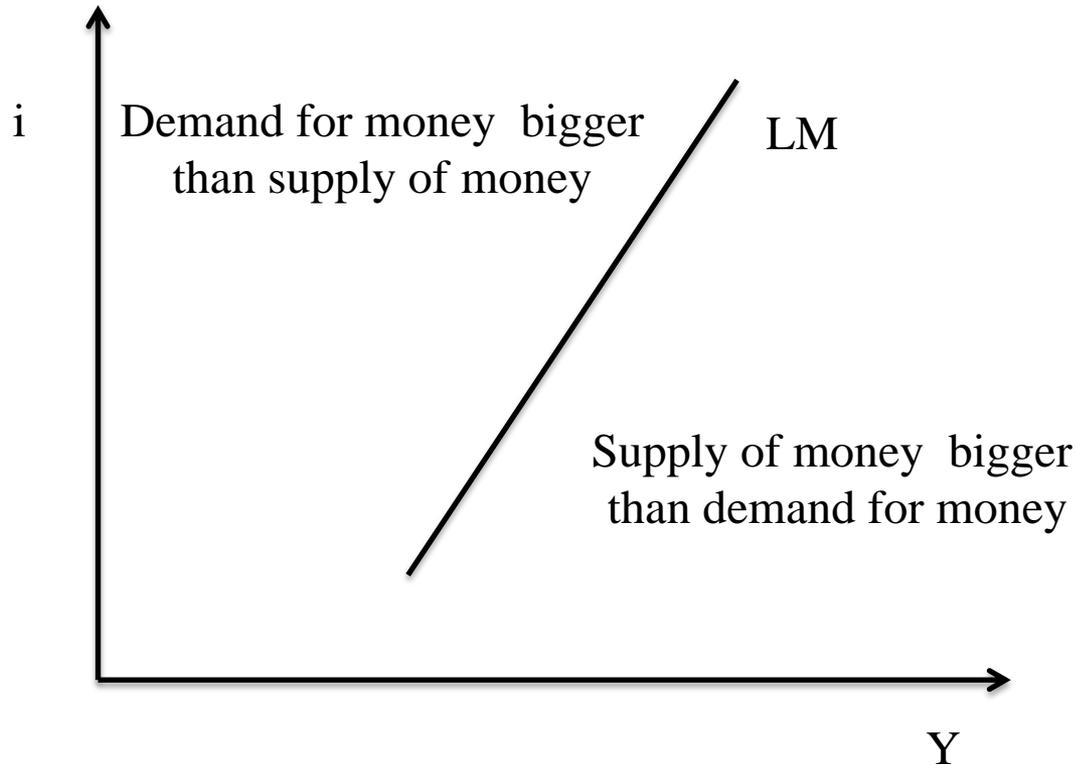
- expansionary or contractionary fiscal policy;
- exogenous increase or decrease in household consumption and domestic investment;
- an exogenous increase or decrease in exports and imports.

$$\frac{M}{P} = L(Y, i)$$

$$L(Y, i) = w_Y \cdot Y - w_i \cdot i$$

$$i = \frac{w_Y}{w_i} \cdot Y - \frac{M}{w_i \cdot P}$$

Money market equilibrium – **LM** curve



LM curve is a curve that shows combinations of interest rates and levels of income at which money market is in equilibrium, that is, at which demand for money equals supply of money.

Factors that will shift the LM curve include:

- expansionary or contractionary monetary policy;
- increase or decrease in the country's average price level;
- exogenous decrease or increase in money demand.

$$BP = CA + CF = 0$$

$$E = a_1 \cdot Y^F + a_2 \cdot R^F \quad X = MPI \cdot Y - m_2 \cdot R^F$$

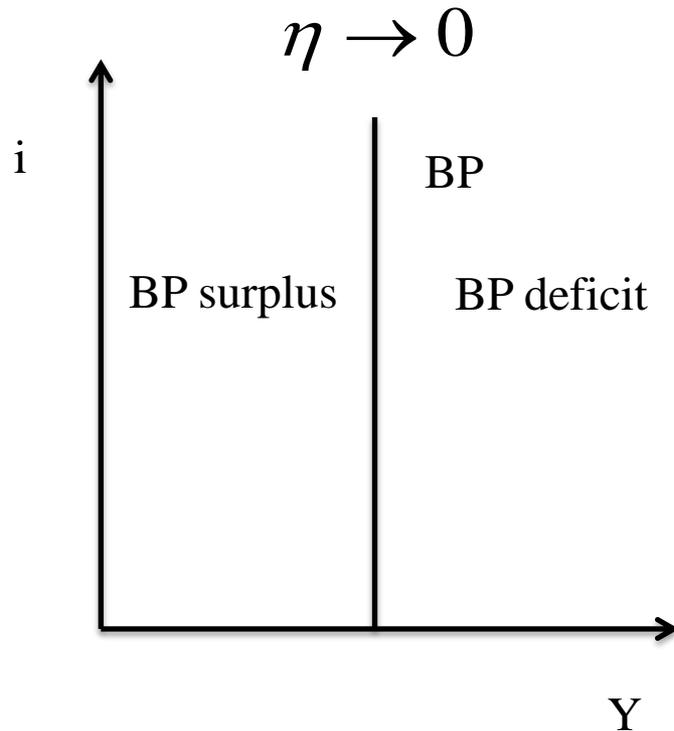
$$CA = E - X = a_1 \cdot Y^F - MPI \cdot Y + (a_2 + m_2) \cdot R^F$$

$$CF = \eta \cdot (i - i^F)$$

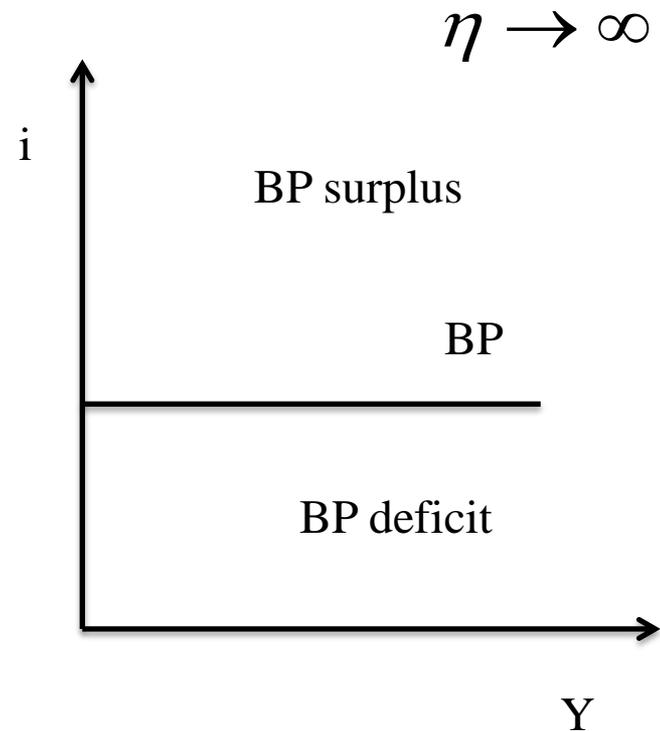
$$i = \frac{MPI}{\eta} \cdot Y - \frac{a_1}{\eta} \cdot Y^F - \frac{a_2 + m_2}{\eta} \cdot R^F + i^F$$

Foreign exchange market equilibrium – **BP** curve

Capital immobility



Perfect capital mobility



BP curve shows the sets of all interest-and-production combinations in a country that result in a zero value for its official settlements balance.

The volume of net exports that affect total production must be consistent with the volume of net capital flows.

Any point above the BP curve will mean a balance of payments surplus.

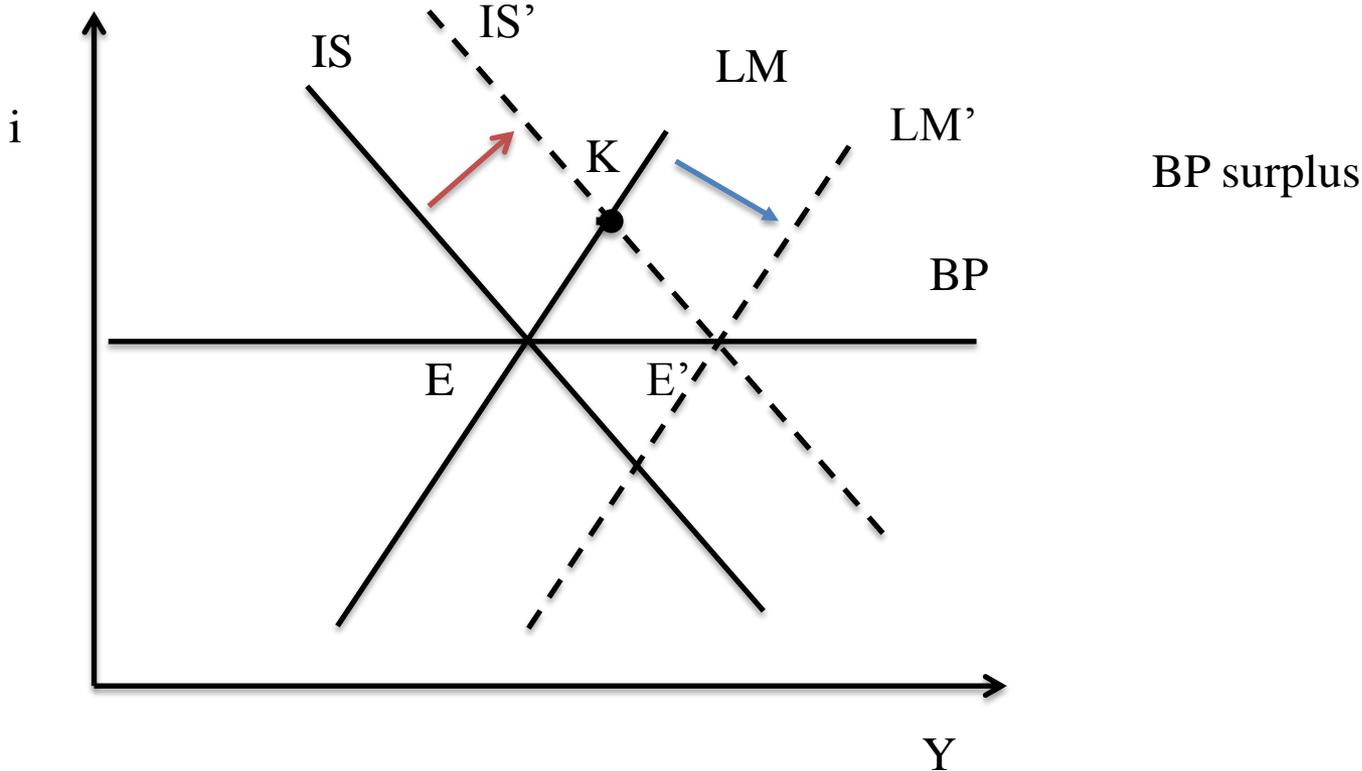
Any points below the BP curve will mean a balance of payments deficit.

Factors that will shift the BP curve include:

- an exogenous increase or decrease in exports or imports,
- exogenous changes that result in an increase or decrease in capital flows.

- Mundell-Fleming model believes that, under assumptions of small country and fully capital mobility, fiscal policy is strong under fixed exchange rate while monetary policy is strong under floating exchange rate.

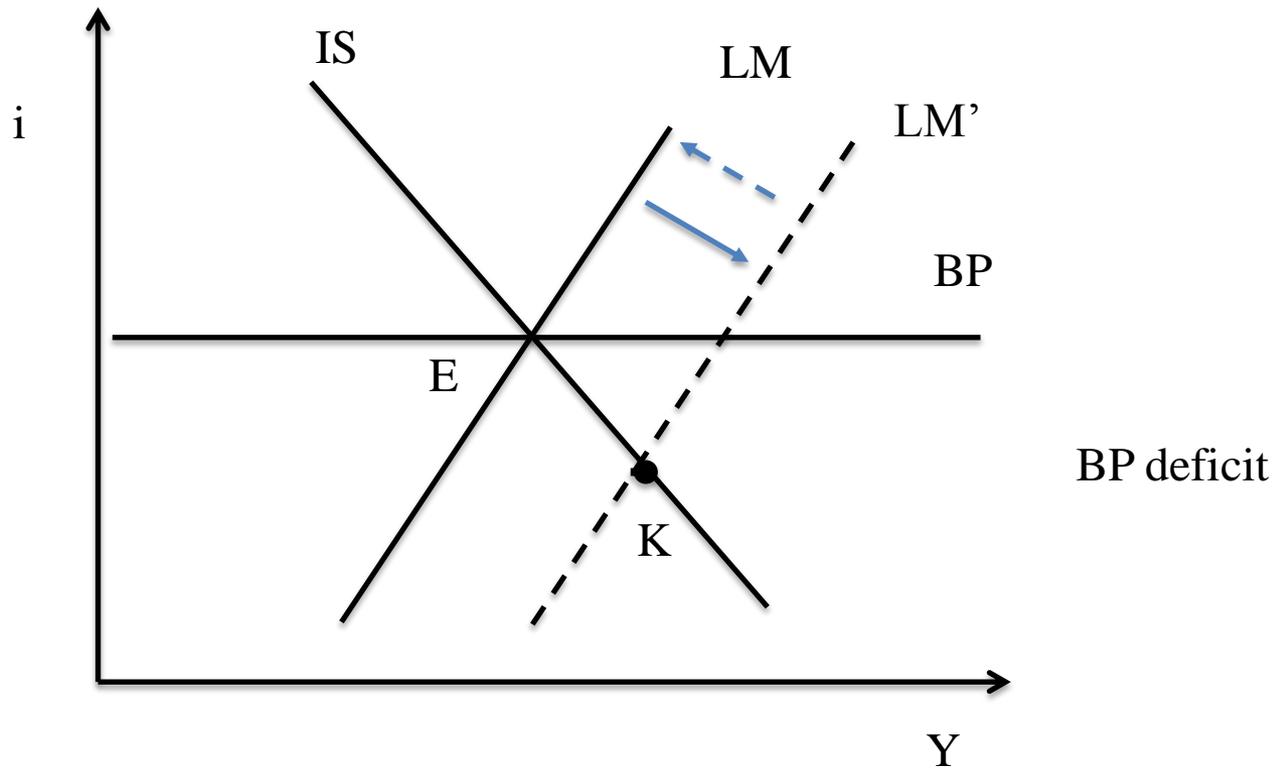
Fully capital mobility



Fiscal policy is strong under fixed exchange rate

- Under fixed exchange rate, expansionary fiscal policy shifts IS curve to the right and the IS-LM intersection shifts from E to K, the payment balance is surplus.
- In order to defend fixed exchange rate, central bank will sell domestic currency in foreign exchange market, which will cause LM curve move to the right and the economy shifts toward a new full equilibrium at point E'.
- Domestic production increases and fiscal policy is strong.

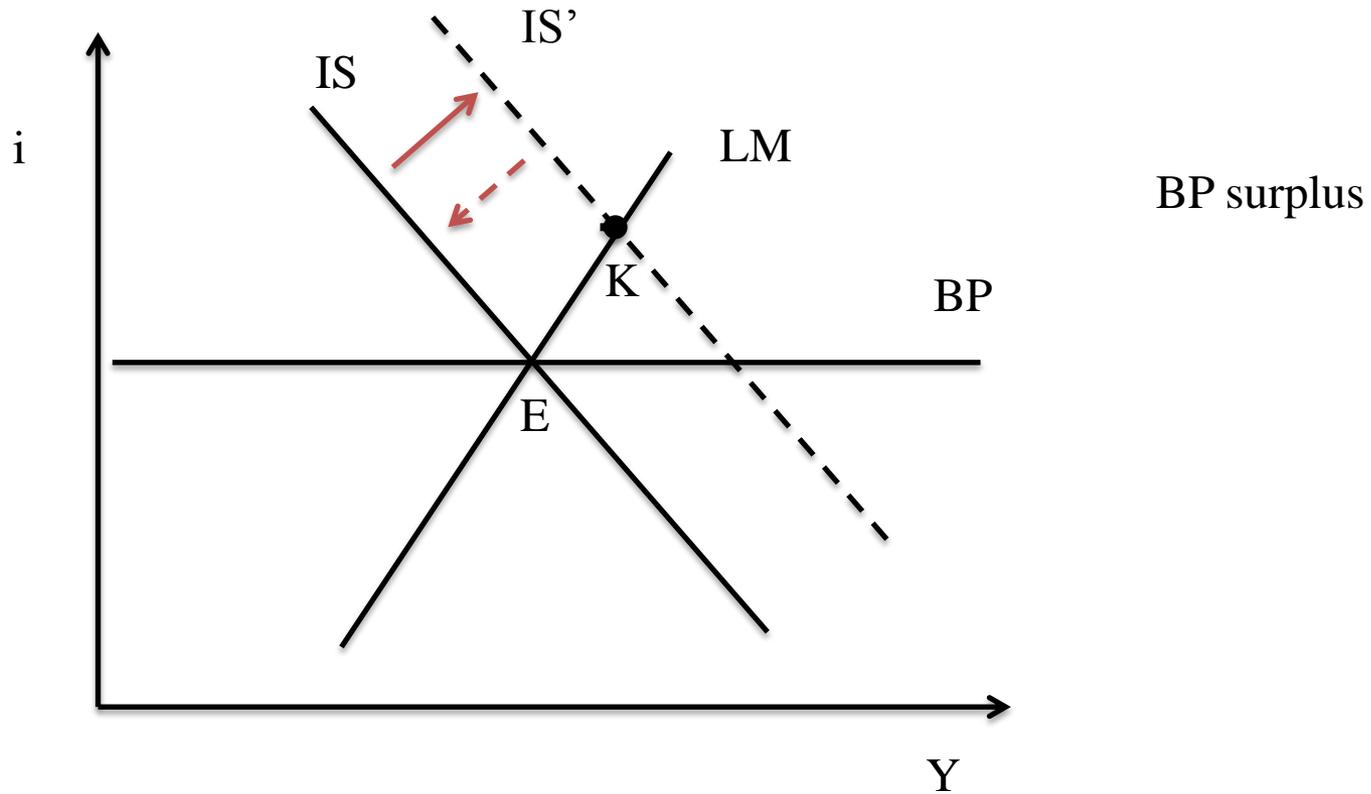
Fully capital mobility



Monetary policy is impotent under fixed exchange rate

- Under fixed exchange rate, expansionary monetary policy shifts LM curve to the right and the IS-LM intersection shifts from E to K, the payment balance is deficit.
- In order to defend fixed exchange rate, central bank will buy domestic currency in foreign exchange market, which will cause LM curve move to the left, and the economy shifts back to point E.
- Domestic production will not change and monetary policy is impotent.

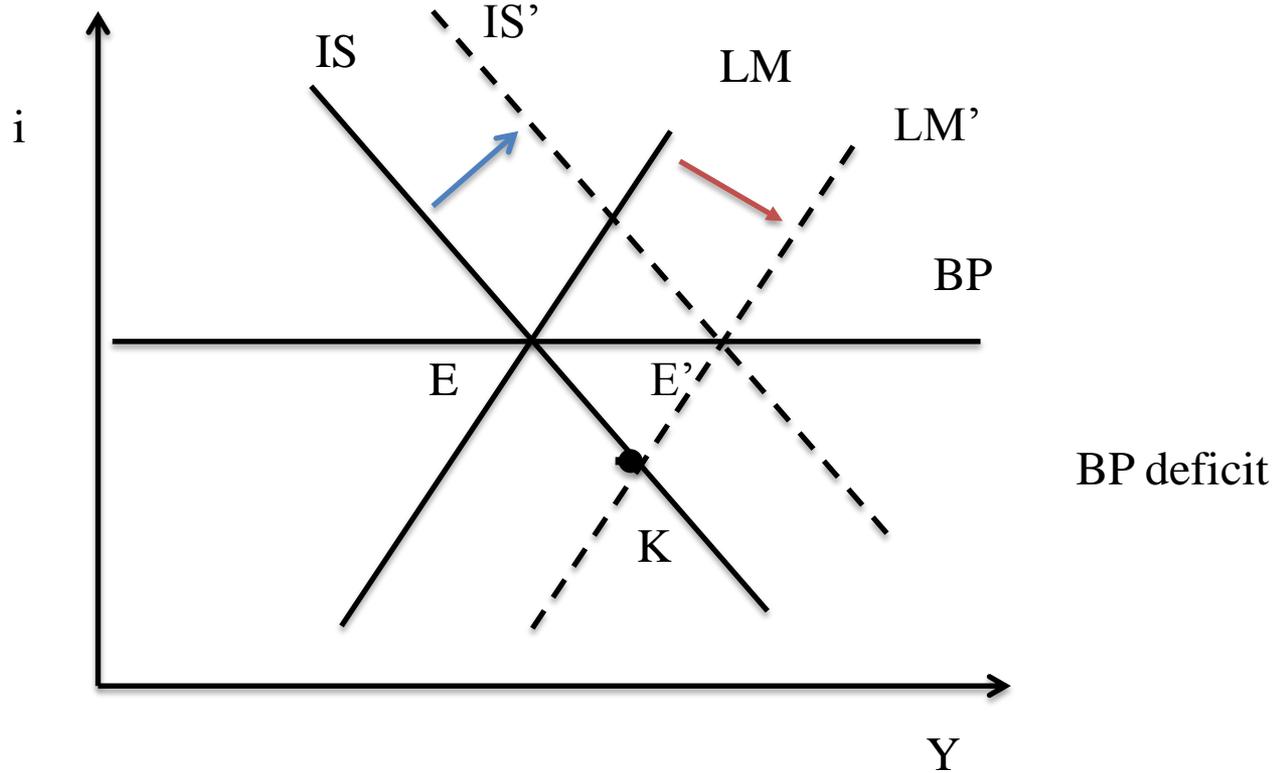
Fully capital mobility



Fiscal policy is impotent under floating exchange rate

- Under floating exchange rate, expansionary fiscal policy shifts IS curve to right and the IS-LM intersection shifts from E to K, the payment balance is surplus.
- Domestic currency will appreciate which will decrease exports. IS curve move to left and the economy shifts back to point E. Domestic production will not change and fiscal policy is impotent.

Fully capital mobility



Monetary policy is strong under floating exchange rate

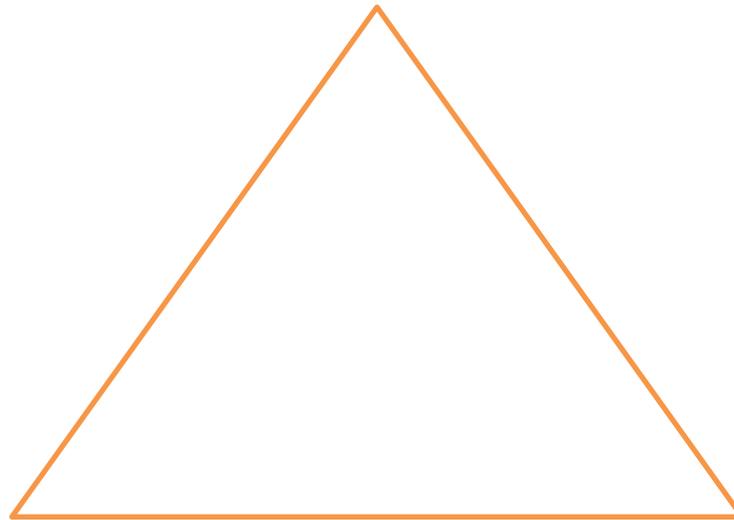
- Under floating exchange rate, expansionary monetary policy shifts LM curve to right and the IS-LM intersection shifts from E to K, the payment balance is deficit. Domestic currency will depreciate which will cause exports increase.
- IS curve move to right and the economy shifts toward a new full equilibrium at point E'.
- Domestic production increased and monetary policy is strong.

Impossible Trinity

- No economy can have the following three: perfect capital mobility, fixed exchange rates and an independent and efficient monetary policy.
- Under the perfect capital mobility assumption, and in order to have an efficient monetary policy, exchange rates must be flexible. Or have fixed exchange rates but assume that monetary policy won't be efficient.

Impossible Trinity

Free capital flows
(Freedom of capital movement)



Independent monetary policy
(Monetary policy autonomy)

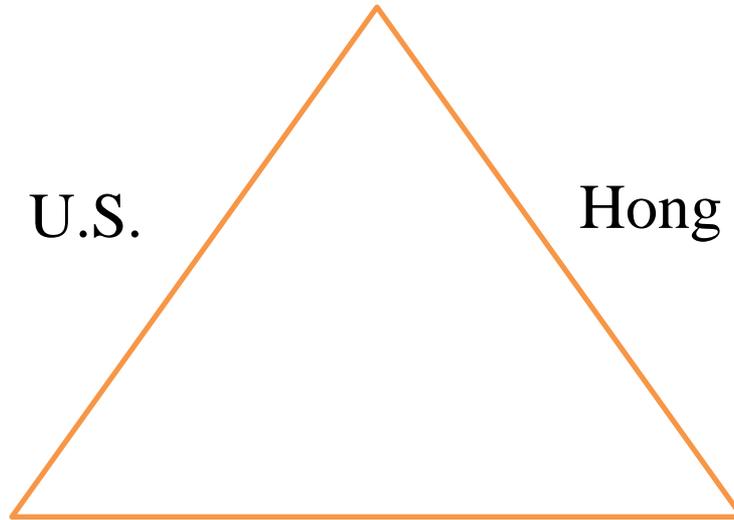
Fixed exchange rate
(Exchange rate stability)

Impossible Trinity

Free capital flows

U.S.

Hong Kong



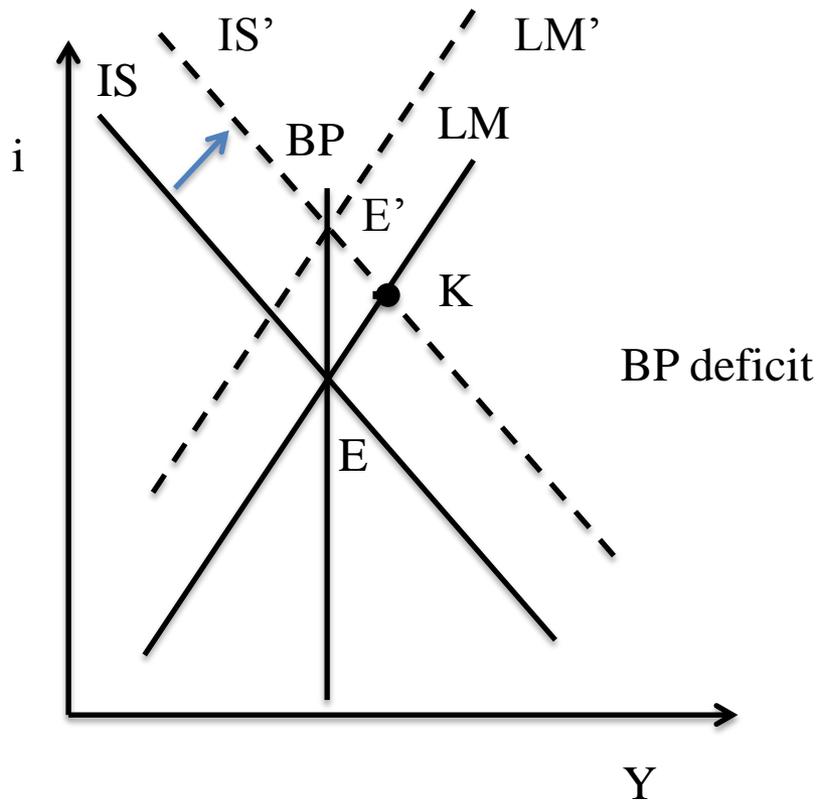
**Independent
monetary
policy**

China

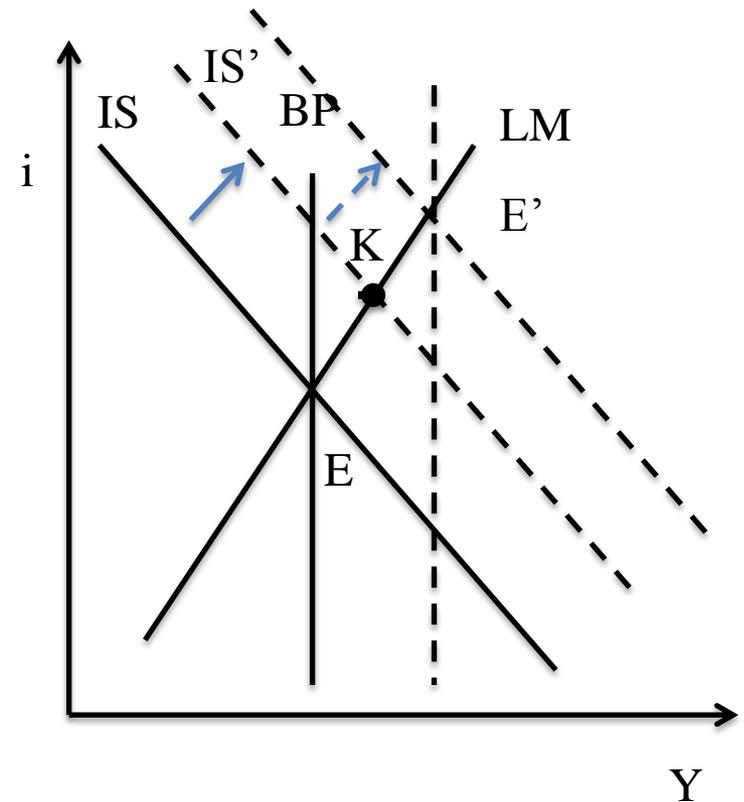
**Fixed
exchange
rate**

- **Hong Kong** - has a pegged exchange rate and free capital mobility. The authorities do not and cannot control money supply or interest rates (monetary policy is not independent).
- **United States** - the Fed controls monetary policy and the US enjoys free capital flows. However, the Fed does not control the exchange rate and does not manipulate the US dollar.
- **China** has a pegged currency and tight rein monetary policy controls.
- A move towards a more flexible and market-determined exchange rate (the fiscal planning, GDP growth targets, and provincial infra capital expenditure (capex) targets)

Capital immobility



Fixed exchange rate



Floating exchange rate

Under fixed exchange rate and capital immobility, fiscal policy is impotent.

Fiscal policy is extremely strong if the capital of this country is immobile.

Effects of fiscal policy under capital immobility

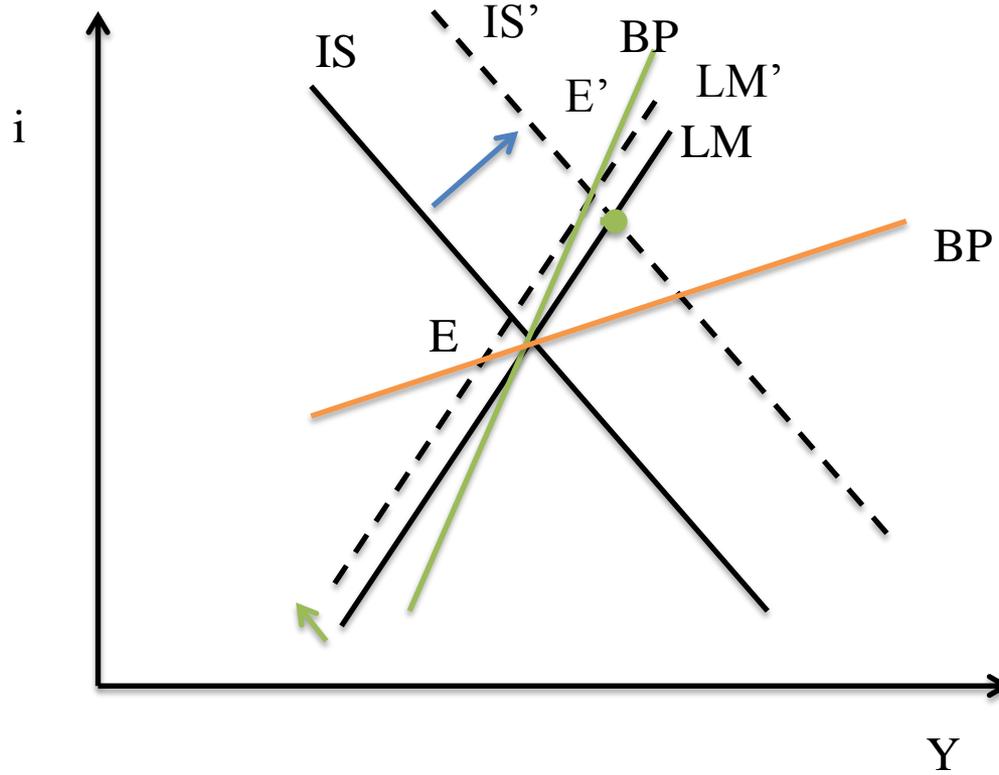
Effects of fiscal policy under capital immobility

- BP curve is vertical, an expansionary fiscal policy will move IS curve to right.
- The new intersection of IS'-LM curve is to the right of BP curve which is a balance of payment deficit.
- Balance of payment deficit will cause domestic currency depreciate. Under a **fixed exchange rate**, government will intervene in foreign exchange market by buying domestic currency and sell foreign currency in order to prevent currency depreciation.
- The intervention will cause LM curve move to left. At last, the new intersection of IS-LM-BP is E', which is the same domestic production compare with initial E.

Effects of fiscal policy under capital immobility

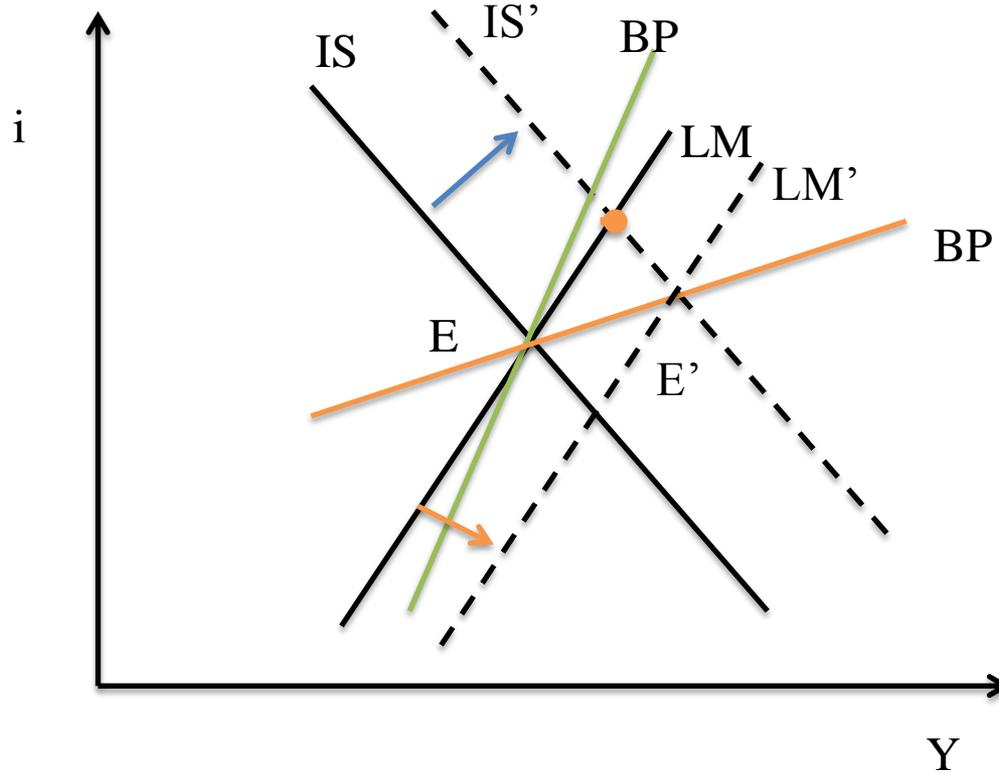
- If it is a **floating exchange** rate, currency depreciation will not cause government intervention because floating exchange rate allows currency fluctuation.
- The depreciation will decrease import and increase export which will cause IS and BP curve move to right.
- The new intersection of IS-LM-BP is E' which is a higher production compare with initial E.

Imperfect capital mobility



Fiscal policy

Imperfect capital mobility



Fiscal policy

Imperfect capital mobility - Fixed exchange rate

- An expansionary fiscal policy will shift the IS to the right.
- Now, depending on capital mobility, we'll either have a balance of payments surplus (high capital mobility) or a balance of payments deficit (small capital mobility).
- Since exchange rates are fixed, government will need to intervene: its acquisitions and disposals of both domestic and foreign currency will shift the LM curve (a balance of payments surplus is the same scenario as in a fiscal policy with perfect capital mobility and fixed exchange rates, while the balance of payments deficit corresponds to the monetary policy scenario).
- Under these circumstances, fiscal policy is completely efficient. It's actually the more efficient the higher capital mobility is.

Imperfect capital mobility - Fixed exchange rate

- An expansionary **monetary policy** will shift LM to the right. Below the BP curve the economy has a balance of payments deficit.
- Since exchange rates are fixed, the government will purchase domestic currency and sell foreign currency, which will drop the money supply and therefore shift the LM' curve to its original position. Monetary policy has again no effect, no matter how great or small capital mobility is.

Imperfect capital mobility - Floating exchange rate

- An expansionary **fiscal policy** will shift the IS curve to the right. Now, depending on capital mobility, we'll either have a balance of payments surplus (high capital mobility, BP+ curve) or a balance of payments deficit (small capital mobility, BP- curve).
- In the case of a balance of payments surplus, and considering flexible exchange rates, there will be an appreciation of the domestic currency. This will decrease net exports, which will shift the IS' curve to the left. Also, since domestic assets are more expensive, the BP+ curve will shift to the left. If there is a balance of payments deficit, the result will be the same one as in the monetary policy case.
- More efficient the smaller capital mobility is.

Imperfect capital mobility - Floating exchange rate

- An expansionary **monetary policy** will shift to the right.
- However, since now exchange rates are flexible, the balance of payments deficit will depreciate the domestic currency. This will increase net exports, shifting the IS curve to the right.
- Also, since domestic assets are less expensive, the BP curve will shift to the right (to either BP'+ or BP'-).
- Monetary policy works well. It's actually the more efficient the higher capital mobility is.

Effects of fiscal policy under different capital mobility

	Fixed exchange rate	Floating exchange rate
Perfect capital mobility	Extremely strong	Impotent
Imperfect capital mobility	Strong	Fiscal policy is not very effective. More efficient the smaller capital mobility is
Capital immobility	Fiscal policy is ineffective	Extremely strong

Effects of monetary policy under different capital mobility

	Fixed exchange rate	Floating exchange rate
Perfect capital mobility	Monetary policy is ineffective	Extremely strong
Imperfect capital mobility	Monetary policy is ineffective	Monetary policy is effective
Capital immobility	Monetary policy is ineffective	Monetary policy is effective