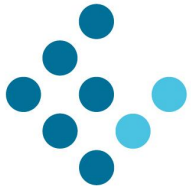


Faculty of Economics

UNIVERSITY OF BELGRADE

Mundell-Fleming Model with Partial International Capital Mobility

IMQF course in International Finance

Caves, Frankel and Jones (2007) World Trade and Payments, 10e, Pearson

Introduction

- How adding international capital flows amends the way macroeconomic policy operates?
- In 1980s trade deficit in the USA widened, due to international flows of capital (caused by the US monetary and fiscal policy)
- What drives international capital flows?
  - Rate of return offered by various countries on their assets
  - Investors' awarennes of future changes to the FX rate, etc.
    - In this capter, we stick to the rate of return, as the single important determinant
- What determines the interest rate (rate of return to assets) in one country?
  - In autarky: supply and demand for money in that country
  - In open economy: international arbitrage would enter into motion (capital will move towards its most productive use)

$$KA = \overline{KA} + k(i - i^*)$$

  - *i (home country interest rate); i* (foreign country interest rate)*
  - *KA is positive (i>i*), when investors from abroad buy assets in a domestic country, or when residents borrow abroad to acquire assets in domestic country*

Outline

- The Model
- Fiscal Policy and Degree of Capital Mobility under Fixed Exchange Rate
- Monetary Policy and Degree of Capital Mobility under Fixed Exchange Rate
- Nonsterilization and Capital Mobility
- Other Automatic Mechanisms of Adjustment
- The Pursuit of Internal and External Balance

The Model

- LM curve:

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

- LM curve: relationship between the income Y, and the interest rate *i*, that gives equilibrium at the money market (real money supply M/P, equals real money demand)
  - LM curve: real money supply, sloped upwards as income and interest rate have opposite effects on real money demand: increase in income raises money demand – without accommodating transactions, this will drive interest rates up, thus reducing money demand, as capital will be invested now in other assets
  - If prices are fixed, expansionary monetary policy will raise real money supply, shifting LM curve to the right (rise in income)

The Model

- IS curve:

$$IS: Y = \frac{\left[\overline{A} - b(i) + \overline{X} - \overline{M}\right]}{s + m}$$

- IS curve: relationship between output Y and interest rate *i*, giving equilibrium at the goods market (amount of goods produced equals the amount of goods demanded)
  - Downward sloped, because interest rate has a second role: rise in interest rate discourages investments and expenditures (consumer loans become more expensive), thus discouraging output
  - IS curve is drawn contingent on the given level of government expenditure: increase in any components of G, shifts IS curve to the right, by the amount of Keynesian multiplier
    - multiplier 1/(s+m) is smaller than under the closed economy assumption (1/s)
  - The effects on income in complete IS-LM model is smaller, as the higher transaction demand for money drives interest rate up and discourages investments (investment crowded out)
  - IS curve can be shifted to the right also due to increase in demand for domestic goods by residents or increase in demand for domestic goods by nonresidents (devaluation)

The Model

BALANCE OF PAYMENT RELATIONSHIP

- A combination of income and interest rate can bring the BP to equilibrium

$$BP = TB + KA = 0$$

$$BP = \overline{X} - \overline{M} - mY + K\overline{A} + k(i - i^*) = 0$$

- Interest rate differential corresponding to the given level of income, which imply BP=0:

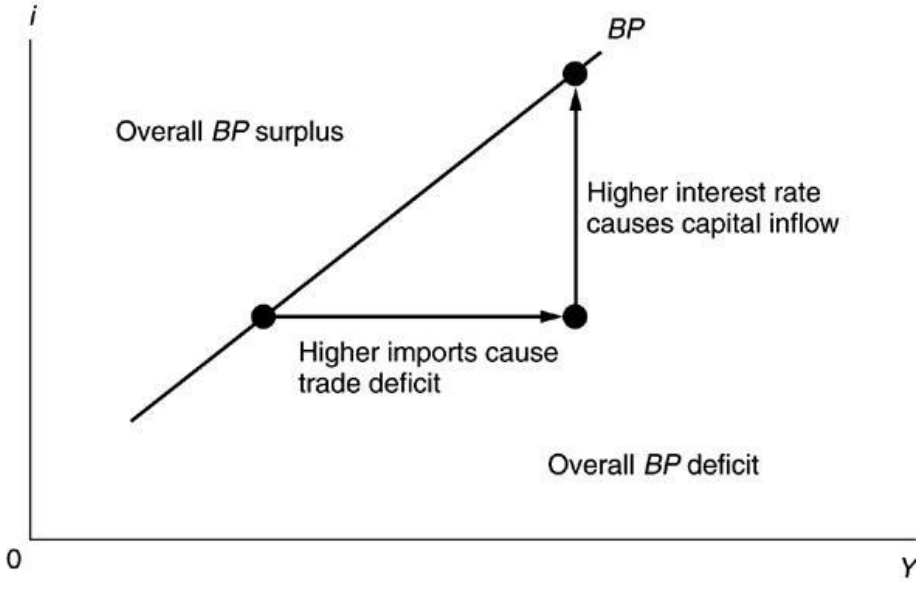
$$i - \bar{i}^* = -\frac{1}{k}(\overline{X} - \overline{M} + K\overline{A}) + \frac{m}{k}Y$$

  - as a country is small, foreign interest rate is exogeneous

The Model

BALANCE OF PAYMENT RELATIONSHIP

- Increase in income must be accompanied with the rise in the interest rate differential to maintain the BP=0
  - Rise in income implies rise in import, widening trade deficit. Higher interest rate in domestic country should attract more capital inflow, to fill in the gap and to bring the BP to equilibrium
- The slope of the line depends inversely on the degree of capital mobility (k) – the larger the k, the flatter BP line
  - If k is small, BP line is steep – it would take a large increase in the interest rate to attract the required capital inflow
  - What would be the slope of BP line if k=0?
- Effect of devaluatuon: shifting the BP curve to the right
  - For any given i, the BP=0 for higher level of income (country can afford higher imports, if BP devalued)



Fiscal Policy and the Degree of Capital Mobility Under Fixed Rates

IMPACT OF FISCAL EXPANSION ON BALANCE OF PAYMENT

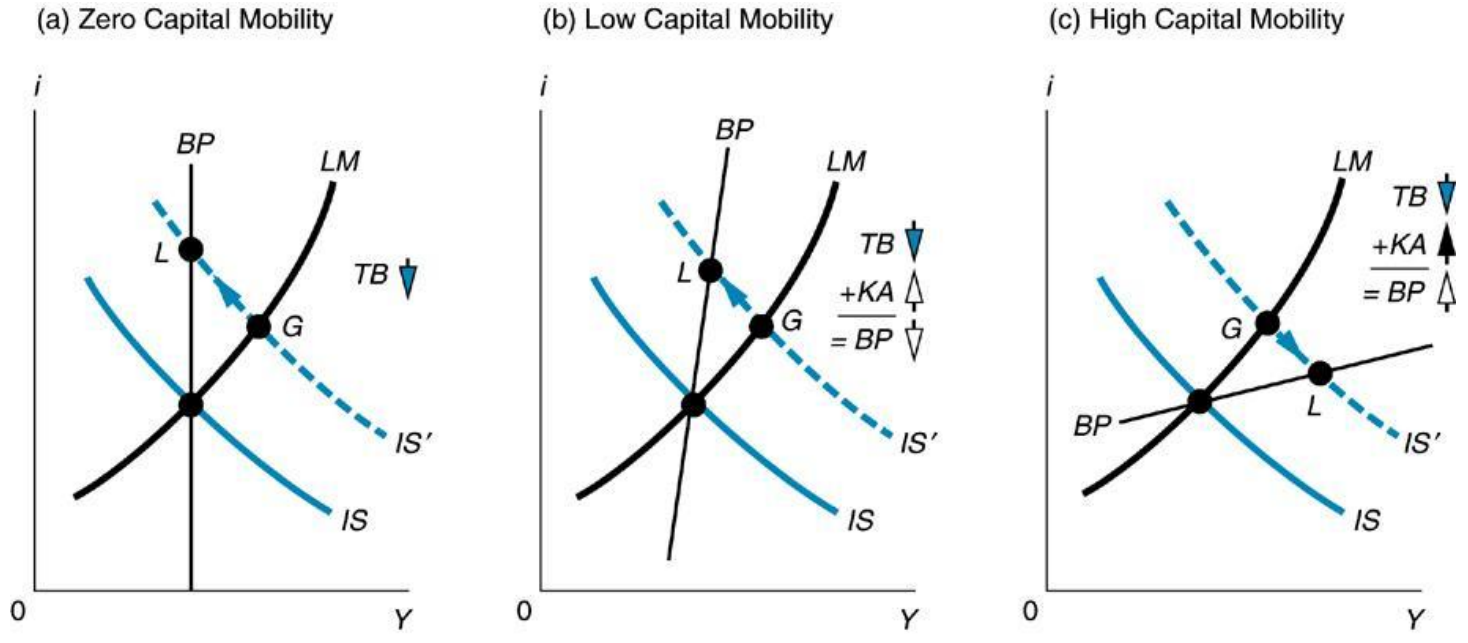
- No capital mobility assumption: fiscal expansion, shifts IS curve to the right – rise in income increases transaction demand for money, thus lifting up the interest rates
  - BP deteriorates due to rise in imports, caused by higher incomes, while the central bank is selling foreign currency reserves

- Capital mobility assumption: rise in interest rates attracts capital, thus improving the BP
  - Inflow of capital may cause rise in imports
  - The net effect (inflow of capital – rise in imports) on the BP will depend on the degree of capital mobility (if capital flows are sensitive to interest rates, BP shall improve and *vice versa*)

- Low mobility - point G (after fiscal expansion) is below the BP line: deficit (but still smaller than under k=0)
  - a central bank is selling international reserves

- High mobility - point G (after fiscal expansion) is above the BP line: surplus (inflow of capital outweights increase in imports)
  - a central bank adding on its international reserves

Fiscal Expansion under Fixed Exchange Rates



Fiscal Policy and the Degree of Capital Mobility Under Fixed Rates

- Majority of developed countries fall now under category (c) – high capital mobility
  - USA after 1974 (capital controls removed)
  - France: 1980s, fiscal expansion triggered trade deficit, but due to modest capital mobility, this has not triggered rise in capital inflow
  - Germany in 1990s: fiscal expansion aimed at bulding up the east provinces, caused rise in interest rates, implying strong rise in capital and appreciation preassure on DEM

- Developing countries
  - Fixed exchage rate regimes
  - High marginal propensity to import means that fiscal expansion has strong effects on TB deterioration
  - Financial markets are shallow, which means that interest rates do not react strongly to fiscal expansion
  - Degree of capital mobility rather modest

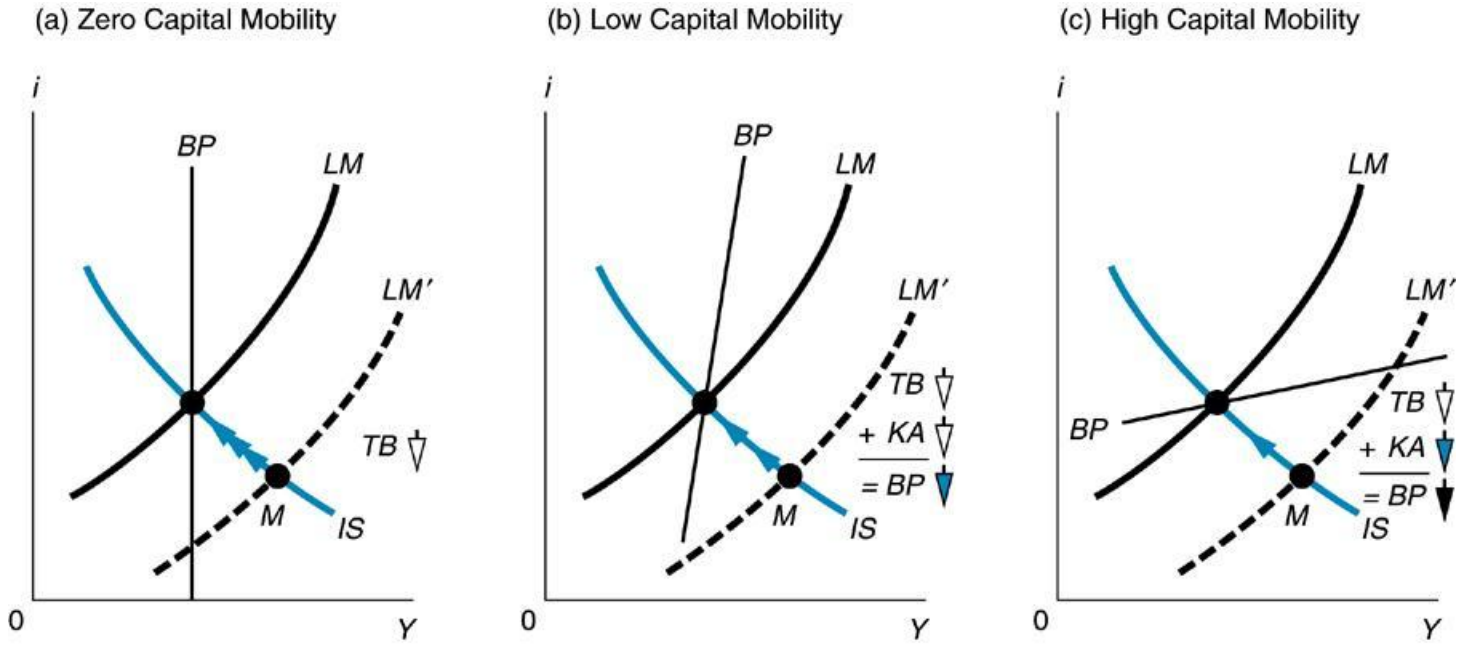
Monetary Policy and the Degree of Capital Mobility Under Fixed Rates

IMPACT OF MONETARY EXPANSION ON BALANCE OF PAYMENT

- Monetary expansion, rise in money supply, lowers the interest rates, thus stimulating spending and raising income (LM curve shifted to the right, to new equilibrium – M)
  - Higher income – higher imports – trade deficit

- Decline in interest rates triggers capital outflow (double negative effect on BP)
  - The largest BP deficit is attained under high capital mobility (c), then under modest capital mobility (b), while being the lowest under zero capital mobility (a)
  - At some point adjustment is needed (to reverse monetary expansion or through automatic adjustment if there are no sterilization operations) or to change the FX rate
    - Devaluation would shift the BP curve to the right (rise in imports)

Monetary Expansion under Fixed Exchange Rates



When Money Flows Are Not Sterilized

MONETARY EXPANSION AND CAPITAL-ACCOUNT OFFSET

- No capital mobility: central bank expands domestic credit – fall in interest rate and rise in income cause trade deficit to widen, thus implying outflow of reserves
  - If there is no sterilization, money supply declines (LM curve is shifting back to the left), triggering rise in interest rate, fall in income/spending/investment, thus bringing the economy back to external balance (TB=0), but now at the lower level of reserves

- Capital mobility: if capital mobility is allowed, the effects would be of the same sign, but larger - lower interest rates triggers capital account deficit, thus BP deficit is larger than under no capital mobility assumption
  - The consequences (decline in money supply and return to external equilibrium) are the same as under no capital mobility assumption, the only difference being that the economy is returning to equilibrium more rapidly (*speed of offset*)

When Money Flows Are Not Sterilized

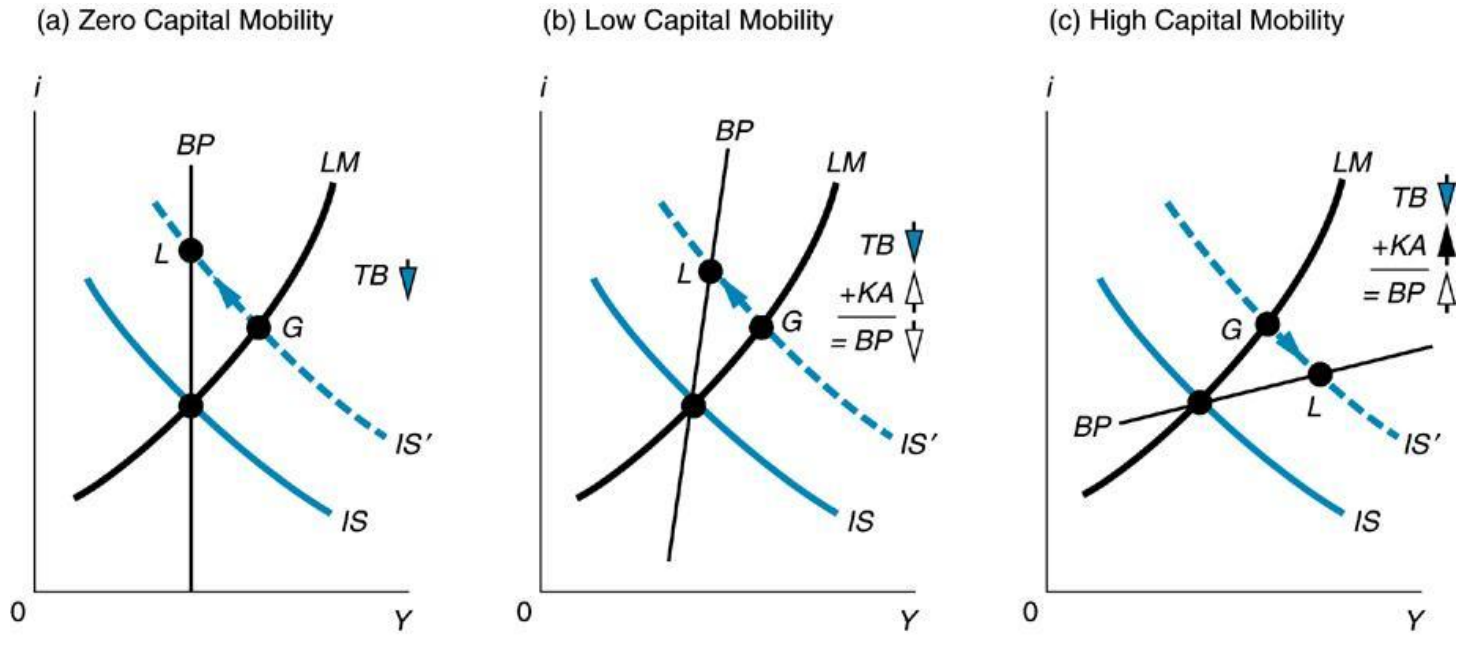
FISCAL EXPANSION AND CAPITAL MOBILITY

- No capital mobility: government imposes fiscal expansion (shifting IS curve to the right), triggering rise in income and widening of trade deficit
  - Trade deficit – decline in money supply (no sterilization), shift of LM curve to the left – increase in interest rates – decrease in expenditures – decline in trade deficit – gradual return to BP equilibrium (no effect on the long run output)

- Modest capital mobility: nonsterilized decline of reserves due to trade deficit – decline in money supply and level of income
  - However, new level of income is still somewhat higher than before the expansion

- High capital mobility: point G implies BP surplus (due to large inflow of capital), building up international reserves
  - without sterilization money supply rises
  - LM curve shifts to the right
  - decline in interest rate and rise in spending
  - the new equilibrium is at point L, where the capital inflow equals to the trade deficit
  - output is higher than before fiscal expansion as well compared to the short run level

Fiscal Expansion under Fixed Exchange Rates



When Money Flows Are Not Sterilized

Are Capital Flows and Money Flows the Same Thing?

- Money flows in/out through the capital account, but also through the trade balance
- Money is truly flowing-in only if there is a BP surplus
  - But it does not mean that money supply rises (it might me sterilized)
  - Instead the term „inflow of money“, capital flows may be more properly described using other terms: borrowing from abroad, foreign financing, foreign investment position, etc.
- Under monetary approach, the overall BP in the long run is zero, although money is flowing through the capital account at the same rate it flows out through trade balance (due to higher interest rates)
- In the long run all three curves intersect (not just the IS and LM)

Other Automatic Mechanisms of Adjustment

- Under capital mobility assumption, fiscal policy may have long run impact on output, due to several reasons ommited by the model

- Inflationary preassure
  - Due to inflationary preassure caused by excess demand, real money supply declines, with discouraging effects on spending

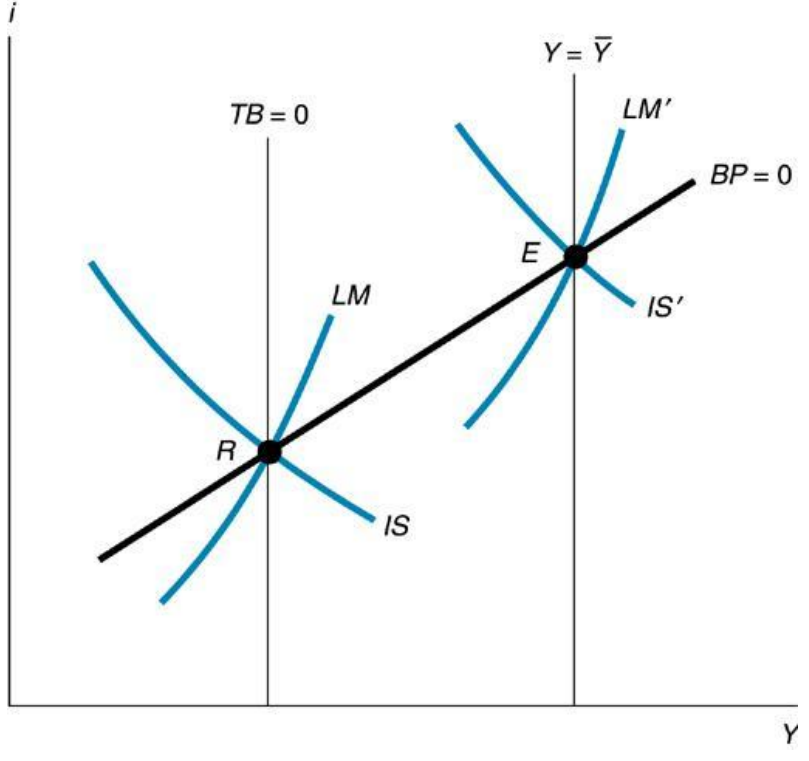
- Change in stock of bonds
  - In equilibrium (L), government still runs budget deficit which means that the stock of government bonds held by private sector is rising. At the same time, there is a current account deficit, which means that the supply of foreign bonds held by public is decreasing
  - Decline in holding of bonds by HHs is equivalent to deterioration of its wealth position, shifting the IS curve to the left (decline in spending) – the process may be in motion until the current account is brought back to balance and stock of bonds is brought back to initial position

The Pursuit of Internal and External Balance

- Recall two policy goals – two instruments principle
  - Instruments: spending and exchange rate or spending and money supply (fiscal and monetary policy)
- Can fiscal and monetary policy instruments together help attaining internal and external balance, under capital mobility assumption?

The Pursuit of Internal and External Balance

- TB=0 – unique level of income leading to external balance, but at the output below the potential
- $Y = \overline{Y}$ output equal to potential output (full employment), but TB<0
  - Any point to the right implies inflationary preassures
  - Any point to the left implies high unemployment and idle factories
- If external balance is defined as BP=0, than it can imply TB<0, if KA>0
  - Use monetary and fiscal policy instruments to shift income up, to the potential level. It implies rise in the interest rates, which means that the new trade deficit is financed by means of the capital inflows – both objectives attained at the point E
  - It is difficult to calculate the exact combination of policies which will take the economy to point E



The Pursuit of Internal and External Balance

DIFFICULUTY OF POLICY MAKING

- Government should identify the relative position of economy with regards to internal and internal balance and than to impose policy measures

- Difficulties:
  - *Time lag* - between the fiscal and monetary policies are changed and the HHs and firms change their spending/investment decisions
  - *Uncertainty* – three kinds of uncertainty
    - Uncertainty regarding economy's position relative to the internal and external balance
    - Uncertainty about future „shocks"
    - Uncertainty about the correct model (size of m, s, slope of LM curve, etc.)
      - *Example of the USA in 1970s: economy was seen as substaintially below the internal balance, which is why the government expanded both monetary and fiscal policy, triggering double diggit inflation*
  - *Expectations* (inflation) – if only current period matters, policymakers should only choose the preferred unemployment/inflation rate combination. But current inflation makes inflation expectations for HHs and businesses, raising the level of inflation. This is why it is advised not to change policy instruments frequently or even to shift to the preset rule (Taylor rule, fiscal rules, etc.)
  - *Political economy* – political myopia, rent seeking, impact of bureaucrats, historical precedents, etc.