

Lecture 6

Impact of capital mobility on the allocation of savings and investment:

Macroeconomic model of savings and investment.

Savings: Generate the supply of loanable funds that can be used to undertake investment.

- Savings generate interest earnings.
- To induce people to save more, the real interest rate r must rise: *Supply* of loanable funds (= savings) increases in the interest rate.

$S = S(r)$ with $dS/dr > 0$.

Investment: Reflects the demand for loanable funds.

- In order to finance an investment project, firms have to borrow funds at the real interest rate r .
- The higher the interest rate, the more costly it is to undertake investment: *Demand* for funds (= investment) falls in the interest rate:

$I = I(r)$ with $dI/dr < 0$

Real interest rate (r) = Nominal interest rate (i) corrected for inflation (π).

Fisher-equation:

$$r = i - \pi$$

What matters for the decision to invest or save is the real interest rate.

The loanable funds market (figure 6.1) clears when supply equals demand.

(S^*, r^*) : Equilibrium without international capital mobility.

There is no capital mobility: no cash outflow or inflow with other countries.

Market with international capital mobility

- In the absence of international capital mobility, investment equals savings.
- With international capital mobility, domestic savers can lend their funds to finance investment projects abroad and foreign savers can lend their funds to finance domestic investment projects.
- Funds will flow to where the interest rate is highest.
- This improves the international allocation of loanable funds and increases world welfare.

If the interest rate in Home is initially higher this triggers capital flows from Foreign to Home until the interest rate are equalized.

So there will be an outflow at foreign, foreign savings $>$ foreign investment. The difference is the savings in Home

In Home savings $>$ Home investments. The difference is the investments from Foreign.

At Home (figure 6.2):

Capital inflow in Home lowers the interest rate to r_{H1} :

Loss for savers: Area $(r_{H0}-1-2-r_{H1})$

Gain for investor: Area $(r_{H0}-1-3-r_{H1})$

Net welfare gain: Area (1-2-3)

At Foreign (Figure 6.3):

Capital outflow in Foreign increases the interest to r_{F1} :

Gain for savers: Area (r_{F0} -3-2- r_{F1})

Loss for investors: Area (r_{F0} -3-1- r_{F1})

Net welfare gain Area (1-2-3)

There are welfare increases in both countries. (Figure 6.4)

Conclusion

- Welfare in the home country increases because the welfare gain for investors (pay lower interest) exceeds the welfare loss for savers (earn lower interest.)
- Welfare in the foreign country increases because the welfare gain for savers (earn higher interest) exceeds the welfare loss for investors (pay higher interest.)
- The world as a whole gains from international capital mobility.

Feldstein-Horioka puzzle

- With international capital mobility and integrated capital markets, savings and investments within countries are no longer directly connected.
- Implies that the correlation between savings and investment within countries should be low.
- Empirical studies do not confirm this: There is substantial correlation between savings and investment.
- Implies that international capital market integration is still far from perfect
- There are still a lot of limitations on the capital market, such as the risk of investment.

Direction of capital flows.

Marginal product of capital

- **The marginal product of capital (MPC)** indicates how much additional output can be produced with one additional (infinitesimally small) unit of capital, holding all other production factors constant.
- The area under the MPC curve, until K_1 , shows the total output that can be produced with a given amount of capital.
- Decreasing MPC implies that the productivity of capital is lower in capital-rich countries than in capital-poor countries.

MPC and the real interest rate r are directly linked:

- MPC reflects the return to investing in capital.
- To make the investment, firms have to borrow money and pay the interest rate r .
- Ignoring depreciation of capital, in equilibrium, the interest rate paid by firms to the suppliers of capital will equal the return on investment.
- So, $r = \text{MPC}$.

Loanable funds model predicts that capital should flow to where interest rates are highest.
Where are interest rates highest?

- Capital exhibits decreasing marginal productivity.
- Implies that capital is more productive and interest rates are higher where capital is scarce.
- Implies that capital should flow from rich (capital- abundant) countries to poor countries (where capital is scarce.)

Home has lots of capital, so interest rates are low (B). The opposite it true in Foreign (C). Capital flows from Home to Foreign until interest rates are equalized (A). Output in Home falls by area (E_0E_1AB)

Figure 6.5 shows the decrease in output at Home

Figure 6.6 shows the increase in output at Foreign:

Figure 6.7 shows the world gain:

Because gain at foreign > loss at Home.

Welfare effects:

Home (Figure 6.8):

Output falls (E_0E_1AB).

Capital income from investing in F (E_0E_1AD)

Welfare gain: (ADB) because the capital gain > the output loss

Foreign (Figure 6.9):

Output increases (E_1E_0CA).

Interest payments on capital from Home (E_0E_1AD)

Welfare gain: (ADC) because output gain > capital loss

The welfare gain for the world is shown in figure 6.10

This equal to the output gain.

The previous model indicated that capital should flow from rich to poor countries. Is this the case in reality?

- Yes, before WWI (Europe to others, “North-South”).
- No, after WWII (“North-North”).

Which factors can explain that nowadays capital flows primarily between capital-rich countries?

- Marginal returns to capital may be non-decreasing.
- Capital markets are not fully integrated (capital controls).
- Differences in taxes, property rights protection, other institutional factors, so effective returns to investment are lower in poor countries (“wedge” between interest rates.)

Funds supply and demand at the firm level.

Limitations of the basic loanable funds model

- Previous model only considered net capital flows ($S \neq I$.)
- There are international capital flows that are not captured in S and I and that occur even when the net flow is zero ($S = I$)
 - Drawing funds from existing wealth (not part of S)

- Buying existing assets (not part of I) (used products)
- The position/shape of the supply of funds curve is not very realistic.

Previously we assumed that the supply of funds curve is given by savings.

In reality, people also use their savings to buy government bonds, real estate, etc.

Implies that the supply of investment funds to firms is only a subset of total savings. Savings do not adequately reflect the supply of funds faced by firms.

Firms use not only external, but also internal financing to fund investment projects.

Firms use not only external but also internal financing to fund investment projects. Idea:

- Some level of financing is available 'internally' at a fixed interest rate (e.g. from retained profits).
- Any additional financing has to come from external sources ('banks'). Banks charge an interest rate above the internal lending rate and the interest rate increases with the level of financing, due to risk.

External financier (bank) faces an asymmetric information problem: The firm is better informed about the returns to its investment projects than the bank.

There are two types of asymmetric information problems:

1. Adverse selection
2. Moral hazard

Adverse selection:

Supplier (bank) cannot distinguish between high- and low risk projects/firms. The interest rate it charges (which reflects the average risk) pushes low-risk firms out of the market who are not willing to pay the high interest rate.

"Classical" Example: Health insurance cannot distinguish between risky and non-risky people, charge the same premium for all. Low-risk ("healthy") individuals are not willing to pay the high premium. They drop out and the remaining pool of insured persons is "more risky".

Moral hazard:

Banks cannot monitor the firm in the execution of its project. Firms may take over excessive risks to increase their potential profits. The bank ends up with more risky firms in its portfolio.

"Classical" Example: Health insurance cannot monitor the behaviour of their insured persons. Individuals engage in extra risky activities (smoking, extreme sports, ...) since they have insurance coverage. Overall level of risk for insurance increases.

Firm's supply of funds for investment

- Internal financing is available at a fixed interest rate.
- Asymmetric information problems faced by external suppliers of finance implies:
 - Providing funds is risky.
 - The more funds are provided, the higher the risk, the higher the interest rate charged.
- Together, this implies that the supply of funds curve has a kink. (Figure 6.11)

I^* is the level of internal financing available to the firm.

r_o is the cost of internal financing for the firm.

Steepness of the external financing line reflects the level of risk:

- The higher the risk, the faster the interest rate increases with the level of external funding.
- If investment becomes more risky, the external supply-of-funds curve becomes steeper.

Without transaction costs, the equilibrium is in point c.

With transaction costs, there is a wedge (b-a). It is the difference between the interest savers get and the loaners pay. (Figure 6.12)

Improved capital mobility can lead to:

- Reduction in transaction costs: wedge falls.
- Greater availability of external funds at a given interest rate: shift of F_S to the right.
- Better risk screening (if foreigners are better at screening or increased competition forces banks to lower their interest rates): higher sensitivity of F_S , so the FS becomes flatter.

Risk diversification thanks to international capital mobility.

- Countries can be hit by adverse shocks, which hit all firms within a country at the same time (e.g. overall economic downturn): **Country-specific risk**.
- Countries are specialized in certain industries, which may be hit by a common shock (e.g. car industry): **Industry-specific risk**.

Risk diversification:

- International capital mobility allows for risk diversification across countries.
 - Invest in different countries (to diversify the country-specific risks)
 - Invest in different industries (to diversify the industry-specific risks)
- Such capital flows do not necessarily show up as net flows (can have $S = I$, but part of domestic savings (investments) are invested (financed from) abroad.

Invest in two countries: Home and Foreign

Two states of the world: A, B with probability of 0.5 each.

- Home: Real interest rate is 8% in state A and 3% in state B → risk.
- Foreign: Real interest rate is 3% in state A and 8% in state B → risk.
- Expected interest rate in each country:
- $r_{exp} = 0.5 \cdot 8 + 0.5 \cdot 3 = 5.5$

If savers invest 50% of their savings in Home and 50% in Foreign:

- Real interest rate in state A: $r = 0.5 \cdot 8 + 0.5 \cdot 3 = 5.5$
- Real interest rate in state B: $r = 0.5 \cdot 3 + 0.5 \cdot 8 = 5.5$
- The interest rate equals the expected interest rate in the previous case, but savers do not face any risks now (the return is 5.5% for sure in both states of the world).
- If people are risk-averse, they prefer the diversified (risk-free) portfolio.

Conclusion:

- International capital mobility and improved capital market integration allow for more efficient allocation of global savings and investment.
- International capital mobility allows for risk diversification of country- or industry-specific risks.

Appendix

Figure 6.1

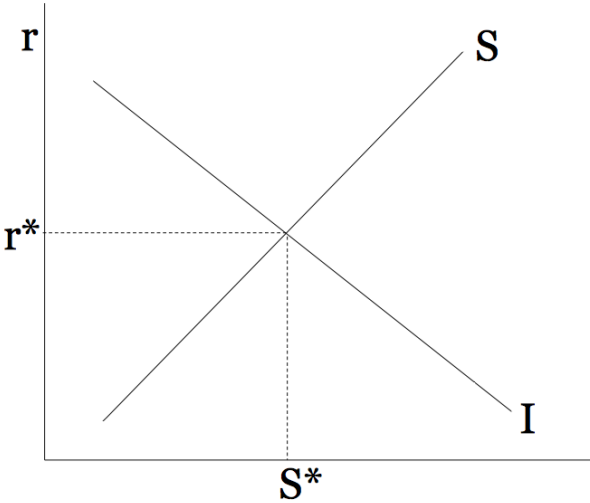


Figure 6.2

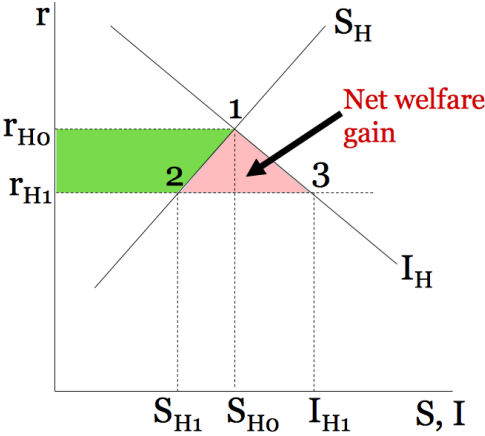


Figure 6.3

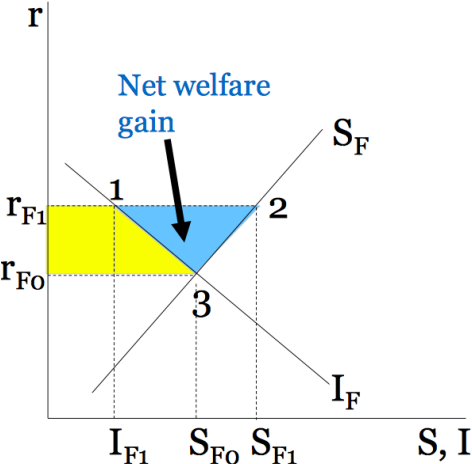


Figure 6.4

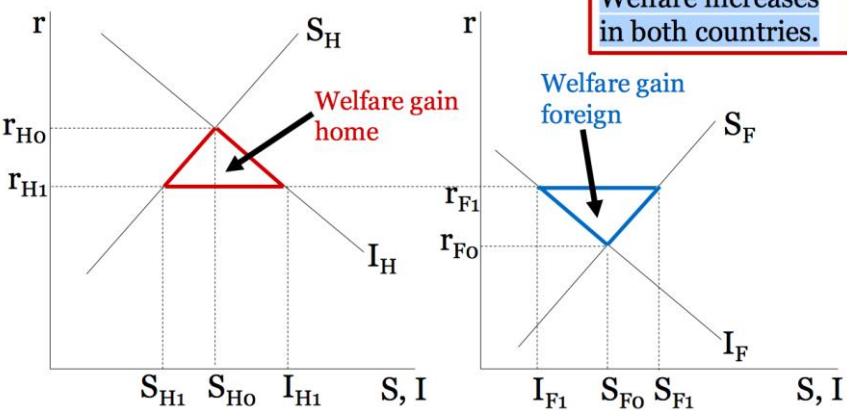


Figure 6.5

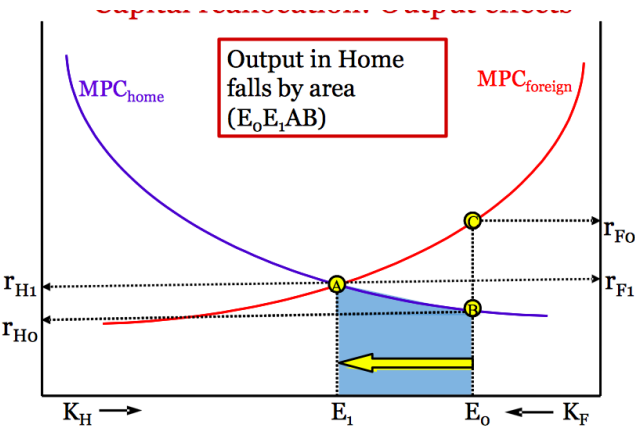


Figure 6.6

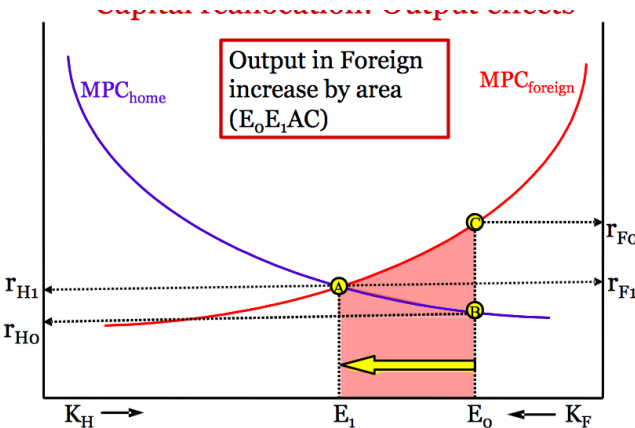


Figure 6.7

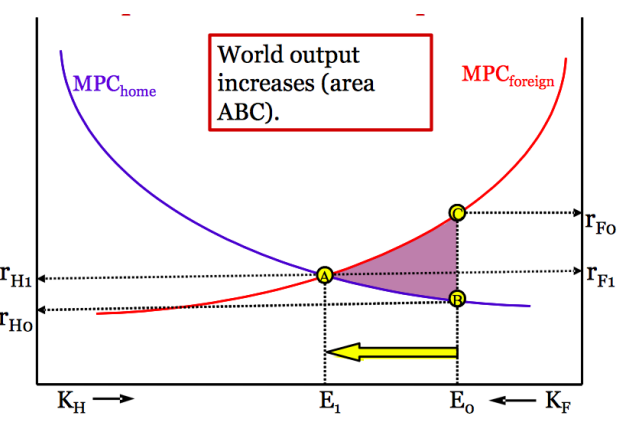


Figure 6.8

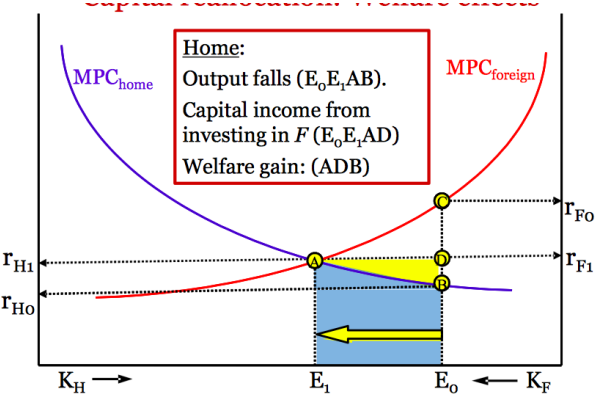


Figure 6.9

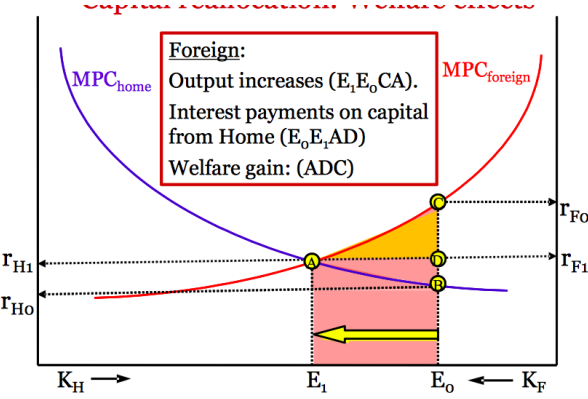


Figure 6.10:

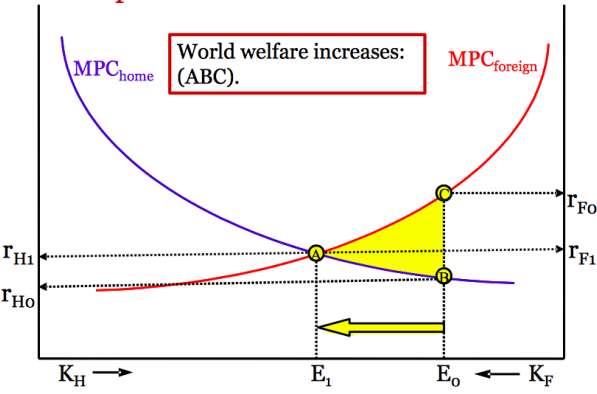


Figure 6.11

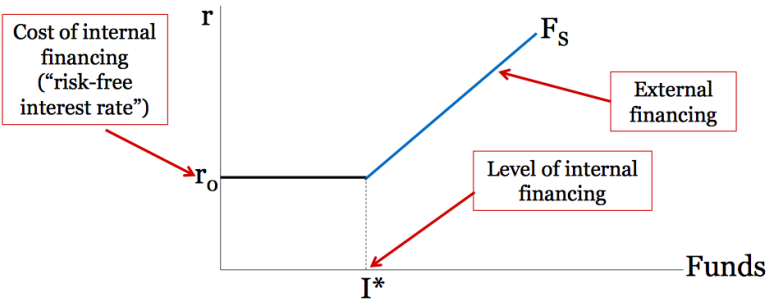


Figure 6.12

