IfW Research Area "Monetary Policy under Market Imperfections"
Reading Group | Kiel, 24 May 2011

Interest and income dynamics in the Mundell-Fleming framework

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Or : „IS-LM … and the three question marks"

IS LM ???

- **Walras' law and the missing n-th market**
  - Fine in equilibrium …
  - … but what about reality (= disequilibrium)?
- **Correspondence principle (Samuelson)**
  - Comparative-static multiplier analysis …
  - … but what about adjustment (dynamic) processes?
- **Market clearing interest rate**
  - Money market as mirror picture of securities market?
  - ⇨ Merging financial stocks and flows
    (no firewall between old and new assets)
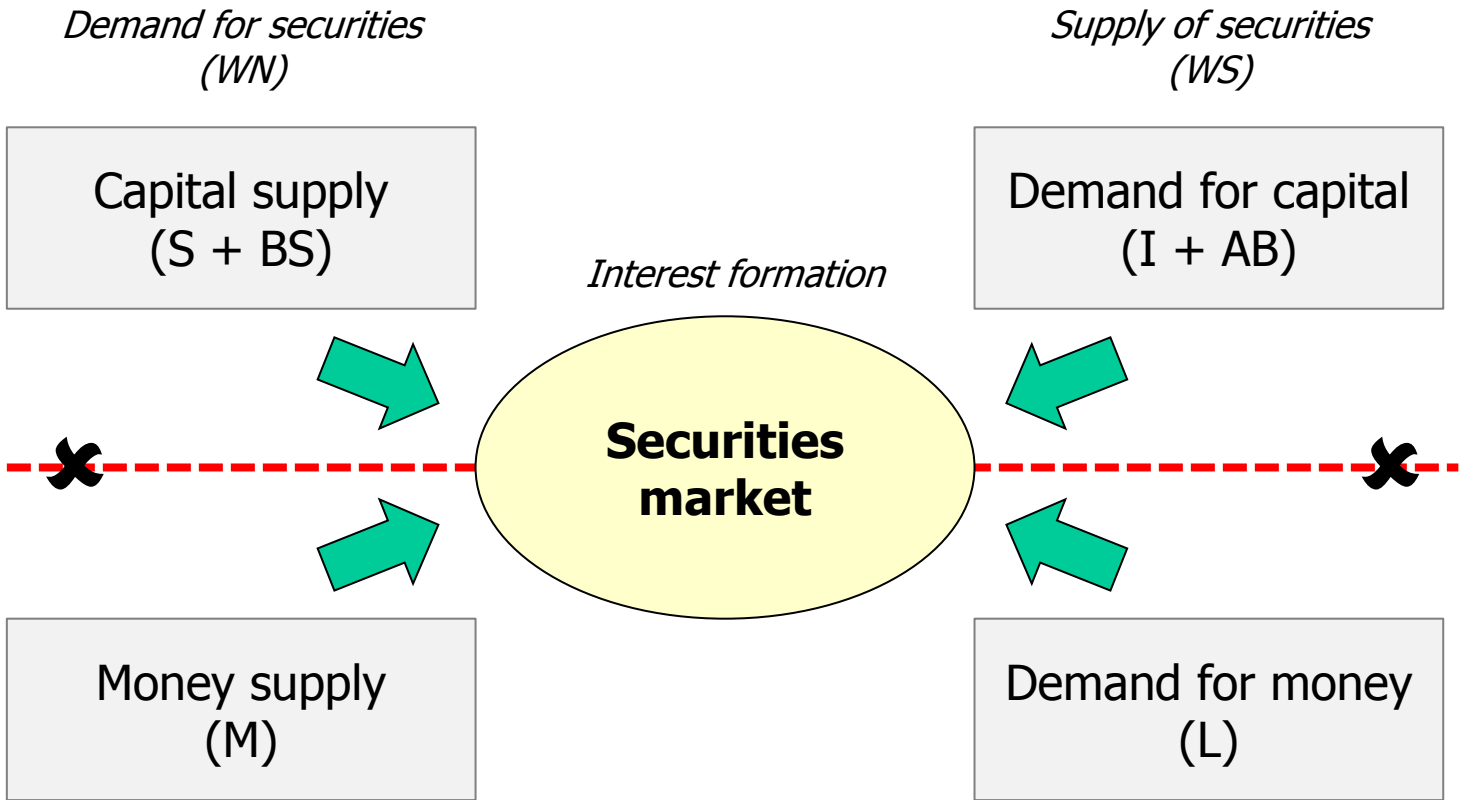
Introductory remarks

- Why Mundell-Fleming framework?
  - Still dominates short-run demand analysis in mainstream text books
  - Backbone of most structural macro-econometric business cycle forecasting models
  - ⇨ Explicating unsatisfying implicit assumptions
- Beyond: Some principle notes on handling financial markets in macro models
- Procedure
  - First: Major principles shown in simple IS-LM model (fixed exchange rate with full sterilization)
  - Next: Extension to Mundell-Fleming (fixed and flexible exchange rates)

Short reminder (of simple IS-LM)

- IS
  - "Goods market equilibrium" (income-production-compatibility)
  - Capital market equilibrium
  - Trading among real sectors (financial sector as intermediary only)

- LM
  - Money market equilibrium
  - Financial sector vs. real sectors (credit creation)

- Securities market (implicit)

⇨ Economic items
  - Goods (flows)
  - Money (stock)
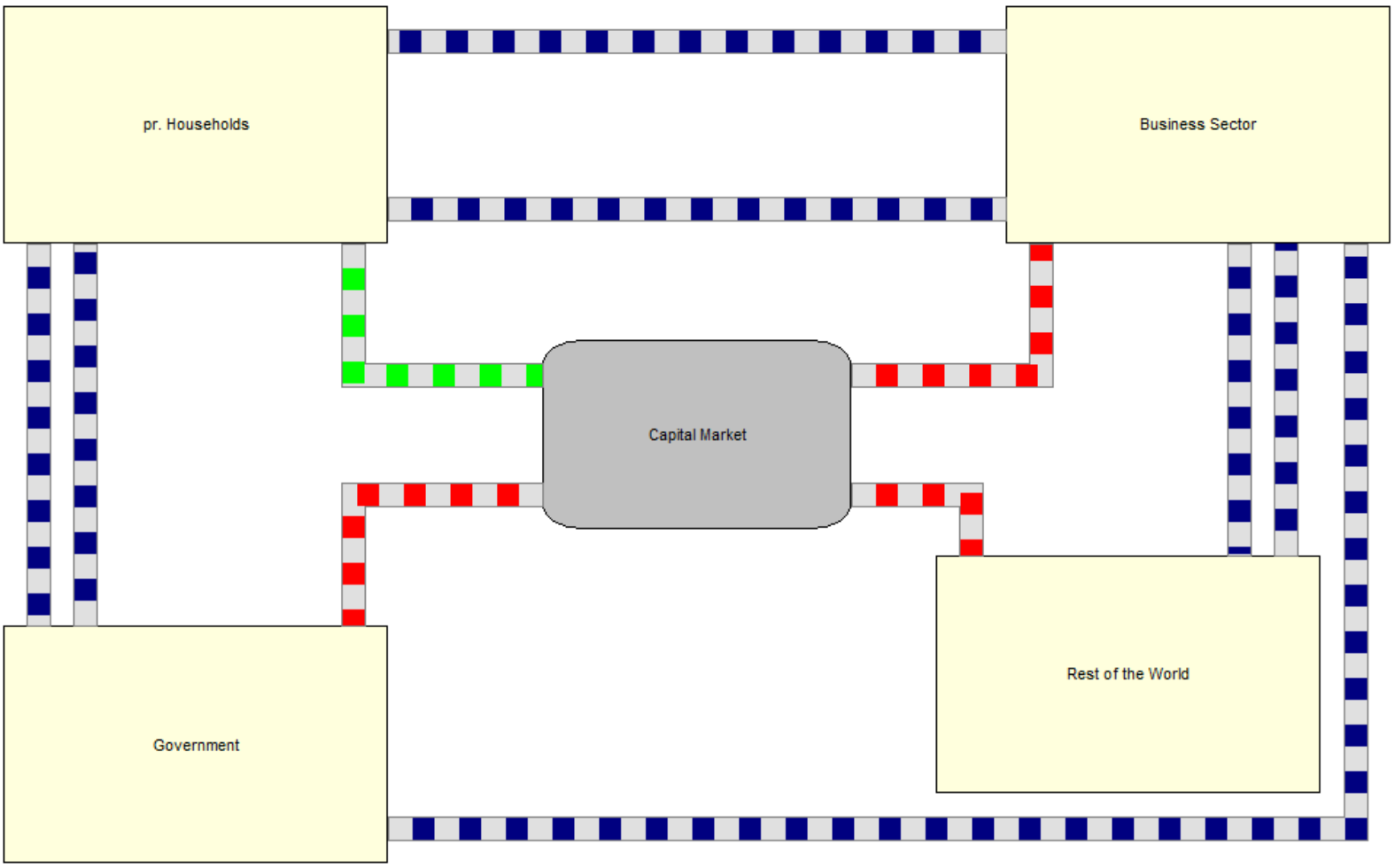 - **Securities (flows *and* stocks = new *and* old)**

Integrated securities market

Demand for securities
(WN)

Supply of securities
(WS)

Capital supply
(S + BS)

Demand for capital
(I + AB)

Interest formation

**Securities
market**

Money supply
(M)

Demand for money
(L)

$$S + BS + M \overset{!}{=} I + AB + L$$

Securities market and sectoral flow analysis

Enabling transactions in circular analysis

- Money as exclusive means of payment

- Transaction planning necessarily entails liquidity position planning
  - Excess liquidity: demand for securities
  - Liquidity deficit: supply of securities

⇨ **Securities market as enabler of transactions on all other markets**

Dynamic analysis and market sequence

Expectation formation for current period

- Securities market
  ⇩

- Foreign exchange market
  ⇩

- Factor markets and production
  ⇩

- Redistribution of income
  ⇩

- Goods market

Assignment of liquidity positions by sectors

- Business (production) sector
  - Projected value added (LT)

- Private households
  - Speculative holdings (LS)
  - Expected income less taxes (LT)

- Government
  - Expected tax revenues (LT)

⇨ Transaction volume = 2*GDP
  - Reflecting goods and factor markets payments
  - Plus liquidity positions resulting from capital market transactions

Time frame, velocity of circulation and market turnovers

- Period length for multiplier process defined by time of constant expectations

- Number of transactions per period (nTP) derived from responsiveness of the demand for money via the velocity of circulation

$$\text{nTP} = \left\{ \begin{array}{ll} \dfrac{2}{l_Y} & \text{für: } \dfrac{2}{l_Y} = \text{int}\left(\dfrac{2}{l_Y}\right) \\[4ex] \text{int}\left(\dfrac{2}{l_Y}\right) + 1 & \text{sonst} \end{array} \right\} \geq 1$$

- Goods, factor and capital market turnover:

$$\text{turnover}_{\text{Period}}/\text{nTP}$$
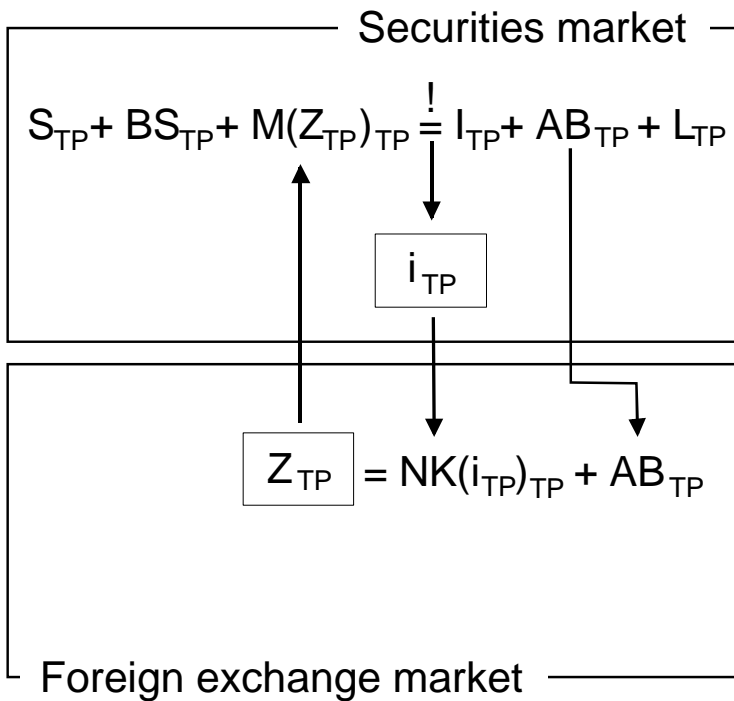
Securities market equilibrium line: the LF curve

$$\frac{S + BS}{nTP} + M \overset{!}{=} \frac{I + AB}{nTP} + L$$

$$i = \frac{\dfrac{D^{aut}}{nTP} + L^{aut} - M^{aut}}{\dfrac{h_r}{nTP} + l_i} + \frac{\dfrac{h_Y - 1 - m_Y}{nTP} + l_Y}{\dfrac{h_r}{nTP} + l_i} Y$$
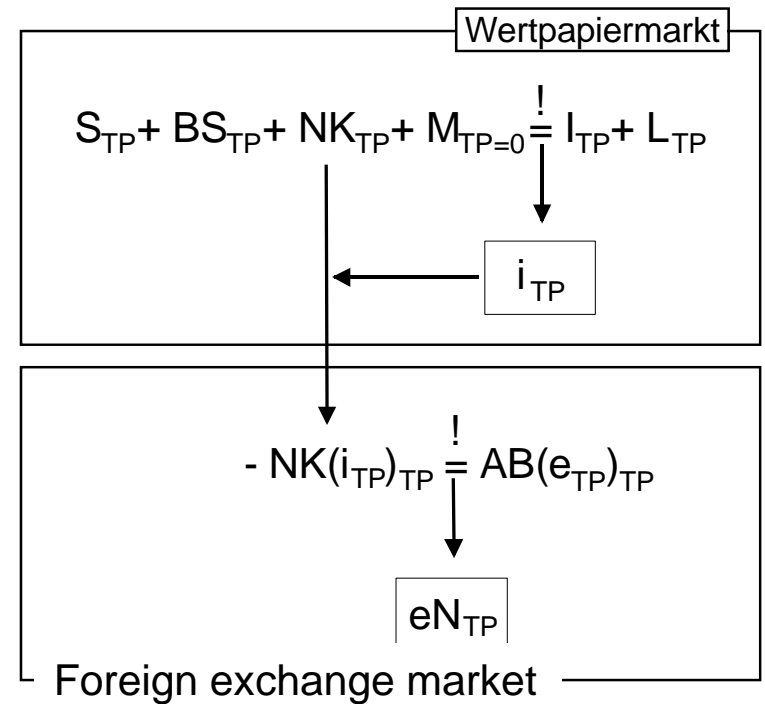
$$\frac{\Delta i}{\Delta Y} = \frac{\dfrac{h_Y - 1 - m_Y}{nTP} + l_Y}{\dfrac{h_r}{nTP} + l_i} = \frac{h_Y - 1 - m_Y + l_Y \cdot nTP}{h_r + l_i \cdot nTP} \geq 0$$

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Foreign exchange market

Fixed exchange rate

Floating exchange rate

Securities market

$$S_{TP} + BS_{TP} + M(Z_{TP})_{TP} \overset{!}{=} I_{TP} + AB_{TP} + L_{TP}$$

i_{TP}

Z_{TP} $= NK(i_{TP})_{TP} + AB_{TP}$

Foreign exchange market

Wertpapiermarkt

$$S_{TP} + BS_{TP} + NK_{TP} + M_{TP=0} \overset{!}{=} I_{TP} + L_{TP}$$

i_{TP}

$$- NK(i_{TP})_{TP} \overset{!}{=} AB(e_{TP})_{TP}$$

eN_{TP}

Foreign exchange market

LF curve: Floating exchange rate

$$\frac{S + BS + NK}{nTP} + M \overset{!}{=} \frac{I}{nTP} + L$$

$$i = \frac{H^{fix} - NK^{aut} + (L^{aut} - M^{aut}) \cdot nTP}{h_r + k_{\Delta i} + l_i \cdot nTP} + \frac{h_Y - 1 + l_Y \cdot nTP}{h_r + k_{\Delta i} + l_i \cdot nTP} \, Y$$

LF curve: Fixed exchange rates (nTP = 1)

$$S + BS + M^{fix} + \lambda \cdot (- m_Y \cdot Y + k_{\Delta i} \cdot i) = I + AB + L$$

with: $\quad M^{fix} = M_{-1} + GSM \cdot (\Delta MBH^{aut} + (1 - n_{WR}) \cdot Z^{fix})$

$$\lambda = GSM \cdot (1 - n_{WR})$$

$$i = \frac{D^{fix} + L^{aut} - M^{fix}}{h_r + l_i + \lambda \cdot k_{\Delta i}} + \frac{h_Y - 1 + (\lambda - 1) \cdot m_Y + l_Y}{h_r + l_i + \lambda \cdot k_{\Delta i}} Y$$