MacroEconomics

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1 Macroeconomics Essentials

1.1 Issues of macroeconomics

- GDP: gross domestic product: measures total income (or output). income generated within geogrpahical boundaries

- GNP ≡ GNI (gross national income): gross national product (separated) : income generated by inhabitants of country
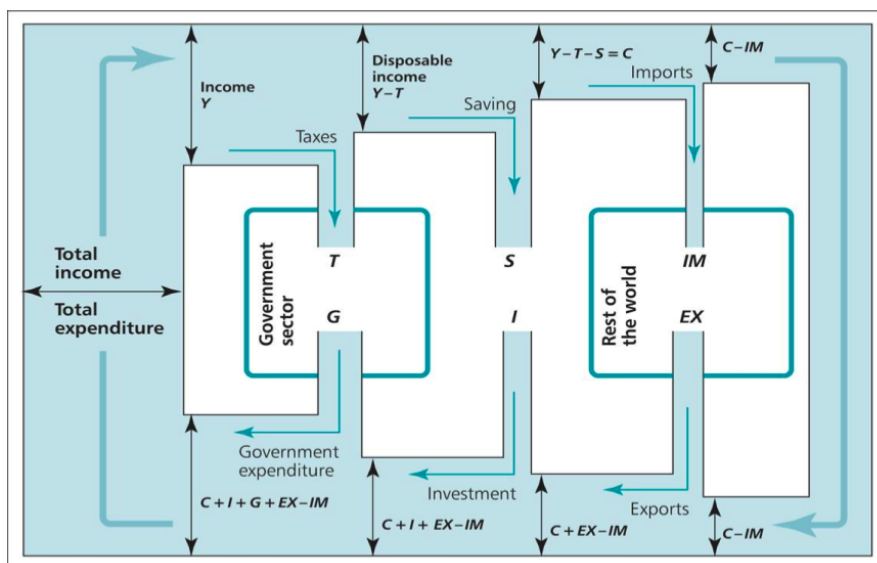
1.2 Macroeconomics Essentials

Figure 1: Circular Flow

$$(S - I) + (T - G) + (IM - EX) = 0 \tag{1}$$

where

- S: savings and I: investments

- T: taxes and G: gov. expenditure

- IM: imports and EX: exports ($NX = EX - IM$)

Quantity Equation

$$MV = PY \tag{2}$$

where

- M money supply

- V velocity of money (turnover): average frequency in which a unit of money is spent.

- P price level

- Y real income

Nominal income is thus PY.

Governement budget

$$G - T = \Delta B_{CB} + \Delta B_{PS} \tag{3}$$

where ΔB are the bonds **owed** to either the private sector (PS) or the central bank (CB). C'est les obkigations du pays (confédération). Si le pays est en déficit ($G - T > 0$) et donc le nombre d'obligations émises augmente ($\Delta > 0$).

$$CA + CP + OR = 0 \tag{4}$$

where

- CA: current account: records goods into and out of the country $= NX$

- CP: capital account: flow of financial assets into and out of the country $-\Delta F$

- OR: official reserve account: purhcase and sales of foreign country by central Bank. $= -\Delta RES$

$$NX = \Delta F + \Delta RES \tag{5}$$

The central bank balance sheet

$$\Delta M = \Delta B_{CB} + \Delta RES \tag{6}$$

2 Booms and Recessions (I): Keynesian Cross

2.1 Circular flow model revisited: terminology and overview

Expenditure: amount of money spent.

Aggregate expenditure

$$AE \equiv C + I + G + EX - IM \tag{7}$$

$$\underbrace{C}_{\text{consumptiom}} = Y - T - S \tag{8}$$

Actual expenditure: Y

$$Y = AE + I^u \tag{9}$$

2.2 Income determination: a first look

We set G, I, NX constant and

$$C = cY \tag{10}$$

where c is the **marginal propensity to consume**.

We then have

$$AE = cY + G + I + NX \tag{11}$$

at equilibrium

$$Y = AE \tag{12}$$

thus

$$Y = \frac{1}{1-c}(G + I + NX) \tag{13}$$

and

$$\Delta Y = \frac{1}{1-c}(\Delta G + \Delta I + \Delta NX) \tag{14}$$

if $\Delta I = \Delta NX = 0$

$$\Delta Y = \frac{1}{1-c}\Delta G \tag{15}$$

and the expression $\frac{1}{1-c}$ is called the **multiplier**

3 Money, interest rates and the global economy

3.1 The money market, the interest rate and the LM curve

The money demand function

$$L = kY - hi \tag{16}$$

where L demand for real money. Y is the income and i the interest rate. Note that $L_Y > 0$ and $L_i < 0$.

Then

$$i = \frac{k}{h}Y - \frac{1}{h}L \tag{17}$$

At equilibrium,we have

$$L = \frac{M}{P} \tag{18}$$

where M is the money supply (nominal prices $\rightarrow$ we divide by price level P).

LM-curve identifies interest-rate i and income Y for which money demand equals money suppy.

3.2 Aggregate expenditure, the interest rate and the exchange rate: the IS curve

Consumptio function

$$C(Y, Y_+^e) = c_1 Y + c_2 Y_+^e \tag{19}$$

can be simplified to $C(Y)$

Investment function

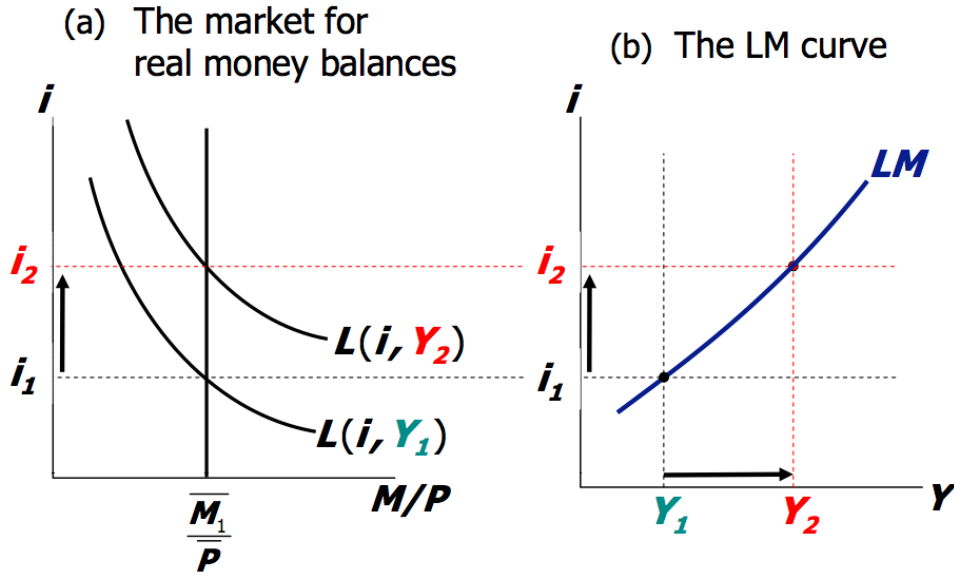$$I(i, Y_+^e) = b_1 Y_+^e + b_2 i \tag{20}$$

can be simplified to $I(i)$

Figure 2: LM-curve

Real exchange rate

$$R = E \frac{P^{\text{world}}}{P} \tag{21}$$

import function

$$IM = m_1 Y - m_2 R \tag{22}$$

export function

$$EX = x_1 Y^{\text{world}} + x_2 R \tag{23}$$

Putting the last 4 equations into $Y = C + I + G + NX$ yields

$$i = -\frac{1 - c - m_1}{b} Y + \frac{x_2 + m_2}{b} R + \frac{\overline{I} + G + x_1 Y^{\text{world}}}{b} \tag{24}$$

The LM-curve is for the money market (money supply M)
and
the IS-curve is for the goods market I, C and NX

4 Exchange rates and the balance of payments

under flexible exchange rate $OR = 0 \Rightarrow CA = -CP$
the current account is determined by

$$CA \equiv NX = EX - IM = -m_1 Y + x_1 Y^{\text{world}} + (x_2 + m_2) R \tag{25}$$

and the capital account by

$$CP = \kappa (i - i^{\text{world}}) \tag{26}$$

putting the last 3 equations together yields

$$i = i^{\text{world}} + \frac{m_1}{\kappa} Y - \frac{x_1}{\kappa} Y^{\text{world}} - \frac{m_2 + x_2}{\kappa} R \tag{27}$$

The 3 endogenous variables of the IS-LM-FE (or Mundell-Fleming) model are Y, i, R. Note that $R = E$ when $P = P^{\text{world}}$ because of 21.
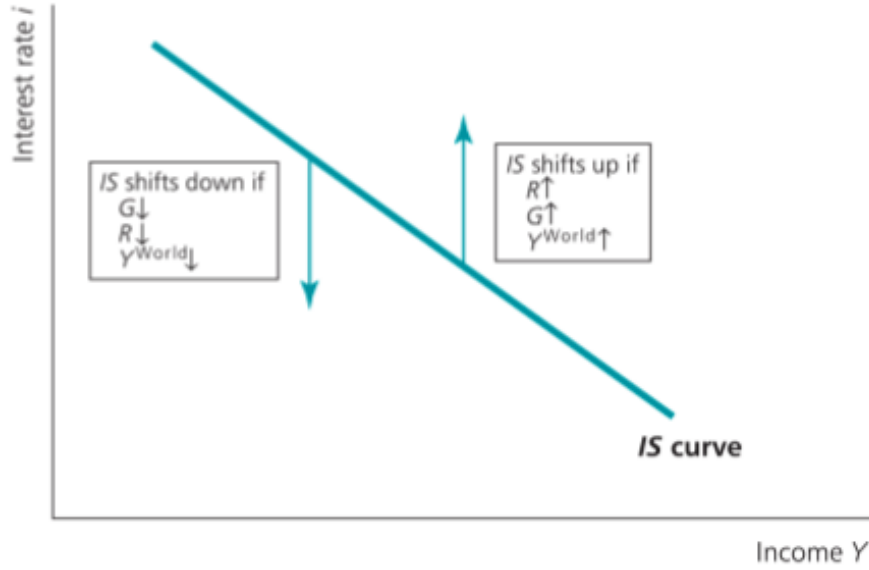
Figure 3: IS-curve

5 Macroeconomic Accounting

$$BP = CA + CP + OR = 0 \tag{28}$$

Simplification

- $OR = 0$: exchange rates flexible

- $CA = NX$, if capital immobility: $NX = 0$

6 IS-LM-FE Modell - Mundell Fleming Model

LM-curve is (at equilibrium $L = M = \overline{M}$)

$$i = \frac{k}{h}Y - \frac{1}{h}\overline{M} \tag{29}$$

IS-curve is ($Y = C + I + G + NX$ and solving for i)

$$i = -\frac{1 - c + m_1}{b}Y + \frac{\overline{I} + G + x_1 Y^{\text{world}}}{b} + \frac{x_2 + m_2}{b}R \tag{30}$$

The general FE-curve reads

$$i = i^{\text{world}} + \frac{m_1}{\kappa}Y - \frac{x_1}{\kappa}Y^{\text{world}} - \frac{m_2 + x_2}{\kappa}R \tag{31}$$

most of the time we assume $\kappa \to \infty$ and thus

$$i = i^{\text{world}} \tag{32}$$

Multiplier is the partial derivative with respect to a certain parameter, for G it is

$$\frac{\partial Y}{\partial G} \tag{33}$$

6.0.1 Endogenous vs exogenous variables

the endogenous variables are **either**:

- Y, i and R

- Y, i and M

The exogenous variables are $G, i^{\text{world}}, Y^{\text{world}}$ and M or i

7 Aggregate Supply Curve

$$p = p^e + \lambda(Y - Y^*) \tag{34}$$

where $p \equiv \ln P$ (percentage change rather than linear change)

Long-run AS curve

$$Y = Y^* \tag{35}$$

8 Aggregate Demand (AD curve)

AD curve under flexible exchange rate

$$P = a - bY + \text{other factors}[M(+), i^w(+), \epsilon^e(+)] \tag{36}$$

and

$$p = m - bY + h(i^w + \epsilon^e) \tag{37}$$

AD curve under flexible exchange rate

$$P = a - bY + \text{other factors}[E(+), P^w(+), G(+), Y^w(+), i^w(-), \epsilon^e(-)] \tag{38}$$

and

$$p = e + p^w - bY + \gamma Y^w + \delta G - f(i^w + \epsilon^e) \tag{39}$$

9 SAS-curve

$$\pi = \pi^e + \lambda(Y - Y^*) = p - p_{-1} \tag{40}$$

10 DAD-curve

DAD-curve under flexible exchange rate

$$\pi = \mu - bY + bY_{-1} + h(\Delta i^w + \Delta \epsilon^e) \tag{41}$$

where $\pi = p - p_{-1}$ and $\mu = m - m_{-1}$