

Notes on:

Fiscal and Monetary Policy in a Model
of an ECB-type Economy.

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Variable Names:

Endogenous:

FRM,	Foreign reserves at monetary authority	[stock]
NC,	Notes and coin	[stock]
FRB,	Foreign reserves at commercial banks	[stock]
G,	Government spending	
BD,	Bank deposits	[stock]
M,	Imports	
Y,	GDP	
T,	Tax revenue	
PDY,	Private disposable income	
PE,	Private spending	
MS,	Money supply (M3)	[stock]
NCP,	Notes and coin in hands of private sector	[stock]
NCB,	Notes and coin at commercial banks	[stock]

Exogenous:

X,	Exports	
BLP,	Bank lending to private sector	[stock]

Basic Model

- 1. FRM \equiv NC FRM
- 2. NCB + NCP \equiv NC NC
- 3. NCB + BLP + FRB \equiv BD FRB
- 4. G = T G
- 5. MS \equiv NCP + BD BD
- 6. X - M \equiv Δ FRM + Δ FRB M
- 7. M = μ *Y Y
- 8. T = τ *Y T
- 9. PDY \equiv Y - T PDY
- 10. PE = α *PDY + Δ BLP + β *MS₋₁ PE
- 11. Δ MS \equiv PDY + Δ BLP - PE MS
- 12. NCP = γ *MS NCP
- 13. NCB = δ *BD NCB

Endogenous Variables (13):

FRM, NC, FRB, G, BD, M, Y, T, PDY, PE, MS, NCP, NCB

Exogenous Variables (2):

X, BLP

One-Period Solution for Y

$$\begin{aligned}
 Y &= M/\mu && \text{from 7} \\
 &= (X - \Delta\text{FRM} - \Delta\text{FRB})/\mu && \text{from 6} \\
 &= (X - \Delta\text{NC} - \Delta\text{FRB})/\mu && \text{from 1} \\
 &= (X - (\Delta\text{NCB} + \Delta\text{NCP}) - \Delta\text{FRB})/\mu && \text{from 2} \\
 &= (X - (\Delta\text{BD} - \Delta\text{BLP} + \Delta\text{NCP}))/\mu && \text{from 3} \\
 &= (X - \Delta\text{MS} + \Delta\text{BLP})/\mu && \text{from 5} \\
 &= (X - (\text{PDY} + \Delta\text{BLP} - \text{PE}) + \Delta\text{BLP})/\mu && \text{from 11} \\
 &= (X - \text{PDY} + (\alpha*\text{PDY} + \Delta\text{BLP} + \beta*\text{MS}_{-1}))/\mu && \text{from 10} \\
 &= (X - (1-\alpha)*(Y - T) + \Delta\text{BLP} + \beta*\text{MS}_{-1})/\mu && \text{from 9} \\
 &= (X - (1-\alpha)*(1 - \tau)*Y + \Delta\text{BLP} + \beta*\text{MS}_{-1})/\mu && \text{from 8}
 \end{aligned}$$

$$[\mu + (1 - \alpha)*(1 - \tau)]*Y = X + \Delta\text{BLP} + \beta*\text{MS}_{-1}$$

$$Y = [X + \Delta\text{BLP} + \beta*\text{MS}_{-1}]/[\mu + (1 - \alpha)*(1 - \tau)]$$

Stationary State Solution for Y

$$MS = MS_{-1}$$

Assumption

$$PDY + \Delta BLP - PE = 0$$

from 11

$$PDY + \Delta BLP - (\alpha * PDY + \Delta BLP + \beta * MS) = 0$$

from 10

$$(1 - \alpha) * (Y - T) + \beta * MS = 0$$

from 9

$$(1 - \alpha) * (1 - \tau) * Y + \beta * MS = 0$$

from 8

$$MS = [(1 - \alpha) * (1 - \tau) * Y] / \beta$$

$$[\mu + (1 - \alpha) * (1 - \tau)] * Y = X + \Delta BLP + \beta * MS$$

$$[\mu + (1 - \alpha) * (1 - \tau)] * Y = X + \Delta BLP + \beta * \{ [(1 - \alpha) * (1 - \tau) * Y] / \beta \}$$

$$\mu * Y = X + \Delta BLP$$

$$\Delta BLP = 0$$

Assumption

$$Y = X / \mu$$

Alternative Sources of Finance for the Government
Three Variants

- a. Finance from the commercial banks, BLG
- b. Finance from the monetary authority, MLG
- c. Finance from abroad, FLG

Each of these sources of finance is treated as exogenous and the consequential amendments to the model equations are as follows:

- a. BLG is added to the banks' balance sheet (equation 3) and to the government's budget identity (equation 4).
- b. MLG is added to the monetary authority's balance sheet (equation 1) and to the government's budget identity (equation 4).
- c. FLG is added to the balance of payments identity (equation 6) and to the government's budget identity (equation 4).

One-Period Solution for Y

The effect of government borrowing on the one-period solution for Y is exactly the same in all three cases, if we write LG to represent all three then it becomes,

$$Y = [X + \Delta BLP + \Delta LG + \beta * MS_1] / [\mu + (1 - \alpha) * (1 - \tau)]$$

So an increase in government borrowing has an effect on income which exactly parallels the effect of bank lending to the private sector (BLP). The increase in income will, of course, lead to a balance of payments deficit with an associated loss in foreign reserves. This much is common to all three cases. As far as the private sector aggregates are concerned, too, the pattern of adjustment is unaffected by the source of government finance. Disposable income, spending, asset accumulation and the associated asset stocks, all rise and then fall back to their initial stationary values. So, for example, the money supply, bank deposits and private holdings of cash are the same in all three cases. So we know that the sum of domestic credit and foreign reserves will be the same too. What differs then is the composition of both domestic credit and the stock of foreign reserves.