Model 1 Banking in sunshine

- No default risk for banks, no macro default risk
- All interest rates equal to policy rate (maybe plus constant margin)
- Banks have more equity than required
- Closed economy
- No currency in circulation (or stocks are constant)
- No consumer price inflation expected
- Zero saving by government and banks

Table: Sectoral balance sheets in model 1

Assets	Govern.	CBank	Banks	GPub	Sum
Deposits at CB		-D_{cb}	D_{cb}		0
Loans from CB		L_{cb}	$-L_{cb}$		0
Deposits at banks			$-D$	D	0
Loans from banks			L	$-L$	0
T-bills	$-B$	B_{cb}	B_b	B_h	0
Real capital				QK	QK
Sum=Net assets	W_g	W_{cb}	W_b	W_h	QK

Balance sheet equations

Public

$$Q(t)K(t) + D(t) + B_h(t) - L(t) = W_h(t) \tag{1}$$

Government

$$-B(t) = W_g(t) \tag{2}$$

Banks

$$L(t) + B_b(t) + D_{cb}(t) - D(t) - L_{cb}(t) \quad = \quad W_b(t) \tag{3}$$

Central bank

$$B_{cb}(t) + L_{cb}(t) - D_{cb}(t) = W_{cb}(t) \tag{4}$$

Adding up

$$B(t) = B_h(t) + B_b(t) + B_{cb}(t) \tag{5}$$

$$W(t) = W_p(t) + W_g(t) + W_b(t) + W_c(t) = Q(t)K(t) \tag{6}$$

Accumulation equations

$$Wp(t) = W_p(t-1) + S(t) + (Q(t) - Q(t-1))K(t-1) \tag{7}$$

$$K(t) = K(t-1) + I(t) \tag{8}$$

$$S(t) = Q(t)I(t) \tag{9}$$

Flow of funds

$$S_p + \Delta L = Q\Delta K + \Delta D + \Delta B_h$$

$$\Delta D + \Delta B_h - \Delta L = 0$$

$$\Delta X(t) = X(t) - X(t-1)$$

Flow of funds

Households

$$\Delta D + \Delta B_h - \Delta L = 0 \tag{10}$$

Government

$$\Delta B = 0 \tag{11}$$

Banks

$$\Delta L + \Delta B_b + \Delta D_{cb} - \Delta D - \Delta L_{cb} = 0 \tag{12}$$

Central bank

$$\Delta L_{cb} + \Delta B_{cb} = -\Delta D_{cb} - \Delta L - \Delta L_{cb} = 0 \tag{13}$$

Bank behavior

$$\Delta L(t) = \lambda Q(t) I(t) \tag{14}$$

$$B_b(t) = \delta_b D(t) \tag{15}$$

$$D_{cb}(t) = \delta_{cb} D(t) \tag{16}$$

Relation to real sectors

$$Q(t) = \frac{F'_K(K(t), N(t+1)) + Q(t+1)}{1 + i(t)} \tag{17}$$

$$I(t) = H(Q(t)/w(t)) \tag{18}$$

$$C_t = C_{t+1}/[\beta(1+i)]^{\sigma} \tag{19}$$

Step by step solution

- $i(t)$ is set by the CB
- $Q(t)$ follows from arbitrage between real capital and other investments, $C(t)$ from Euler equation
- $I(t)$ follows from the supply function for investment goods
- $S(t)$ follows from the definitional relation $S = QI$
- $\Delta L(t)$ follows from banking practice as $\Delta L(t) = \lambda Q(t) I(t)$

- $\Delta D = -\Delta B_h + \Delta L$,substitute for $\Delta B_h = \Delta B - \Delta B_b = -\delta_b \Delta D$ to get

$$\Delta D = \Delta L + \delta_b \Delta D$$

Solution

$$\Delta D = \frac{1}{1-\delta_b} \lambda QI \tag{20}$$

- Flow of funds for banks yields

$$\Delta L_{cb} = \frac{\delta_{cb}}{1-\delta_b} \lambda I \tag{21}$$

Are banks irrelevant

- Interest rate is all there is
- Monetarists
- Banking school
- Bernanke

If weather changes

1. Default risk for borrowers from banks (unbiased estimates, biased estimates, bubbles)
2. Default risks for banks themselves
3. Capital costs of borrowers that depend on the source of financing (taxes, corporate governance)
4. Capital adequacy constraint binding for banks
5. Credit rationing (due to adverse selection, screening)