Mr. Keynes and the NeoClassics Equations and Graphs

Mr. Keynes and the NeoClassics: A Reinterpretation

I. Keynes' Aggregate Model

I-a. Behavioral Equations

(1) $\boldsymbol{Y_t^w = P_t^c C_t/W_t + P_t^i I_t/W_t}$

$\boldsymbol{= C_t^w + I_t^w}$,

(2) $\boldsymbol{M_t^{wd} = m^d(Y_t^w, R_t)}, \quad \boldsymbol{m_1^d} > 0,\ \boldsymbol{m_2^d} < 0$

(3) $\boldsymbol{M_t^{ws} = m^s(R_t)}, \qquad \boldsymbol{m^{s'}} > 0$

(4) $\boldsymbol{A_t^{ws} = \frac{P_t^a A_t}{W_t}}$

$\boldsymbol{= A_t^w}$,

(5) $\boldsymbol{A_t^{wd} = a^d(P_t^a, R_t, Y_t^w)}, \quad \boldsymbol{a_1^d},\ \boldsymbol{a_2^d} < 0, \quad \boldsymbol{a_3^d} > 0$

(6) $\boldsymbol{A_t^w = a^d(P_t^a, R_t, Y_t^w)}$

(7) $\boldsymbol{P_t^a = a(R_t, A_t^w, Y_t^w)}, \qquad \boldsymbol{a_1, a_2} < 0,\ \boldsymbol{a_3} > \boldsymbol{0}$

(8) $\boldsymbol{P_t^{cs} = c^{sp}(C_t^w)}, \qquad \boldsymbol{c^{sp'}} > 0$

(9) $\boldsymbol{P_t^{cd} = c^{dp}(C_t^w, Y_t^w)}, \ \boldsymbol{c_1^{dp}} < 0,\ \boldsymbol{c_2^{dp}} > \boldsymbol{0}$

(10) $\boldsymbol{c^{sp}(C_t^w) = c^{dp}(C_t^w, Y_t^w) = P_t^c}$

(11) $\boldsymbol{C_t^{wd} = c(Y_t^w)}, \qquad \boldsymbol{0} < \boldsymbol{c'} < 1$

(12) $\boldsymbol{S_t^w = Y_t^w - c(Y_t^w)}$

$\boldsymbol{= s(Y_t^w)}, \qquad \boldsymbol{0} < \boldsymbol{s'} < 1.$

(13) $\boldsymbol{P_t^{is} = i^{sp}(I_t^w)}, \qquad \boldsymbol{i^{sp'}} > 0$

(14) $\boldsymbol{P_t^{id} = i^{dp}\big(I_t^w, R_t, P_t^a, c(Y_t^w)\big)}$

$\boldsymbol{= i^{dp}(I_t^w, R_t, P_t^a, Y_t^w)}, \quad \boldsymbol{i_1^{dp}},\ \boldsymbol{i_2^{dp}} < 0,\ \boldsymbol{i_3^{dp}}\ \ \boldsymbol{i_4^{dp}} > \boldsymbol{0}.$

(15) $\boldsymbol{i^{sp}(I_t^w) = i^{dp}(I_t^w, R_t, P_t^a, Y_t^w) = P_t^i}$

(16) $\boldsymbol{I_t^{wd} = i(R_t, P_t^a, Y_t^w)}, \qquad \boldsymbol{i_1} < 0,\ \boldsymbol{i_2, i_3} > \boldsymbol{0}$

$$(17)\quad Y_t^{wd} = C_t^{wd} + I_t^{wd}$$

$$= c(Y_t^w) + i(R_t, P_t^a, Y_t^w),$$

$$(18)\quad N_t^{wid} = n^{id}(I_t^{we}), \qquad n^{id'} > 0$$

$$(19)\quad N_t^{wcd} = n^{cd}(C_t^{we}), \qquad n^{cd'} > 0$$

$$(20)\quad N_t^w = n^{id}(Y_t^{we}) + n^{cd}(Y_t^{we})$$

$$= n(Y_t^{we}), \qquad n' = 1,$$

$$(21)\quad Y_t^{we} = C_t^{we} + I_t^{we}$$

$$(22)\quad Y_t^{ws} = n^{-1}(N_t^w), \quad n^{-1'} = 1$$

$$(23)\quad Y_t^{wd} = c\left(n^{-1}(N_t^w)\right) + i\left(R_t, P_t^a, n^{-1}(N_t^w)\right)$$

$$= y^d(N_t^w, R_t, P_t^a), \quad y_1^d, y_3^d > 0,\ y_2^d < 0,$$

I-b. Dynamic Adjustment Functions

$$(24)\quad dR_t = g^r\left(M_t^{wd} - M_t^{ws}\right)$$

$$= g^r\left(m^d(Y_t^w, R_t) - m^s(R_t)\right)$$

$$(25)\quad dM_t = g^r\left(M_t^{wd} - M_t^w\right)$$

$$= g^r\left(m^d(Y_t^w, R_t) - M_t^w\right),$$

$$(26)\quad dP_t^a = g^{pa}\left(A_t^{wd} - A_t^{sw}\right)$$

$$= g^{pa}\left(a^d(P_t^a, R_t, Y_t^w) - A_t^w\right)$$

$$(27)\quad dC_t^{we} = g^{ce}\left(C_t^{wd} - C_t^{we}\right)$$

$$= g^{ce}\left(c^{dp-1}(P_t^c, Y_t^w) - C_t^{we}\right)$$

$$(28)\quad dI_t^{we} = g^{ie}\left(I_t^{wd} - I_t^{we}\right)$$

$$= g^{ie}\left(i^{dp-1}\left(P_t^i, R_t, P_t^a, Y_t^w\right) - I_t^{we}\right)$$

$$(29)\quad dC_t^w = g^c(C_t^{we} - C_t^w)$$

$$(30)\quad dI_t^w = g^i(I_t^{we} - I_t^w)$$

$$(31)\quad dP_t^i = g^{pi}\left(I_t^d - I_t^s\right)$$

$$= g^{pi}\left(i^{dp-1}\left(P_t^i, R_t, P_t^a, Y_t^w\right) - i^{sp-1}\left(P_t^i\right)\right)$$

$$(32)\quad dP_t^c = g^{pc}\left(C_t^d - C_t^s\right)$$

$$= g^{pc}\left(c^{dp-1}(P_t^c, Y_t^w) - c^{sp-1}(P_t^c)\right).$$

$$(33)\quad dN_t^w = g^{nd}(Y_t^{we} - Y_t^{ws})$$

$$= g^{nd}\left(Y_t^{we} - n^{-1}(N_t^w)\right)$$

$$(34)\quad dY_t^{we} = dC_t^{we} + dI_t^{we}$$

$$= g^{ce}\left(c^{dp-1}\left(P_t^{cd}, Y_t^w\right) - C_t^{we}\right) + g^{ie}\left(i^{dp-1}\left(P_t^{id}, R_t, P_t^a, Y_t^w\right) - I_t^{we}\right)$$

$$(35)\quad dY_t^w = dC_t^w + dI_t^w$$

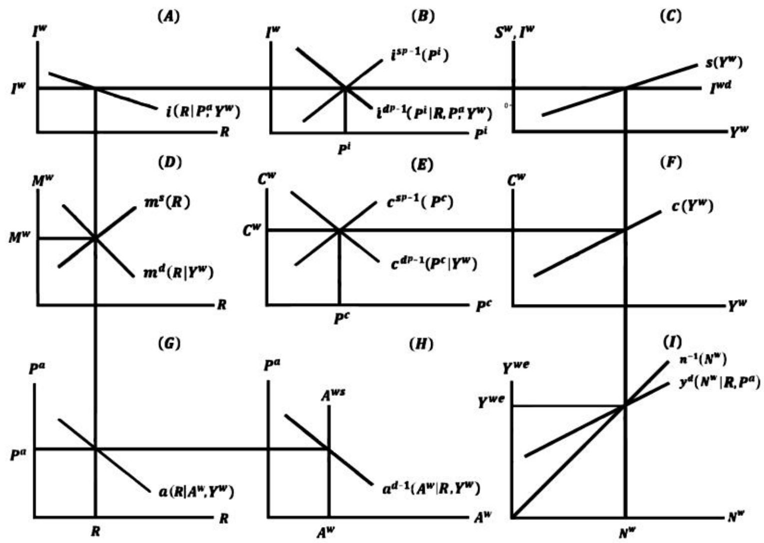
$$= g^c(C_t^{we} - C_t^w) + g^i(I_t^{we} - I_t^w).$$

I-c. Structure of Keynes' Aggregate Model

Table 1: Structure of Keynes' Aggregate Model			
Market	Equilibrium Conditions		Endogenous Variables
Assets	$M_t^{ws} = M_t^w$	$M_t^{ws} = M_t^{wd}$	M_t^w, R_t, P_t^a
	$A_t^{wd} = A_t^w$		
Investment	$I_t^{we} = I_t^{wd}$	$I_t^{we} = I_t^w$	I_t^{we}, I_t^w, P_t^i
	$P_t^{id} = P_t^{is}$		
Consumption	$C_t^{we} = C_t^{wd}$	$C_t^{we} = C_t^w$	C_t^{we}, C_t^w, P_t^c
	$P_t^{cd} = P_t^{cs}$		
Labor	$Y_t^{ws} = Y_t^{we}$		N_t^w
Identities	$Y_t^{we} = C_t^{we} + I_t^{we}$		Y_t^{we}, Y_t^w
	$Y_t^w = C_t^w + I_t^w$		

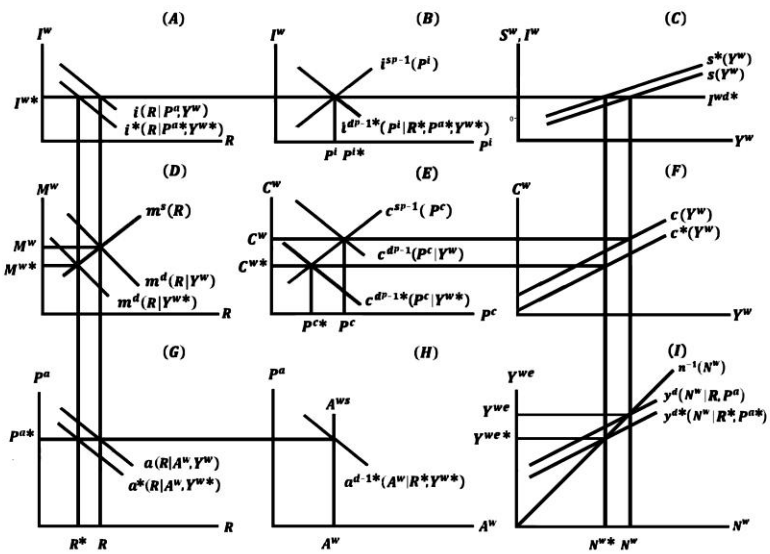
I-d. Short-Run Equilibrium

Figure 1: Short-Run Equilibrium.



I-f. Changes in Short-Run Equilibrium

Figure 2: An Increase in Thriftiness.



I-g. Achieving Long-Run Equilibrium

$$(14a)\quad P_t^{id} = i^{dp}(I_t^w, R_t, A_t^w, P_t^a, Y_t^w), \qquad i_3^{dp},\ i_5^{dp} > 0,\ \ i_1^{dp},\ i_2^{dp},\ i_3^{dp} < 0$$

$$(16a)\quad I_t^{wd} = i(R_t, A_t^w, P_t^a, Y^w), \qquad i_3^d, i_4^d > 0,\ \ i_1^d,\ i_2^d < 0$$

$$(23a)\quad Y_t^{wd} = c\left(n^{-1}(N_t^w)\right) + i\left(R_t, A_t^w, P_t^a, n^{-1}(N_t^w)\right)$$

$$= y^d(N_t^w, R_t, A_t^w, P_t^a), \qquad y_1^d, y_4^d > 0,\ \ y_2^d, y_3^d < 0,$$

$$(8a) \quad P_t^{cs} = P^{c*}$$

$$(13a) \quad P_t^{is} = P^{i*}$$

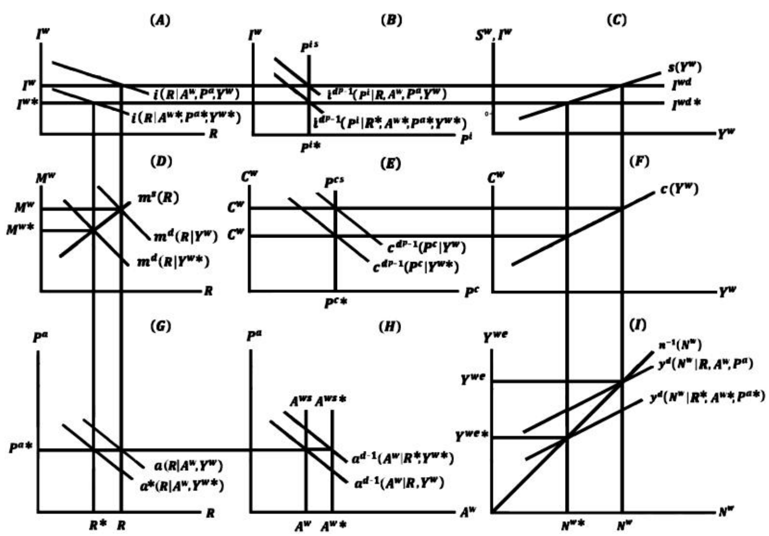
$$(28a) \quad dI_t^{we} = g^{ie}\left(I_t^{wd} - I_t^{we}\right)$$

$$= g^{ie}\left(i^{dp-1}\left(P_t^i, R_t, A_t^w, P_t^a, Y_t^w\right) - I_t^{we}\right)$$

$$(34a) \quad dY_t^{we} = dC_t^{we} + dI_t^{we}$$

$$= g^{ce}\left(c^{dp-1}(P_t^c, Y_t^w) - C_t^{we}\right) + g^{ie}\left(i^{dp-1}\left(P_t^i, R_t, A_t^w, P_t^a, Y_t^w\right) - I_t^{we}\right).$$

Figure 3: Toward Long-Run Equilibrium.



II. Mr. Keynes and the 'NeoClassics'

II-a. Hicks' Two-Good Model

$$(36) \quad C = f^c(N^c), \qquad f^{c'} > 0, \quad f^{c''} < 0$$

$$(37) \quad I = f^i(N^i), \qquad f^{i'} > 0, \quad f^{i''} < 0,$$

$$(38) \quad P^c = W/f^{c'}(N^c), \qquad \partial P^c/\partial N^c > 0$$

$$(39) \quad P^i = W/f^{i'}(N^i), \qquad \partial P^i/\partial N^i > 0.$$

$$(40) \quad Y^c = P^c f^c(N^c)$$

$$= W f^c(N^c)/f^{c'}(N^c), \qquad \partial Y^c/\partial N^c > 0$$

$$(41) \quad Y^i = P^i f^i(N^i)$$

$$= W f^i(N^i)/f^{i'}(N^i), \qquad \partial Y^i/\partial N^i > 0$$

$$(42)\quad \boldsymbol{Y} = \boldsymbol{P^c f^c}(\boldsymbol{N^c}) + \boldsymbol{P^i f^i}(\boldsymbol{N^i})$$

$$= \boldsymbol{W f^c}(\boldsymbol{N^c})/\boldsymbol{f^{c'}}(\boldsymbol{N^c}) + \boldsymbol{W f^i}(\boldsymbol{N^i})/\boldsymbol{f^{i'}}(\boldsymbol{N^i}),$$

$$(43)\quad \boldsymbol{M} = \boldsymbol{kY},$$

$$(44)\quad \boldsymbol{Y^i} = \boldsymbol{i}(\boldsymbol{R}), \qquad \boldsymbol{i}' < 0,$$

$$(45)\quad \boldsymbol{Y^i} = \boldsymbol{s}(\boldsymbol{Y}, \boldsymbol{R}), \qquad \boldsymbol{s_1} > 0, \quad \boldsymbol{s_2} < 0,$$

$$(46)\quad \boldsymbol{M} = \boldsymbol{m^d}(\boldsymbol{Y}, \boldsymbol{R}), \qquad \boldsymbol{m_1^d} > 0, \ \boldsymbol{m_2^d} < 0.$$

$$(47)\quad \boldsymbol{Y^i} = \boldsymbol{i}^*(\boldsymbol{Y}, \boldsymbol{R}), \qquad \boldsymbol{i_1^*} > 0, \ \boldsymbol{i_2^*} < 0.$$

$$(48)\quad \boldsymbol{i}^*(\boldsymbol{Y}, \boldsymbol{R}) = \boldsymbol{s}(\boldsymbol{Y}, \boldsymbol{R}).$$

II-b. Keynesian One-Good Model

$$(49)\quad \boldsymbol{Q} = \boldsymbol{f}(\boldsymbol{N}), \qquad \boldsymbol{f}' > 0, \ \boldsymbol{f}'' < 0$$

$$(50)\quad \boldsymbol{P} = \boldsymbol{W}/\boldsymbol{f}'(\boldsymbol{N}), \qquad \boldsymbol{\partial P/\partial N} > 0$$

$$(53)\quad \boldsymbol{Y} = \boldsymbol{Pf}(\boldsymbol{N})$$

$$= \boldsymbol{Wf}(\boldsymbol{N})/\boldsymbol{f}'(\boldsymbol{N}), \qquad \boldsymbol{\partial Y/\partial N} > 0,$$

II-c. Deriving Hicks' Model from Keynes' Model

$$(52)\quad \boldsymbol{s}(\boldsymbol{Y_t^w}) = \boldsymbol{i}(\boldsymbol{R_t}, \boldsymbol{P_t^a}).$$

$$(53)\quad \boldsymbol{M_t^w} = \boldsymbol{m^d}(\boldsymbol{Y_t^w}, \boldsymbol{R_t}).$$