Corrections to Macroeconomic Theory Mike Wickens January 2010

p18 Equation (2.11) should be

$$\lim_{s \to \infty} \beta^s U'(c_{t+s}) k_{t+s+1} = 0 \tag{2.11}$$

p24 Equation (2.18): should have a minus after the equals sign to be

$$\Delta c_{t+1} = -\frac{U'}{U''} \left[1 - \frac{1}{\beta [F'(k_{t+1}) + 1 - \delta]} \right]$$
(2.18)

p26 Equation (2.23) should be

$$\frac{U''(c^*)}{U'(c^*)}(c_{t+1} - c^*) + \beta F''(k^*)(k_{t+1} - k^*) \simeq \frac{U''(c^*)}{U'(c^*)}(c_t - c^*)$$
(2.23)

and equation (2.24) should be

$$k_{t+1} - k^* \simeq -\{c_t - [F(k^*) - \delta k^*]\} + [F'(k^*) + 1 - \delta)](k_t - k^*)$$

= $-(c_t - c^*) + (1 + \theta)(k_t - k^*)$ (2.24)

This gives the matrix equation

$$\begin{bmatrix} c_{t+1} - c^* \\ k_{t+1} - k^* \end{bmatrix} = \begin{bmatrix} 1 + \frac{U'F''}{(1+\theta)U''} & -\frac{U'F''}{U''} \\ -1 & 1+\theta \end{bmatrix} \begin{bmatrix} c_t - c^* \\ k_t - k^* \end{bmatrix}$$

p27 The roots should be

$$\{\lambda_1, \lambda_2\} \simeq \{\frac{\det A}{trA}, trA - \frac{\det A}{trA}\}$$

=
$$\{\frac{1+\theta}{2+\theta + \frac{U'F''}{(1+\theta)U''}}, 2+\theta + \frac{U'F''}{(1+\theta)U''} - \frac{1+\theta}{2+\theta + \frac{U'F''}{(1+\theta)U''}}\}$$

p33 penultimate equation should have = 0 added to be

$$\frac{\partial \mathcal{L}_t}{\partial i_{t+s}} = -\lambda_{t+s} (1 + \phi \frac{i_t}{k_t}) + \mu_{t+s} = 0, \qquad s \ge 0$$

and NOT

$$\frac{\partial \mathcal{L}_t}{\partial i_{t+s}} = -\lambda_{t+s} (1 + \frac{\phi}{2} \frac{i_t}{k_t}) + \mu_{t+s} = 0, \qquad s \ge 0$$

p55 Fourth equation should have = 0 added to be

$$\frac{\partial \mathcal{L}}{\partial c_{t+s}} = \beta^s U'(c_{t+s}) - \lambda_{t+s} = 0 \qquad s \ge 0$$

and NOT

$$\frac{\partial \mathcal{L}}{\partial c_{t+s}} = \beta^s U'(c_{t+s}) - \lambda_{t+s} \qquad s \ge 0$$

p
58 First new para line 2 should be $-U^\prime(c_t)dc_t$ and NOT
 $U^\prime(c_t)dc_t$

p64 Second line. should read

"It has two features: its slope (which upwards if $r > \theta$)..."

p 67 line 4. The sentence should read "We note, however, that unlike non-durables and services, durables are not a flow variable but a stock;..."

p69 Third and fourth equations should have = 0 added to be

$$\frac{\partial \mathcal{L}}{\partial c_{t+s}} = \beta^s U_{c,t+s} - \lambda_{t+s} = 0 \qquad s \ge 0$$
$$\frac{\partial \mathcal{L}}{\partial D_{t+s}} = \beta^s U_{D,t+s} + \lambda_{t+s} p_{t+s}^D (1-\delta) - \lambda_{t+s-1} p_{t+s}^D = 0 \qquad s > 0$$

and NOT

$$\frac{\partial \mathcal{L}}{\partial c_{t+s}} = \beta^s U_{c,t+s} - \lambda_{t+s} \qquad s \ge 0$$
$$\frac{\partial \mathcal{L}}{\partial D_{t+s}} = \beta^s U_{D,t+s} + \lambda_{t+s} p_{t+s}^D (1-\delta) - \lambda_{t+s-1} p_{t+s}^D \qquad s > 0$$

p71. Fourth and fifth equations should have = 0 added tobe

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$$\frac{\partial \mathcal{L}}{\partial c_{t+s}} = \beta^s U_{c,t+s} - \lambda_{t+s} = 0 \qquad s \ge 0$$
$$\frac{\partial \mathcal{L}}{\partial n_{t+s}} = -\beta^s U_{l,t+s} + \lambda_{t+s} w_{t+s} = 0 \qquad s \ge 0$$

and NOT

$$\frac{\partial \mathcal{L}}{\partial c_{t+s}} = \beta^s U_{c,t+s} - \lambda_{t+s} \qquad s \ge 0$$
$$\frac{\partial \mathcal{L}}{\partial n_{t+s}} = -\beta^s U_{l,t+s} + \lambda_{t+s} w_{t+s} \qquad s \ge 0$$

p89. last para add at the end to read "....wealth are (omitting transfers)"

p93. last line replace "increase" with "decrease"

p135. 5 lines from the end should be $r_t = f'(k_t) - \delta$ and NOT $r_{t+1} = f'(k_t) - \delta$

p141. a whole section needs changing

1. Two lines after equation (6.48) should be $r_t = f'(k_t) - \delta$ and NOT $r_{t+1} = f'(k_t) - \delta$

2. The next three equations and followed para should be

"....written as

$$(1+r_{t+1})(1+n)k_{t+1} = \frac{1+r_{t+1}}{2+\theta}(1-\alpha)k_t^{\alpha} + \frac{n-r_{t+1}}{2+\theta}\tau_t$$

hence

$$k_{t+1} = \frac{1-\alpha}{(2+\theta)(1+n)}k_t^{\alpha} - \frac{1}{2+\theta}\left[\frac{1+\theta}{1+r_{t+1}} + \frac{1}{1+n}\right]\tau_t$$
$$= \phi k_t^{\alpha} - \lambda_t \tau_t$$

where $\lambda_t = \frac{1}{2+\theta} \left[\frac{1+\theta}{1+r_{t+1}} + \frac{1}{1+n} \right] > 0$. This equation is represented in figure 6.2. Consequently, an increase in the unfunded state pension shifts the curve

Consequently, an increase in the unfunded state pension shifts the curve downwards. This results in a lower equilibrium capital stock and lower savings. Therefore, only the current old generation benefits, not future old generations, in particular, not the current young generation."

p155 footnote remove the minus sign in the first equation for σ^{ES} after the equals sign.

p169. Equation (7.46) should be P_t^T and not P^T .

p169 next equation replace

$$\frac{f_t}{y_t} = \left(\frac{(1+\pi)(1+\gamma)}{1+R}\right)^n \frac{f_{t+n}}{y_{t+n}} - \frac{1}{1+R} \sum_{i=0}^n \left(\frac{(1+\pi)(1+\gamma)}{1+R}\right)^i E_t \left(\frac{P^T}{P_{t+i}}(\frac{x_{t+i} - Q^T_{t+i}x_{t+i}^m}{y_{t+i}})\right)$$

by

$$\frac{f_t}{y_t} = \left(\frac{(1+\pi)(1+\gamma)}{1+R}\right)^n \frac{f_{t+n}}{y_{t+n}} - \frac{1}{1+R} \sum_{i=0}^n \left(\frac{(1+\pi)(1+\gamma)}{1+R}\right)^i \frac{P_{t+i}^T}{P_{t+i}} \left(\frac{x_{t+i} - Q_{t+i}^T x_{t+i}^m}{y_{t+i}}\right)^{i-1} \frac{P_{t+i}^T}{y_{t+i}} \left(\frac{x_{t+i} - Q_{t+i}^T x_{t+i}^m}{y_{t+i}}\right)^{i-1} \frac{P_{t+i}^T x_{t+i}^m}{y_{t+i}} \frac{P_{t+i}^T x_{t+i}^$$

p169 Replace equation (7.47) by

$$\lim_{n \to \infty} \left(\frac{(1+\pi)(1+\gamma)}{1+R} \right)^n \frac{f_{t+n}}{y_{t+n}} = 0$$
(7.47)

p169 Replace next equation by

$$-\frac{f_t}{y_t} \le \frac{1}{1+R} \sum_{i=0}^{\infty} \left(\frac{(1+\pi)(1+\gamma)}{1+R}\right)^i \frac{P_{t+i}^T}{P_{t+i}} \left(\frac{x_{t+i} - Q_{t+i}^T x_{t+i}^m}{y_{t+i}}\right)$$

p169 Replace last equation by

$$\frac{P_{t+i}^T}{P_{t+i}} (\frac{x_{t+i} - Q_{t+i}^T x_{t+i}^m}{y_{t+i}})$$

p211 Replace equation 9.10 and the following sentence with

$$n_t(i) = 1 - \left(\frac{u_{c,t}W_t(i)}{\eta\varepsilon P_t}\right)^{\frac{1}{\varepsilon-1}}$$
(9.10)

If $\varepsilon \ge (\le)1$, an increase in $W_t(i)$ will reduce (raise) labour supply $n_t(i)$.

p 212. As a result of this correction, equation (9.13) and the equation above should read

$$n_t(i) = \left(\frac{\phi}{\alpha_i A_{it}(\phi - 1)} \frac{W_t}{P_t(i)}\right)^{-\frac{1}{1 - \alpha_i}} = 1 - \left(\frac{u_{c,t} W_t}{\eta \varepsilon P_t}\right)^{\frac{1}{\varepsilon - 1}}$$

Hence

$$\frac{P_t(i)}{P_t} = \frac{\phi}{\alpha_i A_{it}(\phi - 1)} \frac{W_t}{P_t} \left[1 - \left(\frac{u_{c,t} W_t}{\eta \varepsilon P_t}\right)^{\frac{1}{\varepsilon - 1}} \right]^{1 - \alpha_i}$$
(9.13)

p212 Second sentence after equation (9.13) should now read

"Equation (9.13) implies that an increase in the economy-wide real-wage rate would raise the relative price of firm i if $\varepsilon \leq 1$, but the response is unclear if $\varepsilon \geq 1$."

p212 Second sentence of the last paragraph and equation (9.14) should read:

"In this case equation (??) becomes an implicit equation for the real wage, namely,

$$1 = \frac{\phi}{\alpha A_t(\phi - 1)} \frac{W_t}{P_t} \left[1 - \left(\frac{u_{c,t} W_t}{\eta \varepsilon P_t}\right)^{\frac{1}{\varepsilon - 1}} \right]^{1 - \alpha}$$
(9.14)

p214 Replace the eight and ninth equations on the page (i.e. at the end of the section 9.3.3.2) by

$$n_t(i) = A_i^{\phi-1} \left[\frac{\phi-1}{\phi} \frac{P_t}{W_t}\right]^{\phi} y_t$$
$$y_t(i) = A_i^{\phi} \left[\frac{\phi-1}{\phi} \frac{P_t}{W_t}\right]^{\phi} y_t$$

 $\mathbf{p220}$ The penultimate equation should be

$$\pi_t = \rho(1 - \gamma) \sum_{0}^{\infty} \gamma^s E_t [p_{t+s}^* - p_{t-1}]$$

and equation (9.23) should be

$$\pi_t = \frac{\rho(1-\gamma)}{1-\rho\gamma} (p_t^* - p_{t-1}) + \frac{\gamma}{1-\rho\gamma} E_t \pi_{t+1}$$
(9.23)

p221 replace the inflation equation in mid page by

$$\pi_t = \frac{\rho(1-\gamma)}{1+\gamma - 2\rho\gamma} (p_t^* - p_{t-1}) + \frac{\gamma}{1+\gamma - 2\rho\gamma} E_t \pi_{t+1} + \frac{1-\rho}{1+\gamma - 2\rho\gamma} \pi_{t-1}$$

p237 Replace equation 10.16 by

$$E(r) = r^{f} - (1 + r^{f})Cov(m, 1 + r)$$
(10.16)

p237 Replace equation 10.17 by

$$\rho = -(1+r^f)Cov(m,1+r)$$
(10.17)

 $\mathbf{p256}$ second equation should be

$$\frac{c_{A,t+1}}{c_{A,t}} = \frac{c_{B,t+1}}{c_{B,t}}$$

 $\mathbf{p378}$ Replace fourth equation by

$$y = y_n + \alpha v + \frac{\varepsilon}{1 + \alpha^2 \lambda}$$

 $\mathbf{p378}$ Replace seven th equation by

$$= \frac{1}{2}\lambda[\alpha v + \frac{\varepsilon}{1+\alpha^2\lambda} - k)]^2 + \frac{1}{2}(v - \frac{\alpha\lambda\varepsilon}{1+\alpha^2\lambda} + \alpha\lambda k)^2$$

p378 Replace next equation by

$$E(Q) = \frac{1}{2}\lambda \left[\alpha^2 \sigma_v^2 + \left(\frac{1}{1+\alpha^2 \lambda}\right)^2 \sigma_\varepsilon^2 + k^2 \right] + \frac{1}{2} \left(\sigma_v^2 + \left(\frac{\alpha \lambda}{1+\alpha^2 \lambda}\right)^2 \sigma_\varepsilon^2 + (\alpha \lambda)^2 k^2 \right)$$

p383 Starting at the sixth equation insert the following:

$$E(U^{CB}) = -\frac{1}{2} \left[\frac{(\alpha \lambda)^2}{1+\delta} + (1+\delta)\sigma_v^2 \right]$$
$$= (1+\delta)E(U^P) > E(U^{CB})$$

where U^P is the public's welfare."

p383 Replace

"As the public's welfare is independent of the value of δ it obtains no benefit from having a central bank more antipathetic to inflation than itself.

In contrast, the welfare cost of the central bank is affected by the size of δ ."

by

"For the central bank the optimal value of δ is obtained from"

p383 End of the penultimate para add the following:

"....having a large δ . But for the public

$$\frac{\partial E(U^P)}{\partial \delta} = \left(\frac{\alpha\lambda}{1+\delta}\right)^2 > 0,$$

implying that the more conservative the central bank, the better off is the public."

p384. Replace the first equation by

$$E(U^{P})|_{C} = E(U^{P})|_{D} + \frac{1}{2}\left(\frac{\alpha\lambda}{1+\delta}\right)^{2} > E(U^{P})|_{D}$$

p402 After equation 14.10 replace

"Noting that $E_t z_{t+s} = e_t$ for $s \ge 0$, "

by

"Noting that $E_t z_{t+s} = z_t$ for $s \ge 0$, and $\Delta z_t = e_t$, "

p402 Replace equation 14.11 by

$$\Delta x_t = \frac{1}{\eta_1} \Delta x_{t-1} + G_0 e_t + G_1 e_{t-1} \tag{14.11}$$

which is a vector autoregressive/moving average model (VARMA) in the change in $x_t."$

p402 Next para should read.

"Equation (14.11) describes the dynamic behaviour of changes in $\ln c_t$ and $\ln k_t$ following a technology shock e_t . The precise path followed by the economy depends on the (deep) structural parameters of the model. The equation implies that the system returns to its steady state growth path following a temporary technology shock, but not to its original steady state as the temporary shock e_t has a permanent effect on technology z_t and hence on $\ln c_t$ and $\ln k_t$."

p433 The penultimate sentence should read "...that can be solved for y(t)."

p450 In equation (15.57) and the following three equations α should read β , and β should read α .

p455 Equation (15.66) should be

$$y_t = Q_{yx} x_t - \sum_{s=0}^{\infty} Q_{yy} \Gamma_{yy}^{-s} P E_t z_{t+s}$$
(15.66)