

$$J = \begin{bmatrix} 0 & 0 & J13 & J14 & J15 & J16 & \frac{GA^D\beta 2\mu + (Z + \alpha)\omega 2}{k\beta 1Z} & \frac{(Z + \alpha)\omega 2}{kZ\beta 1} & 0 & 0 \\ \frac{2Gk}{\hat{a}2} & \frac{2G}{\hat{a}2} & \frac{Gk}{\hat{a}2Z} & \frac{Gk}{\hat{a}2Z} & \frac{G^2}{\hat{a}2} & \frac{G^2k}{\hat{a}2} & \frac{G^2k}{\hat{a}2} & \frac{Z}{1 + \phi} & 0 & 0 \\ \frac{(3Z - 2)Z}{(Z - 1)^2} & 0 & \frac{1}{(Z - 1)^2} & 0 & 0 & -\frac{GZ}{(Z - 1)^2} & 0 & 0 & -\frac{2Z^2}{(Z - 1)^2} & 0 \\ 0 & \frac{(3Z - 2)^2}{(Z - 1)^2} & 0 & \frac{1}{(Z - 1)^2} & 0 & 0 & -\frac{GZ}{(Z - 1)^2} & 0 & 0 & -\frac{2Z}{(Z - 1)^2} \\ 0 & 0 & \frac{k}{G} & -\frac{k}{G} & 1 & 0 & 0 & 0 & 0 & 0 \\ J61 & 0 & J63 & J64 & J65 & J66 & J67 & \frac{\beta 2\mu}{k\beta 1} & J69 & 0 \\ \frac{2k}{\hat{a}2} & J72 & \frac{k}{\hat{a}2Z} & \frac{k}{\hat{a}2Z} & \frac{G}{\hat{a}2} & \frac{Gk}{\hat{a}2} & \frac{Gk}{\hat{a}2} & 1 & 0 & J710 \\ J81 & \frac{J81}{2k} & \frac{J81}{2Z} & \frac{J81}{2Z} & \frac{J81}{2kZ} & \frac{G.J81}{2Z} & \frac{G.J81}{2Z} & \frac{\{G(Z - 1)(1 + k) - \beta 2\}(Z - 1)\beta 2}{2A^D Z\beta 2(A^D Z\beta 2 + S) + S^2} & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$X_{12} = a.(1 + p_{21}) + p_2^{m1}, \quad Z = G.(1 + \phi) + 1, \quad G = (1 + a), \quad R = c_p.\pi.\{G.(1 + k)p_{21} + k.p_1^{m1} + p_2^{m1}\}(1 + \phi), \quad S = 1 + k - \beta 2 + \phi(1 + k) + a(Z + \phi)$$

$$J13 = \frac{c_p.\pi.\{G.(1 + k)p_{21} - k.p_1^{m1}.G(1 + \phi) + p_2^{m1}\} + G\{A^D.Z.\beta 2\mu - k.\alpha.(1 + \phi)\omega 1\} + (Z + \alpha)\omega 2}{G.k.Z^2.\beta 1}, \quad J14 = \frac{A^D.G.\beta 2\mu + c_p.\pi.p_2^{m1} + (1 + \alpha)\omega 2}{G.k.Z.\beta 1}$$

$$J15 = \frac{A^D.G.Z.\beta 2\mu + c_p.X_{12}.(1 + \phi) + (Z + \alpha)\omega 2}{k^2.Z.\beta 1}, \quad J16 = \frac{A^D.G.Z.\beta 2\mu + R + (Z + \alpha)\omega 2}{k.Z.\beta 1}, \quad J61 = \frac{A^D.G.Z.\beta 2\mu + R + (Z + \alpha)(k.\omega 1 + \omega 2)}{G^2.k.Z.\beta 1}$$

$$J63 = \frac{A^D.G.Z.\beta 2\mu + R + (Z + \alpha)\omega 2 - (Z - 1)k.\omega 1}{G^2.k.Z^2.\beta 1}, \quad J64 = \frac{A^D.G.\beta 2\mu + c_p.\pi.p_2^{m1}.(1 + \phi) + (1 + \alpha)\omega 2}{G^2.k.Z.\beta 1}, \quad J65 = \frac{A^D.G.Z.\beta 2\mu + c_p.\pi.X_{12}.(1 + \phi) + (Z + \alpha)\omega 2}{G.k^2.Z.\beta 1}$$

$$J66 = \frac{A^D.G.Z.\beta 2\mu + R + (Z + \alpha)\omega 2}{G.k.Z.\beta 1}, \quad J67 = \frac{A^D.G.Z.\beta 2\mu + (Z + \alpha)\omega 2}{G.k.Z.\beta 1}, \quad J69 = \frac{2.[A^D.G.Z.\beta 2\mu + R + (Z + \alpha)(\omega 2 + k.\omega 1)]}{G^2.k.Z.\beta 1}, \quad J72 = \frac{(Z - 1)(k.G + A^D.\beta 2) - \beta 2 + 3G^2.(1 + \phi)}{G.(Z - 1)\beta 2}$$

$$J710 = \frac{((k + 3)a + (1 + \phi)a2k + A^D.\beta 2 + 6)(1 + \phi)a + k + A^D.\beta 2 - \beta 2 + k.\phi + A^D.\beta 2.\phi + 3\phi + 3}{G.(Z - 1)\beta 1}, \quad J81 = \frac{2(Z - 1)^2 A^D k \beta 2}{2A^D Z \beta 2 (A^D Z \beta 2 + S) + S^2}$$