Technical Appendix

Appendix C

After rearranging the integrals, aggregate human wealth is given by:

$$H^R(t) = {}^{t} \quad \frac{1}{\lambda_P + \lambda_R} e^{\ \frac{1}{\lambda_R}(t\ \ s)} \left[a_R e^{\ \ \alpha_R(t\ \ s)} \right]$$

$$\left\{ {}_{t}^{+} \quad e^{\ {}_{t}^{z}\left[\hat{r}(v) + \frac{1}{\lambda_R} \right] dv} \hat{\omega}^R(z) \left[\exp^{\ \alpha_R(z''t)} \right] E^R(z) N^R(z) dz \right.$$

I reorganize the integrals as:

$$H^R(t) = {}^{t} \quad \frac{a_R}{\lambda_P + \lambda_R} e^{\ (\frac{1}{\lambda_R} + \alpha_R)(t\ \ s)} \left[{}_{t}^{+} \quad e^{\ {}_{t}^{z}\left[\hat{r}(v) + \frac{1}{\lambda_R} + \alpha_R \right] dv} \hat{\omega}^R(z) E^R(z) N^R(z) dz \right] ds$$

with:

$$\lim_{z \ > +} e^{\ {}_{t}^{z}\left[\hat{r}(v) + \frac{1}{\lambda_R} + \alpha_R \right] dv} \hat{\omega}^R(z) E^R(z) N^R(z) = 0$$

and:

$${}^{t} \quad \frac{a_R}{\lambda_P + \lambda_R} e^{\ (\frac{1}{\lambda_R} + \alpha_R)(t\ \ s)} = 1$$

$$\frac{a_R}{\lambda_P + \lambda_R} \frac{1}{\frac{1}{\lambda_R} + \alpha_R} = 1$$

The term in braces is independent of s. Differentiating with respect to time yields:

$$\dot{H}^R(t) = \left(\hat{r}(t) + \frac{1}{\lambda_R} \right.$$

Appendix E

In the steady state,
When $\ {}^{R}(t) = 0$,

$$(\hat{r} + \alpha_R \quad \delta) C^R = \left(\delta + \frac{1}{\lambda_R} \right) \left(\frac{1}{\lambda_R} + \alpha_R \right) W^R$$

As a result:

$$\delta \quad \alpha_R < \hat{r}$$

The concavity of F implies that:

$$F(K) > rK$$

which gives:

$$C^R + C^P + rT_k K > rK$$

or equivalently:

$$\left(\delta + \frac{1}{\lambda_R}\right)(K^R + H^R) > \hat{r}K \quad C^P$$

$$\left(\delta + \frac{1}{\lambda_R} \quad \hat{r}\right)K^R + \left(\delta + \frac{1}{\lambda_R}\right)H^R + (C^P \quad \hat{r}K^P) > 0 \tag{22}$$

For this inequality to hold, two sufficient conditions are:

Appendix F

Conditions for the strict concavity of V

Recall that V is described as follows:

I obtain:

$$\frac{{}^{2}\upsilon}{C^{R}(z)} = \frac{\upsilon_{C^{R}(z\ \ n,z)}}{C^{R}(z)}$$

$$= \chi(z \quad n)\frac{\xi^{C^{R}(z\ \ n,z)}}{C^{R}(z)}U_{C^{R}(z\ \ n,z)} + \left(1 + \chi(z \quad n) + \chi(z \quad n)\xi^{C^{R}(z\ \ n,z)}\right)\frac{U_{C^{R}(z\ \ n,z)}}{C^{R}(z)}$$

$$= \chi(z \quad n)\frac{\xi^{C^{R}(z\ \ n,z)}}{C^{R}(z)}U_{C^{R}(z\ \ n,z)} + \left(1 + \chi(z \quad n) + \chi(z \quad n)\xi^{C^{R}(z\ \ n,z)}\right)\frac{{}^{2}U(\bullet)}{C^{R}(z)}$$

Therefore,

$$\frac{{}^{2}\upsilon}{C^{R}(n)} < 0 \text{ if } \chi(z \quad n)\frac{\xi^{C^{R}(z\ \ n,z)}}{C^{R}(z)}U_{C^{R}(z\ \ n,z)} + \left(1 + \chi(z \quad n) + \chi(z \quad n)\xi^{C^{R}(z\ \ n,z)}\right) \quad {}^{2}U(\bullet)$$

In a similar way,

$$\frac{{}^{2}\upsilon}{L^{R}(n)} < 0 \text{ if } \left\{\chi(z \quad n)\frac{\xi^{L^{R}(z\ \ n,z)}}{L^{R}(z)}U_{L^{R}(z\ \ n,z)} + \left(1 + \chi(z \quad n)\chi(z \quad n)\xi^{L^{R}(z\ \ n,z)}\right)\frac{{}^{2}U(\bullet)}{L^{R}(z)}\right\} < 0$$

If those two last conditions are satisfied, υ is concave.