proposed policy is

$$F_y(y,x) + \beta F_x(x,y) = 0,$$

which is also satisfied by assumption. Thus, the two-period cycle is indeed optimal.

8. Show that $(0.29, 0.18)$ is a two-period optimal cycle for the previous parameters.

Ans: We know that the proposed two-period cycle must satisfy

$$F_y(x,y) + \beta F_x(y,x) = (1-\theta)(1-y)^{\alpha(1-\theta)-1} x^{\alpha\theta} - \beta\theta (1-x)^{\alpha(1-\theta)} y^{\alpha\theta-1} = 0,$$

and

$$F_y(y,x) + \beta F_x(x,y) = (1-\theta)(1-x)^{\alpha(1-\theta)-1} y^{\alpha\theta} - \beta\theta (1-y)^{\alpha(1-\theta)} x^{\alpha\theta-1} = 0.$$

Plugging $(x,y) = (.29, .18)$ into these equations for the parameter values described above, we find that both equations are equal to zero. Thus, the proposed two-period cycle is optimal.

2 A model of durabe and non-durable goods

Consider an economy where in each period every one of the consumers has an endowment y. This endowment can be used for investment in durable goods or for consumption of non-durables. Then the technology for this economy is:

$$x(t) + c(t) = y$$

for all $t \geq 0$, where $x(t)$ denote the investment in durables and $c(t)$ the consumption of non-durables. The stock of durable goods have a law of motion:

$$\dot{d}(t) = x - \delta d(t)$$

where δ is the depreciation rate of durables per unit of time.

The period utility function depends on the flow of nondurable purchases and on the stock of durables, and is given by $U(c,d)$. We assume that U is strictly quasi-concave in (c,d). In some cases we will specialize to

$$U(c,d) = \frac{[h(c,d)]^{1-\gamma} - 1}{1-\gamma} \tag{1}$$

for $\gamma \geq 0$, and where

$$h(c,d) = \left[c^{-\theta} + \frac{1}{A} d^{-\theta}\right]^{-1/\theta}$$

for $\theta \geq -1$.The agent's utility is the discounted value of $U(c,d)$, using discount rate ρ. With this parameterization the elasticity of substitution between c and d is $1/(1+\theta)$, and the inter-temporal elasticity of substituion between the bundle h of (c,d) is $1/\gamma$.

Thus problem of the planner for this economy is

$$\max_{c,d} \int_0^\infty e^{-\rho t} U(c(t), d(t))\, dt$$

subject to

$$\dot{d}(t) + c(t) = y - \delta d(t),$$

and $d(0) > 0$ given.

Q0. To better understand the utility function in 1. show that if

$$\begin{aligned} U_{cd} &> 0 \text{ if } \frac{1}{\gamma} > \frac{1}{1+\theta}, \\ U_{cd} &= 0 \text{ if } \frac{1}{\gamma} = \frac{1}{1+\theta}, \\ U_{cd} &< 0 \text{ if } \frac{1}{\gamma} < \frac{1}{1+\theta}. \end{aligned}$$

And hence that if $\sigma \equiv 1/\gamma = 1/(1+\theta)$ the utility function is additively separable in c, d :

$$U(c,d) = \frac{c^{1-\frac{1}{\sigma}} + \frac{1}{A} d^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}}.$$

A. The first derivative is

$$U_c = \left[c^{-\theta} + \frac{1}{A} d^{-\theta}\right]^{-\frac{1-\gamma}{\theta}-1} c^{-\theta-1}$$

so the cross derivative is

$$U_{cd} = (1-\gamma+\theta)\left\{\left[c^{-\theta} + \frac{1}{A} d^{-\theta}\right]^{-\frac{1-\gamma}{\theta}-2} c^{-\theta-1} \frac{1}{A} d^{-\theta-1}\right\}$$

so

$$1-\gamma+\theta \geq 0 \iff 1+\theta \geq \gamma \iff \frac{1}{\gamma} \geq \frac{1}{1+\theta}.$$

Finally, if $1/\gamma = \sigma = \frac{1}{1+\theta}$ then

$$\begin{aligned} -\theta &= 1 - \frac{1}{\sigma} \\ 1-\gamma &= 1 - \frac{1}{\sigma} \end{aligned}$$

so

$$U(c,d) = \frac{\left[c^{-\theta} + \frac{1}{A} d^{-\theta}\right]^{-\frac{1-\gamma}{\theta}}}{1-\gamma} = \frac{c^{1-\frac{1}{\sigma}} + \frac{1}{A} d^{1-\frac{1}{\sigma}} - 1}{1-\frac{1}{\sigma}}$$

Q1. Write the Hamiltonian of the problem, using λ for the co-state, d for the state, and c for the control.

A:

$$H(c,d) = U(c,d) + \lambda\left[-d\delta + y - c\right]$$

Q2. Write the f.o.c. w.r.t c and d.

A:

$$\dot{\lambda} = \rho\lambda - H_d : \dot{\lambda} = \lambda(\rho+\delta) - U_d(c,d),$$

and

$$H_c = 0 : U_c(c,d) = \lambda.$$

Q3. Let $\bar{v} \equiv \delta + \rho$ be the steady state user cost of the durable good. Write two equations in two unknowns for the steady state values of $(\bar{c}, \bar{d})$ in terms of U_d, U_c, ρ and $\bar{v}$..

A:

The steady state is then:

$$\begin{aligned} \frac{U_d}{U_c}\left(\bar{c}, \bar{d}\right) &= \bar{v}, \\ \delta\bar{d} + \bar{c} &= y\ . \end{aligned}$$

Q4. Use the equation $H_c = 0$ to obtain a differential equation linking $\dot{\lambda}, \dot{c}$ and $\dot{d}$.

A:From $U_c(c(t), d(t)) = \lambda(t)$ we obtain:

$$\dot{c}U_{cc} + \dot{d}U_{cd} = \dot{\lambda},$$

Q5. Using this last expression, replace the law of motion for the co-state variable and the law of motion of the state variable to find the law of motion of the control $\dot{c}$ as a function of parameters c and d.

A:

$$\dot{c}U_{cc}(c,d) + \dot{d}U_{cd}(c,d) = U_c(c,d)(\delta+\rho) - U_d$$

and using the budget constraint for $\dot{d}$:

$$\dot{c}U_{cc}(c,d) = U_c(c,d)(\delta+\rho) - \left[y - d\delta - c\right]U_{cd}(c,d) - U_d(c,d)$$

Q6. Linearize this last ODE around the steady state, i.e.: $\left(\dot{c}, \dot{d}, c, d\right) = \left(0, 0, \bar{c}, \bar{d}\right)$ and replacing $\dot{d}$ by using the resource constraint of the economy.Your answer should be of the type $\dot{c} = a_{11}\left(c - \bar{c}\right) + a_{12}\left(d - \bar{d}\right)$ for two constants a_{11} and a_{12}. This constant are functions of the second derivatives of U evaluated at the steady state, and of δ and ρ.

Note on linearization: Suppose we want to linearize the function $g\left(x, y\right)$ around $\bar{x}$ and $\bar{y}$. We get:

$$g\left(x, y\right) = g_x\left(\bar{x}, \bar{y}\right)\left(x - \bar{x}\right) + g_x\left(\bar{x}, \bar{y}\right)\left(y - \bar{y}\right)$$

A:The ODE that we want to linearize is:

$$\dot{c} = \frac{U_c\left(c, d\right)\left(\delta + \rho\right) - \left[y - d\delta - c\right] U_{cd}\left(c, d\right) - U_d\left(c, d\right)}{U_{cc}\left(c, d\right)}$$

Linearizing around the steady state

$$\begin{aligned} \frac{U_d\left(\bar{c}, \bar{d}\right)}{U_c\left(\bar{c}, \bar{d}\right)} &= \bar{v}, \\ \delta\bar{d} + \bar{c} &= y \ . \end{aligned}$$

$$\dot{c} = \left(\frac{\left(U_{cc}\left(\delta + \rho\right) + U_{cd} - \left[y - \delta\bar{d} - \bar{c}\right] U_{ccd} - U_{cd}\right) U_{cc} - \left(U_c\left(\delta + \rho\right) - \left[y - \delta\bar{d} - \bar{c}\right] U_{cd} - U_d\right) U_{ccc}}{\left(U_{cc}\right)^2}\right)\left(c - \bar{c}\right)$$

$$+ \left(\frac{\left(U_{cd}\left(\delta + \rho\right) + \delta U_{cd} - \left[y - \delta\bar{d} - \bar{c}\right] U_{cdd} - U_{dd}\right) U_{cc} - \left(U_c\left(\delta + \rho\right) - \left[y - \delta\bar{d} - \bar{c}\right] U_{cd} - U_d\right) U_{ccd}}{\left(U_{cc}\right)^2}\right)\left(d - \bar{d}\right)$$

Evaluated at the steady state we get:

$$\begin{aligned} \dot{c} &= \left(\frac{U_{cc}\left(\delta + \rho\right) + U_{cd} - U_{dc}}{U_{cc}}\right)\left(c - \bar{c}\right) \\ &\quad + \left(\frac{U_{cd}\left(\delta + \rho\right) + \delta U_{cd} - U_{dd}}{U_{cc}}\right)\left(d - \bar{d}\right) \end{aligned}$$

or:

$$\begin{aligned} \dot{c} &= \left(\delta + \rho\right)\frac{U_{cc}}{U_{cc}}\left(c - \bar{c}\right) + \left(\delta + \rho\right)\frac{U_{cd}}{U_{cc}}\left(d - \bar{d}\right) + \frac{U_{cd}}{U_{cc}}\left(c - \bar{c}\right) \\ &\quad + \frac{\delta U_{cd}}{U_{cc}}\left(d - \bar{d}\right) - \frac{U_{dd}}{U_{cc}}\left(d - \bar{d}\right) - \frac{U_{dc}}{U_{cc}}\left(c - \bar{c}\right) \end{aligned}$$

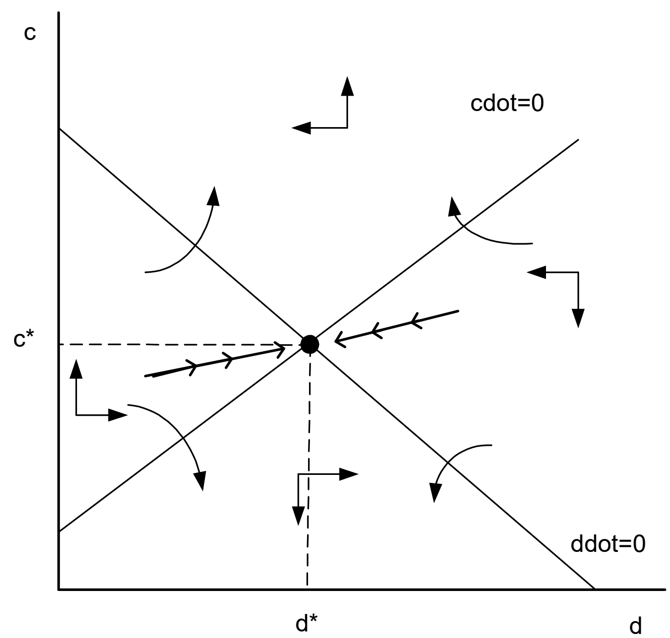
where U_{cc}, U_{cd}, U_{dd} are evaluated at the steady state.

Q7. Using your previous answer to write the two **linear** differential equations that characterize the dynamics of this economy, one for $\dot{c} = a\ (c, d)$ and one for $\dot{d} = b\,(c, d)$.

A:Summarizing we have the linear system:

$$
\begin{aligned}
\dot{c} &= a\,(c, d) \equiv [\delta + \rho]\,(c - \bar{c}) + \left[\frac{U_{cd}\,(\delta + \bar{v}) - U_{dd}}{U_{cc}}\right]\left(d - \bar{d}\right) \\
\dot{d} &= b\,(c, d) \equiv y - d\delta - c
\end{aligned}
$$

Q8. Assume that $U_{cd}\,(\delta + \bar{v}) - U_{dd} > 0$. Draw the phase diagram with c in the y-axis and d in the x-axis. Label the axis, label the steady states, draw all the arrows for the field, and indicate clearly where the the stable arm (saddle-path) is.



Q9. We are looking for a solution of the form

$$
c = \psi\,(d) = \bar{c} + \psi'\left(\bar{d}\right)\left(d - \bar{d}\right)
$$

thus, we are looking for the value of the constant $\psi'\,(\bar{m})$. Use the method of undetermined coefficients to find a quadratic equation for ψ' as a function of: $[\bar{v} + \delta]$ and

$$
\Delta \equiv \left[\frac{U_{cd}\,(\delta + \bar{v}) - U_{dd}}{-U_{cc}}\right]
$$

where the second derivatives are evaluated at the steady state. Hint: You need to use L'Hopital's rule. Recall what we did in pset 5 problem 1.

A:

$$\begin{aligned}
\frac{\partial \psi\left(\bar{d}\right)}{\partial d} &\equiv \psi'\left(\bar{d}\right) = \frac{\dot{c}}{\dot{d}} = \frac{a\left(\psi\left(\bar{d}\right), \bar{d}\right)}{b\left(\psi\left(\bar{d}\right), \bar{d}\right)} = \frac{0}{0} \\
&= \frac{\left(\delta + \rho\right)\psi'\left(\bar{d}\right) + \left[\frac{U_{cd}(\delta + \bar{v}) - U_{dd}}{U_{cc}}\right]}{-\delta - \psi'\left(\bar{d}\right)},
\end{aligned}$$

where the second line uses L'Hopital. The quadratic equation for ψ' is then

$$\left(\psi'\left(\bar{d}\right)\right)^2 + \left(2\delta + \rho\right)\psi'\left(\bar{d}\right) + \left[\frac{U_{cd}\left(\delta + \bar{v}\right) - U_{dd}}{U_{cc}}\right] = 0$$

Q10. Show that the stable solution is given by

$$\psi' = \frac{-\left[\bar{v} + \delta\right] + \sqrt{\left[\bar{v} + \delta\right]^2 + 4\frac{U_{cd}(\bar{v}+\delta) - U_{dd}}{(-U_{cc})}}}{2},$$

(hint: this is trivial once you have the solution of Q9, and the figure for the saddle path, that help you to find the "right" solution of the quadratic equation).

A: Solve the quadratic equation.

$$\left(\psi'\left(\bar{d}\right)\right)^2 + \left(2\delta + \rho\right)\psi'\left(\bar{d}\right) + \left[\frac{U_{cd}\left(\delta + \bar{v}\right) - U_{dd}}{U_{cc}}\right] = 0$$

the quadratic equation is:

$$\psi'\left(\bar{d}\right) = \frac{-\left[\bar{v} + \delta\right] \pm \sqrt{\left[\bar{v} + \delta\right]^2 - 4\left[\frac{U_{cd}(\delta+\bar{v}) - U_{dd}}{U_{cc}}\right]}}{2}$$

where the positive root is given by:

$$\psi' = \frac{-\left[\bar{v} + \delta\right] + \sqrt{\left[\bar{v} + \delta\right]^2 + 4\frac{U_{cd}(\bar{v}+\delta) - U_{dd}}{(-U_{cc})}}}{2}.$$

Elasticity of the optimal consumption function.

For this we specialize the utility function U to (1).

We will show how the elasticity of the policy function is related to the inter-temporal and intra-temporal elasticities of substitution. Recall that the intra-tempral elasticity of substitution between c and d is $1/\left(1+\theta\right)$, and the inter-temporal elasticity of substituion between bundles of (c, d) given by h is $1/\gamma$.

We will parameterized the problem as a function of $\left(\theta,\gamma,\delta,\bar{v},\bar{d}/\bar{c}\right)$. The interpretation of $\bar{d}/\bar{c}$ as a parameter, is that we solve for the constant A using the steady-state equation derived above as a function of the paramters $\theta,\bar{v}$, so that $\bar{d}/\bar{c}$. We obtain the following result:

Keeping the steady state value $\bar{d}/\bar{c}$ fixed, the elasticity of the optimal consumption function evaluated at steady state is a function of $\gamma/\left(1+\theta\right)$ and satisfies

$$\frac{d}{c}\frac{\partial c\left(d\right)}{\partial d}|_{d=\bar{d}} \equiv \frac{\bar{d}}{\bar{c}}\psi'\left(\bar{d}\right) = \begin{cases} 1 & \text{for } \frac{\gamma}{1+\theta}=0 \\ <1 & \text{for } \frac{\gamma}{1+\theta}>0 \end{cases}$$

and $\frac{\bar{d}}{\bar{c}}\psi'\left(\bar{d}\right)$ is decreasing in $\frac{\gamma}{1+\theta}$.

As an intermediate step to see why $\left(\bar{d}/\bar{c}\right)\left(\partial c\left(\bar{d}\right)/\partial d\right)$ depends on the ratio of γ to $1+\theta$ only, and to develop a formulat for $\Delta\left(\gamma/\left(1+\theta\right)\right)$ do the following:

Q11. To show this, first show that when h is a CES we have that:

$$\begin{aligned}\frac{h_{dd}}{h_{cc}} &= \frac{1}{\left(d/c\right)^2}, \\ \frac{h_{cd}}{h_{cc}} &= -\frac{1}{d/c},\end{aligned}$$

$$\frac{h_c h_c}{-h h_{cc}} = \frac{1}{\left(1+\theta\right)\bar{v}\left(d/c\right)},$$

and that for $U\left(c,d\right)=h\left(c,d\right)^{1-\gamma}/\left(1-\gamma\right)$

$$\begin{aligned}\frac{U_{dd}}{U_{cc}} &= \frac{h_{dd}/h_{cc}+\gamma\bar{v}^2\left(h_c h_c\right)/\left(-h h_{cc}\right)}{1+\gamma\left(h_c h_c\right)/\left(-h h_{cc}\right)}, \\ \frac{U_{cd}}{U_{cc}} &= \frac{h_{cd}/h_{cc}+\gamma\bar{v}\left(h_c h_c\right)/\left(-h h_{cc}\right)}{1+\gamma\left(h_c h_c\right)/\left(-h h_{cc}\right)}\end{aligned}$$

and

$$\frac{h_c h_c}{-h h_{cc}} = \frac{1}{\left(1+\theta\right)\bar{v}\left(d/c\right)} \; .$$

Q12. First assume that $\gamma=0$. Using part of the results of Q11 show that

$$\psi'\left(\bar{d}\right)=\frac{\bar{c}}{\bar{d}}$$

A. we have

$$\psi' = \frac{-\left[\bar{v}+\delta\right]+\sqrt{\left[\bar{v}+\delta\right]^2+4\frac{h_{cd}\left(\bar{v}+\delta\right)-h_{dd}}{-h_{cc}}}}{2}$$

so

$$\frac{h_{cd}\left(\bar{v}+\delta\right)-h_{dd}}{-h_{cc}}=\frac{\left(\delta+\bar{v}\right)}{d/c}+\left(\frac{1}{d/c}\right)^{2}$$

Thus

$$\begin{aligned}
& \left[\bar{v}+\delta\right]^{2}+4\frac{h_{cd}\left(\bar{v}+\delta\right)-h_{dd}}{-h_{cc}} \\
= & \left[\bar{v}+\delta\right]^{2}+2\left(\delta+\bar{v}\right)\left(\frac{2}{d/c}\right)+\left(\frac{2}{d/c}\right)^{2} \\
= & \left(\bar{v}+\delta+\left(\frac{2}{d/c}\right)\right)^{2}
\end{aligned}$$

and hence

$$\begin{aligned}
\psi' &= \frac{-\left[\bar{v}+\delta\right]+\sqrt{\left(\left[\bar{v}+\delta\right]+\left(\frac{2}{d/c}\right)\right)^{2}}}{2} \\
&= \frac{-\left[\bar{v}+\delta\right]+\left[\bar{v}+\delta\right]+\left(\frac{2}{d/c}\right)}{2} \\
&= \frac{1}{d/c}.
\end{aligned}$$

Q13. Assume that $\gamma>0$ and that $1/\gamma=\sigma$ and $-\theta=1-\frac{1}{\sigma}$, or $\frac{\gamma}{1+\theta}=1$ so that U is additively separable. What is the value of $\Delta\left(\frac{\gamma}{1+\theta}\right)=\Delta\left(1\right)$ for this case? (hint: compute U_{cd}, U_{dd} and U_{cc} at the steady state values of c,d). Verify that Δ, and hence $-\left(d/c\right)\partial c/\partial d$ does depend on the particular value of σ, given $\bar{c}/\bar{d}$ and $\bar{v}$. Show that the value of $\left(d/c\right)\psi'$ is smaller than the one for $\gamma=0$ and $\theta>-1$.

A. Since $U_{cd}=0$, and

$$\Delta\left(\frac{\gamma}{1+\theta}\right)=\Delta\left(1\right)=\frac{U_{dd}}{U_{cc}}=\frac{-\sigma\frac{1}{A}d^{-\frac{1}{\sigma}-1}}{-\sigma c^{-\frac{1}{\sigma}-1}}=\frac{c}{d}\frac{\frac{1}{A}d^{-\frac{1}{\sigma}}}{c^{-\frac{1}{\sigma}}}=\left(\frac{c}{d}\right)\bar{v}$$

Comparing with the case of $\gamma/(1+\theta)=0$ we have:

$$\begin{aligned}
\psi' &= \frac{-[\bar{v}+\delta]+\sqrt{[\bar{v}+\delta]^2+4\left(\frac{\bar{c}}{\bar{d}}\right)\bar{v}}}{2} \\
&< \frac{-[\bar{v}+\delta]+\sqrt{[\bar{v}+\delta]^2+2(\bar{v}+\delta)2\left(\frac{\bar{c}}{\bar{d}}\right)+4\left(\frac{\bar{c}}{\bar{d}}\right)^2}}{2} \\
&= \frac{-[\bar{v}+\delta]+\sqrt{\left[\bar{v}+\delta+2\left(\frac{\bar{c}}{\bar{d}}\right)\right]^2}}{2} \\
&= \frac{-[\bar{v}+\delta]+\left(\bar{v}+\delta+2(\bar{c}/\bar{d})\right)}{2} \\
&= \frac{\bar{c}}{\bar{d}}.
\end{aligned}$$

Q14. Assume that $\gamma>0$, what assumptions are required for $1/(1+\theta)$ such that you also find

$$\psi'\left(\bar{d}\right)=\frac{\bar{c}}{\bar{d}}$$

Hint: look at the formula for ψ'.

A: We need $\frac{\gamma}{1+\theta}=0$, so if $\gamma>0$ then $\theta\to\infty$.

Q15. Give an intuitive interpretation for this last two results. (2 lines max).

A: The elasticity of the optimal decision rule for consumption depends on the ratio between the elasticity of substitution between durable and non durable goods, $1/(1+\theta)$, and the intertemporal elasticity of substitution $1/\gamma$. If durables and non durables are very poor substitutes, the elasticity $(d/c)\psi'$is one. To understand this effect, consider an agent that starts with a stock of durables 1 percent below its steady state, so it must decrease consumption of non durables to reach the higher level of durables in steady state. If $1/(1+\theta)$ is close to zero, so that durables and non durables are Leontief, then on impact it will decrease consumption by 1 percent. In this case, durables and non-durables are, essentially, the same. If instead, they are good substitutes, so that $1/(1+\theta)$ is high, the effect of durables in non-durables is smaller, and hence non-durables consumption will not decreae that much.

Q16. Assume that $\gamma>0$. We will like to show that $\frac{\bar{d}}{\bar{c}}\psi'\left(\bar{d}\right)$ is decreasing in $\frac{\gamma}{1+\theta}$.

For this, show that $\Delta\left(\frac{\gamma}{1+\theta}\right)$ is decreasing in γ provided that $\delta>0$, where $\Delta\left(\gamma/(1+\theta)\right)$ is given by

$$\Delta\left(\frac{\gamma}{1+\theta}\right)\equiv\frac{U_{cd}\left(\delta+\bar{v}\right)-U_{dd}}{\left(-U_{cc}\right)}.$$

A:

$$
\begin{aligned}
\Delta\left(\frac{\gamma}{1+\theta}\right) &\equiv \frac{U_{cd}\left(\delta+\bar{v}\right)-U_{dd}}{\left(-U_{cc}\right)} \\
&= \frac{\left(\frac{1}{d/c}-\frac{\gamma}{(1+\theta)(d/c)}\right)\left[\delta+\bar{v}\right]+\left(\frac{1}{d/c}\right)^2+\frac{\gamma\bar{v}}{(1+\theta)(d/c)}}{1+\frac{\gamma}{(1+\theta)\bar{v}(d/c)}} \\
&= \frac{\frac{1}{d/c}\left[\delta+\bar{v}\right]-\frac{\gamma}{(1+\theta)(d/c)}\delta+\left(\frac{1}{d/c}\right)^2}{1+\frac{\gamma}{(1+\theta)\bar{v}(d/c)}} \\
&= \frac{\frac{1}{d/c}\left[\delta+\bar{v}\right]+\left(\frac{1}{d/c}\right)^2}{1+\frac{\gamma}{1+\theta}\frac{1}{\bar{v}(d/c)}}-\frac{\frac{\delta}{(d/c)}}{\frac{(1+\theta)}{\gamma}+\frac{1}{\bar{v}(d/c)}}
\end{aligned}
$$

$$
\frac{\partial\Delta\left(\frac{\gamma}{1+\theta}\right)}{\partial\left(\frac{\gamma}{1+\theta}\right)}<0
$$

Q17. Argue that if $\Delta\left(\gamma/\left(1+\theta\right)\right)$ is decreasing in γ then $\frac{\bar{d}}{\bar{c}}\psi'\left(\bar{d}\right)$ is decreasing in $\frac{\gamma}{1+\theta}$.

A: Since

$$
\psi'\left(\bar{d}/\bar{c},\frac{\gamma}{1+\theta}\right)=\frac{-\left[\bar{v}+\delta\right]+\sqrt{\left[\bar{v}+\delta\right]^2+4\Delta\left(\frac{\gamma}{1+\theta}\right)}}{2}
$$

then $\psi'\left(\frac{\gamma}{1+\theta}\right)$ is decreasing in $\frac{\gamma}{1+\theta}$.

Q18. Give an intuitive interpretation of this result. (2 lines max).

A: This answer follows the answer to Q14. If γ is very large, the agent does not want to substitute the bundle h intertemporally, so that consumption reacts very little. Or, equivalently, if $1/(1+\theta)$ is very large, so the agent substitutes durable and non durable easily, non durable consumption will also react by a small amount.