You are expected to answer all parts of all questions. If you cannot solve part of a question, do not give up. The exam is written so that you should be able to answer later parts even if you are stumped by earlier parts.

Write all answers on the exam itself; if you run out of room, use the back of the previous page.
Part I. Short Discussion Questions.

1. Risk Aversion of the Value Function. Consider an infinite-horizon consumption optimization problem under uncertainty for a consumer solving

\[ v(m_t) = \max_{c_t} u(c_t) + \beta \mathbb{E}_t[v(m_{t+1})] \]  

where the utility function is \( u(\bullet) = (1 - \rho)^{-1} \cdot 1^{-\rho} \).

   a) Show that relative risk aversion of the value function is

\[ \left( -\frac{v''(m_t)c_t}{v'(m_t)} \right) = \rho c'(m_t) \]  

   Answer:

The Envelope theorem says

\[ v'(m_t) = u'(c(m_t)) \]  

which can be differentiated to obtain

\[ v''(m_t) = u''(c(m_t))c'(m_t). \]  

Recalling that with CRRA utility

\[ u'(c) = c^{-\rho} \]  

\[ u''(c) = -\rho c^{-\rho-1} \]  

so absolute risk aversion is \(-u''/u' = \rho c^{-\rho-1}/c^{-\rho} = \rho/c\) and relative risk aversion is \(-u''c/u' = \rho\) so relative risk aversion of the value function is

\[ \left( -\frac{v''(m_t)c_t}{v'(m_t)} \right) = \left( -\frac{u''(m_t)c_t}{u'(c_t)} \right) = \rho c'(m_t) \]  

b) Explain why this definition suggests that consumers with lower market resource ratios \( m_t \) can be expected to be willing to spend more of their budgets on actuarially fair insurance. Explain the intuition carefully.

   Answer:

Concavity of the consumption function implies that consumers with low \( m_t \) have higher marginal propensities to consume \( c'(m) \) and therefore higher relative risk aversion. Since relative risk aversion of the value function should be positively related to the consumer’s eagerness to shield himself from consumption risk, low-market-wealth consumers will, ceteris paribus, spend a larger proportion of their budgets on actuarially-fair insurance. The intuition is that a given income shock poses a greater risk to consumption for a consumer
with a higher MPC, so that consumer should be willing to pay more to avoid this risk.

c) Discuss consequences of this point for an individual’s portfolio choice between risky and safe assets after big negative shock to wealth. Then discuss the implications of this result if there is a big negative shock to aggregate wealth that hits all consumers the same way. In particular, discuss whether, in a typical asset-pricing model, the general equilibrium outcome when everybody’s preferences change in the same way is likely to cause a move in asset prices that will amplify the original shock or whether the asset-pricing effect is more likely to dampen the original shock.

*Answer:*

Since a decline in wealth moves a person to a portion of the consumption function that has a higher MPC, the risk aversion of the value function after the drop in wealth will be greater. If the same thing happens to everybody, there will be greater aggregate risk aversion, and this will make everyone want to avoid risky assets, which will lead to a further decline in the prices of risky assets (in a generic general-equilibrium asset pricing model), which intensifies the negative impact on wealth.
2. **Lingering Uncertainty and Slow Recoveries.** Reinhart and Rogoff (2009) present evidence that the recovery from recessions caused by financial crises tends to be slower than recoveries from other kinds of recessions. One idea about why this might be is that uncertainty remains high long after the acute phase of the financial crisis is over. Discuss whether Reinhart and Rogoff (2009)’s results could be explained using a tractable buffer stock model by a permanent increase in $\bar{\sigma}$, without any further assumptions about the structure of the economy and without any consideration of pricing of risky assets, capital market imperfections, costs of adjustment to investment or the capital stock, or other modifications to the production side of the economy.

*Answer:*

As shown in the handout *TractableBufferStock*, a one-time permanent increase in $\bar{\sigma}$ causes an instant drop in the level of consumption, followed by an extended period of *faster* growth than in the steady-state prior to the increase in $\bar{\sigma}$. Thus, the plain-vanilla tractable buffer stock model *cannot* explain the Reinhart and Rogoff (2009) facts as resulting from a persistent increase in uncertainty. Some other modification to the framework is necessary. For example, if there are costs of adjustment to the capital stock or to the rate of investment the economy might decline for a long time before beginning to recover. Or, if higher uncertainty impairs the functioning of capital markets as in the lecture on capital market imperfections, the *interaction* of uncertainty with capital market imperfections might explain the Reinhart and Rogoff (2009) facts.
Part II. Medium Length Questions.

1. Dynamics of Investment in Response to a Temporary ITC in the \( q \) Model.

Answer the following questions using an Abel (1981)-Hayashi (1982) \( q \) model of investment.

a) Leading up to date \( t \), the economy is in steady state. At date \( t \), the government unexpectedly introduces a permanent increase in the investment tax credit, \( \zeta \uparrow \). Show the effects on a phase diagram and show dynamics of investment, capital, share prices, and \( q \) following the tax change.

Answer:

See qModel-Figure 4

b) Leading up to date \( t \), the economy is in steady state. At date \( t \), the government unexpectedly introduces a *temporary* increase in the investment tax credit, \( \zeta \uparrow \). The low ITC will last for two years, and then the ITC will revert back to its normal level. Show the effects on a phase diagram and show dynamics of investment, capital, share prices, and \( q \), and the capital stock under two scenarios: (1) costs of adjustment for the capital stock, \( \omega \), are high; (2) costs of adjustment are low.

Answer:

The way to think about problems like this is, first, to figure out what the long-run phase diagrams will look like, then to figure out what the phase diagram will look like in the short run. A key point to realize is that the \( \Delta k \) phase diagram at any moment of time is a purely mechanical budget equation, so it is usually fairly easy to figure out what happens to the \( \Delta k \) locus. A second point is that the tax terms that enter the equations are always the current value of those taxes; any effects of future taxes have to come through their effects on \( \lambda \) or \( q \).

Upon introduction of the temporary increase in ITC at date \( t \), \( \lambda \) jumps down and then gravitates to the original saddle path. At date \( t + 2 \), \( \lambda \) will be on the original saddle path when the ITC increase is reverted. Afterwards, \( \lambda \) will move on the original saddle path to the old equilibrium level. The point here is that there can be no anticipated jump in \( \lambda \). When costs of adjustment for the capital stock are low, the initial jump of \( \lambda \) is big; when costs of adjustment for the capital stock are high, the initial jump of \( \lambda \) is small.

Dynamics of \( q \): At date \( t \), \( q \) jumps up (note that \( q = \lambda / \hat{p} \), though \( \lambda \) jumps down, \( \hat{p} \) goes down because of the change in ITC). Between date \( t \) and date \( t + 2 \), \( q \) moves in the same direction as \( \lambda \) (northeast).
At date $t + 2$, $\varphi$ jumps down to the original saddle path due to the ITC reversal.

Dynamics of $i$: $i$ closely follows the dynamics of $\varphi$ since $i = (i(\varphi) + \delta)k = (2 - 1\omega + \delta)k$. At date $t$, $i$ jumps up. Between date $t$ and date $t + 2$, $i$ increases gradually. At date $t + 2$, $i$ jumps down below the initial level and gradually goes back to the initial level.

Dynamics of $k$: $k$ increases between date $t$ and date $t + 2$ and then decreases to its original level.

c) Leading up to date $t$, the economy is in steady state. At date $t$, the government unexpectedly announces that in two years (that is, in year $t + 2$), there will be a permanent increase in the investment tax credit, $\zeta \uparrow$. Show and explain the effects on a phase diagram and show dynamics of investment, capital, share prices, and $\varphi$, and the capital stock under two scenarios: (1) costs of adjustment for the capital stock, $\omega$, are high; (2) costs of adjustment are low.

Answer:

See qModel.

Upon announcement of the permanent increase in ITC in two years at date $t$, $\lambda$ jumps down and then gravitates to the saddle path dictated by the new ITC. At date $t + 2$, $\lambda$ will be on the new saddle path when the permanent ITC increase is introduced. Afterwards, $\lambda$ will move on the new saddle path to the new equilibrium level. The point here is again that there can be no anticipated jump in $\lambda$. When costs of adjustment for the capital stock are low, the initial jump of $\lambda$ is big; when costs of adjustment for the capital stock are high, the initial jump of $\lambda$ is small.

Dynamics of $\varphi$: At date $t$, $\varphi$ jumps down (note that $\varphi = \lambda/\hat{p}$, though $\lambda$ jumps down, there is no change in $\hat{p}$). Between date $t$ and date $t + 2$, $\varphi$ moves in the same direction as $\lambda$ (southwest). At date $t + 2$, $\varphi$ jumps up to the new saddle path dictated by the new ITC. Afterwards, $\varphi$ gravitates to the new equilibrium level.

Dynamics of $i$: $i$ closely follows the dynamics of $\varphi$ since $i = (i(\varphi) + \delta)k = (2 - 1\omega + \delta)k$. At date $t$, $i$ jumps down. Between date $t$ and date $t + 2$, $i$ decreases gradually. At date $t + 2$, $i$ jumps up and then gradually decreases to its new equilibrium level.

Dynamics of $k$: $k$ decreases between date $t$ and date $t + 2$ and then increases to its new equilibrium level, which is higher than the original equilibrium level.
The point here is that if firms know that the price of capital will be much lower two years in the future, they will have a strong incentive to postpone purchases of capital until that point. However, there is an offsetting effect which is that they know that they will ultimately want to have a higher capital stock and that means there is an incentive to have a higher capital stock now. Which of these two motives wins out (delay purchases until they are cheap; build capital now so adjustment costs will be lower when you start your future capital-building campaign) depends on the magnitude of adjustment costs.

- Phase diagrams of $\lambda_t$ and $\phi_t$ are the same as in question a).
- Dynamics if $\omega$ is high enough so that early investment adjustment dominates:

  - for $k_t$, staying at the old steady state before $t$; gradually increases from time $t$ and asymptotes toward the new higher steady state level.
  - for $i_t$, staying at the old steady state level before $t$; jumps up at time $t$, evolves to the northeast until time $t + 1$; between $t + 1$ and $t + 2$, an upward jump; and after $t + 2$, asymptotes downward toward the new steady state level which is higher than the old one.
  - for $\phi_t$, staying at the old steady state level before $t$; jumps up at time $t$, evolves to the northeast until time $t + 1$; between $t + 1$ and $t + 2$, an upward jump; and after $t + 2$, asymptotes downward toward the same equilibrium level one.
  - for $\lambda_t$, staying at the old steady state level before $t$, jumps up at time $t$, evolves to the northeast until time $t + 2$, and thereafter asymptotes downward toward the new steady state level which is lower than old one.

- Dynamics if $\omega$ is low enough so that there is no early investment adjustment: all variables stay at the old steady state level until time $t + 2$ when the ITC increase actually takes effect, then

  - $k_t$ gradually increases to higher new steady state level.
  - $i_t$ jumps up at $t + 2$, then gradually asymptotes toward the new higher steady state level.
  - $\phi_t$ jumps up at $t + 2$, then gradually asymptotes toward the original equilibrium level one.
\( \lambda_t \) jumps downward at \( t + 2 \), then gradually decreases toward the lower new steady state level.

d) Explain why the logic of the examples you just went through helps understand why, whenever a member of Congress introduces a bill to increase the investment tax credit, that bill is always ‘retroactive.’ That is, if the ITC change ever passes, it will apply to investments made during the period between the introduction of the bill and its passage into law.

Answer:

Even a member of Congress is smart enough to know that if a cut in the ITC is passed that will not take effect until some future date, firms will delay investment until the tax change comes into effect so they can take advantage of the tax credit. Since Members of Congress do not want to be accused of causing a collapse in corporate investment, they never pass a cut in the ITC that is only effective starting at some future date.

2. Saving and Growth Redux. Consider a Ramsey/Cass-Koopmans growth model with labor-augmenting technological progress at rate \( \phi \) and suppose there is no population growth so that we can normalize the labor force to be \( L_t = 1 \ \forall \ t \). Under standard assumptions (like Cobb-Douglas production) and standard notation (such as a capital share of \( \alpha \)), such a model can be normalized by the level of labor productivity, and if we assume for simplicity that there is no depreciation, the normalized problem becomes

\[
\max \int_0^\infty \left( \frac{c_t^{1-\rho}}{1-\rho} \right) e^{-\hat{\vartheta} t} dt
\]

s.t.

\[
\dot{k}_t = y_t - c_t - \phi k_t
\]

\[
y_t = k_t^\alpha
\]

where \( \hat{\vartheta} = \vartheta - \phi(1 - \rho) \) with time preference \( \vartheta \) and RRA \( \rho \). In such a model, it can be shown that the steady-state \( k \) is

\[
\bar{k} = \left( \frac{\alpha}{\rho \phi + \vartheta} \right)^{\frac{1}{1-\alpha}},
\]

and the aggregate saving rate is defined as

\[
s = \frac{y - c}{y} = 1 - c/y.
\]

a) Show that the steady-state saving rate is

\[
\bar{s} = \phi \bar{k}^{1-\alpha},
\]
and determine whether the steady-state saving rate increases or decreases when the growth rate increases.

Answer:

At steady state, \( \dot{k} = 0 \). Thus,

\[
0 = \dot{k} = \dot{y} - \dot{c} - \phi \dot{k} \\
\ddot{s} = \frac{\dot{y} - \dot{c}}{\dot{y}} = \frac{\phi \dot{k}}{k^\alpha} = \phi \dot{k}^{1-\alpha}.
\]

Substituting from (10), the steady state saving rate can be written

\[
\ddot{s} = \phi \left( \frac{\alpha}{\rho \phi + \vartheta} \right) = \frac{\alpha}{\rho + \vartheta / \phi}.
\]

It is easily seen that under the usual assumption \( \vartheta > 0, \phi \uparrow \) would lead to \( \ddot{s} \downarrow \). The steady-state saving rate increases when the growth rate increases.

b) In economic terms, explain the various considerations that are at work, and which might be likely to be strongest.

Answer:

In the partial equilibrium context, we learned in class that if the current level of permanent labor income is \( y \) and the expected growth rate is \( \phi \), human wealth is

\[
h = \left( \frac{y}{r - \phi} \right)
\]

and thus even small changes in \( \phi \) can have large effects on human wealth; a small increase in growth, say, will have a large positive effect on \( h \) and therefore a large positive effect on \( c \) and a large negative effect on \( s \).

In that discussion, though, the interest rate was taken as exogenous. Here, the interest rate is endogenous. In fact, it is

\[
\ddot{r} = \alpha \ddot{k}^{\alpha-1} = \alpha \left( \frac{\rho \phi + \vartheta}{\alpha} \right) = \rho \phi + \vartheta.
\]

Thus, according to the model, equilibrium interest rates rise with the rate of productivity growth. This is because an increase in the growth rate will result in lower capital per unit of effective labor.
If $\rho > 1$ the increase in the interest rate exceeds the increase in the growth rate. While the pure “growth rate” contribution to the human wealth effect ($\phi$ in (12) boosts human wealth, the “interest rate” effect on human wealth is of the opposite sign and larger.

(The size of the interest rate effect on saving can be interpreted as the net of the effects of growth on income and on consumption; the consumption effects, as usual, can be interpreted as income, substitution, and human wealth effects, but with the additional complication that the equilibrium level of nonhuman wealth is also affected by the change in $\phi$).

This result was not emphasized in class because empirical evidence does not support the model’s implication that interest rates are higher in fast-growing countries. This may be because international capital markets are sufficiently open that no country can have much effect on them, or it may be for other reasons. But whatever the reason, the empirical fact that interest rates do not seem to be higher for fast-growing countries is a good reason to focus on the partial equilibrium result.

c) Using a phase diagram, analyze the effects of an unexpected permanent increase in $\phi$. Next, make a graph showing the path of the aggregate saving rate over time after the economy switches into the fast-growth regime. Explain the reason both graphs look the way they do in intuitive terms. Discuss what determines whether the saving rate rises or falls in the instant when consumers learn that growth has increased.

Answer:

The effects of $\phi$ on the $\dot{c} = 0$ locus are qualitatively the same as an increase in $\vartheta$: the locus moves left because the steady-state level of the capital stock is lower. The reason that $\vartheta \uparrow$ and $\phi \uparrow$ have similar effects is that increasing either of them makes consumers want to spend more now; higher $\vartheta$ directly makes them more impatient, and higher $\phi$ means that they will be richer in the future than they are now, and because they are forward-looking this extra future income means they can ‘afford’ to spend more now (this is the human wealth effect of the faster growth).

$\phi$ also affects the $\dot{k} = 0$ locus. This is because $k$ is capital per efficiency unit of labor, and if efficiency units of labor start growing faster, then capital must also grow faster in order to maintain capital-per-efficiency-unit constant.

The key insight for understanding the behavior of the saving rate is that the increase in $\phi$ also implies that the rate of return on
capital increases, because any specific amount of physical capital will be more productive than previously expected because it will be combined with more effective labor in the future. The higher interest rate, in turn, gives the representative agent an incentive to save more than at the old interest rates.

Several things are unambiguous: (1) since the new equilibrium $k$ is lower, the new equilibrium interest rate is higher than before the increase in $\phi$; (2) the final steady-state saving rate is higher than the saving rate experienced immediately after the increase in $\phi$, because with faster growth more saving is needed to maintain the capital/income ratio constant (this is partly, but not fully, offset by the fact that the steady-state capital/income ratio is lower); (3) the variation in saving rates over time is less for $\rho$ large than for $\rho$ small, because for $\rho$ large consumers are less willing to substitute consumption over time.

3. Beliefs, Preferences, and Choices.

Malmendier and Nagel (2011) present evidence that the experience of living through the Great Depression had a lasting, perhaps lifelong, effect on the behavior of persons who were young at the time. Specifically, they show that “Depression Babies” (DB’s, henceforth), interpreted (say) to include anyone between the ages of 5 and 25 during the Depression, tend to be less willing
to allocate their portfolios to “risky” assets than people born at other times (non-DB’s, henceforth).

This question asks you to think about the implications of their research for the consequences of the Great Recession.

a) Write down the Merton (1969)-Samuelson (1969) formula derived in \textit{CRRA-RateRisk} that determines the portfolio share of risky assets that will be chosen by an optimizing consumer with CRRA utility and no other risk. (Use \(\varsigma\) for the proportion of the portfolio invested in the risky asset, \(\rho\) for the coefficient of relative risk aversion, \(\phi\) for the magnitude of the risky return premium, and \(\sigma_r^2\) for the expected variance of risky return.) If you cannot remember the formula exactly, make a guess about its form).

\textit{Answer:}

\[ \varsigma = \left( \frac{\phi}{\rho \sigma_r^2} \right). \] (16)

b) Suppose that surveys of households can reveal people’s expectations about the rate of return on the stock market (interpreted here as “the risky asset”). But suppose it is impossible to directly measure an individual’s risk aversion or perception of the market’s riskiness. Does the theory suggest that there is any way to use portfolio choices to distinguish between the following two ideas: (1) DB’s avoid risky assets because they have high risk aversion; (2)
DB’s avoid risky assets because they perceive the stock market to be “riskier” than other (non-DB) people perceive it to be.

Answer:

According to (16), what matters for portfolio allocation is the product of relative risk aversion and the variance of returns. Therefore, it is impossible to use portfolio allocation choices to distinguish the hypothesis of high risk aversion from the hypothesis of perceptions of high riskiness.

c) Now suppose that individuals’ relative risk aversion coefficients could be estimated in some other way. For example, suppose that everyone who smokes has risk aversion of 2, while all nonsmokers have risk aversion of 5. Describe how information like whether someone is a smoker or not might be useful in distinguishing the two hypotheses above (still assuming that individuals’ expected returns can be discovered by asking them survey questions).

Answer:

If the risk preferences of “smoker” DB’s and “smoker” non-DB’s are the same, then we can compare, say, all DB “smokers” and non-DB “smokers” who expect the stock market to have an excess return of 8 percent. If they have the same portfolio shares, then that suggests that they perceive the degree of uncertainty in stock returns to be similar. If the DB’s have lower portfolio shares, that suggests that they perceive the riskiness of the stock market to be greater than the non-DB’s perceive it to be.
Part III. Long Question.

Rational Inattention and Consumption Dynamics.

Reis (2006) considers the problem of a consumer who faces costs of obtaining or processing the information necessary to decide how much to consume. In the case of a continuous-time consumer with CARA utility $u(c) = -(1/\alpha)e^{-\alpha c}$ who faces an information acquisition cost $K$, Reis shows that it will be optimal to adjust consumption only at fixed intervals of length $d$. If the consumer’s time preference rate is equal to the interest rate, consumption will remain constant between these adjustment dates. Designating the level of consumption as a function of wealth $o$, the information cost as $K$, and the variance of shocks to permanent income as $\sigma^2$, Reis shows that at dates of adjustment

$$c(o; K) = c(o; 0) - \left( \frac{rK}{e^{rd} - 1} \right) - \left( \frac{\alpha r \sigma^2}{4} \right) (e^{rd} - 1) \quad (17)$$

and that the length of the intervals of inattentiveness (that is, the intervals during which consumption does not adjust to new information) is

$$d = \left( \frac{1}{r} \right) \log \left( 1 + \sqrt{\frac{4K}{\alpha \sigma^2}} \right) \quad (18)$$

1. Equation (17) says that consumption for the inattentive consumer is lower than for the consumer with zero costs of obtaining information. Provide an interpretation for each of the two reasons consumption is lower, with a discussion of why the term takes the form it does. Hint: $K$ is a real monetary expenditure that the consumer must pay in each period.

**Answer:**

a) The $\left( \frac{rK}{e^{rd} - 1} \right)$ term reflects the fact that the consumer is paying a cost $K$ on a regular basis. The consumer therefore cannot afford to do as much spending on items other than the information gathering process. (Think of this as being like the fees one might pay to a personal financial advisor).

b) The $\left( \frac{\alpha r \sigma^2}{4} \right) (e^{rd} - 1)$ term reflects the precautionary motive induced by the fact that the consumer’s consumption will deviate from the optimal level during intervals when news has arrived but not been processed. This increases the degree of uncertainty about future consumption. This explains why the term depends on the risk aversion parameter $\alpha$: A consumer who is not risk averse does not care about the increased uncertainty of his consumption and does not adjust spending as a consequence of the extra risk. The magnitude of the increase in uncertainty is measured by the $e^{rd-1}$ term.
2. Give an intuitive explanation for the sign of the effects of \( r, K, \alpha, \text{and} \sigma \) in (18).

\textbf{Answer:}

\begin{enumerate}
\item \( r \): When interest rates are low, the penalty for errors in the level of consumption (which is the accumulated interest on the erroneous expenditures) is small. Therefore the consumer is willing to wait a longer time between adjusting.
\item \( K \): The higher is the information cost, the longer the consumer waits between periods of adjustment, in order to minimize the total amount spent on acquiring information.
\item \( \alpha \) and \( \sigma^2 \): These jointly measure the size of the precautionary motive; with a higher degree of risk aversion or a larger amount of risk, the consumer will adjust more frequently.
\end{enumerate}

3. Now consider an entire economy populated by inattentive consumers of this kind. Reis shows that if consumers’ decision dates are randomly distributed in the population, and the maximum length of an inattentiveness interval is \( D \), then

\[ E_{t-D}[C_{t+1} - C_t] = \text{constant}. \]

(19)

Provide an intuition for this equation, and explain how it relates to the Hall (1978) model. Contrast this result with the predictions of a model of sticky expectations or habit formation.

\textbf{Answer:}

Hall’s model is a special case of Reis’s model with costs of adjustment of 0 so that consumption adjusts at every instant. In Reis’s model, consumers cannot predict whether they will be adjusting their consumption up or down at the next adjustment date; so if we take expectations from a period longer in the past than the maximum interval of inattentiveness of any consumer, it must be the case that the changes in consumption of every consumer are unpredictable with respect to information available at that past date. If each consumer’s changes are unpredictable, aggregate consumption changes must be unpredictable.

In the model of sticky expectations presented in class, a fraction of consumers updates their information exogenously in each period. But even after an arbitrarily long time interval, there will still be a few consumers who have not adjusted their expectations. Hence the random walk proposition does not hold even over long stretches of time. (Of course, in practice if the interval is long enough, the fraction of consumers who have not adjusted will get so small as to be undetectable).

In the model of habit formation, dynamics of consumption were similar to those in the sticky expectations model, and again there is no
time interval long enough to eliminate all predictability in consumption growth.

4. Reis shows that even a small cost of obtaining information can produce long intervals of optimal inattention. What is the key intuition for why the cost of remaining inattentive is likely to be small if consumption is set optimally during the brief instants of attention?

*Answer:*

Since consumption at the instants of attention is set to the optimal level, the deviations of optimal consumption from actual consumption are likely to be quite small for a long time; this is an implication of the general point that the costs of small deviations of consumption from its optimum are second-order small:

\[ u(c) \approx u(c^*) + u'(c^*)(c - c^*) + u''(c^*)(c - c^*)^2/2, \]

but the Envelope theorem says that the marginal utility cost of changing consumption a little bit at the optimum is zero, so the cost of deviations will be on the order of \( u''(c^*)(c - c^*)^2/2 \).

5. Suppose there are two kinds of macroeconomic events: “newsworthy” events (like the end of a hyperinflation, or the start of the 1991 Gulf war) and “boring” events, which do not attract much coverage in the news media. Suppose that the cost of observing “newsworthy” events is zero because there is pervasive news media coverage of those events, but the cost of observing “boring” events is \( K \) as in Reis’s model. Discuss how the predictions of the models of intattentive consumers would differ from the predictions of the habit formation model with respect to the reaction of consumption to “newsworthy” versus “boring” events.

*Answer:*

In the model of inattentiveness, the only reason consumption differs from the random walk model is because of the cost of observing economic events. If an event is covered “for free” in the news media, then one would expect the reaction to that event to be very rapid if not instantaneous. The model of consumption sluggishness through inattentiveness would apply only to “boring” events. In contrast, the habit formation model assumes that people always have full information about the economy, but the optimal reaction to that information is to adjust consumption gradually. Thus, the habit formation model provides no rationale for a difference between the reaction of consumption to “newsworthy” and to “boring” events.
References


