Consumption and Saving

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Economics: The scientific study of the choices made by individuals and societies in regard to the alternative uses of scarce resources which are employed to satisfy wants.

- **Scientific** study. Testable. Disinterested in outcome.

- Testability: questions of belief? := do tax cuts create more jobs? will outsourcing hurt America?

- Economists try to maintain objectivity even though they study politically charged issues.

- a tension: human beings may/can not be all that objective; subjectivity, biases (first impressions matter, looks matter), people forget (prices), anger,...a theory for every Tom, Miguel, or Mao?
Homo economicus

- Not a problem for the natural sciences: what is true for one block of ice is true of them all.

- Economists create a strawperson, a fictitious character who behaves within certain reasonable bounds: rational (*Homo economicus*); a person who is *consistent* in her actions and takes those actions that make her happier than other competing actions.

- Economists **believe** that *Homo sapiens* $\equiv$ *Homo economicus*. 
what is consumption: national income accounts

- the value of all goods and services bought by households in a year.
- durable goods last a long time ex: cars, home appliances
- non-durable goods last a short time ex: food, clothing
- services work done for consumers ex: dry cleaning, air travel.
## Importance of consumption in national income accounts

<table>
<thead>
<tr>
<th></th>
<th>$ billions</th>
<th>% of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption</td>
<td>$7,064.5</td>
<td>69.2%</td>
</tr>
<tr>
<td>Durables</td>
<td>858.3</td>
<td>8.4</td>
</tr>
<tr>
<td>Nondurables</td>
<td>2,055.1</td>
<td>20.1</td>
</tr>
<tr>
<td>Services</td>
<td>4,151.1</td>
<td>40.7</td>
</tr>
</tbody>
</table>
Low personal savings rate in the US
Personal Savings Rate 1959–2007

Low savings rate in the US relative to OECD countries

Figure 1: Household saving rates published by the OECD
in % of disposable income

Belgium Spain Italy Netherlands United Kingdom Germany France United States Japan
why save? transfer income across a) time (lifecycle motive) b) states of nature (precautionary motive)

People trade-off present consumption with future consumption

Assumptions of the Fisher model

1. only 2 periods
2. current $w_1$ and future income $w_2$ given
3. perfect capital markets: person (*Homo economicus*) can borrow/save $S$ “any” amount at market interest rate $R = 1 + r$; net vs gross

difference between feasibility & choice
The budget constraint

- $c_1$ is real consumption in period 1 and $c_2$ is real consumption in period 2.
- per-period budget constraints

\[
\begin{align*}
  c_1 &= w_1 - S \\
  c_2 &= w_2 + RS \\
  c_1 &\geq 0, \quad c_2 \geq 0, \quad S \geq 0
\end{align*}
\]

- $S$ put in a bank account in period 1 earns an interest “$r$” for the length of the period. Next period, agent has $(S + rS)$. She also has her period 2 income of $w_2$.

- non-negativity constraint on consumption; not on saving
The intertemporal budget constraint

- writing it as a single lifetime *intertemporal* budget constraint (IBC)
- fungibility of funds across time
- notion of discounting; **Present Discounted Value** – PDV (if you have to make a payment of $100 one year from now, how much should you put aside today?)

\[ c_1 + \frac{c_2}{1 + r} = w_1 + \frac{w_2}{1 + r} \]

- interpretation of IBC as PDV of lifetime cons = PDV of lifetime income.
The intertemporal budget constraint

- plotting the budget constraint; maximum amount he can save or borrow?
- the **feasible set** of consumption possibilities (budget set)
- no borrowing, no saving point; saving segment
- negative slope implies trade-off between current and future consumption
- why are interior points left out?
preferences: (a) consumer knows if he prefers $A$ to $B$ or $B$ to $A$ or he is indifferent; (b) only one is true, (c) if $A \succeq B \succeq C$, then $A \succeq C$.

Utility fn: if $x \succeq y$, then $u(x) > u(y)$

People may have different preferences about whether to consume more when young or to consume more when old.

The level of utility any combination of current and future consumption brings to a consumer is summarized by the utility function:

$$U(c_1, c_2)$$

assume $U$ is strictly increasing in $c_1$ and $c_2$. 


Preferences and utility

- consumption smoothing; people don’t like extremes.
- Example

\[ U(c_1, c_2) = c_1^{0.4} c_2^{0.6} \]

Check \( U(20, 1) < U(10, 10) \).

- 3-D picture of utility; to move to 2-D, use indifference curves (IC)
- IC’s show all combinations of current and future consumption that yields the same level of utility \( \bar{U} \)

\[ U(c_1, c_2) = \bar{U} \]

- Figure
properties of indifference curves:
  - downward-sloping; notion of MRS (rate at which person would like to substitute current cons. for future cons.);
  - declining MRS

consumption-smoothing idea and its relation to declining MRS

Optimal bundle diagrammatically; MRS = slope of IC at a point (negative).

Optimal ("utility maximizing") level of consumption: where MRS = the slope of the budget line. Interpretation.
The agent’s problem in formal notation

- the agent’s problem:

\[
\max_{(c_1, c_2)} U(c_1, c_2)
\]

subject to

\[
c_1 + \frac{c_2}{1 + r} = w_1 + \frac{w_2}{1 + r}
\]

and non-negativity constraints on consumption.
Example

\[ U(c_1, c_2) = \ln c_1 + \beta \ln c_2 \]

\( Y \equiv \left[ w_1 + \frac{w_2}{1+r} \right] \iff \text{PVLII; Solution: optimal consumption} \)

\[ c_1^* = \frac{1}{(1+\beta)} Y; \quad c_2^* = (1+r) \frac{\beta Y}{(1+\beta)} \]

optimal saving:

\[ S^* = \frac{\beta w_1}{(1+\beta)} - \frac{1}{(1+\beta)} \frac{w_2}{1+r} \]
\[ c_1^* = \frac{1}{(1 + \beta)} \left[ w_1 + \frac{w_2}{1 + r} \right]; \quad c_2^* = (1 + r) \frac{\beta}{(1 + \beta)} \left[ w_1 + \frac{w_2}{1 + r} \right] \]

\[ S^* = \frac{\beta w_1}{(1 + \beta)} - \frac{1}{(1 + \beta)} \frac{w_2}{1 + r} \]

- consumption depends not only on current income but on PVLI (present value of lifetime income)
using saving to bring income forward/backward to help smoothen consumption

\[ S^* = \frac{\beta w_1}{(1 + \beta)} - \frac{1}{(1 + \beta)} \frac{w_2}{1 + r} \]
Distinguishing between temporary and permanent changes:

1. **Temporary** increase in $w_1$ to $w_1 + \Omega$ with no increase in $w_2$

$$c_1 + \frac{c_2}{1 + r} = (w_1 + \Omega) + \frac{w_2}{1 + r}$$

2. **Permanent** increase in $w_1$ to $w_1 + \Omega$ and increase in $w_2$ to $w_2 + \Omega$.

$$c_1 + \frac{c_2}{1 + r} = (w_1 + \Omega) + \frac{(w_2 + \Omega)}{1 + r}$$
Permanent increases in income have much stronger effects on consumption than temporary changes.

\[
S_{\text{temp}} = \frac{\beta (w_1 + \Omega)}{(1 + \beta)} - \frac{1}{(1 + \beta)} \frac{w_2}{1 + r}
\]

\[
S_{\text{permanent}} = \frac{\beta (w_1 + \Omega)}{(1 + \beta)} - \frac{1}{(1 + \beta)} \frac{(w_2 + \Omega)}{1 + r} \Rightarrow S_{\text{permanent}} < S_{\text{temp}}
\]

Tax cuts are more likely to have strong effects on consumption if the cut is a permanent one.
Ricardian Equivalence

Do tax cuts work? increase consumption? get economies out of recessions?
When people have more money, they can spend it on goods and services. And in our society, when they demand an additional good or a service, somebody will produce the good or a service. And when somebody produces that good or a service, it means somebody is more likely to be able to find a job.

We know that tax relief is going to help this economy ... The tax relief we passed in 2001 helped make the recession one of the shallowest in American history.
Ricardian Equivalence

- Suppose the government cuts taxes today and has no plans to cut spending. Are you better off as a result? Will you consume more?
- The situation before any tax-cuts are announced: In period 1, govt. collects taxes $T_1$ and spends $G_1$; similarly in period 2.
- Deficit:
  \[ D_{\text{pre}} = G_1 - T_{1\text{pre}} \]
- Govt. finances deficit $D$ by selling bonds (borrowing from the public).
In period 2,
\[ T_{2\text{pre}} = (1 + r)D_{\text{pre}} + G_2 \]

or,
\[ T_{2\text{pre}} = (1 + r)\{G_1 - T_{1\text{pre}}\} + G_2 \] (1)

After tax-cuts are announced → Suppose govt. announces a tax-cut of \( \Delta T \) in the first period. Then, govt. deficit after the policy (denoted \( D_{\text{post}} \)) is
\[ D_{\text{post}} = G_1 - \{T_{1\text{pre}} - \Delta T\} = G_1 - T_{1\text{pre}} + \Delta T \]

Then
\[ T_{2\text{post}} = (1 + r)D_{\text{post}} + G_2 \]

or,
\[ T_{2\text{post}} = (1 + r)\{G_1 - T_{1\text{pre}}\} + (1 + r)\Delta T + G_2 \] (2)
Ricardian Equivalence

- Therefore, taxes will have to be increased by the amount [using (1) & (2)]
  \[ T_{2\text{post}} - T_{2\text{pre}} = (1 + r)\Delta T \]

- Thus a current period tax cut of \(\Delta T\) implies a tax hike of \((1 + r)\Delta T\) in the future!

- For the consumer: first period effective income goes up (as a result of the tax cut in the first period) from \(w_1\) to \(\{w_1 + \Delta T\}\). But second period income (as a result of the tax hike in the second period) goes down from \(w_2\) to \(\{w_2 - (1 + r)\Delta T\}\).

- What happens to their permanent income?
Precautionary Motive

- life is full of economic risks and uncertainties.
- good and bad outcomes; people don’t like extremes (risk-averse);
- like to smooth consumption over good and bad states; can save to limit the economic setbacks (buffer); precautionary saving
Precautionary Motive

- Suppose second period income is uncertain; can be $w_2 - \Omega$ with probability 0.5 and $w_2 + \Omega$ with probability 0.5.
- Very risk-averse people focus only (put a lot of weight) on the really bad state.
- Save assuming that their second period income will be $w_2 - \Omega$.
- Difference between this and what they would have saved if they knew that their second period income was $w_2$ for sure is called precautionary saving.
- May explain low US saving.