Household Consumption and Saving - National Saving
Chapter 4
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1 Household consumption and saving

Two-period model where agent cares about current and future consumption

\[ u(c, c^f) \]

- Consumer preferences - consumption today \((c)\) and consumption in the future \((c^f)\) both yield utility

- Indifference curves - combinations of \(c\) and \(c^f\) for which the agent receives the same level of utility

  - slope downward from left to right - to be willing to give up current consumption must receive more future consumption
– higher indifference curves represent higher levels of utility - holding one good constant and increasing the other raises utility

– bowed toward the origin due to the law of diminishing marginal utility
• Present-value budget (resource) constraint - requires assumption that the
agent can borrow or lend as much as he wants at the real interest rate \( r \)
subject to this constraint. Requires the present-value of lifetime consumption (PVLC) equal present-value lifetime resources (PVLR).

\[
c + \frac{c^f}{1 + r} = y + \frac{y^f}{1 + r} + a
\]

where \( y \) (\( y^f \)) represents the household’s current (future) income and \( a \)
represents initial wealth (assets).

– Graph \( c^f \) as a function of \( c \).

\[
c^f = (1 + r)(y + a - c) + y^f
\]

* slope is \(- (1 + r)\)

* intercept is \((1 + r)(y + a) + y^f\)
• Utility maximization subject to the budget constraint

  – Graph

  * Assume agents want smooth consumption (assumption about preferences as implied by shape of utility function)

  \[ c = c^f \]

  * Use the budget constraint to solve for \( c^* \)

  \[
  c^* = \frac{1 + r}{2 + r} \left( y + \frac{y^f}{1 + r} + a \right) = \frac{1 + r}{2 + r} PVLR
  \]

  \[
  c_f^* = \frac{1 + r}{2 + r} \left( y + \frac{y^f}{1 + r} + a \right) = \frac{1 + r}{2 + r} PVLR
  \]
• Saving = income minus consumption

\[ s^* = y - c^* = y - \frac{1+r}{2+r} \left( y + \frac{y^f}{1+r} + a \right) \]

\[ = \frac{1+r}{2+r} \left( \frac{y - y^f}{1+r} - a \right) \]

• With income constant, an increase in current consumption is equivalent to a reduction in current saving.

• If income is not changing, and the agent has no wealth, saving will be zero.
2 Theory of aggregate consumption and saving

Add up all individual household consumption and saving functions and get desired aggregate consumption and saving.

- How does an increase in the **real interest rate** affect desired aggregate current consumption?
  
  - budget line becomes steeper - give up less $c$ to get one more $c^f$; price of $c^f$ in terms of $c$ has fallen
  
  \* Substitution effect - holding utility constant, a reduction in the price of $c^f$ (increase in the price of $c$) will cause agents to substitute out of $c$ and into $c^f$. As $c$ falls, saving rises.
• Income effect - an increase in the real interest rate increases resources for a saver and decreases them for a borrower. Therefore the income effect for a saver of a real interest rate increase tends to increase consumption and reduce saving and have the opposite effect for a borrower.

• Generally believe the substitution effect dominates, even when household is a saver.
• Increase in **current income**?
  
  – both intercepts on budget line increase, shifting it rightward parallel to original line. Current and future consumption both increase. Therefore, saving must also increase

• Increase in expected **future income**?
  
  – * both intercepts increase, shifting budget constraint outward

    * current and future consumption both increase

    * since current income did not change, saving must fall

• Increase in **wealth**? - similar to increase in current income
To summarize, desired saving is an increasing function of the real interest rate and current income and a decreasing function of wealth and expected future income.
3 Extensions

• Permanent income theory - many horizon model
  – assume that agents want a flat consumption profile
  – consumption depends on present value of expected future lifetime earnings
  – permanent increase in income affects consumption one for one
  – temporary increase in income has small effect on consumption

• Life-cycle model - three periods correspond to youth when agents begin work, middle-age when agents reach peak income-earning years, and old age when agents retire.
– How does age affect saving behavior?

– How does a bequest motive affect saving behavior?

– How would borrowing constraints in youth affect aggregate saving?

– Compare saving behavior across countries with well-functioning financial markets and those without.

• Why do stock market booms and consumption booms often go together?

• Why was the US saving rate so low compared to that in other countries?
4 Taxes and Consumption and Saving

4.1 Lump-Sum Taxes

- Amend the two-period model above to have a government.
  - The household present-value budget constraint should contain current and future disposable income instead of income.

\[ c + \frac{c^f}{1 + r} = y - T + \frac{y^f - T^f}{1 + r} + a \]

- Add a government present-value budget constraint.

\[ G + \frac{G^f}{1 + r} = T + \frac{T^f}{1 + r}. \]
– If agents want smooth consumption, household consumption will be given by

\[ c = \frac{1 + r}{2 + r} \left( y - T + \frac{y^f - T^f}{1 + r} + a \right) = \frac{1 + r}{2 + r} PVLR. \]

– Household savings is

\[ s = y - T - c = \frac{1 + r}{2 + r} \left( \frac{(y - T) - (y^f - T^f)}{1 + r} - a \right) \]

• How does a tax cut affect individual consumption and saving?
4.2 Distortionary taxes change incentives

- tax nominal interest income
  
  - expected real after-tax interest rate
    
    \[ r_{at} = i(1 - t) - \pi^e \]
    
    where \( \pi^e \) is expected inflation
  
  - budget constraint (slope of \( -(1 + r_{at}) \)) becomes flatter - get less future consumption for one unit of current consumption because must give up some interest earnings to government as taxes
  
  - substitute out of future consumption into current consumption
  
  - saving falls as consumption rises
– when returns to saving are taxed, saving falls

– other effects depending on how the government budget constraint adjusts with the extra tax revenue

5 Desired National Saving

– Desired saving is the sum of desired private saving plus desired public saving.

\[ S^d = (Y - T - C^d) + (T - G) = Y - C^d - G \]

– The effect of a tax increase on national savings
- What adjusts in government budget constraint?

- Effect is determined by the effect on $C^d$ and $G$ and possibly $Y$.

- The effect of an increase in government spending on national saving

  - direct effect reducing national saving

  - indirect effect depending on how the government budget constraint is met and its effect on consumption
6 Summary

- Desired national saving is an upward sloping function of the real interest rate

- Rightward shifts of the savings curve are due to
  - Increase in current income
  - Decrease in expected future income
  - Increase in wealth
  - Increase in lump-sum taxes
  - Decrease in government spending