

Intermediate Macroeconomics

Chapter 10 Consumption and Savings

Consumption

1. Keynesian Consumption Function
2. Empirical Studies
3. Life Cycle Hypothesis
4. Expectations
5. Permanent Income Hypothesis
6. Recent Empirical Results
7. Policy Implications

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1. Keynesian Consumption Function

- $C = C_0 + c * Y$
- Only current period income determines level of consumption
- Marginal Propensity to Consume (MPC):
Constant at all levels of income
- Average Propensity to Consume (APC):
Declines as income increases

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1. Keynesian Consumption Function Average propensity to consume

- $APC = \frac{\text{Total Consumption}}{\text{Total Income}}$
- $APC = \frac{C(t)}{Y(t)} = \frac{C_0 + c * Y(t)}{Y(t)} = \frac{C_0}{Y(t)} + c$
- As income increases
 - $C_0 / Y(t)$ gets smaller
 - c (marginal propensity to consume) is constant
 - APC gets smaller

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1. Keynesian Consumption Function Average propensity to consume

$$\text{Consumption} = \$500 + 0.90 * \text{Income}$$

Income, Y	\$1,000	\$10,000	\$100,000
Consumption, C ₀	\$ 500	\$ 500	\$ 500
	0.9 * Y	+ 9,000	+ \$90,000
	<u> </u>	<u> </u>	<u> </u>
C =	\$1,400	= \$9,500	= \$90,500
APC = $\frac{C}{Y}$	1.40	0.95	0.905

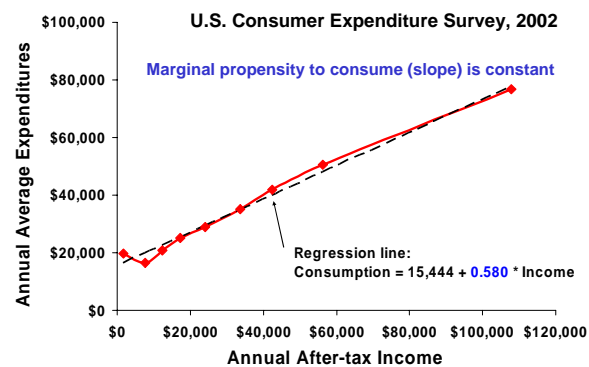
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2. Empirical Studies

- Cross-Section Studies
 - conducted at single point in time
 - cross-section studied - individual households
 - household income (X-axis) versus household consumption (Y-axis)
 - MPC constant, **APC declines**
- Time-Series Studies
 - observations at different points in time
 - total income (X-axis) vs total consumption (Y-axis)
 - MPC constant, **APC constant**

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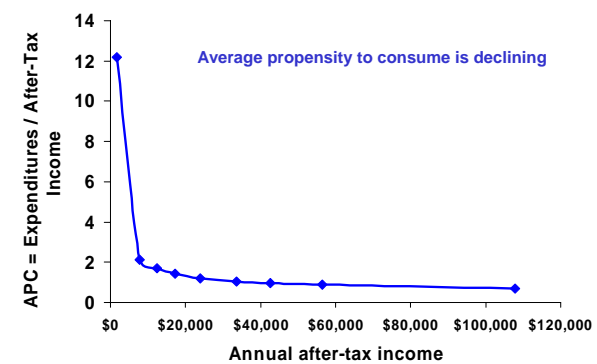
2. Empirical Studies Cross section – consumption vs income



Source: U.S. Bureau of Labor Statistics
<http://www.bls.gov/cex/home.htm>

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2. Empirical Studies Cross section - average propensity to consume

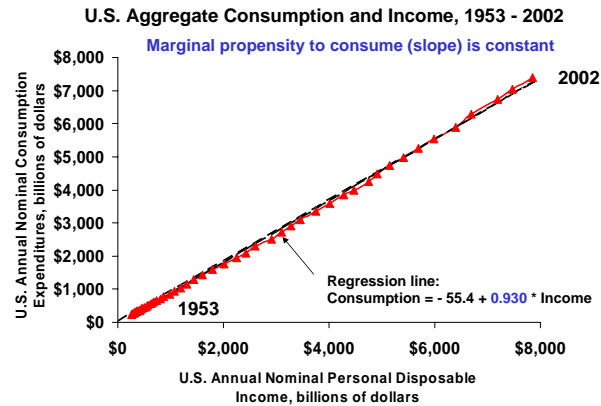


Source: U.S. Bureau of Economic Analysis
<http://www.bea.gov/bea/dn/nipaweb/index.asp>

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2. Empirical Studies

Time series - consumption vs income

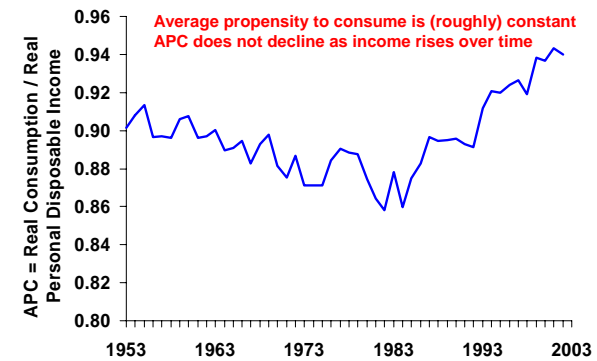


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Source: U.S. Bureau of Economic Analysis
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2. Empirical Studies

Time series - average propensity to consume



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3. Life-Cycle Hypothesis

- Assumptions:
 - people desire to smooth consumption over lifetime
 - savings provide for consumption in old age
- Lifetime Consumption
= consumption per year * expected lifespan
- Lifetime Income
= expected annual income * labor years
- Lifetime Consumption = Lifetime Income

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3. Life Cycle Hypothesis

Simple model

Base Case

Year	1	2	3	4	5	6	Totals
Income	15	15	15	15	0	0	60
Consumption	10	10	10	10	10	10	60
Savings	5	5	5	5	-10	-10	0

- Consumption is based on current wealth and total lifetime earnings
- Consumption is smoothed over lifetime

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3. Life Cycle Hypothesis Simple model

Case 1. Temporary increase in income (equivalent to increase in current wealth)

Year	1	2	3	4	5	6	Totals
Income	45	15	15	15	0	0	90
Consumption	15	15	15	15	15	15	90

- Marginal Propensity to Consume out of **temporary change** in income = $(15 - 10) / (45 - 15) = 1/6$
- or, $MPC = 1 / N_L$
 N_L = number of years in life span

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3. Life Cycle Hypothesis Simple model

Case 2. Expected permanent increase in income

Year	1	2	3	4	5	6	Totals
Income	45	45	45	45	0	0	180
Consumption	30	30	30	30	30	30	180

- Marginal Propensity to Consume out of **permanent change** in income = $(30 - 10) / (45 - 15) = 2/3$
- or, $MPC = W_L / N_L$
 W_L = number of years earning income

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3. Life Cycle Hypothesis Simple model results

Temporary change in income

- Base case -> Case 1
- $MPC = 1/N_L$, constant for any size temporary change in income.
- APC declines as temporary change in income becomes larger.
 - Base case, year 1, $APC = C/Y = 10/15$
 - Case 1, year 1, $APC = C/Y = 15/45$

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3. Life Cycle Hypothesis Simple model results

- Permanent change in income
 - Base case -> Case 2
 - $MPC = M_L/N_L$, constant for any size permanent change in income
 - APC is constant.
 - Base case, year 1, $APC = C/Y = 10/15$
 - Case 2, year 1, $APC = C/Y = 30/45$

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4. Expectations

- Naive Expectations
 - $E_t(X_t) = X_{t-1}$
- Static Expectations
 - $E_t(X_t) = X$
- Perfect Foresight
 - $E_t(X_t) = X_t$
- Adaptive Expectations
 - $E_t(X_t) = a * X_{t-1} + (1 - a) * E_{t-1}(X_{t-1})$
- Rational Expectations
 - $E_t(X_t) = X_t + e_t$

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5. Permanent Income Hypothesis

- LCH Model
- Incorporates adaptive expectations to explain how expectations of future income are formed
- Current changes in income are considered to be permanent based on:
 - $YP = Y(t-1) + a * [Y(t) - Y(t-1)]$
- Consumption = $c * YP$

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6. Recent Empirical Work

Excess Sensitivity - consumption is more responsive to changes in income than implied by the LCH / PIH models.

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6. Recent Empirical Work Excess sensitivity explanations

- Durable goods are “lumpy”
- Purchase of durable goods doesn't represent Consumption represented by theory. Consumption of a durable goods extends over the lifetime of the good.
- Liquidity Constraints
- Precautionary Savings Motive
- Adaptive or Rational Expectations don't hold. People don't forecast and don't save for retirement

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7. Policy Implications

- Temporary Tax Changes
- Ricardian Equivalence
- Higher Interest Rates
- Social Security