

## Intermediate Macroeconomics – Econ 2201

### Forward Looking Decisions: Consumption and Saving

Talan İşcan  
Dalhousie University  
Winter 2012

Topic 9

1

## Personal wealth

---

Present discounted value of entire lifetime earnings and income

total wealth = human + non-human wealth

human wealth = expected present discounted value  
of after-tax labour income

non-human wealth = financial (bonds, stocks)  
+ non-financial (house)

Topic 9

2

## A stylized framework

---

Total wealth

$$\$H_t = \frac{\$R_{t+1}^e}{(1+i_{1t})} + \frac{\$R_{t+2}^e}{(1+i_{1t})(1+i_{1t+1}^e)} + \dots \quad (\text{house})$$

$$\$P_{2t}^B = \frac{\$F_{t+2}}{(1+i_{1t})(1+i_{1t+1}^e)} \quad (\text{bonds})$$

$$\$Q_t = \frac{\$D_{t+1}^e}{(1+i_{1t})} + \frac{\$D_{t+2}^e}{(1+i_{1t})(1+i_{1t+1}^e)} + \dots \quad (\text{stocks})$$

$$\$HW_t = \frac{\$W_{t+1}^e}{(1+i_{1t})} + \frac{\$W_{t+2}^e}{(1+i_{1t})(1+i_{1t+1}^e)} + \dots \quad (\text{human wealth})$$

dividends  $D$  depend on after-tax profits } after-tax income  $Y - T$   
after-tax labor income  $W$

Topic 9

3

## Wealth and expectations

---

What happens to total wealth

1. when  $i_{1,t+1}^e$  increases?
2. when  $T_{t+1}^e$  increases?

Topic 9

4

## Consumption as a forward looking decision

---

- permanent income theory of consumption
- life-cycle theory of consumption

### Main insight

Households consider their total wealth to determine their current consumption and saving

### Main difference

Bequests

## Example

---

starting non-human wealth:	\$0
starting labour income:	\$40,000
labour income at $t$ :	$\$40,000 \times (1 + .03)^t$
tax rate:	25%
interest rate:	0%
working years:	37
human wealth:	\$1,985,227
total wealth:	\$1,985,227

## Consumption smoothing

---

Consumption behavior:

maintain constant marginal utility of consumption over time (when  $r = 0\%$ )

Implication:

Even if income varies over time, consumption remains relatively constant

Relation to current income:

Consumption depends on *permanent* income

## Permanent income

---

Annuity value of human and non-human wealth (Friedmand 1956)

expected remaining life:	56
permanent income:	$\frac{\$1,985,227}{56} = \$35,450$
annual consumption:	\$35,450

The next slide:

time profile of wealth, income, and consumption

## A life-cycle consumption profile



Topic 9

9

consumption

## Empirical evidence

How do life-cycle consumption and wealth profiles look in data?

Evidence from Gokhale et al. (BPEA 1996)

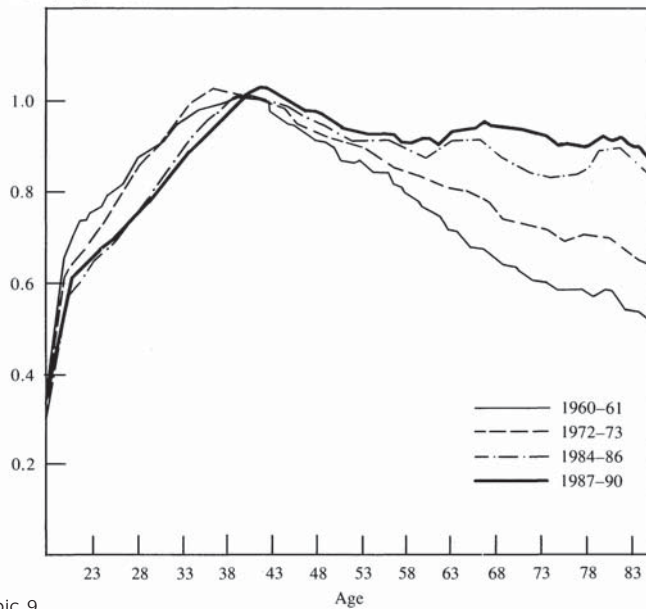
- Representative samples of U.S. households
- Data on four waves of sampled households: 1960–61, 1972–73, 1984–86, 1987–90
- Sample covers 18 to 85 years old households

Topic 9

10

Figure 1. Relative Total Consumption Profiles

Index, 40-years-old = 1

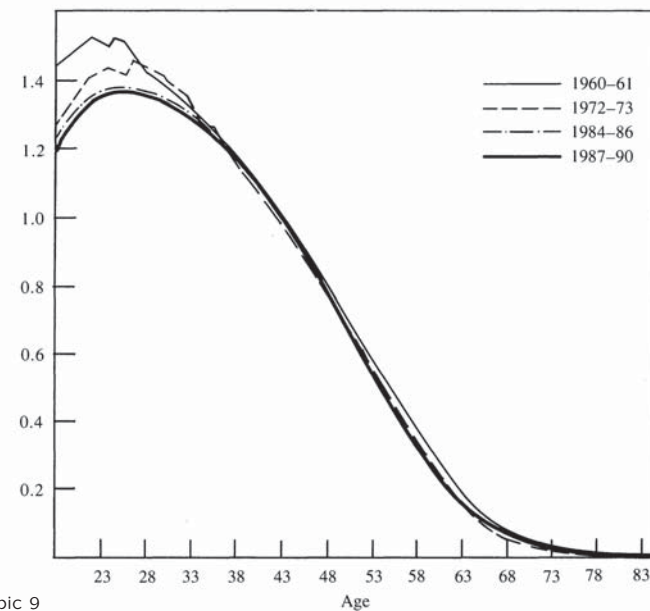


Topic 9

11

Figure 5. Ratio of Cohort Human Wealth Per Capita to Total Resources Per Capita

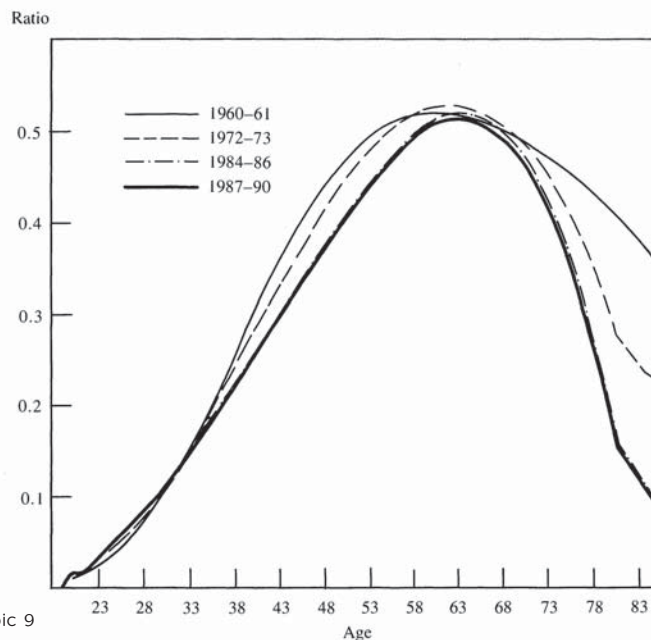
Ratio



Topic 9

12

Figure 6. Ratio of Cohort Nonhuman Wealth Per Capita to Total Resources Per Capita



Topic 9

13

## A reinterpretation of consumption

“Old” consumption function

$$C = c_0 + c_1(Y - T)$$

“New” consumption function (short run: fixed  $P$ )

$$C = C(Y_t - T_t, Y_{t+1}^e - T_{t+1}^e, i_t, i_{t+1}^e, \dots)$$

A unified interpretation:

$c_0 \rightarrow$  propensity to consume out of total wealth  
(due to permanent income)

$c_1 \rightarrow$  propensity to consume out of current income  
(due to transitory changes in income)

Topic 9

14

## Investment as a forward looking decision

Recall: in a closed economy

$$I = S + (T - G)$$

and

$$S = (Y - T) - C$$

If  $C$  is a forward looking decision, then  $I$  must be too

$$I = I(Y_t, Y_{t+1}^e, i_t, i_{t+1}^e, \dots)$$

Topic 9

15

## Three empirical facts

Comovement

- consumption and investment typically move together

Volatility

- investment is more volatile than consumption

Contribution to macroeconomic fluctuations

- consumption and investment contribute equally

$$2011 : \frac{C}{GDP} = 57\% \quad \text{and} \quad \frac{I}{GDP} = 18\%$$

Topic 9

16

## The IS-LM model and expectations

**Main objective:** Extend the IS–LM model to incorporate forward looking decisions

**Building blocks:** Goods and financial markets equilibrium

**Assumptions:**

- closed economy
- zero expected inflation,  $\pi_t^e = 0$

## Housekeeping

- Denote future variables by superscript  $e$   
E.g.,  $Y^e$  is (expected) future income
- Given  $\pi_t^e = 0$ ,  $i = r$  (real interest rate)
- Consumption

$$C = C(Y - T, r, Y^e - T^e, r^e)$$

- Investment

$$I = I(Y, T, r, Y^e, T^e, r^e)$$

## 'New' goods market equilibrium

Aggregate demand

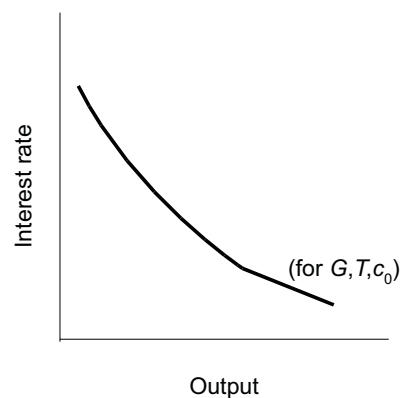
$$Z = C + I + G \quad (\text{current})$$

$$Z^e = C^e + I^e + G^e \quad (\text{future})$$

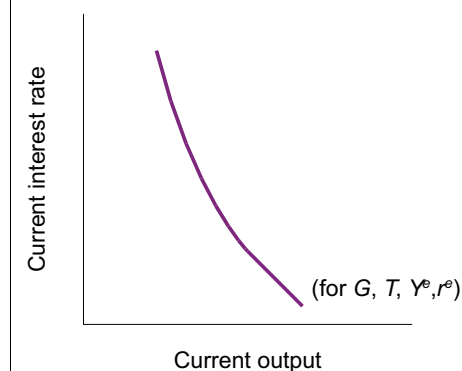
Equilibrium condition: aggregate demand = output

$$Z = Y \quad \text{and} \quad Z^e = Y^e$$

## 'Old' IS-relation

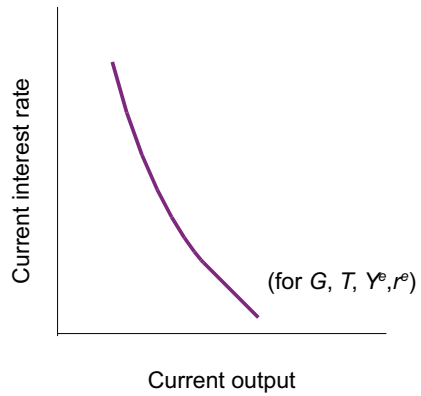


## 'New' IS-relation

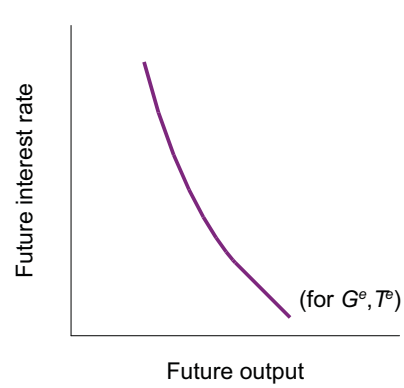


Current period IS-curve is steeper than the 'old' IS-curve

### 'Current' IS-curve



### 'Future' IS-curve



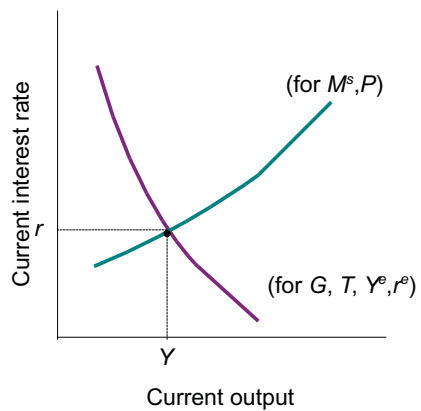
### Money market equilibrium

Current period money demand = money supply

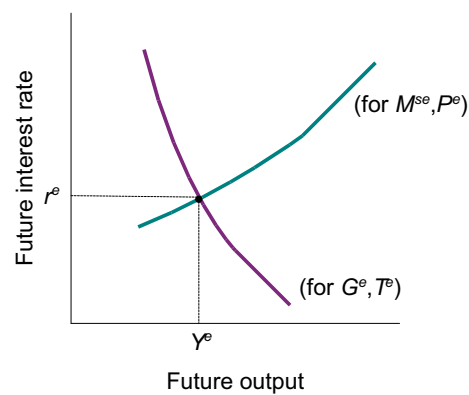
$$\frac{M^s}{P} = YL(r)$$

⇒ identical to the "old" LM relation

### 'Current period' equilibrium



### 'Future period' equilibrium



### Interpretation

Equilibrium values of  $Y$  and  $r$  in the future can be viewed as

- Medium-run equilibrium

$$Y^e = Y_n$$

- Short-run equilibrium

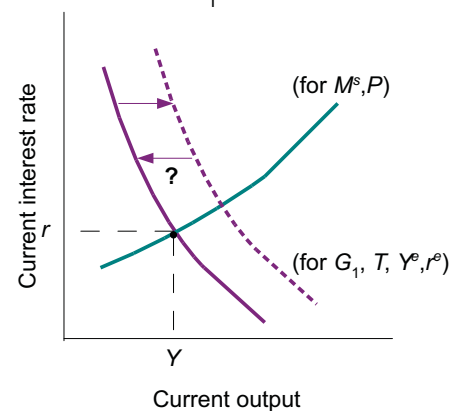
$$Y^e \neq Y_n$$

## Examples

1. Anticipated contractionary monetary policy change
  - $M$  remains the same  $M^e$  declines
  - short-run adjustment
2. Permanent expansionary fiscal policy change
  - both  $G$  and  $G^e$  increase
  - medium-run adjustment(see the next slide)

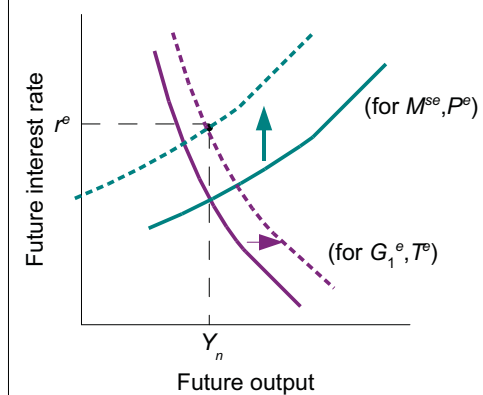
### 'Current period' equilibrium

$$G_1 > G$$



### 'Future period' equilibrium

$$G_1^e > G^e$$



Unanticipated permanent expansionary fiscal policy change