

**Lecture 9:** Intermediate macroeconomics, autumn 2008

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## Theory of consumption

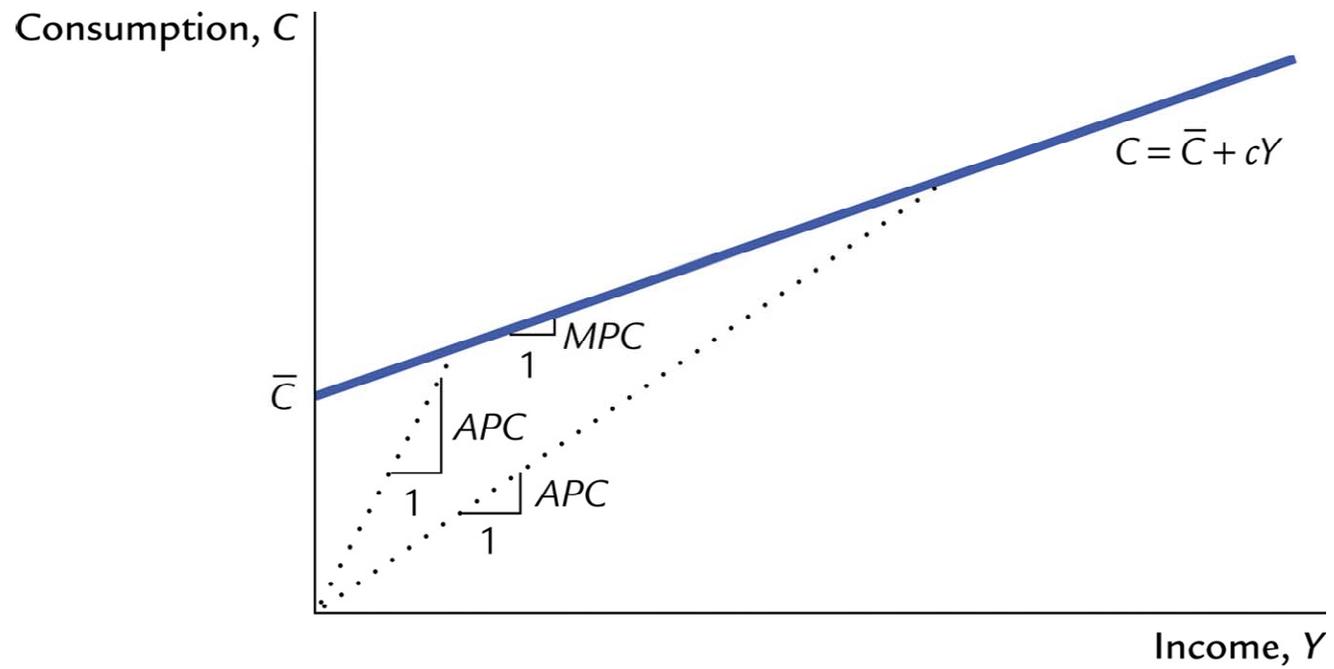
### Keynesian consumption function

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

**Consumption depends on current disposable income**

$$0 < MPC < 1$$

- **But it is more reasonable to believe that consumption depends on forward-looking decisions: Irving Fisher, Milton Friedman, Franco Modigliani and Robert Hall**
- **Intertemporal decisions**
- **Fisher's two period model**



**Figure 17-1:** The Keynesian Consumption Function

### Intertemporal budget constraint

**Period 1:**  $S = Y_1 - C_1$

**Period 2:**  $C_2 = (1 + r)S + Y_2$

**Substitution of (1) into (2) gives:**

$$C_2 = (1 + r)(Y_1 - C_1) + Y_2 = (1 + r) Y_1 + Y_2 - (1 + r) C_1$$

$$C_1 = 0 \Rightarrow C_2 = (1 + r) Y_1 + Y_2$$

$$C_2 = 0 \Rightarrow C_1 = Y_1 + Y_2 / (1 + r)$$

$C_1 = Y_1$  and  $C_2 = Y_2$  is always possible

$$C_1 + C_2 / (1 + r) = Y_1 + Y_2 / (1 + r)$$

$(1 + r)$  is the price of consumption in period 1 in terms of lower consumption in period 2. It is thus always more expensive to consume in period 1 than in period 2.

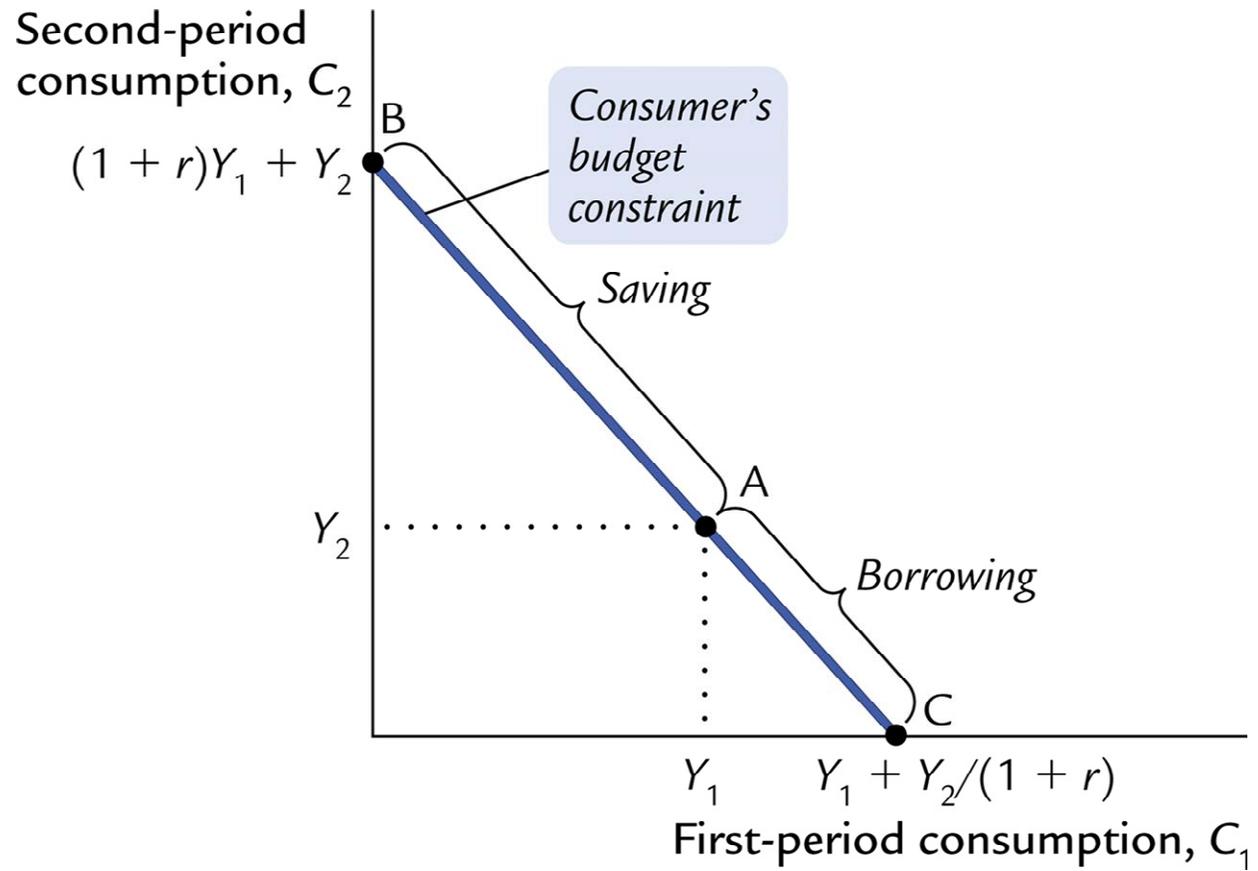
$$r = 0 \Rightarrow C_1 + C_2 = Y_1 + Y_2$$

**Present value of consumption = Present value of income.**

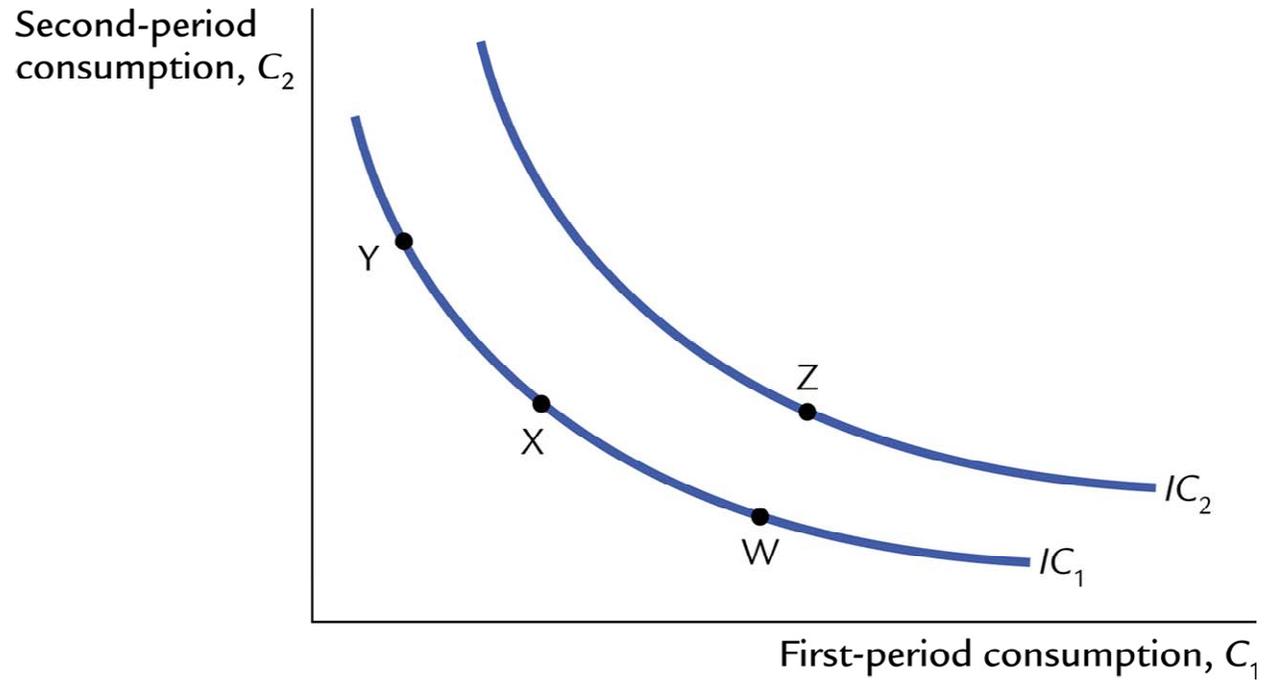
The present-value concept is used to compare amounts of money received at different points of time.

The present value of any amount in the future is the amount that would be needed today, given available interest rates, to produce that future amount.

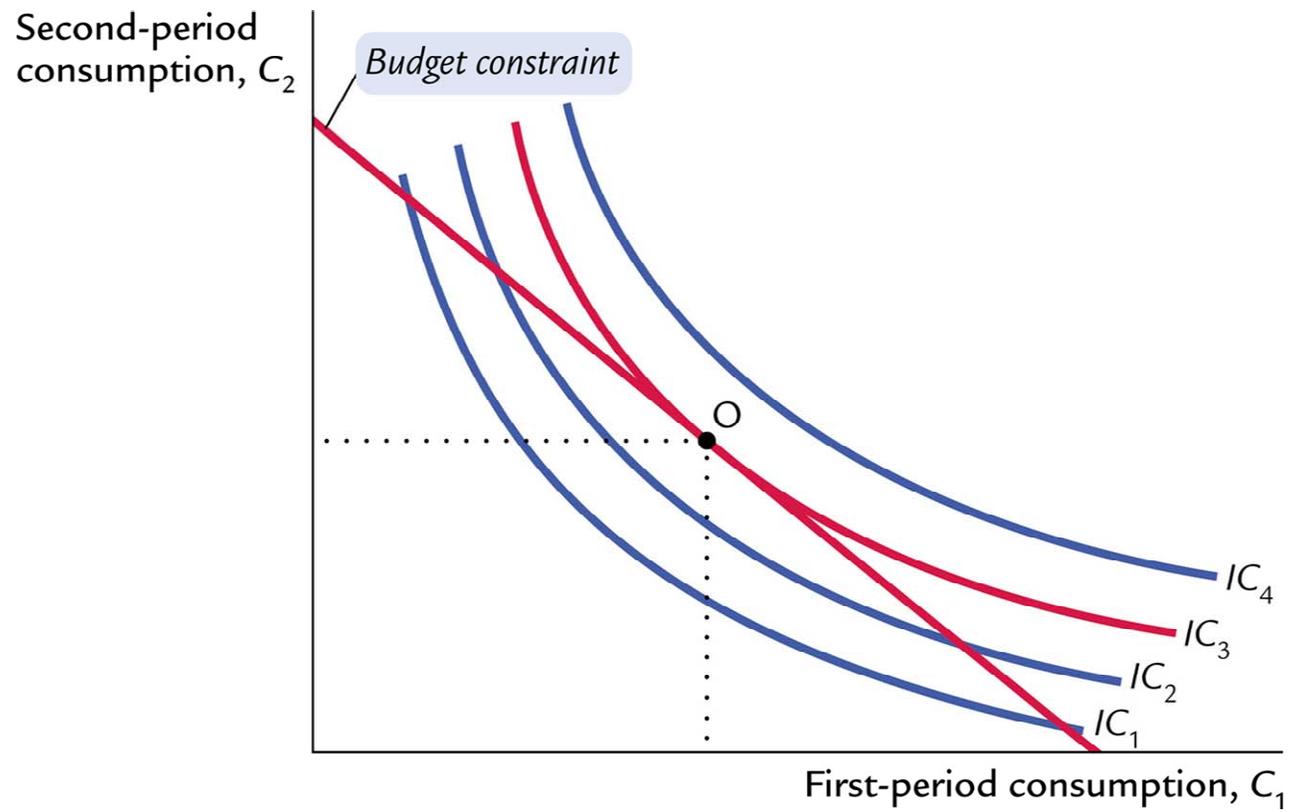
If you are going to be paid  $X$  € in  $T$  years, and the interest rate is  $r$ , the present value of  $X$  is  $X/(1+r)^T$ .



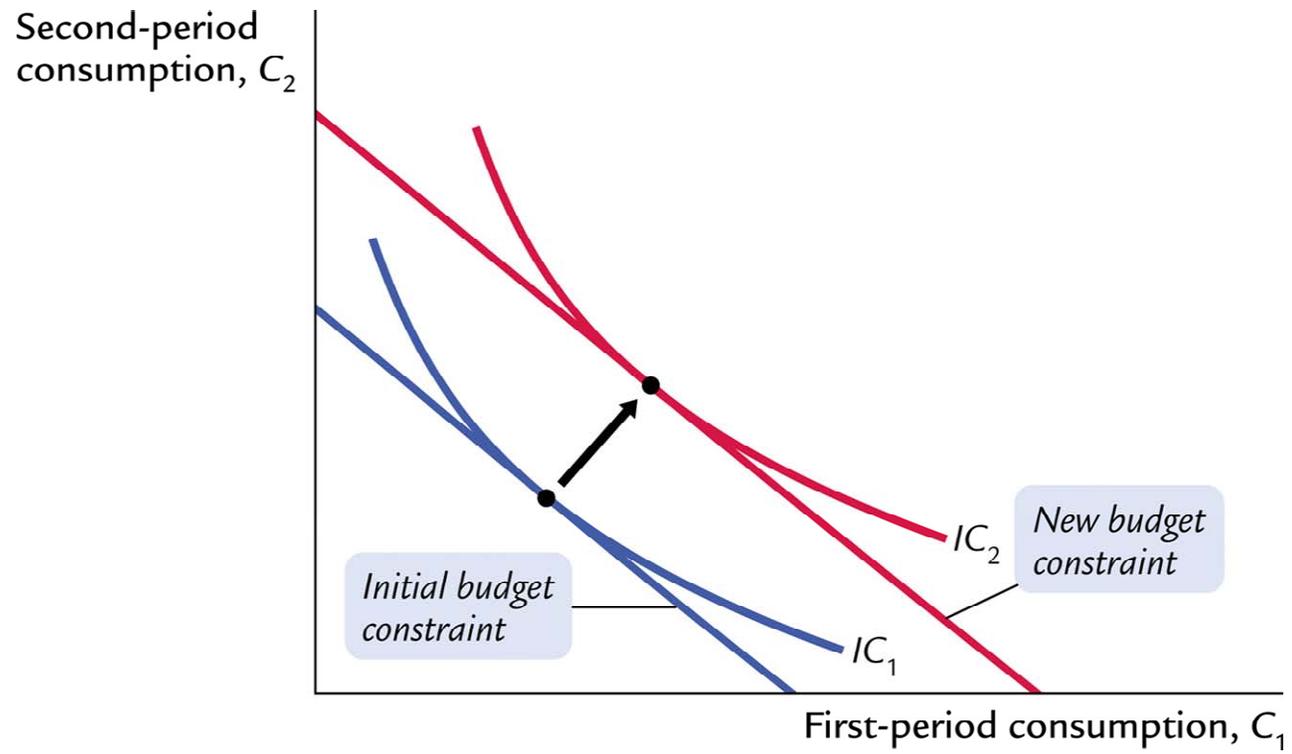
**Figure 17-3:** The Consumer's Budget Constraint



**Figure 17-4:** The Consumer's Preferences



**Figure 17-5:** The Consumer's Optimum



**Figure 17-6:** An Increase in Income

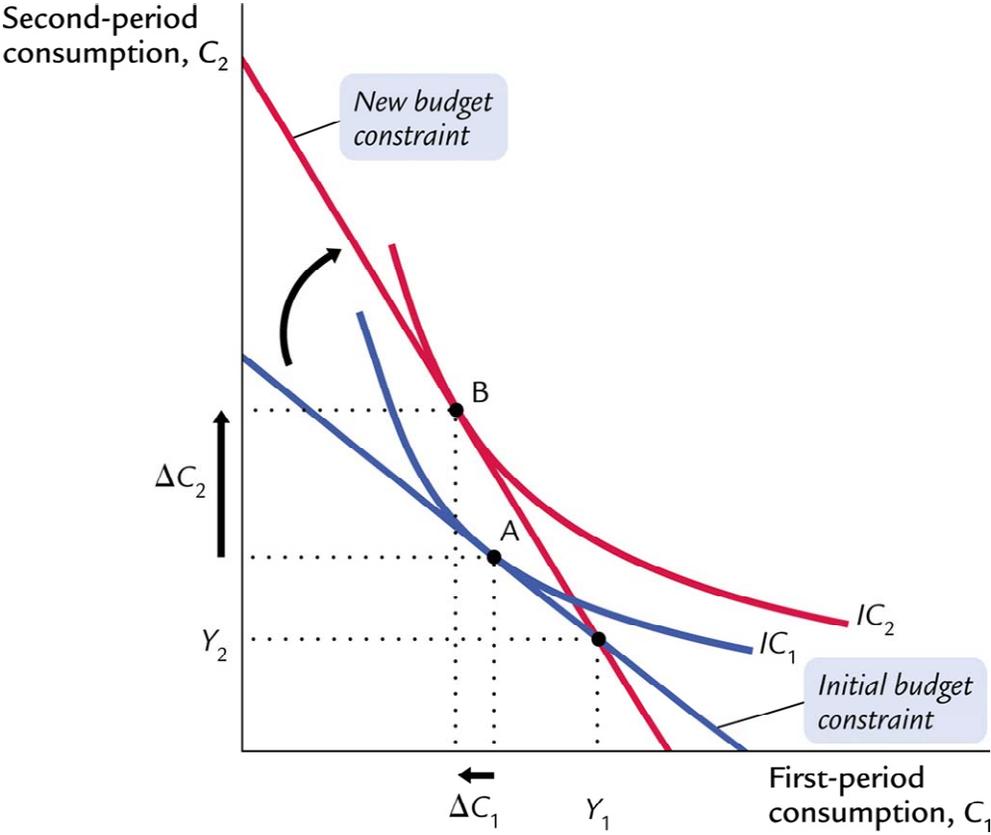
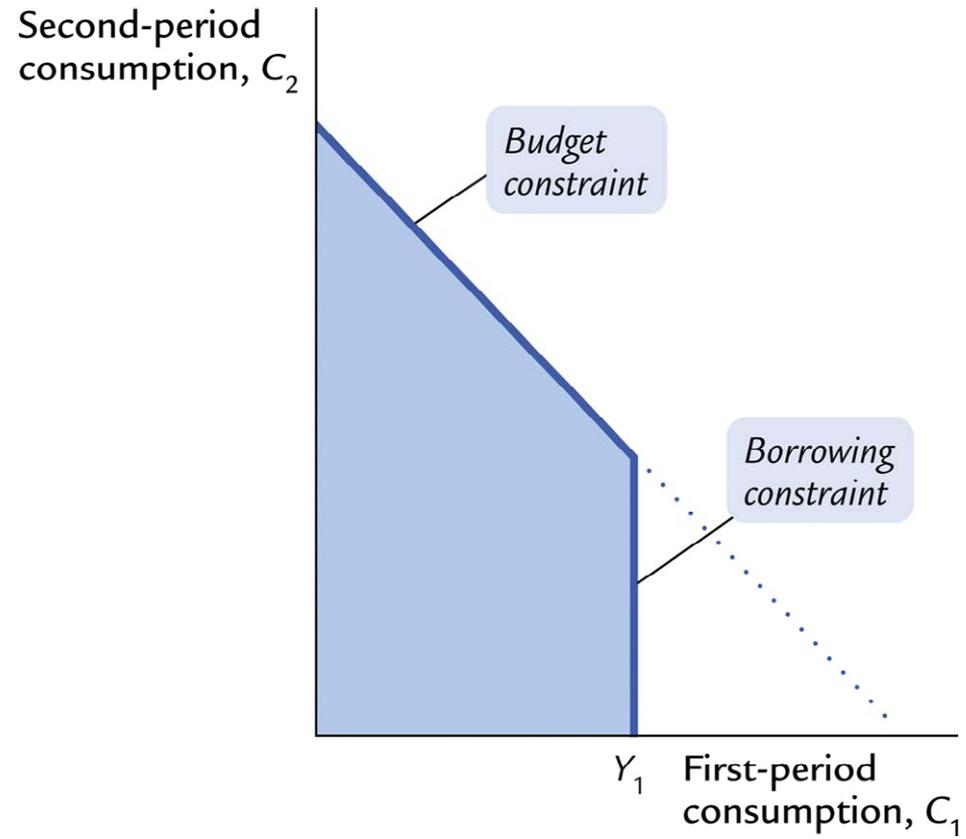
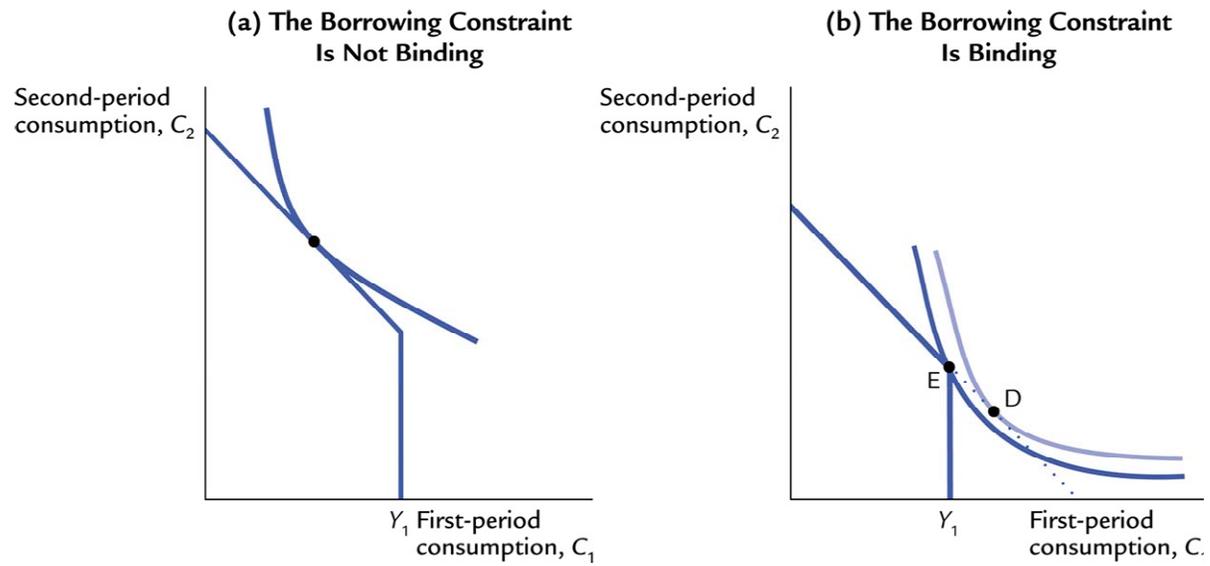


Figure 17-7: An Increase in the Interest Rate

- **Expected future income changes influence consumption already now**
  - **Oil revenues in Norway**
  - **Future pensions**
  - **Earlier anticipated future productivity increases in the US: explanation of low savings and large current account deficits**
  
- **Consumption smoothing**
  
- **Households try to smooth consumption over time (equalise marginal utility of consumption)**
  - **decreasing marginal utility of consumption**
  - **the same consumption level each period if subjective discount rate = market interest rate**



**Figure 17-8:** A Borrowing Constraint



**Figure 17-9:** The Consumer's Optimum With a Borrowing Constraint

### Borrowing constraints

- Around  $\frac{1}{4}$  of households are rationed in the credit market
- The MPC of rationed households is unity (one)
- A temporary income increase of  $\Delta Y$  gives a permanent income rise by  $r\Delta Y$  (the permanent return if the income rise is invested in the credit market) for non-rationed households.  $MPC \approx r$
- Hence, aggregate  $MPC = \frac{1}{4} \cdot 1 + \frac{3}{4} \cdot r \approx \frac{1}{4}$

### Time-inconsistent preferences

- Behavioural economics
- Too low savings because of "pull of instant gratification"?

**Question 1: 1000 SEK today (A) or 1100 SEK tomorrow (B)?**

**Question 2: 1000 SEK in 100 days (A) or 1100 SEK in 101 days (B)?**

- Many people choose A in question 1 and B in question 2.
- This is an example of time inconsistent preferences.
- Individuals do not adhere to a long-term plan but deviate from it.

**Franco Modigliani's life cycle hypothesis**

***R* = Remaining years of work**

***Y* = Annual income**

***W* = Wealth**

***T* = Remaining years of life**

$$C = (W + RY)/T$$

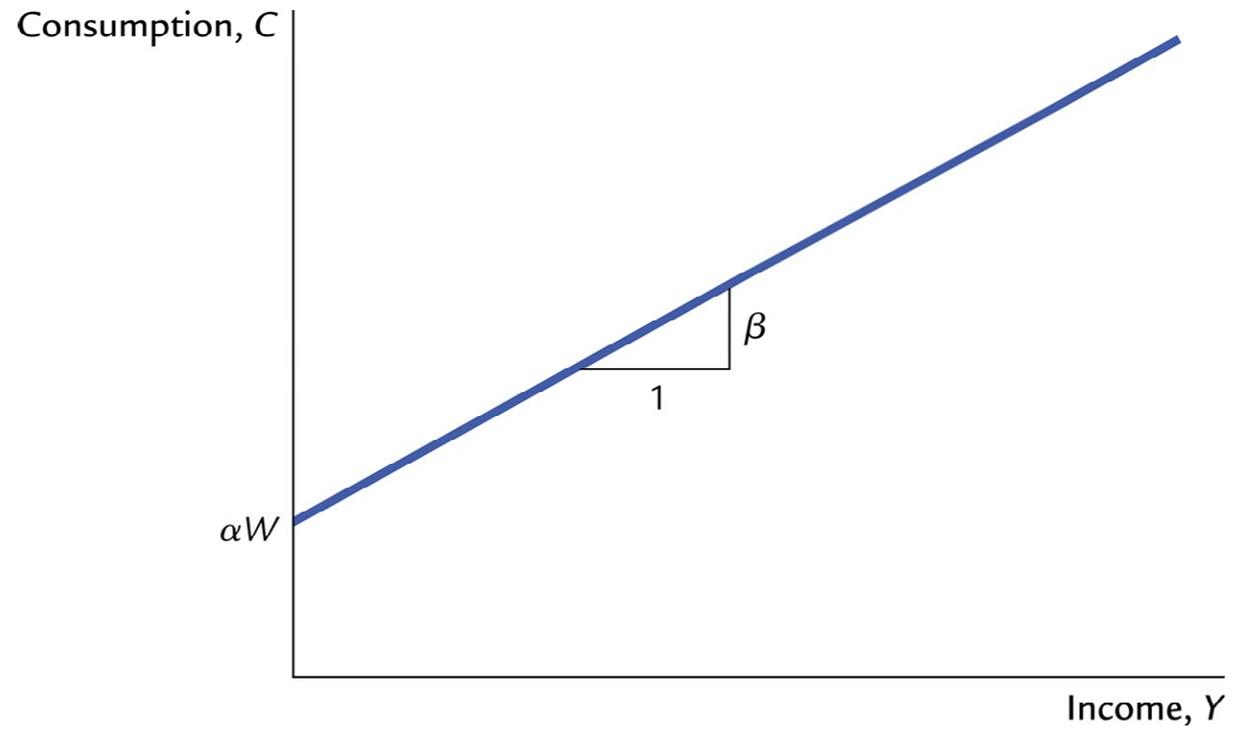
$$C = W/T + RY/T$$

$$T = 50, R = 30 \Rightarrow C = W/50 + 30/50Y = 0,02W + 0,6Y$$

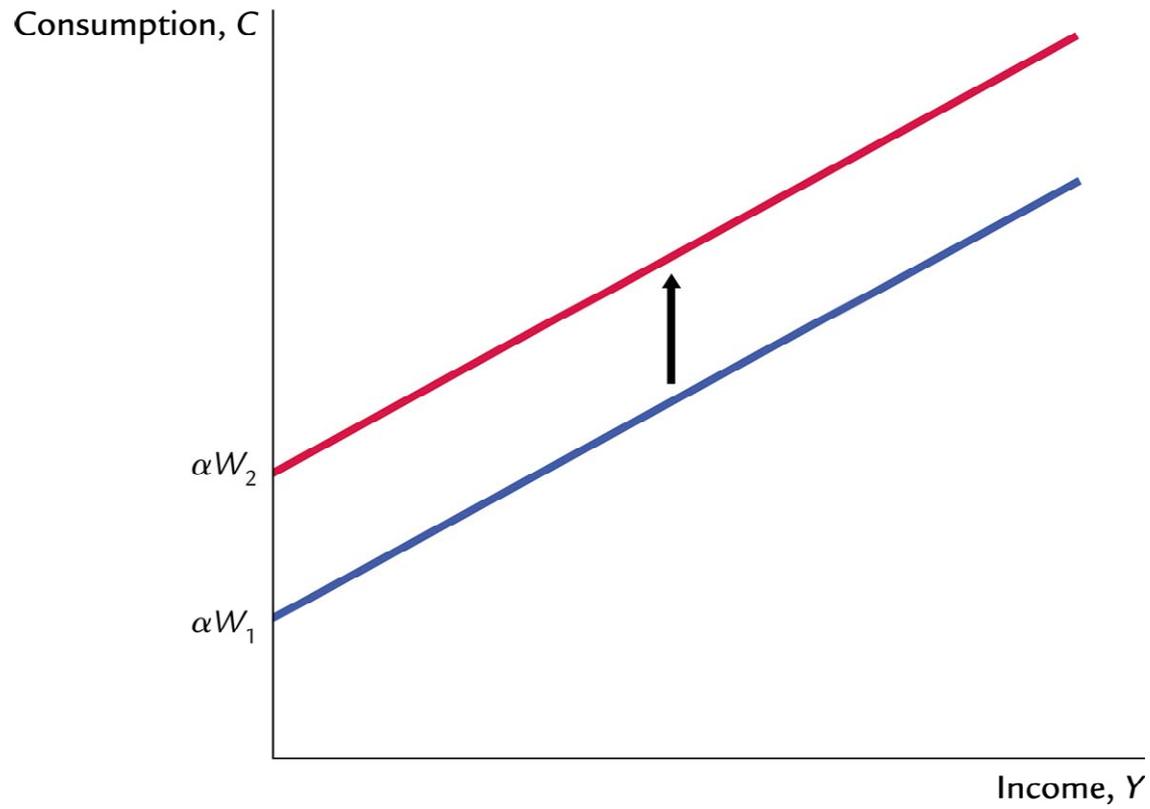
$$MPC_W = 0,02$$

$$MPC_Y = 0,6$$

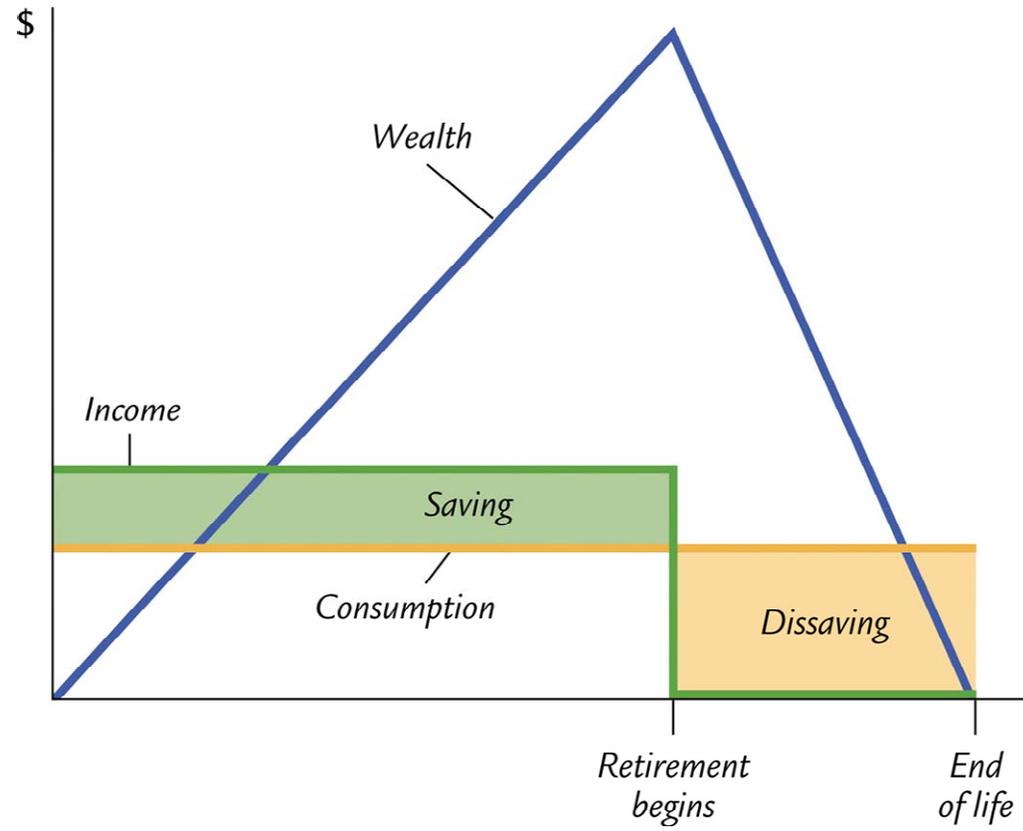
$$T = 21, R = 1 \Rightarrow C = W/21 + 1/21Y \approx 0,05W + 0,05Y$$



**Figure 16.10** The Life-Cycle Consumption Function  
Mankiw: Macroeconomics, Sixth Edition  
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**Figure 16.11** How Changes in Wealth Shift the Consumption Function  
Mankiw: Macroeconomics, Sixth Edition  
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**Figure 16.12** Consumption, Income, and Wealth Over the Life Cycle  
Mankiw: Macroeconomics, Sixth Edition  
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- **Changes in asset prices (shares, houses) nowadays play a large role for the development of private consumption**
- **Risks of “boom-bust cycles” – sudden “asset price reversals” tend to reinforce cyclical variations**
  - **property price bubble in Sweden, Finland and the UK in the 1980s and “asset price deflation” in the early 1990s**
  - **similar developments in Japan in the 1980s, after that prolonged recession (depression)**
  - **worldwide boom in stock prices in the late 1990s, then stock price falls when the dotcom bubble burst**
  - **we are now watching significant falls in house prices and of stock prices (US, UK, Ireland, Spain, France)**
- **Difficult problem for central banks: Should they just have inflation targets for the CPI or should they also try to counteract large swings in asset prices (as Alan Greenspan and the Fed have done several times before)?**
  - **if asset prices rise too much, they may later fall a lot and make it impossible to avoid a deep recession and deflation (since the nominal interest rate cannot become negative: Japan is a prime example)**
  - **are central banks better than financial markets in identifying asset price bubbles?**
  - **ECB uses money supply increases as an indicator of the risks of asset price bubbles**

### Savings and the pension system

- **Pay-as-you-go system (*fördelningssystem*)** – each generation pays the pensions of the previous generation
- **A funded system (*premiereservsystem*)** – each generation pays for its own pensions through pre-funding, which gives a higher savings rate
- **If one introduces a pay-as-you-go system, the first generation in the system is a winner (since it does not pay for any pensions for the preceding generation): our earlier ATP-system, which was introduced in the 1960s**
- **The earlier ATP-system was not sustainable: it built on too optimistic projections of future growth: this was the background of the Swedish pension reform in the 1990s**
- **Problem: if a pay-as-you-go system is replaced by a funded system, the last generation in the pay-as-you-go system becomes a loser (one has to pay twice: first for the pensions of the previous generation and then for the own pensions)**
- **Swedish pension reform: combination of a pay-as-you-go system (the larger part is an actuarial pay-as-you-go system where all labour income earns pension rights) and a funded system (the PPM system)**
- **The Swedish pay-as-you-go system is based on *defined contributions* and not as before on *defined benefits***
  - **benefits are automatically adjusted to contributions**

- **benefits are indexed to the developments of wages per employed**
- **automatic brake adjusts benefits downwards if the financial viability of the system is at risk**
  
- **Many other countries would need to do similar pension reforms as in Sweden**
  - **higher contributions**
  - **lower pensions (Finland: indexation to average longevity)**
  - **higher retirement age (Denmark: indexation to average longevity)**
  - **partial shift to funded system**

### Effects of tax cuts

- Normally we expect a tax cut to raise the real disposable incomes of households and therefore to raise private consumption
- Alternative view: Ricardian equivalence (David Ricardo – famous British 19th century economist who did not really believe in the theory he formulated)
- With a given path for government consumption, a tax cut today does not change life income because the tax cut must be financed by future tax rises that exactly offset the rise in income today. Hence private consumption does not change.

### Main assumptions behind Ricardian equivalence

1. Forward-looking households.
2. Households understand the intertemporal government budget constraint.
3. Lower taxes today do not imply lower future public consumption.
4. Households are not credit constrained.
5. The current generation cares for future generations.

**Mathematical formulation of Ricardian equivalence in the Irving Fisher two-period model**

**$G$  = government consumption,  $T$  = tax,  $D$  = government budget deficit.**

**Period 1**

$$D = G_1 - T_1$$

**Period 2**

$$T_2 = (1 + r)D + G_2$$

$$T_2 = (1 + r)(G_1 - T_1) + G_2$$

**The government budget constraint**

$$T_1 + T_2/(1 + r) = G_1 + G_2/(1 + r)$$

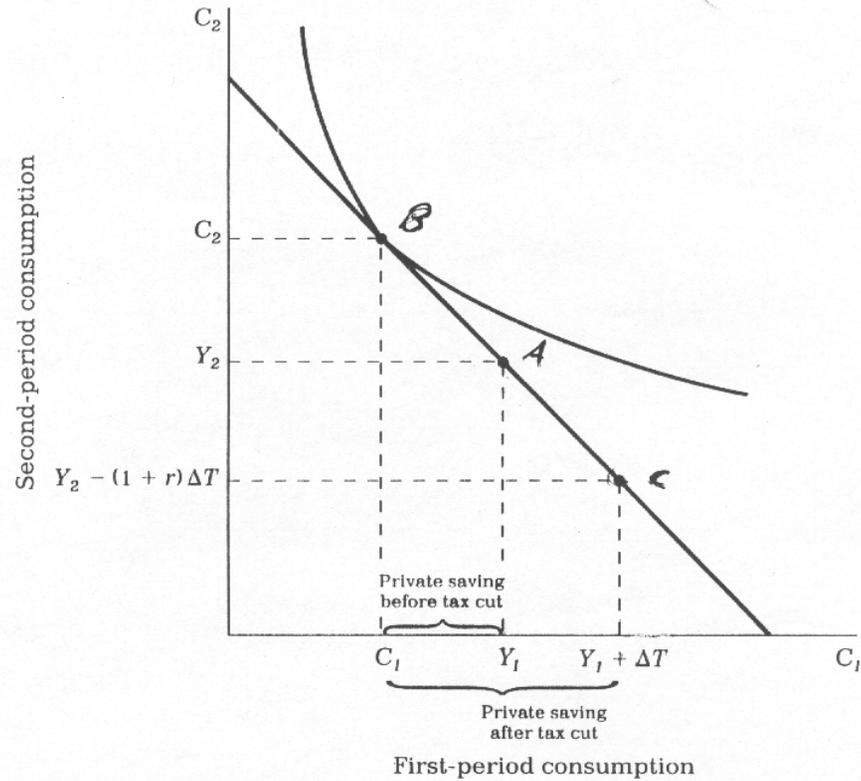
**Present values of taxes and expenditures must be equal.**

**Tax cut in period 1:  $\Delta T_1$**

**Tax rise in period 2:  $(1 + r)\Delta T_1$**

**Present value of future tax rise:  $(1 + r)\Delta T_1/(1 + r) = \Delta T_1$**

**The tax cut thus has no effect on life income of individuals and thus no effect on their consumption.**



**Figure 16-1 A Debt-Financed Tax Cut in the Fisher Diagram.** A debt-financed tax cut of  $\Delta T$  raises first-period income. Yet if government purchases are unchanged, then the government budget constraint requires that second-period taxes be

raised by  $(1+r)\Delta T$ . Because the present value of income is unchanged, the budget constraint is unchanged, and the consumer chooses the same consumption as before the tax cut. Hence, Ricardian equivalence holds.

**With Ricardian equivalence a tax cut does not affect the government budget constraint**

Tax cut in period 1:  $\Delta T_1$

Tax rise in period 2:  $\Delta T_1(1+r)$

$$C_2 = -(1+r)C_1 + (1+r)Y_1 + Y_2$$

$$C_2 = -(1+r)C_1 + (1+r)(Y_1 + \Delta T_1) + Y_2 - (1+r)\Delta T_1$$

$$C_2 = -(1+r)C_1 + (1+r)Y_1 + (1+r)\Delta T_1 + Y_2 - (1+r)\Delta T_1$$

$$C_2 = -(1+r)C_1 + (1+r)Y_1 + Y_2$$

- The whole tax cut is saved to pay for future tax rise
- This type of fiscal policy does not change private consumption

**Temporary increase in government consumption**

- **Direct increase in aggregate demand**
- **Anticipated future tax rise to pay for it**
- **Anticipated fall in life income**
- **Private consumption falls**
- **But the fall in private consumption is smaller than the rise in government consumption, since the fall in private consumption is distributed among all periods (consumption smoothing)**
- **Hence there is an increase in *net* aggregate demand today**

**Permanent increase in government consumption**

- **Direct increase in aggregate demand**
- **Anticipated future tax rise to pay for it**
- **Anticipated fall in life income**
- **Private consumption falls**
- **But now private consumption falls by as much as government consumption increases, since a *permanent* increase in government consumption must be paid for by an equally large *permanent* tax increase**
- **Hence there is no increase in *net* aggregate demand today**

## Two types of fiscal policy

### 1. Automatic stabilisers

- automatic changes in tax revenues and government expenditures because of cyclical developments

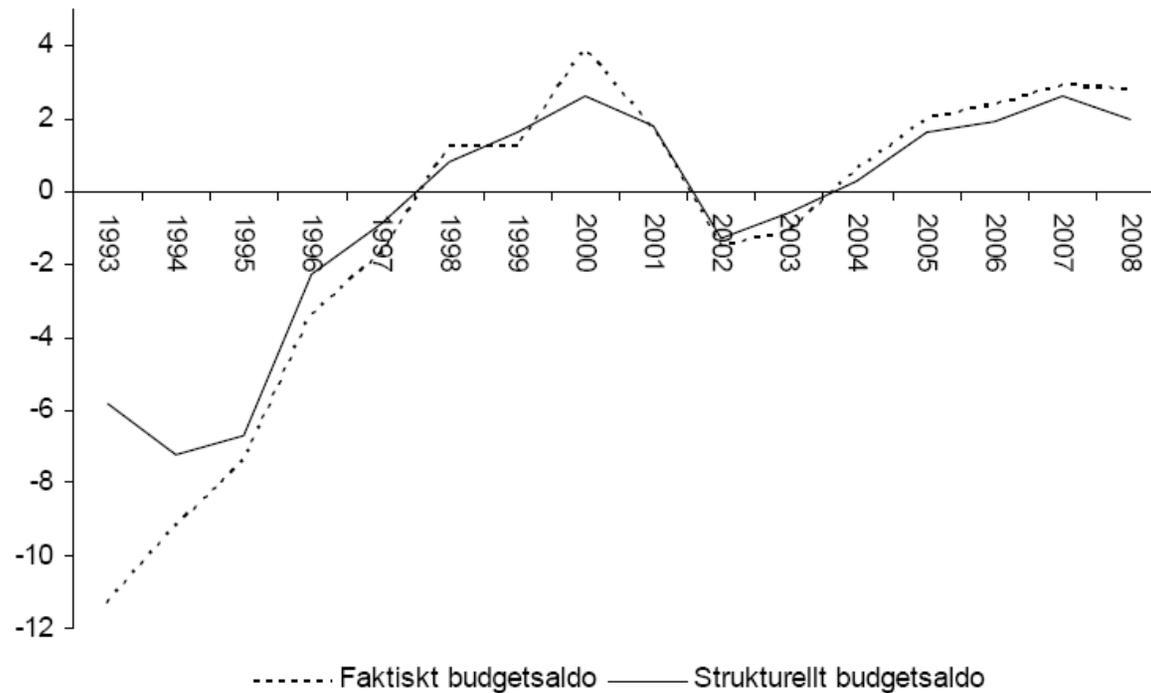
### 2. Discretionary fiscal policy

- active decisions

- The stance of fiscal policy is usually measured by the change in the cyclically adjusted fiscal balance

- The cyclically adjusted fiscal balance is the fiscal balance that would prevail in a normal cyclical situation.
- The cyclically adjusted fiscal balance is computed by adjusting the actual fiscal balance for the cyclical situation.
- Rule of thumb for Sweden: a reduction in the output gap by one percentage point deteriorates the fiscal balance by 0.55 percent of GDP.
- (Cyclically adjusted budget balance in percent of GDP) = (Actual budget balance in percent of GDP) – (GDP gap · 0.55)
- $$\text{GDP gap} = \frac{(\text{Actual GDP}) - (\text{Potential GDP})}{\text{Potential GDP}}$$

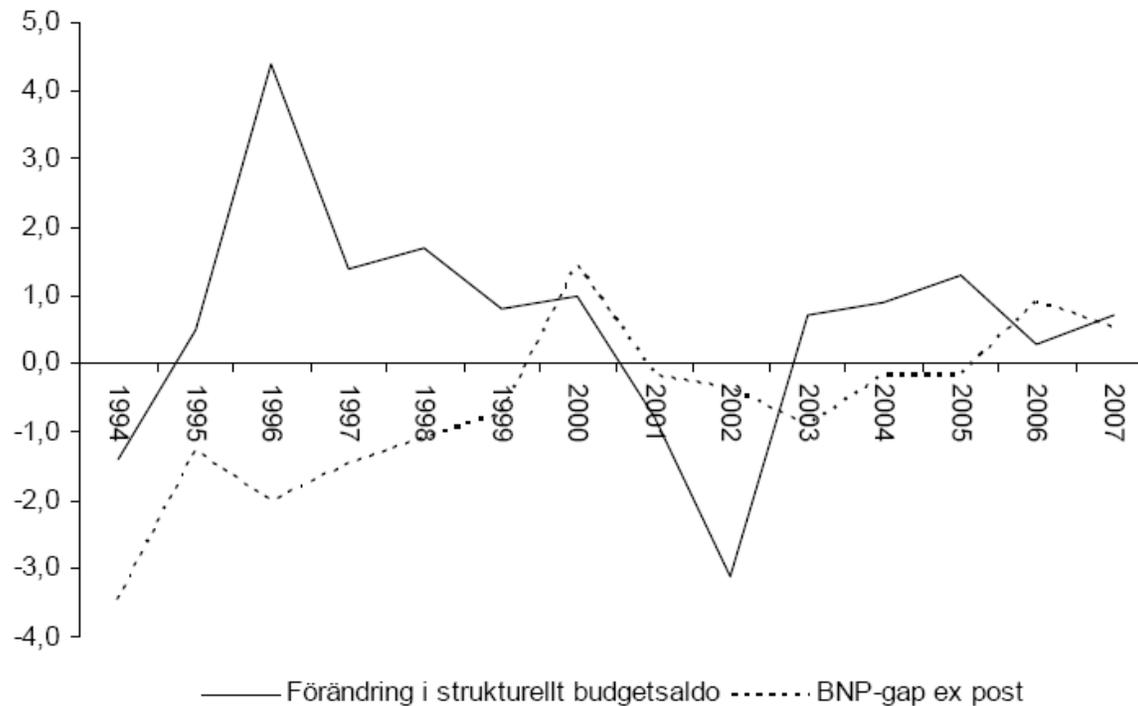
**Figur 2.12 Faktiskt och strukturellt budgetsaldo (procent av BNP)**



*Anm:* Med budgetsaldo avses här den offentliga sektorns finansiella sparande. Det strukturella budgetsaldot inkluderar en justering för engångseffekter. De faktiska utfallen är enligt Budgetpropositionen för 2008.

*Källor:* Finansdepartementet och Konjunkturinstitutet.

**Figur 2.13a Förändring i strukturellt budgetsaldo och produktionsgapets nivå ex post (procent av BNP)**



*Anm:* Med budgetsaldo avses här den offentliga sektorns finansiella sparande. Det strukturella budgetsaldot inkluderar en justering för engångseffekter. De faktiska utfallen är enligt Budgetpropositionen för 2008.

*Källor:* Finansdepartementet och Konjunkturinstitutet.

**Tabell 4.2 Indikatorer för impuls till efterfrågan***Årlig förändring, procent av BNP*

	2007	2008	2009	2010	2011
<b>Finansiellt sparande</b>	<b>1,3</b>	<b>-0,8</b>	<b>-1,7</b>	<b>0,6</b>	<b>0,9</b>
varav					
Automatiska stabilisatorer	-0,2	-1,1	-0,6	0,2	0,5
Engångseffekter	0,0	0,3	-0,3	0,0	0,0
Extraordinära kapitalvinster	0,3	-0,8	0,1	0,0	0,0
<b>Strukturellt sparande</b>	<b>1,3</b>	<b>0,7</b>	<b>-0,9</b>	<b>0,3</b>	<b>0,5</b>
varav					
Diskretionär finanspolitik <sup>1</sup>	-0,9	0,0	-1,1	0,1	0,1
Kapitalkostnader, netto	0,2	-0,1	0,4	0,1	0,0
Kommunsektorns finanser	0,0	0,0	-0,2	0,0	0,0
Övrigt	1,9	0,8	0,1	0,2	0,3
<b>BNP-gap, förändring i procentenheter</b>	<b>-0,4</b>	<b>-1,9</b>	<b>-1,0</b>	<b>0,4</b>	<b>0,8</b>

<sup>1</sup> Avser, som andel av BNP, utgifts- och inkomstförändringar 2007-2011 i förhållande till tidigare år av beslutade och aviserade samt nu föreslagna och aviserade reformer och finansiering (se tabell 8.4).

Källor: Statistiska centralbyrån och Finansdepartementet.

### **Principles of stabilisation policy (consensus view)**

- **Use monetary policy as primary stabilisation tool**
- **Fiscal policy should rely mainly on the automatic stabilisers**
- **Large risks of misusing discretionary fiscal policy**
  - **only in exceptional situations**
  - **large output gaps**
  - **ineffective monetary policy (liquidity trap: zero interest rate bound)**
  - **targeting of low-income groups**

### **Current situation**

- **This is likely to be an exceptional situation**
- **Bank aid?**
- **Tax rebate?**
- **Temporary reduction of value-added tax**
- **Expenditure increases?**
  - **student grants**
  - **public investment**
  - **labour market programmes**
  - **temporary lengthening of benefit periods**