

Lecture 9: Intermediate macroeconomics, autumn 2009

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Topics

- **The Keynesian consumption function**
- **The intertemporal budget constraint**
- **Borrowing constraints**
- **Time-inconsistent preferences**
- **Modigliani's life cycle hypothesis**
- **Ricardian equivalence**
- **Fiscal policy in the current crisis**

*Literature: Mankiw-Taylor, chapters 15 and 17;
Swedish Fiscal Policy Council, chapter 1.*

Theory of consumption

The Keynesian consumption function

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

- Consumption depends on current disposable income

- Marginal propensity to consume, $MPC = \frac{\partial C}{\partial (Y - T)}$

$$0 < MPC < 1$$

- 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

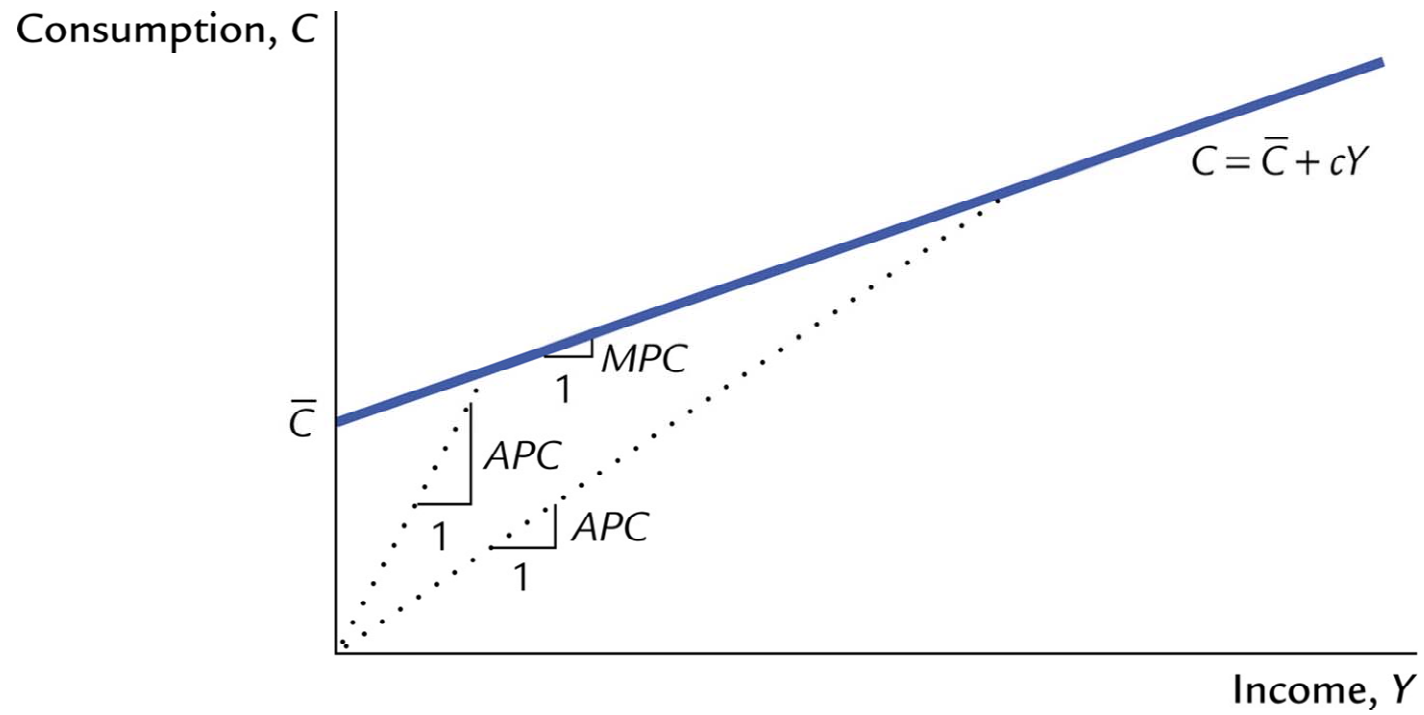


Figure 17-1: The Keynesian Consumption Function

The intertemporal budget constraint – a two-period framework

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

- **Draw the intertemporal budget constraint in the C_2, C_1 -plane.**
 - C_2 as a function of C_1 , holding Y_1, Y_2 and r constant
 - A negatively sloped line with slope $-(1 + r)$.

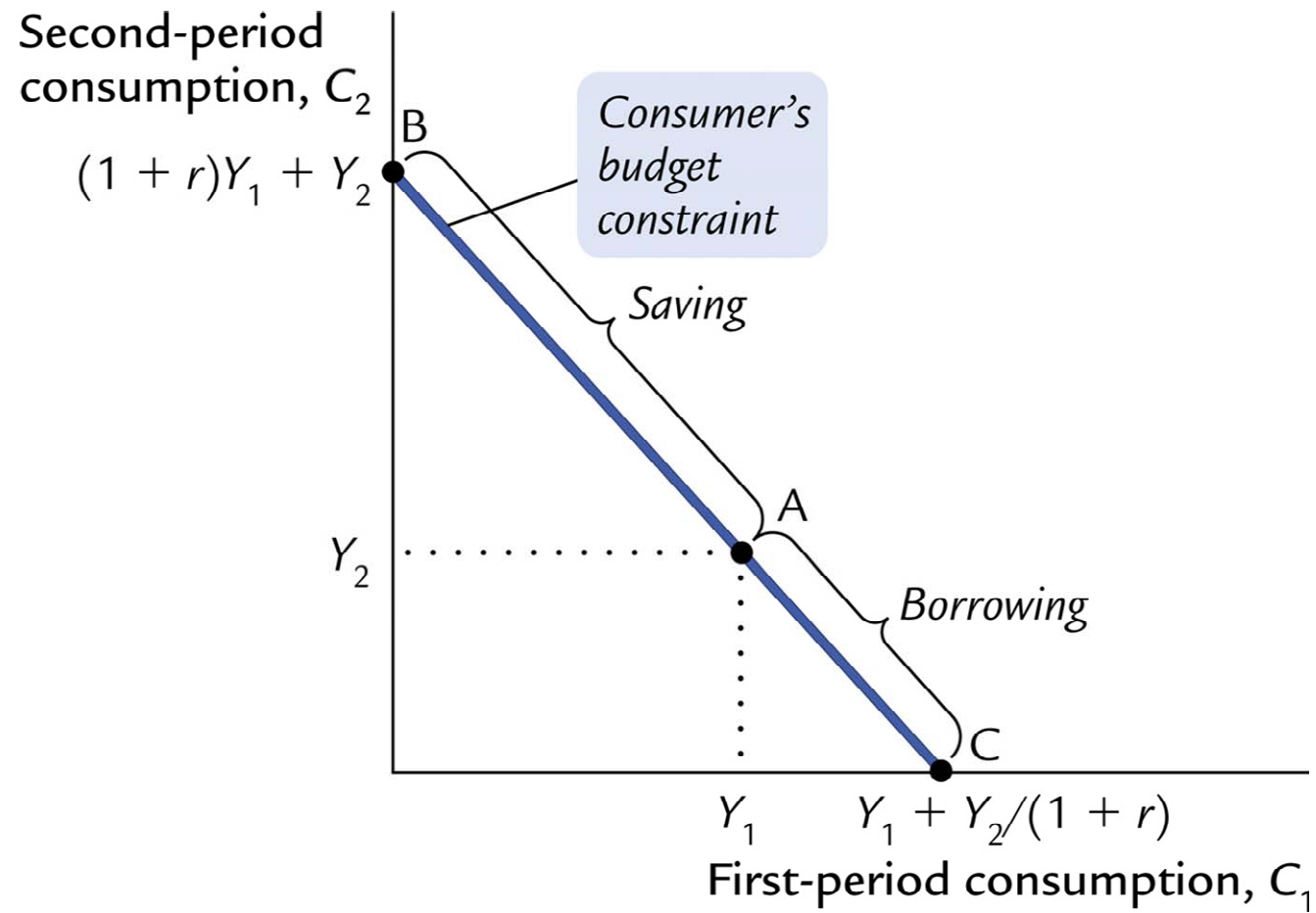


Figure 17-3: The Consumer's Budget Constraint

The budget constraint in present-value terms

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

The budget constraint can be rearranged to:

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

$(1 + r)$ 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.

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 $X/(1+r)^T$.

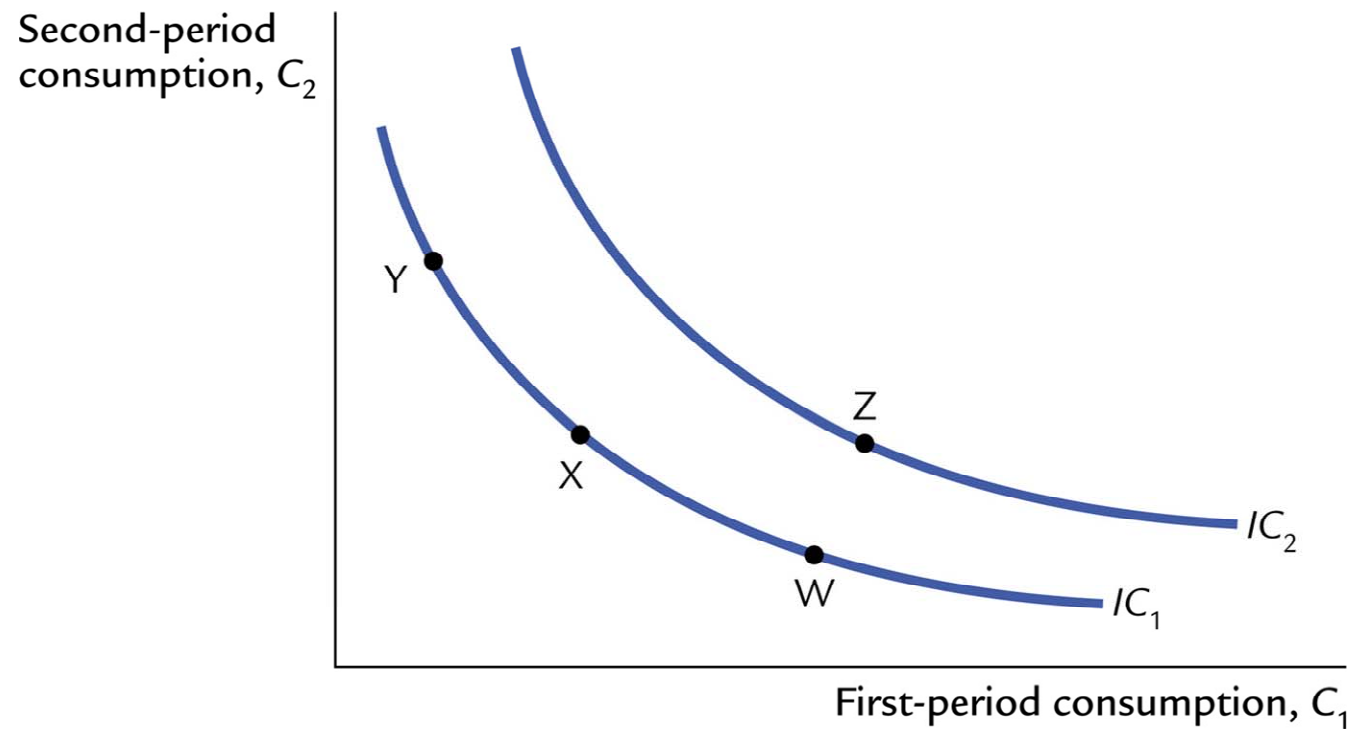


Figure 17-4: The Consumer's Preferences

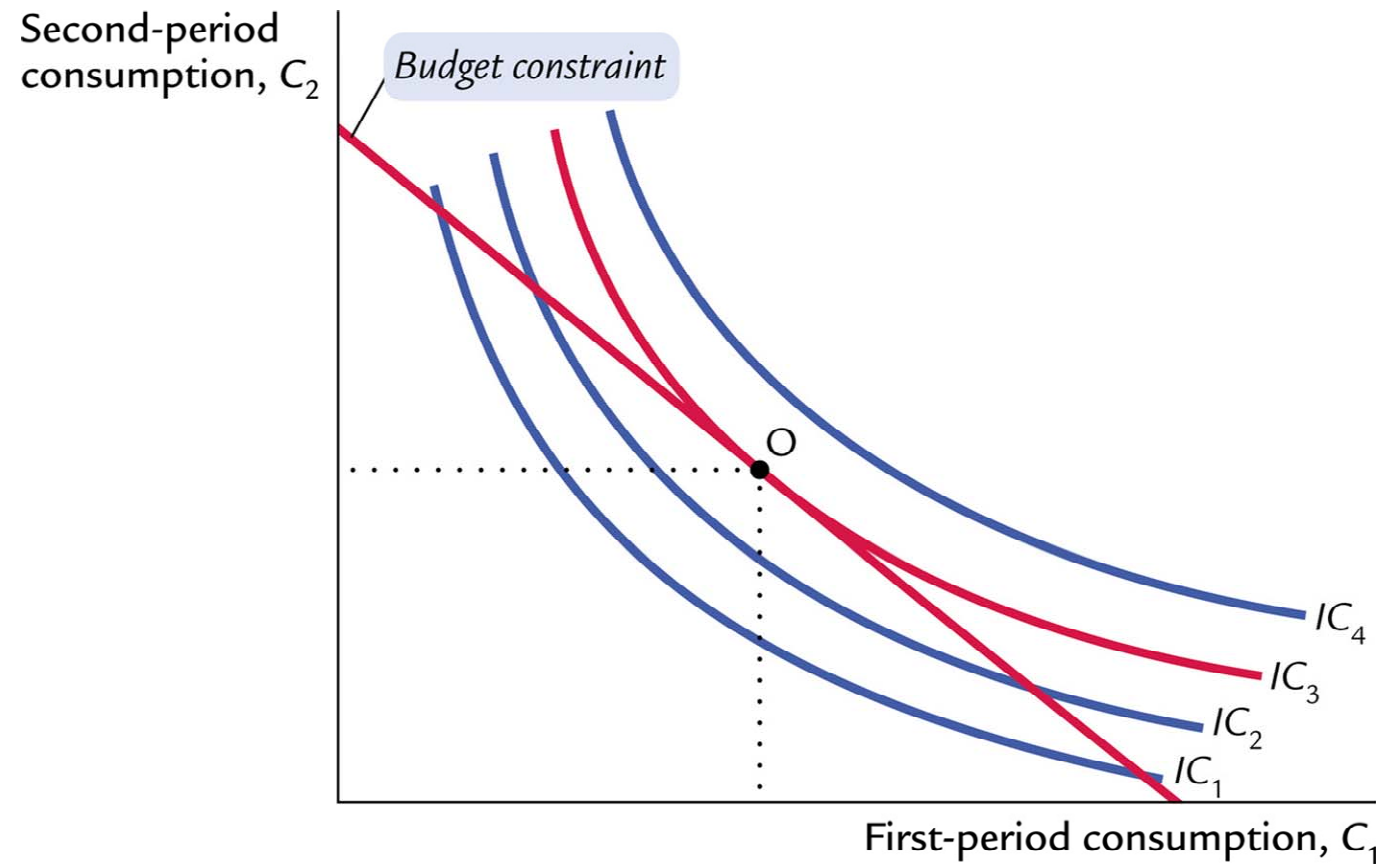


Figure 17-5: The Consumer's Optimum

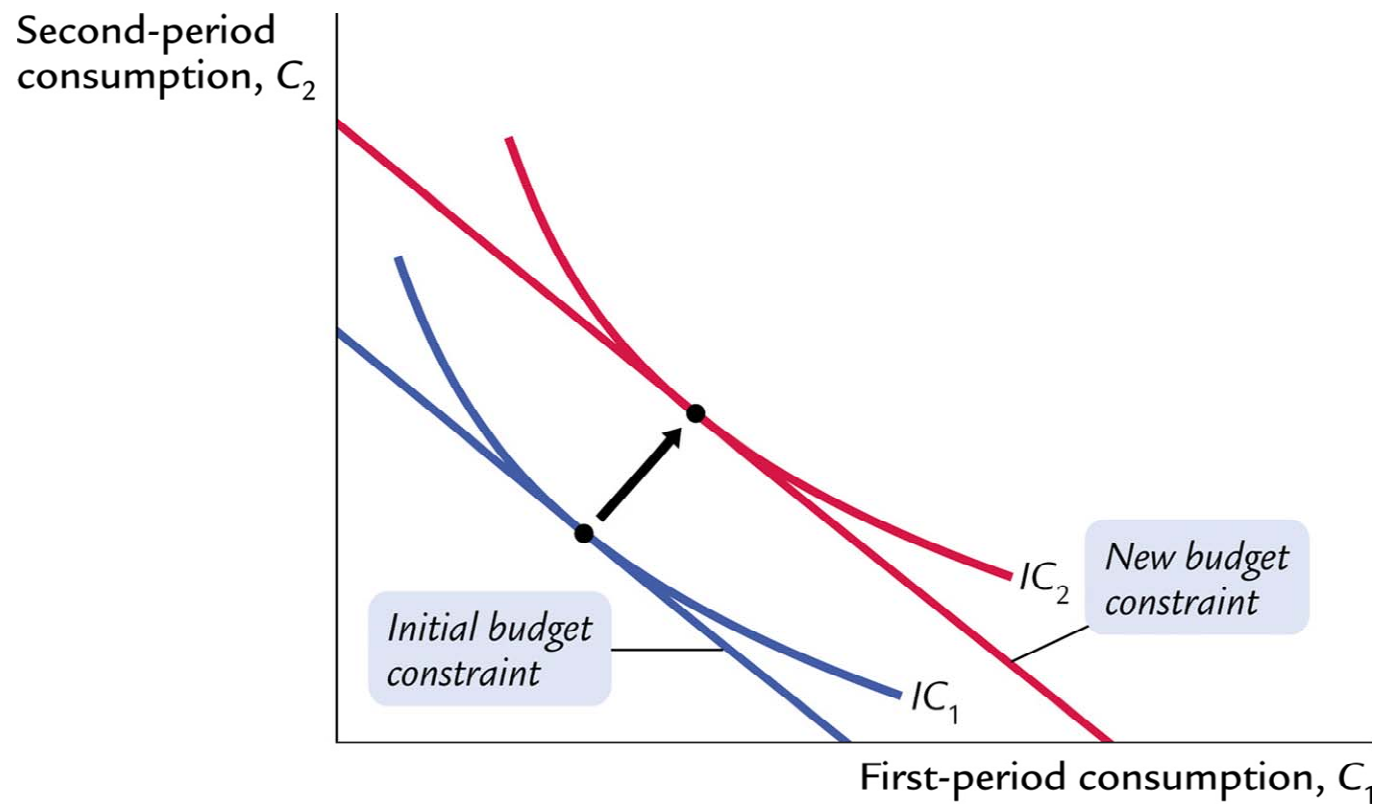


Figure 17-6: An Increase in Income

- **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 between periods)**
 - **Decreasing marginal utility of consumption**
 - **The same consumption level each period if subjective discount rate = market interest rate**

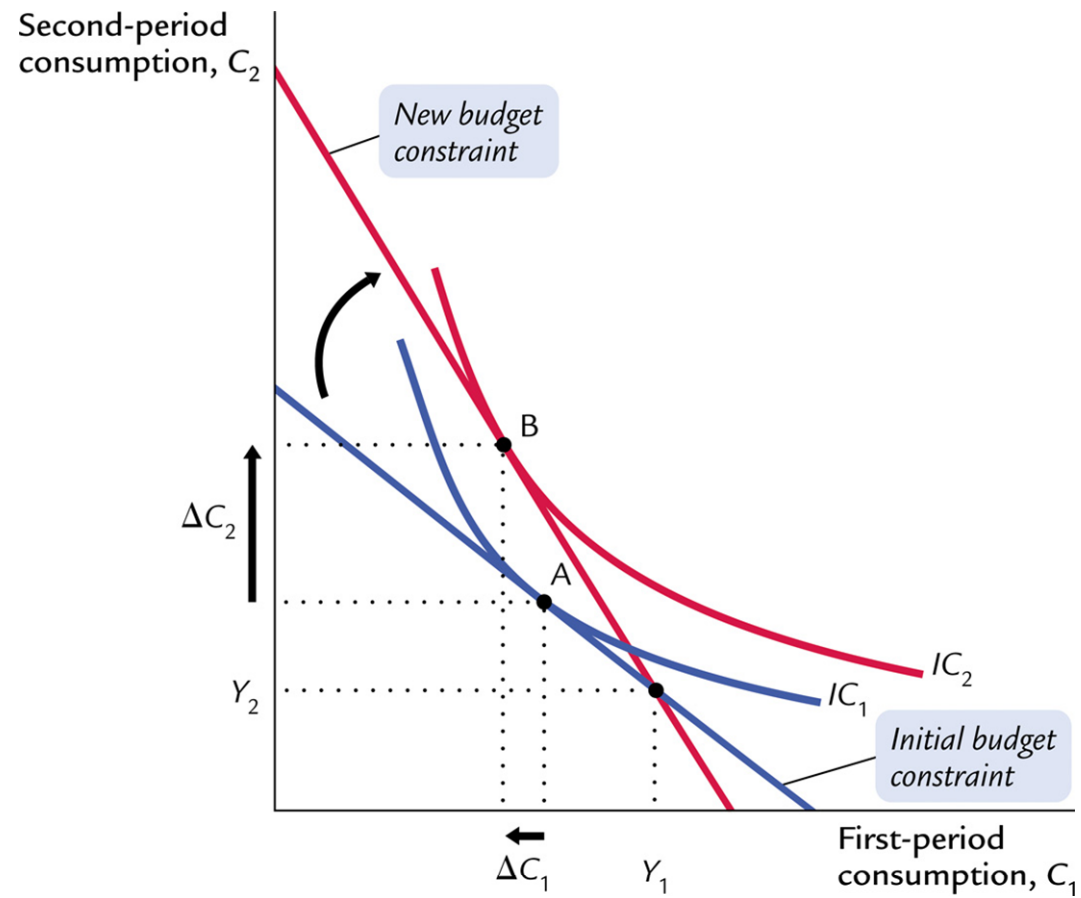


Figure 17-7: An Increase in the Interest Rate

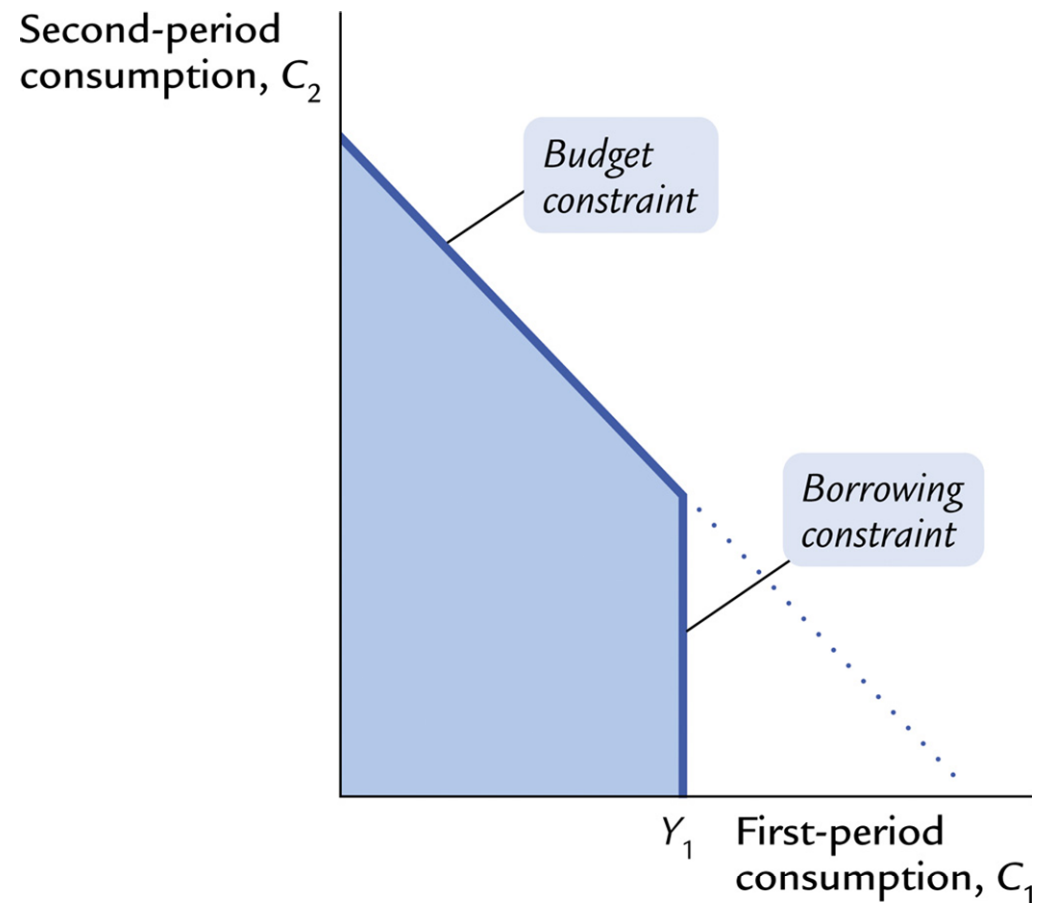


Figure 17-8: A Borrowing Constraint

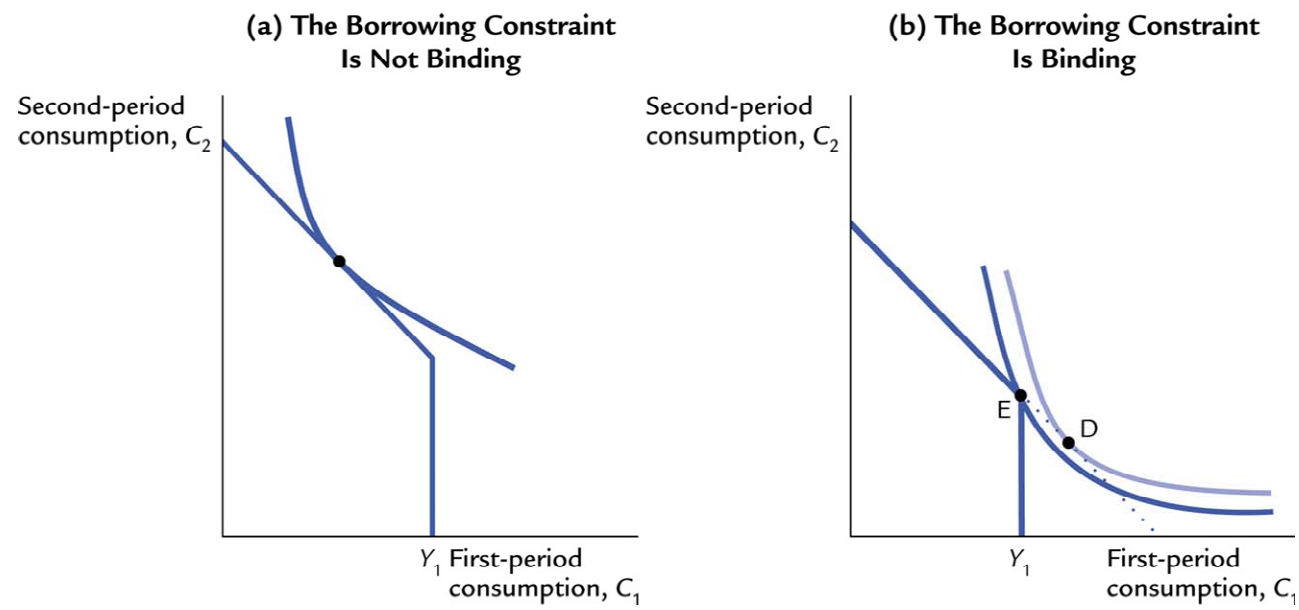


Figure 17-9: The Consumer's Optimum With a Borrowing Constraint

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 ΔY 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

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

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

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

$$MPC_W = 0,02$$

$$MPC_Y = 0,6$$

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

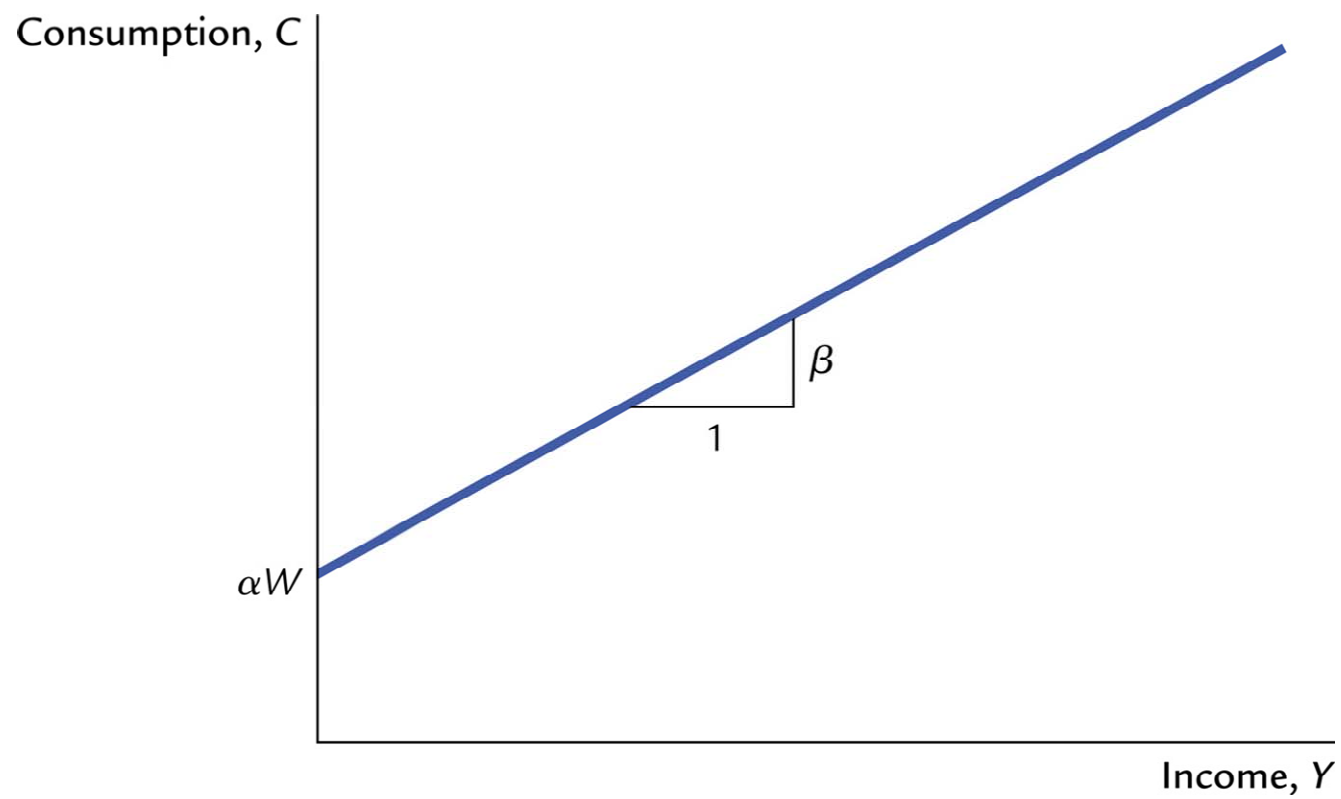


Figure 16.10 The Life-Cycle Consumption Function

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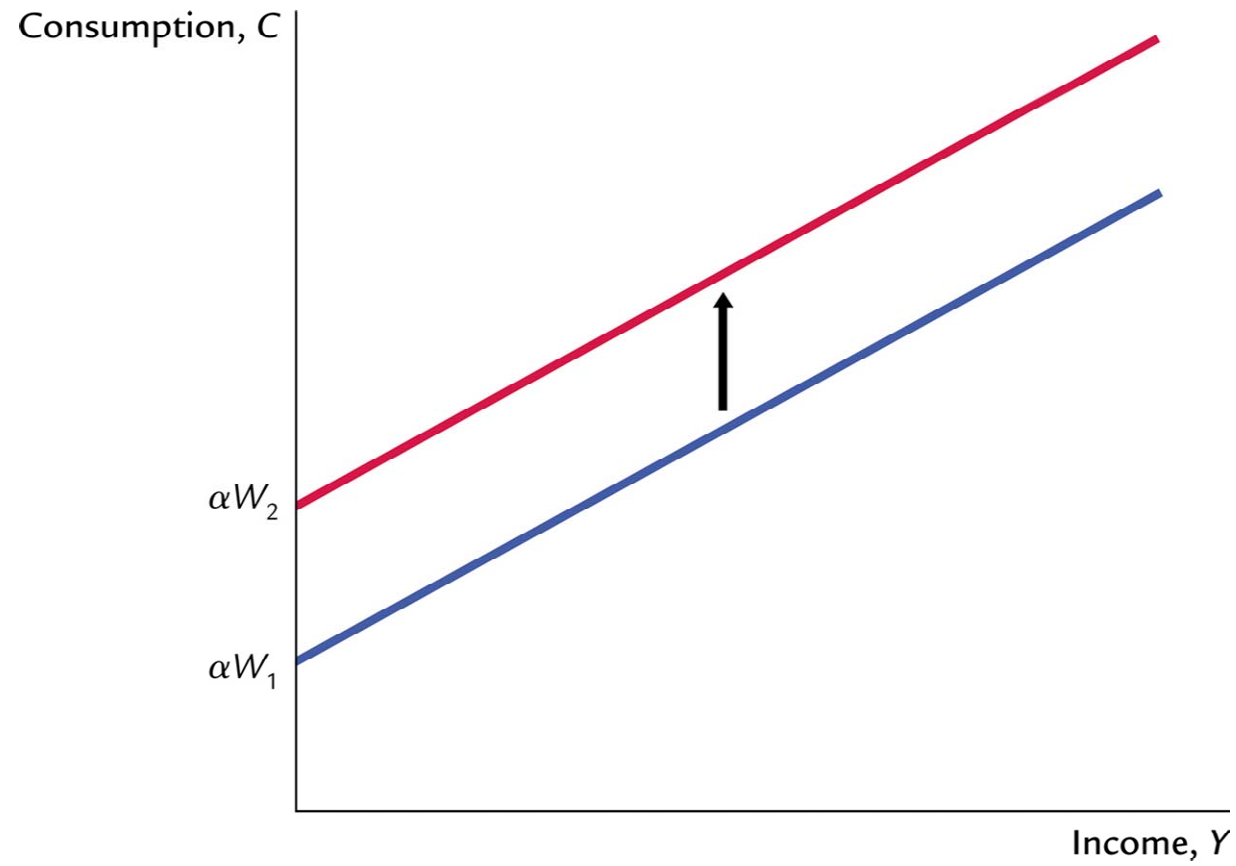


Figure 16.11 How Changes in Wealth Shift the Consumption Function

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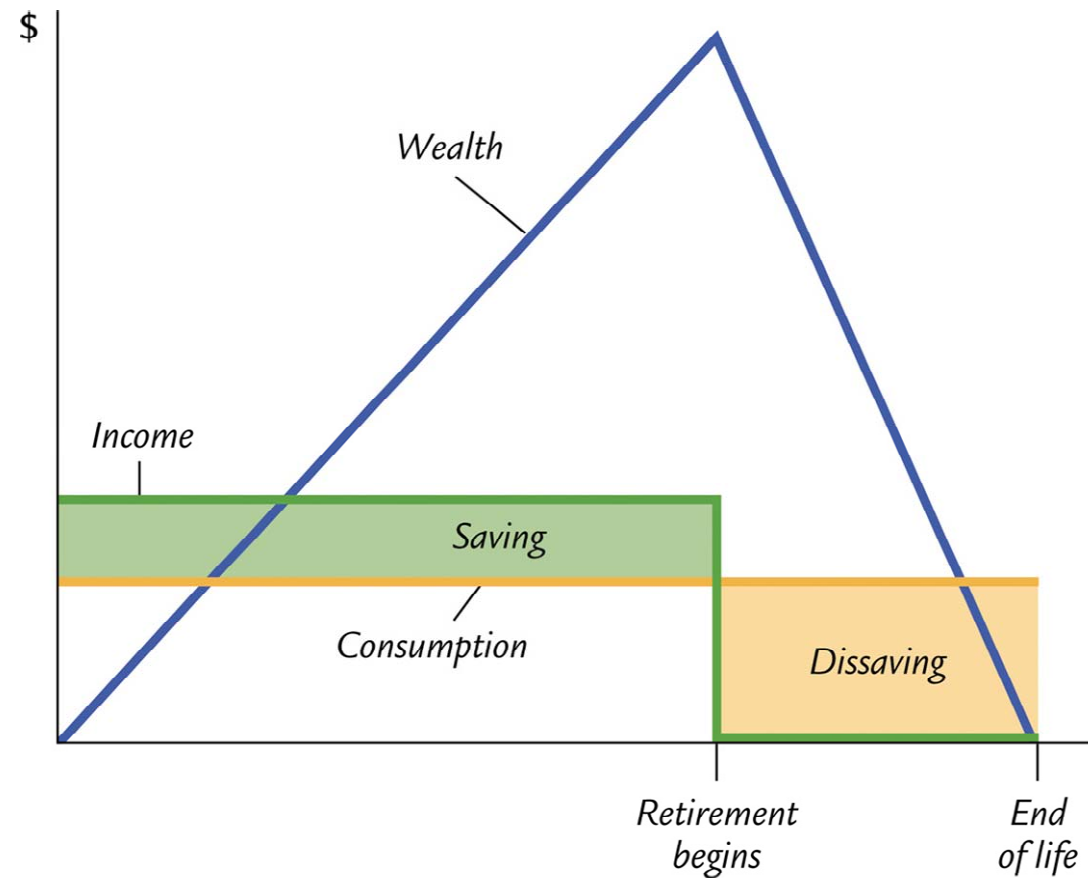


Figure 16.12 Consumption, Income, and Wealth Over the Life Cycle

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Aspects of consumption

- **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**
 - **significant falls in house prices and of stock prices have played a large role in the current recession (US, UK, Ireland, Spain)**
 - **process of debt deflation: when asset prices fall, the value of collateral falls and banks contract credit, which leads to further falls in asset prices.**
 - **reversal of asset price developments may help the upswing**

Asset prices and central bank policy

- **Difficult problem for central bank interest rate policy: 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 earlier and many countries now).**
- **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.**
- **Need for more instruments?**
 - **variations in capital adequacy ratios (equity capital relative to outstanding loans)**
 - **higher capital adequacy ratios on average**

Table 1.2. Real house prices are falling almost everywhere

	Per cent annual rate of change				Level relative to long-term average ¹		
	2000-2006	2007	2008 ²	Latest quarter ³	Price-to-rent ratio	Price-to-income ratio	Latest available quarter
United States	5.3	-0.6	-6.1	-3.2	117	99	Q1 2009
Japan	-4.3	-1.1	-2.9	-3.3	67	66	Q1 2009
Germany	-2.9	-1.2	-2.7	-1.8	71	64	Q4 2008
France	9.5	4.9	-1.8	-7.3	146	127	Q1 2009
Italy	6.1	3.1	-1.1	-2.9	123	112	Q3 2008
United Kingdom	8.8	8.4	-4.3	-15.0	134	126	Q1 2009
Canada	6.7	8.5	-3.4	-11.0	161	116	Q1 2009
Australia	7.1	8.8	0.2	-9.0	154	120	Q1 2009
Denmark	7.9	2.9	-7.9	-13.1	144	132	Q4 2008
Finland	4.7	5.6	-2.4	-8.8	140	97	Q1 2009
Ireland	8.3	-1.8	-11.6	-13.5	154	121	Q4 2008
Netherlands	2.9	2.6	0.7	-2.1	152	145	Q1 2009
Norway	5.5	11.4	-5.2	-10.7	149	117	Q4 2008
New Zealand	9.2	8.3	-8.0	-11.9	140	135	Q4 2008
Spain	11.2	2.6	-3.7	-7.3	172	138	Q1 2009
Sweden	6.7	8.6	0.0	-4.4	155	119	Q4 2008
Switzerland	1.7	1.3	0.2	5.3	86	77	Q1 2009
Euro area ^{4,5}	4.6	2.0	-2.3	-4.5	122	106	
Total of above countries ⁵	4.2	1.5	-4.1	-4.9	116	100	

Note: House prices deflated by the Consumer Price Index.

1. Long-term average = 100, latest quarter available.

2. Average of available quarters where full year is not yet complete.

3. Increase over a year earlier to the latest available quarter.

4. Germany, France, Italy, Spain, Finland, Ireland and the Netherlands.

5. Using 2005 GDP weights.

Source: Girouard *et al.* (2006); and OECD.

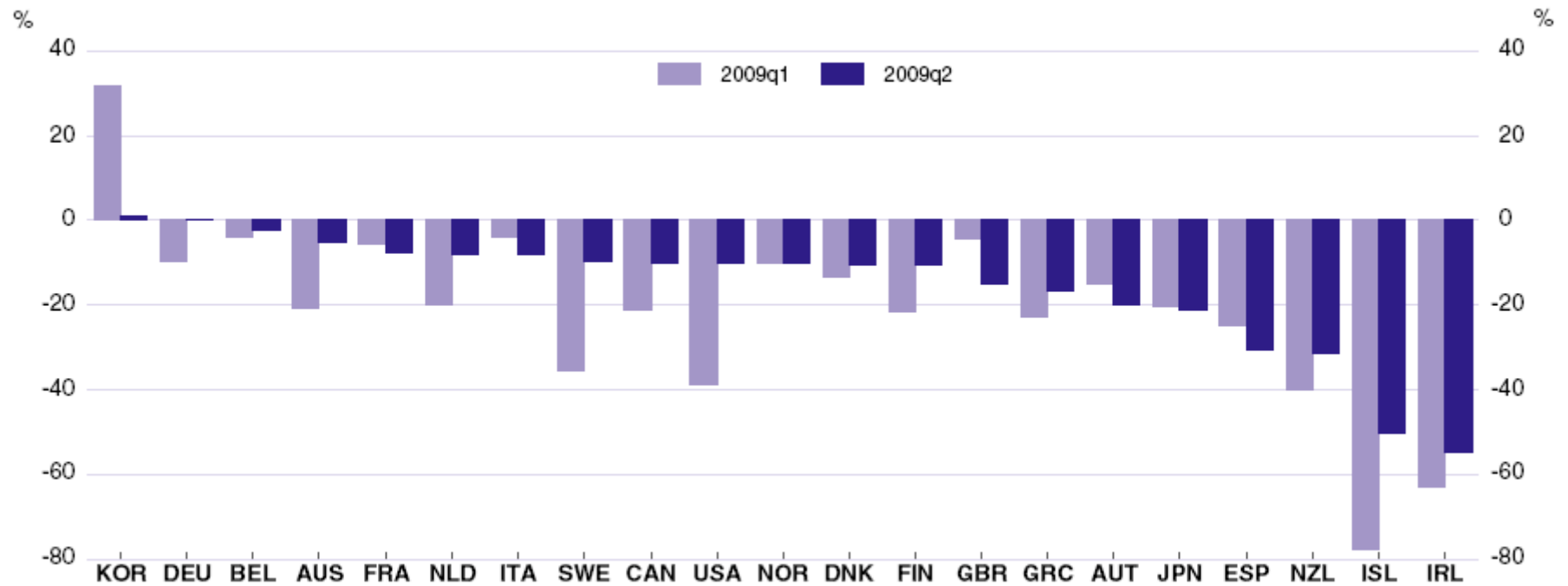
Diagram 34 Hushållens förmögenhet i USA

I relation till disponibel inkomst, kvartalsvärden



Källor: Federal Reserve och U.S. Department of Commerce.

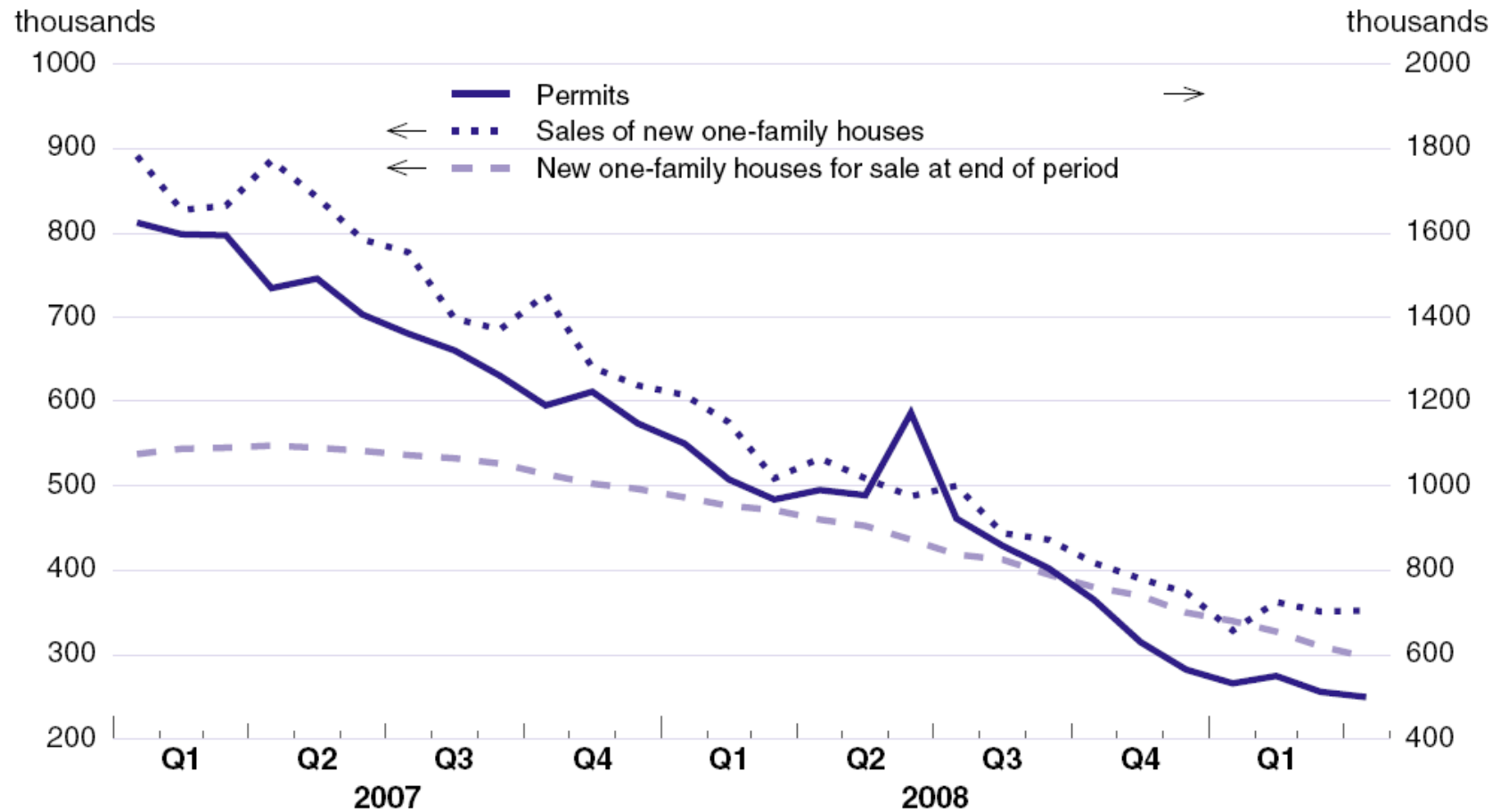
Figure 1.5. Housing investment is falling in almost all countries
 Quarter-on-quarter growth rate, seasonally adjusted at annual rate



Note: 2009q1 and 2009q2 are forecasted for most countries.

Source: OECD Economic Outlook 85 database.

Figure 1.6. **US housing construction may be nearing a bottom**



Source: Datastream.

Ricardian equivalence

- **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.**

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.**

Ricardian equivalence in the Fisher two-period model

G = government consumption

T = tax

D = government budget deficit

Period 1

$$D = G_1 - T_1$$

Period 2

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

The government budget constraint in present-value terms

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

Present values of taxes and expenditures must be equal.

Tax cut in period 1: ΔT_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.

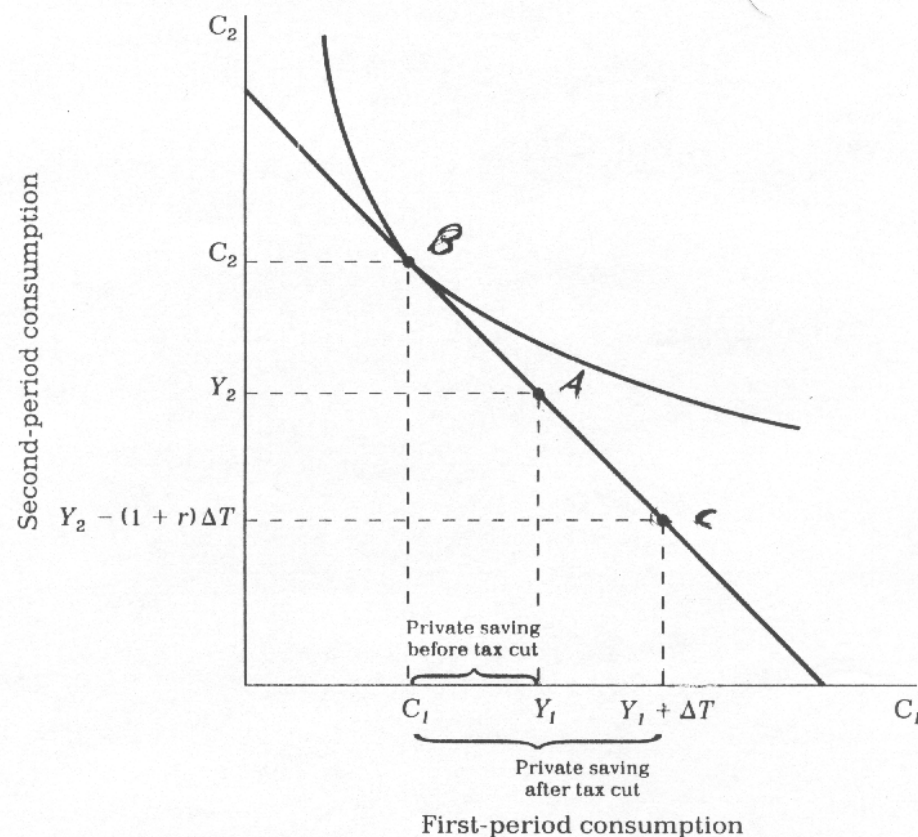


Figure 16-1 A Debt-Financed Tax Cut in the Fisher Diagram. A debt-financed tax cut of ΔT raises first-period income. Yet if government purchases are unchanged, then the government budget constraint requires that second-period taxes be

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: ΔT_1

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

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

Disposable income in period 1: $Y_1 + \Delta T_1$

Disposable income in period 2: $Y_2 - (1+r)\Delta T$

Substitutions give:

$$\begin{aligned} C_2 &= -(1+r)C_1 + (1+r)Y_1 + (1+r)\Delta T_1 + Y_2 - (1+r)\Delta T_1 = \\ &= -(1+r)C_1 + (1+r)Y_1 + Y_2 \end{aligned}$$

- The whole tax cut is saved to pay for future tax rise
- This type of fiscal policy does not change private consumption
- Hence tax cuts are ineffective as a stabilisation policy tool under Ricardian equivalence

Effects of a *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)**
- **The fall in private consumption today is smaller than the rise in government consumption**
- **Hence there is an increase in *net* aggregate demand today**

Effects of a *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

- 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)

$$\text{GDP gap} = \frac{(\text{Actual GDP}) - (\text{Potential GDP})}{\text{Potential GDP}}$$

Principles of stabilisation policy (consensus view)

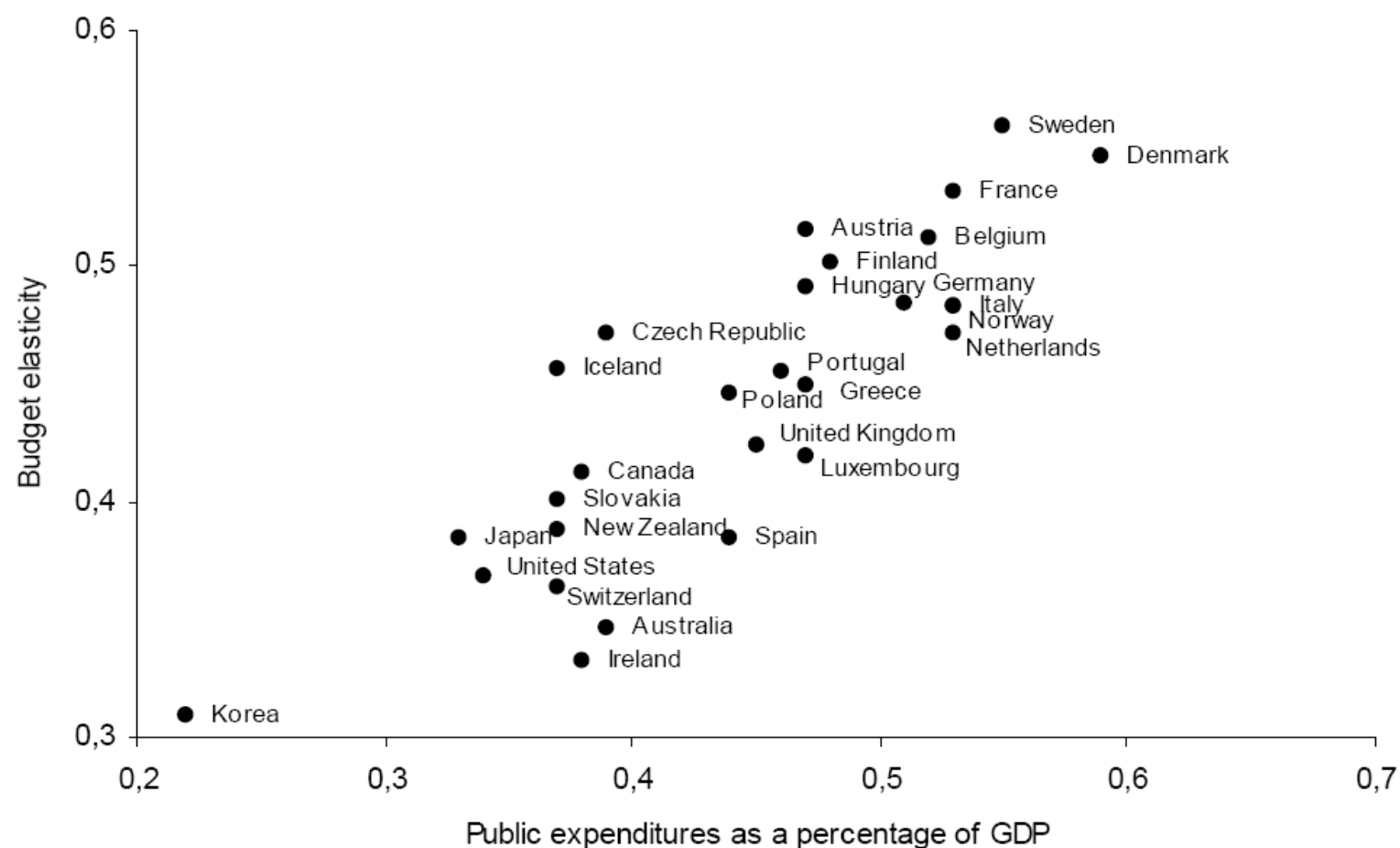
- **Use monetary policy as primary stabilisation tool**
- **Fiscal policy should rely mainly on the automatic stabilisers**
- **Large risks of misusing discretionary fiscal policy**
 - **only in exceptional situations**
 - **large output gaps**
 - **ineffective monetary policy (liquidity trap: zero interest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

Fiscal balance in Sweden

	2005	2006	2007	2008	2009	2010
Actual fiscal balance	2.0	2.4	3.8	2.5	-2.2	-3.4
Cyclically adjusted fiscal balance	0.6	0.5	1.6	2.3	1.4	0.2
GDP gap	1.3	2.5	2.6	0.0	-6.4	-6.5
Change in cyclically adjusted fiscal balance	0.9	-0.1	1.1	0.7	-0.9	-1.2

Source: Budgetpropositionen för 2010

Figure 1.5 Budget elasticity and the size of the public sector



Note: Public expenditure refers to total expenditure as a percentage of GDP in 2005.

Sources: Girouard and André (2005) and OECD (2008a).

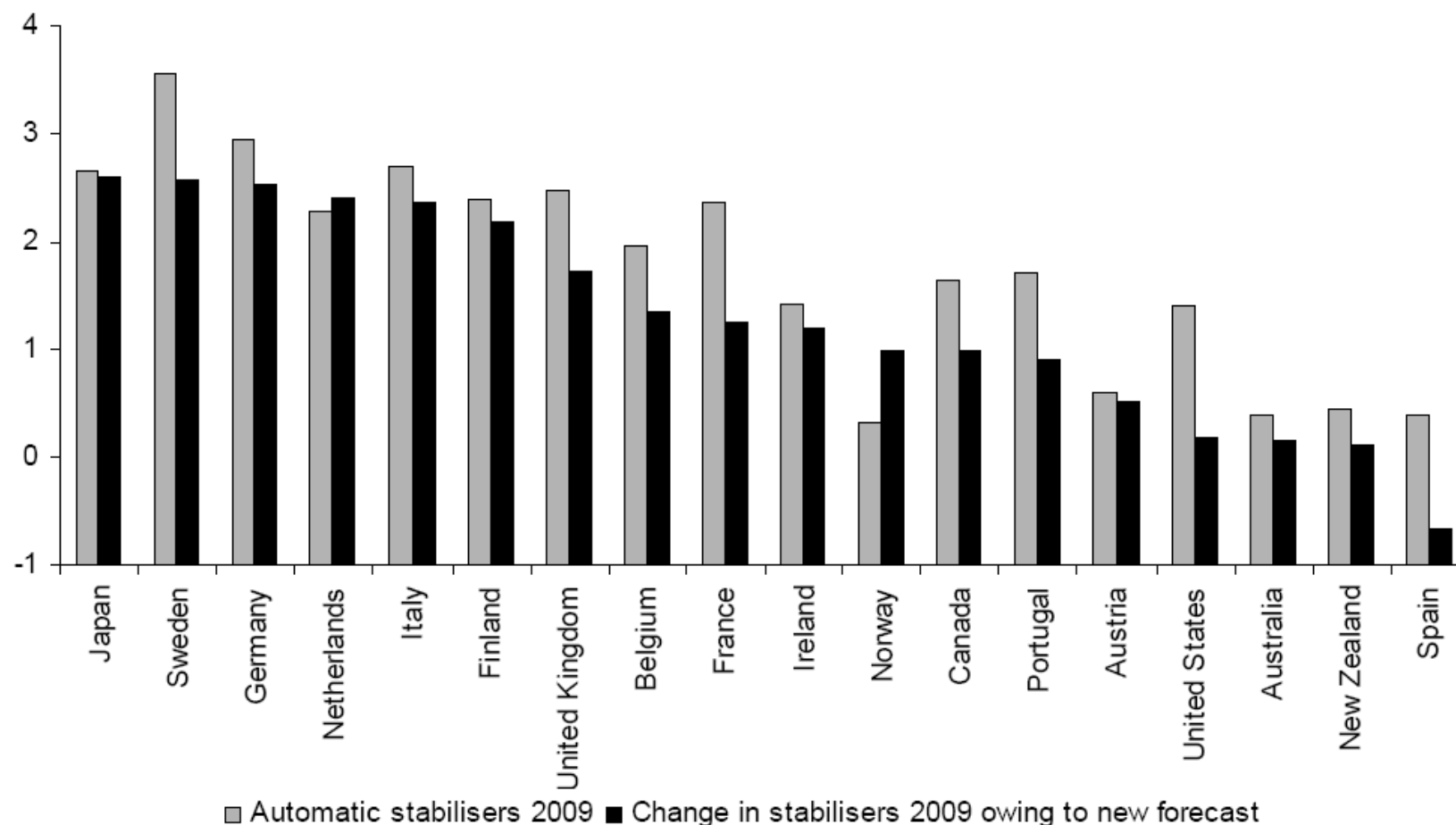
Table 1.8 Budget elasticity over time

	Contribution to budget elasticity					Budget elasticity
	Income tax	Social security contributions	VAT	Corporate tax	Unemployment insurance	
1998	18.0	12.8	12.0	3.5	12.1	58.4
1999	17.7	13.0	12.8	3.8	11.1	58.4
2000	17.2	13.1	12.7	4.9	11.3	59.2
2002	16.5	13.3	12.9	2.7	19.3	54.7
2003	16.9	12.6	13.0	2.9	19.0	54.4
2004	16.8	12.3	12.9	4.1	18.3	54.4
2005	16.9	12.2	13.1	5.2	18.0	55.4
2006	16.8	11.9	12.9	5.2	17.2	54.0
2007	17.0	12.0	13.0	5.0	17.3	54.3
2008	17.6	12.2	13.5	4.6	15.4	53.3
2009	17.4	12.2	13.3	4.9	15.4	53.2

Note: Elasticities in per cent. Data for the tax systems 1998-2007 are based on various annual issues of the OECD Taxing Wages where 2001 is not reported. Data for 2008 and 2009 are partly based on forecasts from the 2009 Budget Bill and the National Institute of Economic Research (2008a).

Source: Fiscal Policy Council calculations.

Figure 1.11 Automatic stimulus measures



Note: Percentage of GDP. The grey bars show the size of the automatically generated stimulus measures, calculated as the OECD's budget elasticity multiplied by the IMF's estimate of the production gap in 2009. The black bars show how much these automatically generated stimulus measures have increased as a result of the IMF's revision of its estimate of the output gap in the past year.

Source: Fiscal Policy Council calculations.

Automatic stabilisers and local governments

- **Local governments (municipalities and regions) must budget for balance or surplus (revenues \geq costs)**
- **Deficits must be covered over a three-year period**
- **When tax revenues fall in a downturn, expenditures must be cut or tax rates raised**
- **Procyclical behaviour which amplifies cyclical swings**
 - **part of automatic stabilisers are invalidated**
- **Argument for higher central government grants to local governments in the recession**
 - **now discretionary decisions (17 billion SEK in 2010)**
 - **better with rules-based system: let central government grants vary countercyclically so that total local government revenues are smoothed over the cycle**
 - **government inquiry on this**
 - **avoid bailing out individual municipalities or regions**
- **Similar problems for US states**
 - **balanced budget requirements**
 - **California could not pay its bills**

Debate on the need for more fiscal stimulus in Sweden

- **The government has been reluctant to do more until now**
 - **reduction of cyclically adjusted fiscal balance for 2009 by around 1 percent of GDP in last year's budget proposal**
 - **little additional stimulus when the crisis deepened**
- **Swedish Fiscal Policy Council: need for more stimulus**
 - **extraordinary situation**
 - **earlier stimulus measures not so effective (earned income tax credit, lower tax rate for high-income earners)**
 - **less income protection in the case of unemployment than before.**

Proposals of Swedish Fiscal Policy Council

- **Temporary stimulus measures**
 - **temporary central government grants to local governments**
 - **temporary rise in unemployment benefits**
 - **temporary tax rebate for low-income earners**
 - **higher study support**
- **High multiplier for government consumption**
- **High MPC for low-income earners**

Government budget proposal for 2010

- **Additional stimulus measures of around 1 percent of GDP**
 - **temporary grants to local governments**
 - **more resources to labour market programmes**
 - **new permanent earned income tax credit**
 - **permanent tax cut for persons over 65 years of age**
 - **some expenditure increases**
- **Too much of permanent measures?**
 - **risk for future sustainability of public finances**
 - **very difficult to estimate cyclically adjusted fiscal balance in deep recessions**
 - **more important to stimulate demand than supply now**