



THE UNIVERSITY OF
SYDNEY

ECON1002: INTRODUCTORY MACROECONOMICS

LECTURE 2: SAVINGS, INVESTMENT AND WEALTH

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Dr Jordi Vidal-Robert

Lecturer | Assistant Professor

School of Economics | University of Sydney

Based on slides Wills and Bernanke, Olekalns and Frank

Chapter 2

**Measuring macroeconomic
performance:
saving, investment and wealth**

Learning objectives

- 2.1 What is the relation between saving and wealth?
- 2.2 For what reasons do people save?
- 2.3 What had happened to the household saving ratio in Australia?
- 2.4 What does national saving mean?
- 2.5 How are investment and capital formation related?
- 2.6 What role does the real interest rate play in determining saving and investment?

Overview

1. Wealth

2. Savings

3. Investment

**4. Financial Markets:
Where Savings meets Investment**

Overview

1. Wealth

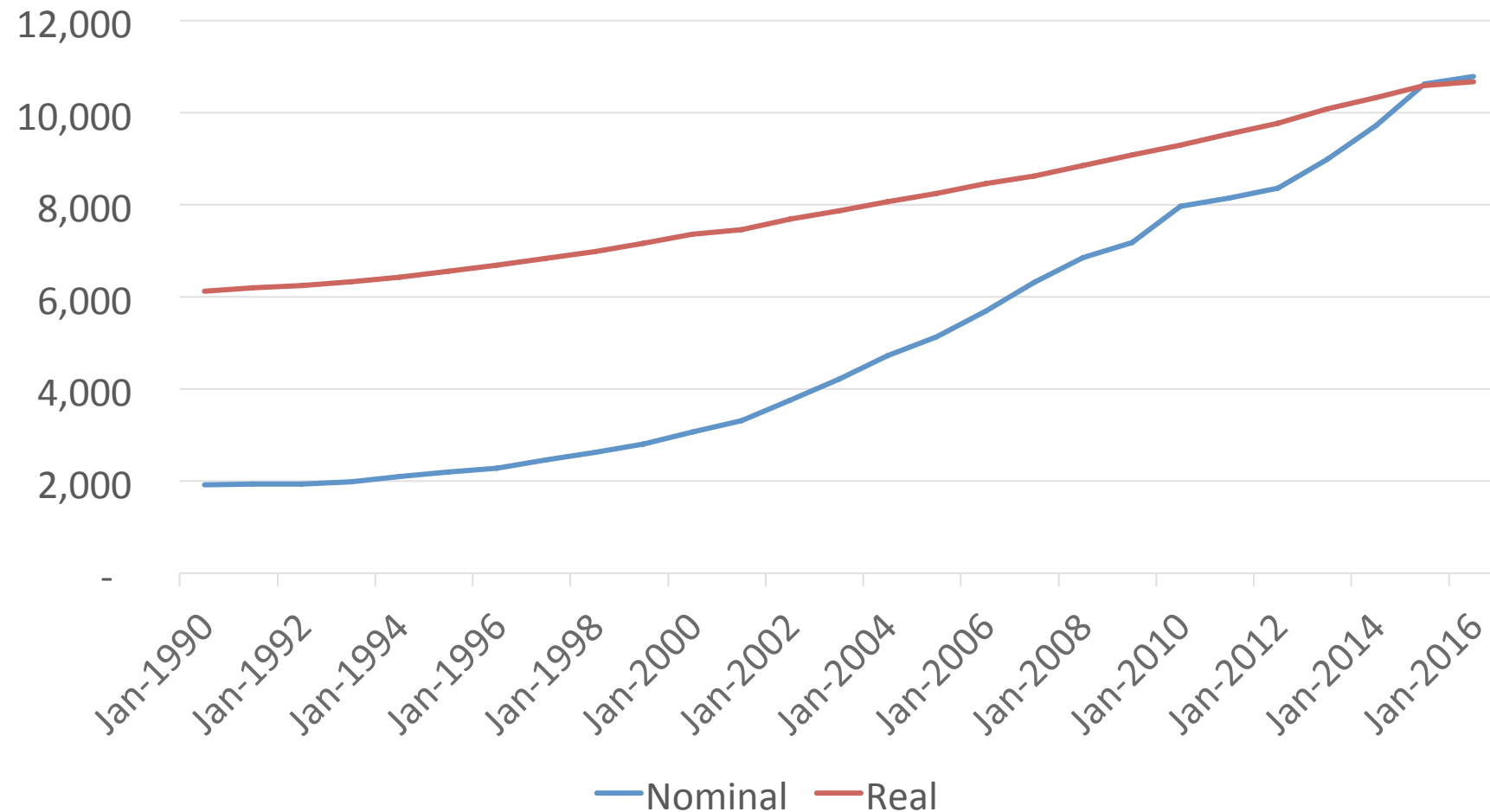
2. Savings

3. Investment

**4. Financial Markets:
Where Savings meets Investment**

Australia's national wealth has increased steadily over time

Australian net worth, nominal and real, \$ billions

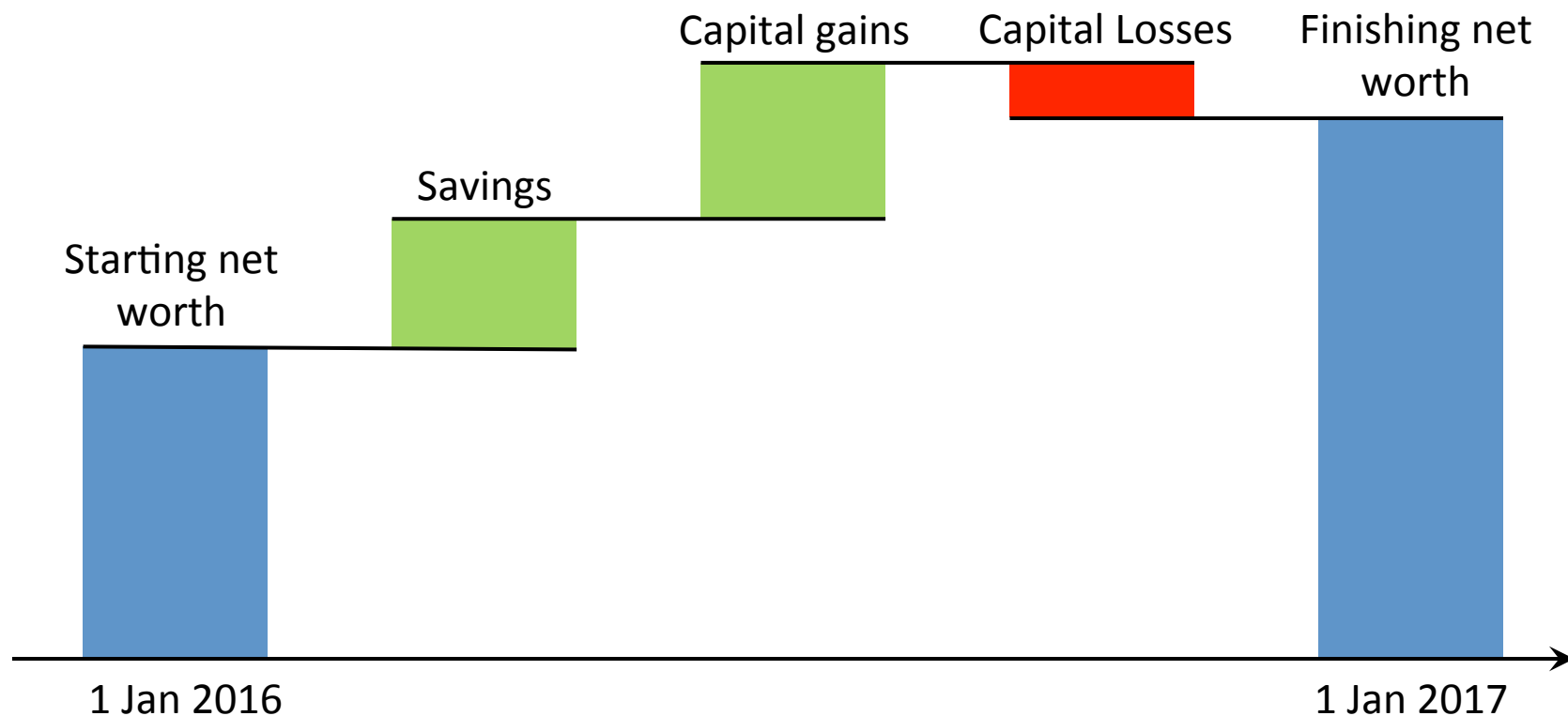


Source: ABS 5204.010

Wealth is a stock; savings, investment and capital gains are a flow



Wealth can increase by savings or by capital gains



- Capital gains/losses are changes in the value of wealth you already own

Balance sheet identities

- Saving is current income minus current spending.
- Saving rate is the proportion of total income devoted to saving.
- Capital gains (or capital losses) are changes in the values of the assets owned.
- Change in net worth = Saving + Capital gains – Capital losses

continued

Balance sheet identities ...continued

- Assets are anything of value that one owns.
- Liabilities are the debts one owes.
- Net worth is equal to assets minus liabilities.

Wealth (net worth) is equal to assets (something of value) minus liabilities (something owed)

TABLE 2.1 Mary's balance sheet

ASSETS		LIABILITIES	
Cash	\$80	Student loan	\$3000
Cheque account	\$1200	Credit card balance	\$250
Shares	\$1000		
Car (market value)	\$3500		
Furniture (market value)	\$500		
Total	\$6280	Total	\$3250
		Net worth	\$3030

If Mary saved \$20 this week how would that change her net worth?

Stocks and flows

- Flow variables are measured over a period of time.
 - Example: Mary saves \$20 per week.
- Stock variables are measured at a point in time.
 - Example: Mary's wealth of \$3030 as of 1 January 2011.

Overview

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Where Savings meets Investment

Savings is important because it finances future investment

- Savings are income set aside
- Economic growth is driven by increasing human and physical capital
- Capital is built by investment, which is taken from national savings (income/GDP which is not consumed) or borrowed from abroad
- Borrowing from abroad can be risky if it quickly stops (eg. Capital flight from developing countries)
- Households can choose to consume now, or save and invest in capital, which will raise economic growth so they can consume more tomorrow

Why do households save?

- Households generally save for three reasons:
 1. Life-cycle saving
 - Saving to meet long-term objectives such as saving for cars, houses, children's education and future retirement.
 2. Precautionary saving
 - Saving for protection against unexpected setbacks, such as the loss of a job or a medical emergency.
 3. Bequest saving
 - Saving done for the purpose of leaving an inheritance to future generations.

Saving and the real interest rate

- The real interest rate is the ‘reward’ for saving.
 - The higher the interest rate, the more attractive saving is, as the higher the benefit received from saving.
- However, for ‘target’ saving:
 - Higher interest rates will achieve the target quicker, and can actually reduce saving.
- Empirical evidence suggests modest increases in saving at higher interest rates.

Income and national saving

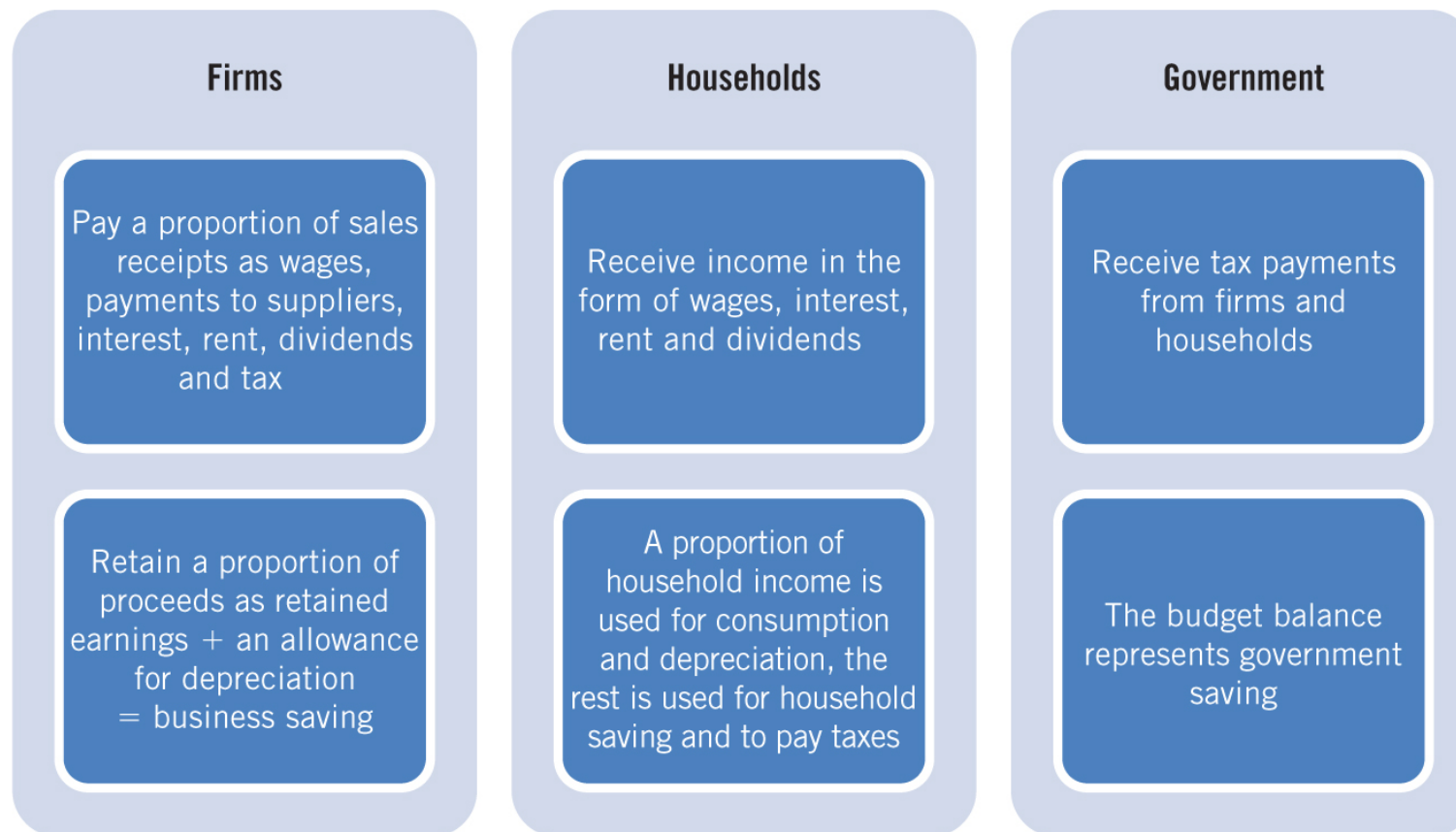


Figure 2.7 **Income and national saving** Each of these three sectors in the economy receives an income flow each period. After meeting their current needs, what is left over from this income flow represents saving. The combined saving of the three sectors is *national saving*.

National savings is GDP that is not consumed, which we can see from rearranging the “Expenditure Method” of measuring GDP

The GDP Identity (from Lecture 1)

$$Y = C + I + G + NX$$

GDP *Household consumption* *Investment* *Government spending ($C_G + I_G$)* *Net Exports (Exports – Imports)*

- National saving is current income less spending on current needs
- What part of this spending is just for current needs?

Spending on current and future needs

- Investment (I)
 - Spending on capital equipment to expand the economy's future productive capacity; it is saving.
- Consumption (C)
 - Spending largely on current needs, but also durable goods which provide services into the future.
- Government spending (G)
 - A mixture of spending on current needs and funding for future needs.

Rearranging the GDP identity we find that, in a closed economy, national saving = national investment

i. Closed economy

For simplicity let $NX = 0$ (a “closed economy” with no trade):

$$Y = C + I + G$$

As $G = C_G + I_G$, rearranging gives:

$$Y = C + I + (C_G + I_G)$$

$$Y - C - C_G = I + I_G$$

As Savings is GDP which is not consumed we have:

$$Y - C - C_G = S$$

$$S = I + I_G$$

So, in a closed economy, national savings = national investment.

Note: the textbook assumes $I_G = 0$, so that $G = C_G$. These slides give a more detailed picture.

Introducing taxes we see that national savings is a combination of both private and government savings

i. Closed economy

Starting from the previous slide, savings equals income less consumption:

$$S = Y - C - C_G$$

Introducing net taxes ($T = \text{taxes} - \text{transfers}$) which are paid from household's income to the government:

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

$$S = S_p + S_G$$

So, National savings (S) is equal to private (S_p) plus public (S_G) savings.

Public savings ($S_G = T - C_G$) is part of the government's "budget balance"

$$\text{Gov't budget balance} = T - C_G - I_G$$

The government budget can be in surplus (>0 , repaying debt), balanced ($=0$), or deficit (<0 , borrowing/increasing debt).

Private and public components of national saving

continued

- Transfer payments
 - Payments the government makes to the public for which it receives no current goods or services in return.
- Private saving
 - The saving of the private sector of the economy is equal to the after-tax income of the private sector minus consumption expenditures ($Y - T - C$); private saving can be further broken down into household saving and business saving.
- Public saving
 - The saving of the government sector is equal to net tax payments minus government purchases ($T - G$).

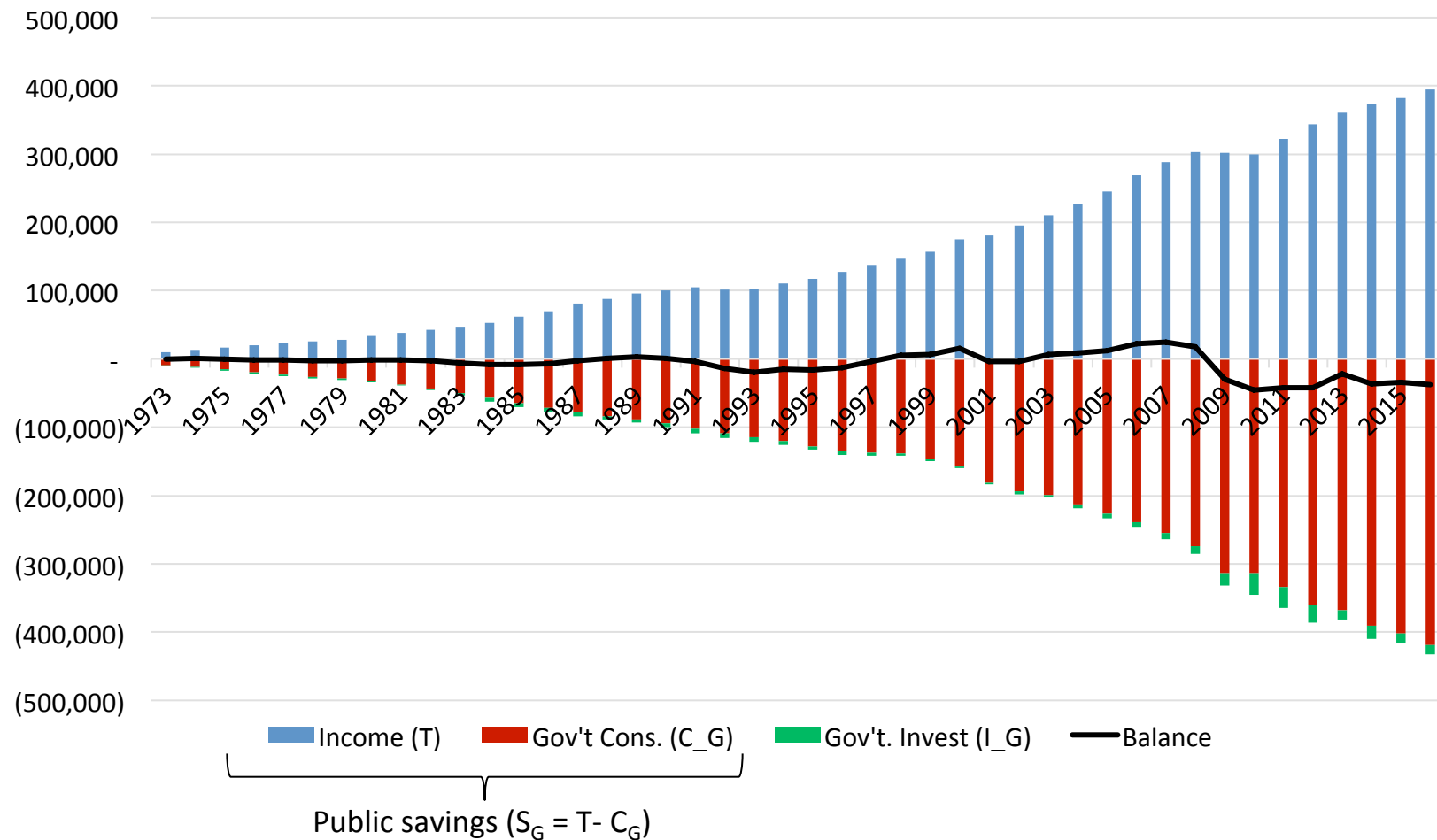
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Public saving and the government budget

- **Balanced budget**
 - Taxes and spending in a given year are equal.
- **Government budget deficit**
 - The excess of government spending over tax collections.
 - It is also called public debt = $(T - G) < 0$.
- **Government budget surplus**
 - The excess of government tax collections over government spending; the government budget surplus equals public saving.
 - It is also called public saving = $(T - G) > 0$.

The Australian national government went into deficit (borrowing) in 2009 to stimulate the economy by reducing saving and increasing investment

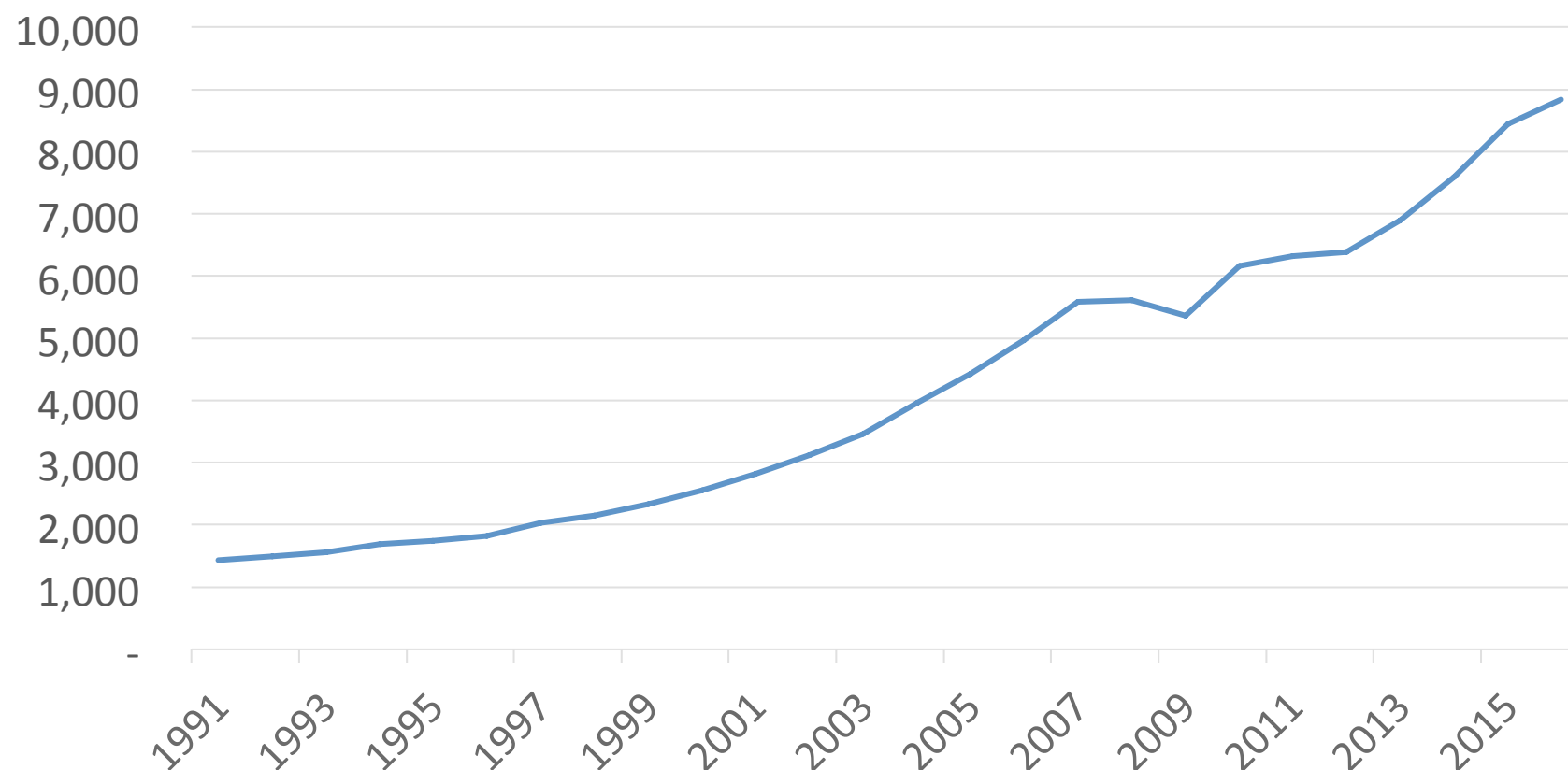
Australian national general government income, consumption and investment, \$ millions



Source: ABS 5204.030 and 5204.032

In Australia household wealth has steadily increased (except for a small dip during the 2007-09 financial crisis)

Australian household net worth, nominal, \$ billions

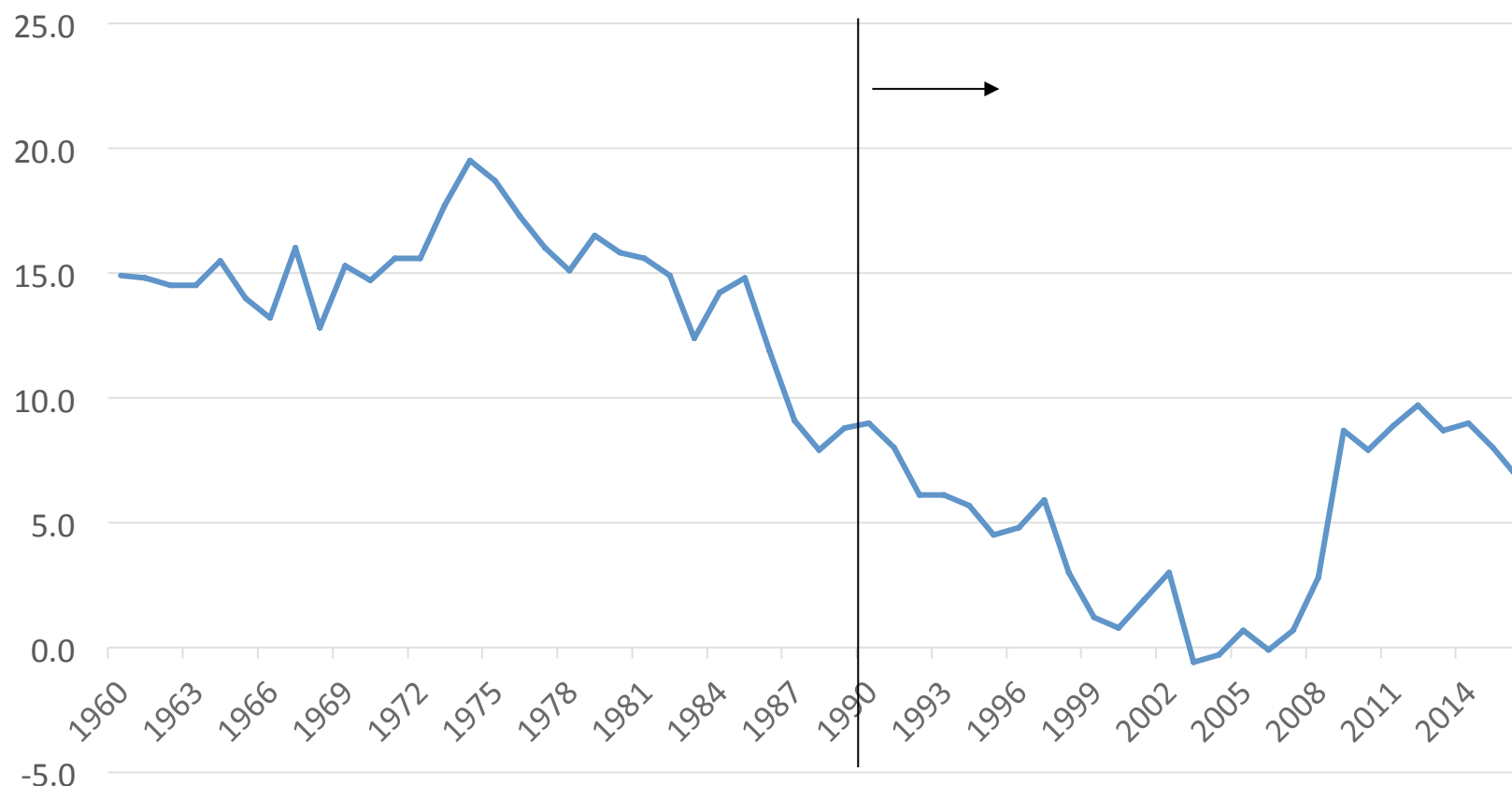


- Note: wealth is also owned by businesses and government

Source: ABS 5204.038

...This is despite households saving less, due to easy credit (Keating's bank liberalization in 1983), compulsory super (1992)...

Household saving ratio, % of income



For detail: <http://www.rba.gov.au/speeches/2011/sp-ag-220911.html>

Source: ABS 5204.001

Is low household saving a problem in Australia?

- Household saving in Australia fell substantially during the 1990s and has been negative in the early 2000s.
- Low household saving in Australia is not a serious problem.
 - It is total national saving that matters for capital formation.
 - Low household saving has been offset by increases in saving by business firms in recent years.

...And falling nominal interest rates as inflation came under control

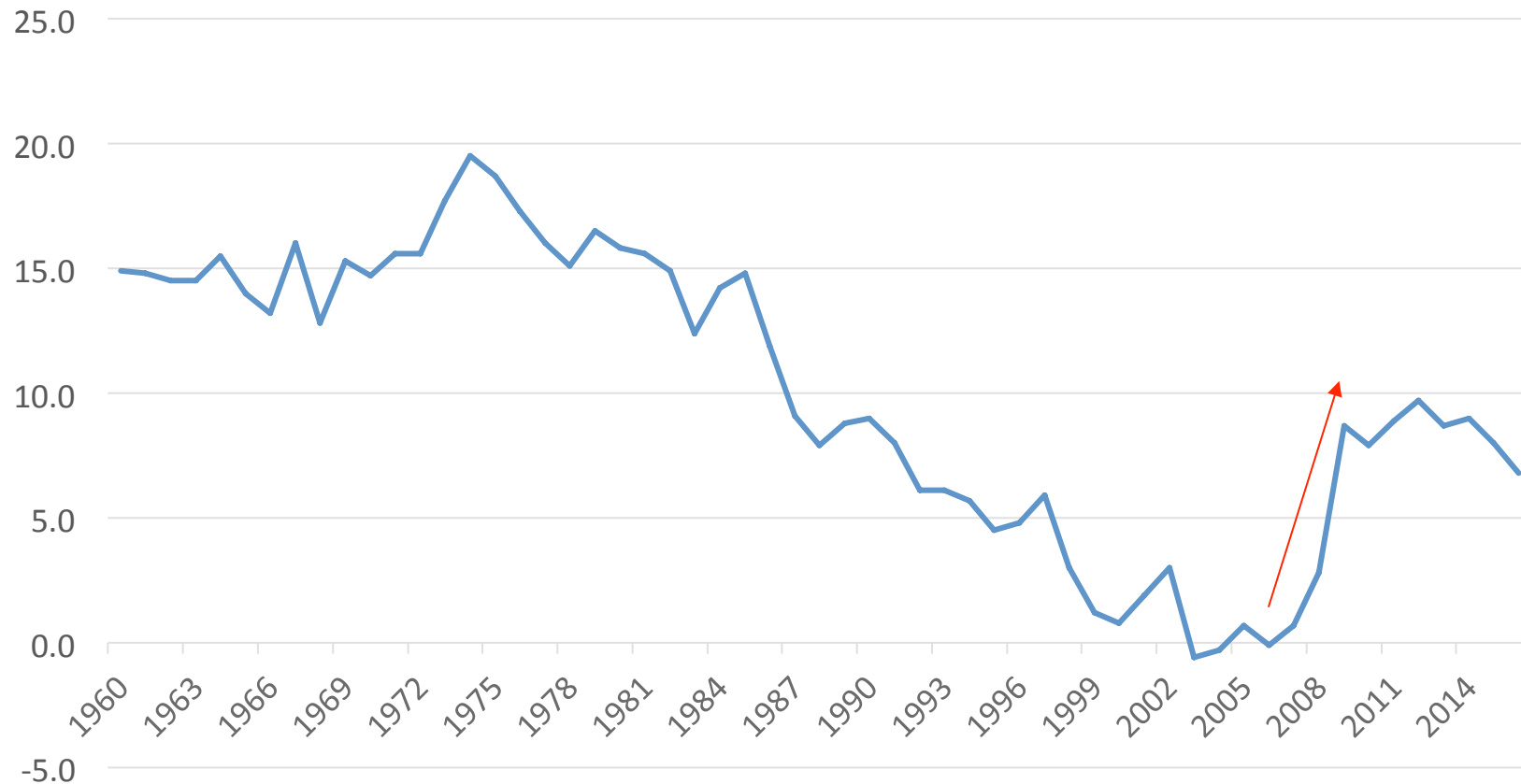
3 month bank bill yield, %



Source: RBA

After the financial crisis household saving jumped up...

Household saving ratio, % of income



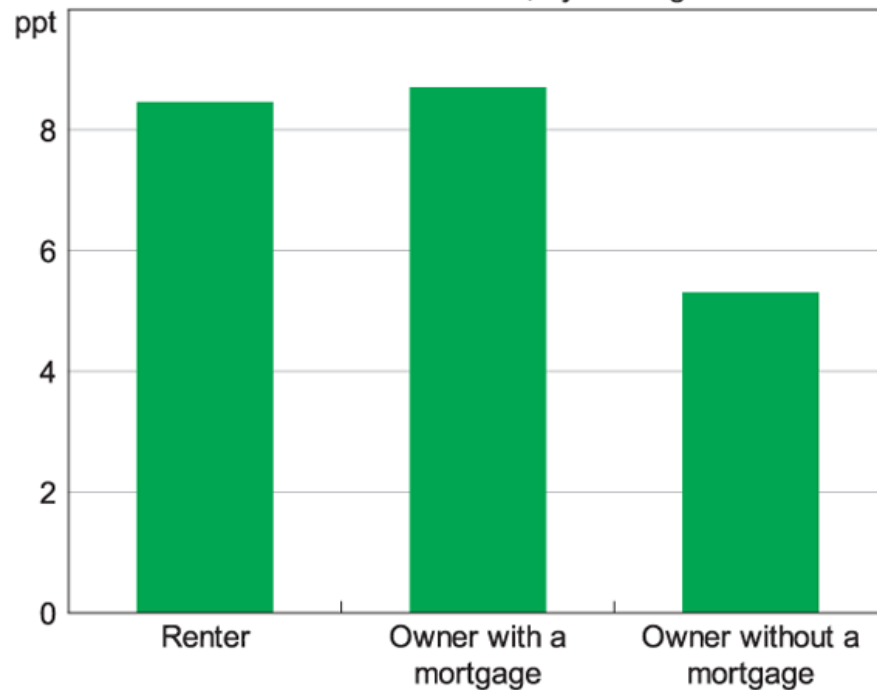
For detail: <http://www.rba.gov.au/speeches/2011/sp-ag-220911.html>

Source: ABS 5204.001

...Mainly amongst young people who rent/have a mortgage, to rebuild their assets after the crisis, and repay rising home loans

Change in Median Saving Ratios

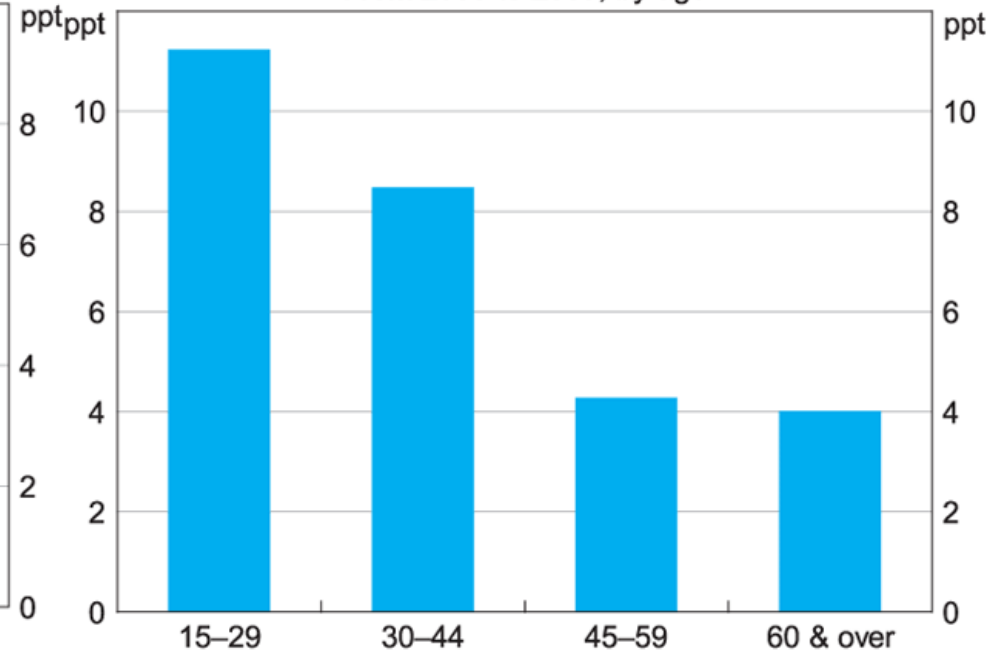
From 2006 to 2009; by housing



Source: HILDA Release 9.0

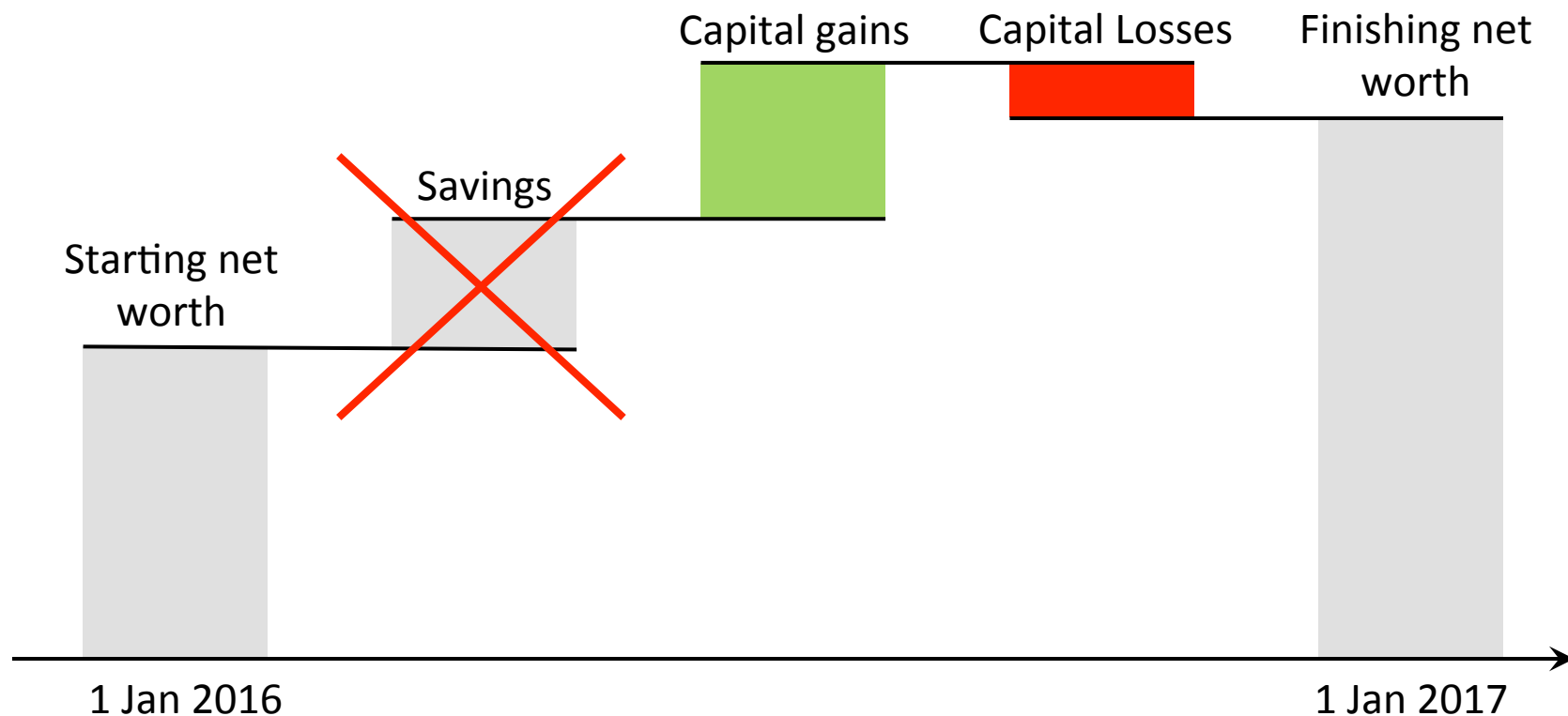
Change in Median Saving Ratios

From 2006 to 2009; by age



Source: HILDA Release 9.0

If Australia's household wealth did not increase from 1990-2007 because of savings, it must be because of capital gains.



- Capital gains/losses are changes in the value of wealth you already own

These came from the share market (up to 2007)

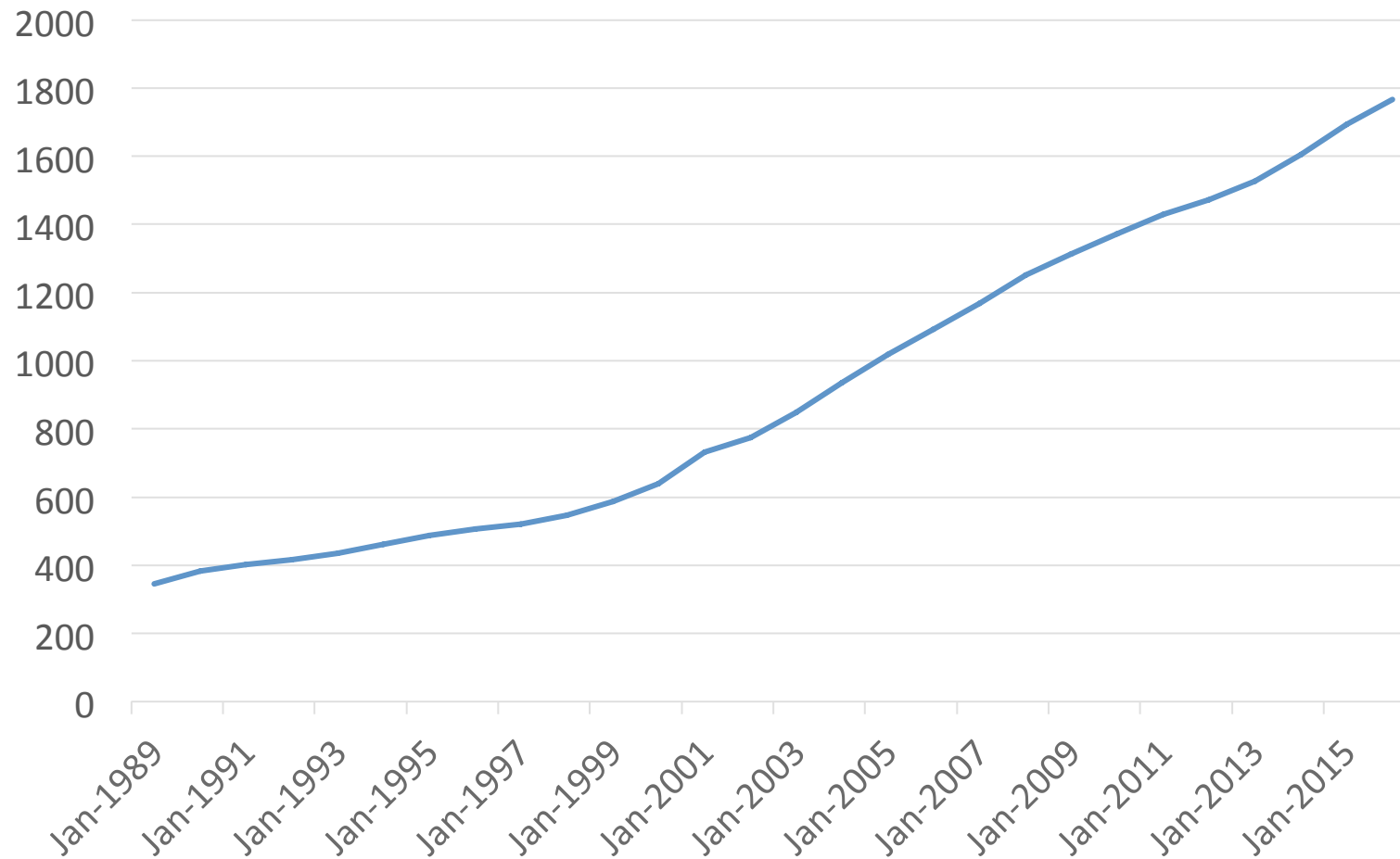
ASX All Ordinaries index



Source: ASX

... and increases in the value of the private housing stock

Value of Australian private dwellings, \$ Billions



Source: ABS 5204.041

Low household saving is not a major problem because it has been offset by business saving

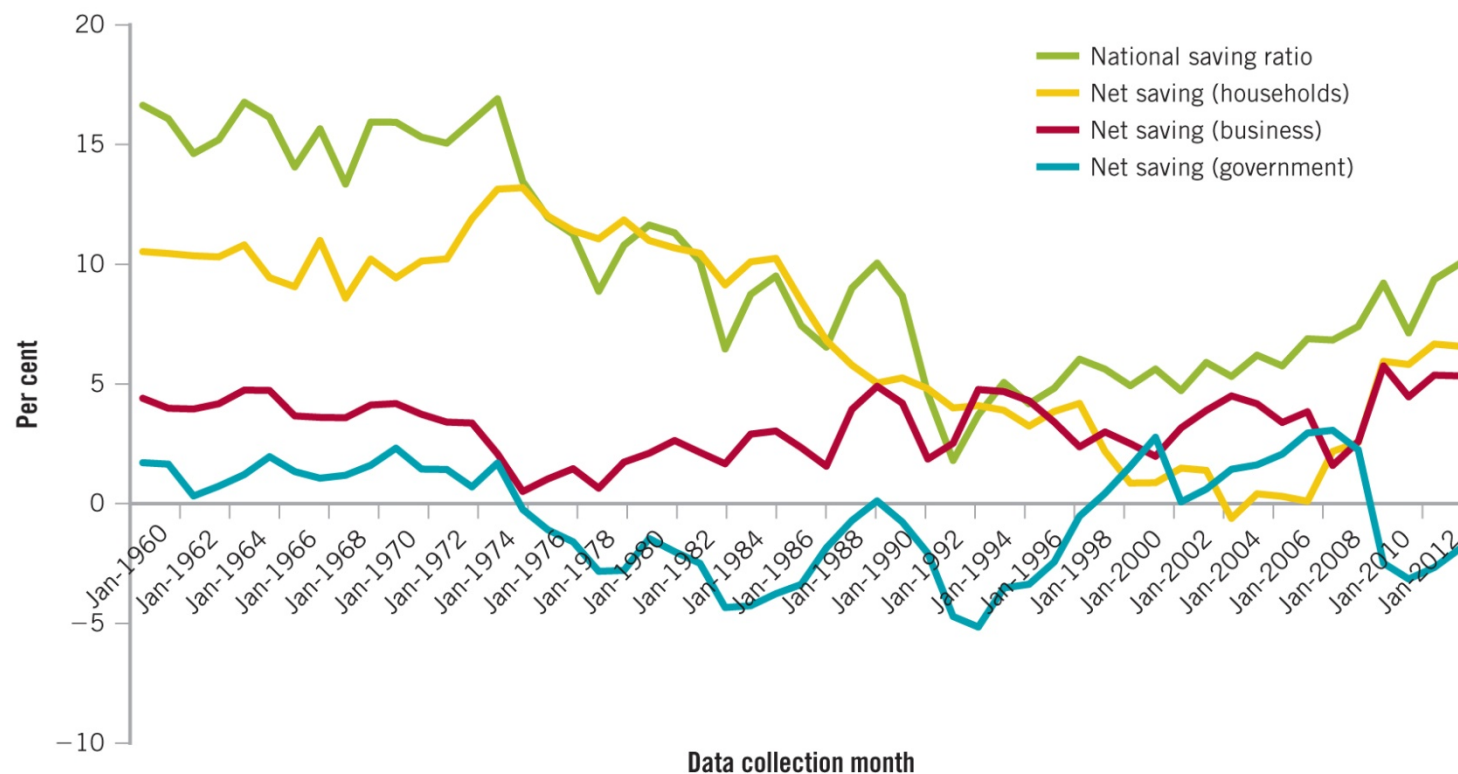


Figure 2.10 Australia's net national savings as a proportion of gross national income, by sector In recent years, business and household saving have made the largest contribution to national saving.

Source: Australian Bureau of Statistics (2012), *Australian National Accounts: National Income, Expenditure and Product*, Cat. No. 5206.0, Table 34, National income account, current prices, annual

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Investment decision

- What factors determine whether and how much firms choose to invest?
- The investment decision is made based on the cost–benefit principle.
 - Marginal cost of investment \geq Marginal benefit of investment

Firms decide to invest if the expected marginal benefit exceeds the marginal cost.

BOF Chapter 2, Example 2.5

1. Patrick can earn \$4400 (after tax) in his current job.
OR,
2. Patrick can borrow \$4000 for 1 year at 6% p.a. to buy a lawnmower, to earn \$6000 (before taxes of 20%). The lawnmower can be resold at its original price (no depreciation).

Marginal Benefit	<ul style="list-style-type: none">• Marginal benefit is the <u>additional benefit</u> Patrick would get, beyond what he will already get otherwise. $\underbrace{(\$6000)}_{\text{income}} - \underbrace{(20\% \times \$6000)}_{\text{taxes}} - \underbrace{\$4400}_{\text{Opportunity cost}} = \underbrace{\$400}_{\text{Marginal benefit}}$	
Marginal Cost	<ul style="list-style-type: none">• Marginal cost is the <u>additional cost</u> Patrick must pay, to get the benefit. $\underbrace{\$4000}_{\text{Cost of buying lawnmower}} + \underbrace{(6\% \times \$4000)}_{\text{interest}} - \underbrace{\$4000}_{\text{Income from selling lawnmower}} = \underbrace{\$240}_{\text{Marginal cost}}$	$\$400 - \$240 = \$160 (>0)$

Note: assume Patrick earns 0% on his savings, so we exclude the time value of money.

...an equivalent way of looking at it, is if the project generates a higher return than the next best option.

**Project 1:
Current job**

- Return: \$4400

**Project 2:
Lawn
mowing**

- Return:
$$\underbrace{(\$6000 - (20\% \times \$6000))}_{\text{income} \quad \text{taxes}} + \underbrace{\$4000}_{\text{Income from selling}} - \underbrace{(6\% \times \$4000)}_{\text{interest}} - \underbrace{\$4000}_{\text{cost of buying}} = \underbrace{\$4560}_{\text{return}}$$

$$\$4560 - \$4400 = \$160 (>0)$$

- Investment is affected by:
 - Taxes, cost of capital, interest rates.
- Even if the investment is financed internally, the interest rate is the opportunity cost of financing something else

Example: Should Patrick buy a ride-on lawnmower? continued

- For Patrick:

	\$6000 net revenue
LESS	<u>\$1200 tax (@ 20%)</u>
	\$4800

- If Patrick could earn \$4400 after taxes by working at an alternative job, then the value of the marginal product of investing in his lawn mowing business is \$400 (or \$4800 – \$4400).
- If Patrick needs to borrow the \$4000 purchase price @ 6% pa this adds \$240 to his costs. He will still benefit with \$160 (or \$400 – \$240) above the next best alternative.

continued

Example: Should Patrick buy a ride-on lawnmower? continued

- Patrick should buy the mower if the value of the marginal product is greater than zero.
- The key factor that determines the marginal product is the cost of the capital. If the lawn mower costs \$7000 instead of \$4000, his interest @ 6% is \$420, which exceeds the \$400 marginal product.

Determinants of the level of investment

- Real interest rate
 - If the interest rate increases to 12% instead of 6%, his interest expense is \$480 which exceeds the \$400 marginal product.
- Taxation rate
 - If taxes increase to 25% on net revenue, his marginal product of \$100 is exceeded by the \$240 interest expense.
- Other impacts on revenues
 - If the running costs are different from those expected, or the price he can charge for his service changes, these facts will impact on the costs and benefits that determine the value of the marginal product.

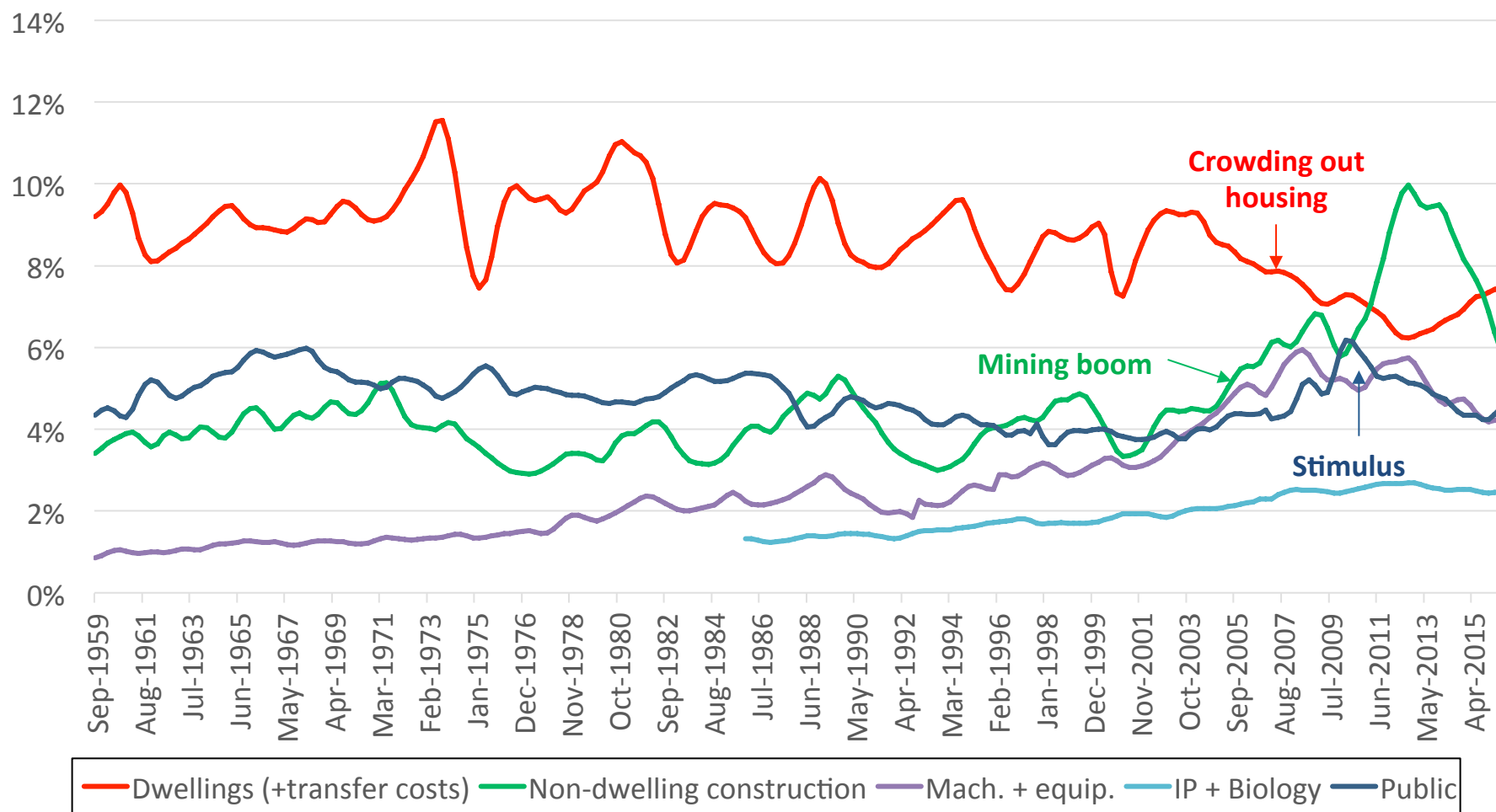
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Determinants of the level of investment continued

- Even if a firm finances capital from its savings, the real interest rate is an opportunity cost of alternative uses of its finance.
 - Increased real interest rates increase the opportunity cost.

The mining investment boom has ended, and is being replaced by a boom in housing construction

Gross fixed capital formation, % of GDP



Source: ABS 5206.002

Investment in the mining sector

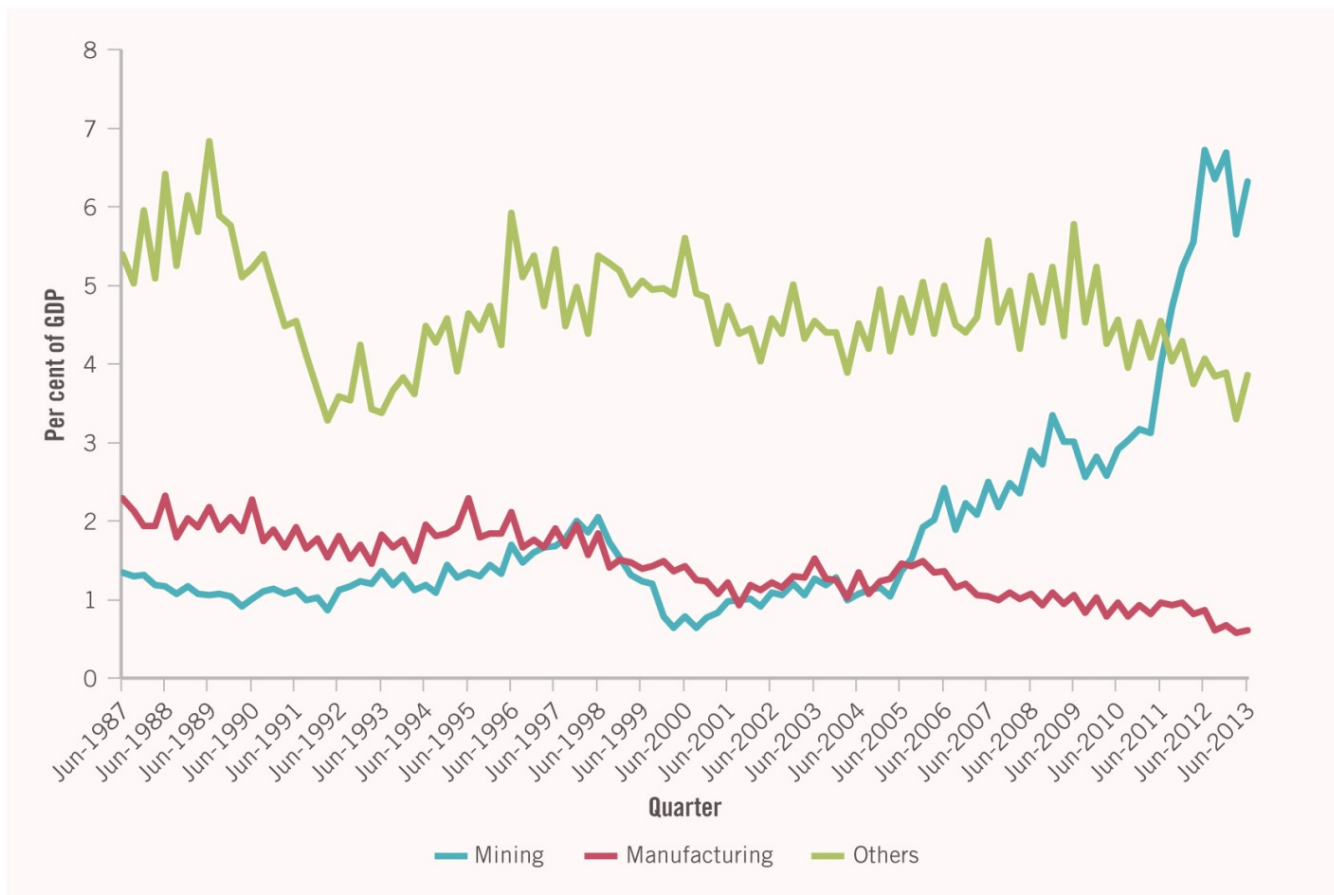


Figure 2.12 Investment as a share of GDP Investment in the mining industry has become a much more significant component of the Australian economy as a result of increased demand from the emerging economies, particularly China. In contrast, the importance of investment in the manufacturing sector is declining.

Source: Authors' calculations based on Australian Bureau of Statistics (2013), *Australian National Accounts: National Income, Expenditure and Product*, June, Cat. No. 5206.0 and *Private New Capital Expenditure and Expected Expenditure, Australia*, June, Cat. No. 5625.0

Overview

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**4. Financial Markets:
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Saving, investment and financial markets

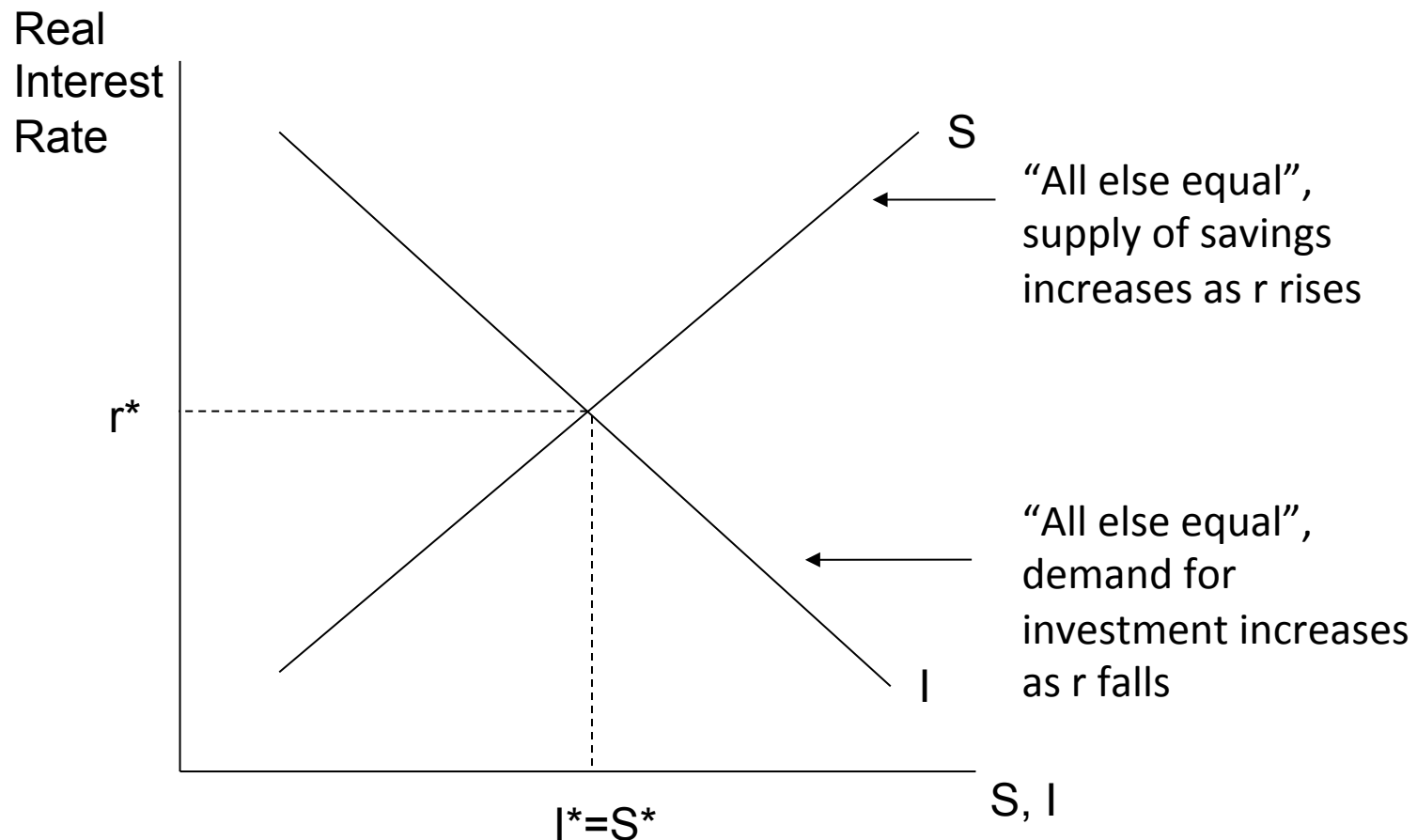
- Saving and investment decisions are determined by different forces.
- In a closed economy without international borrowing or lending, national saving must equal national investment.
- This equality of saving and investment occurs through financial markets, where the demand for saving (for investment) is made equal to the supply of saving through the price, which is the real interest rate.

Supply and demand for saving

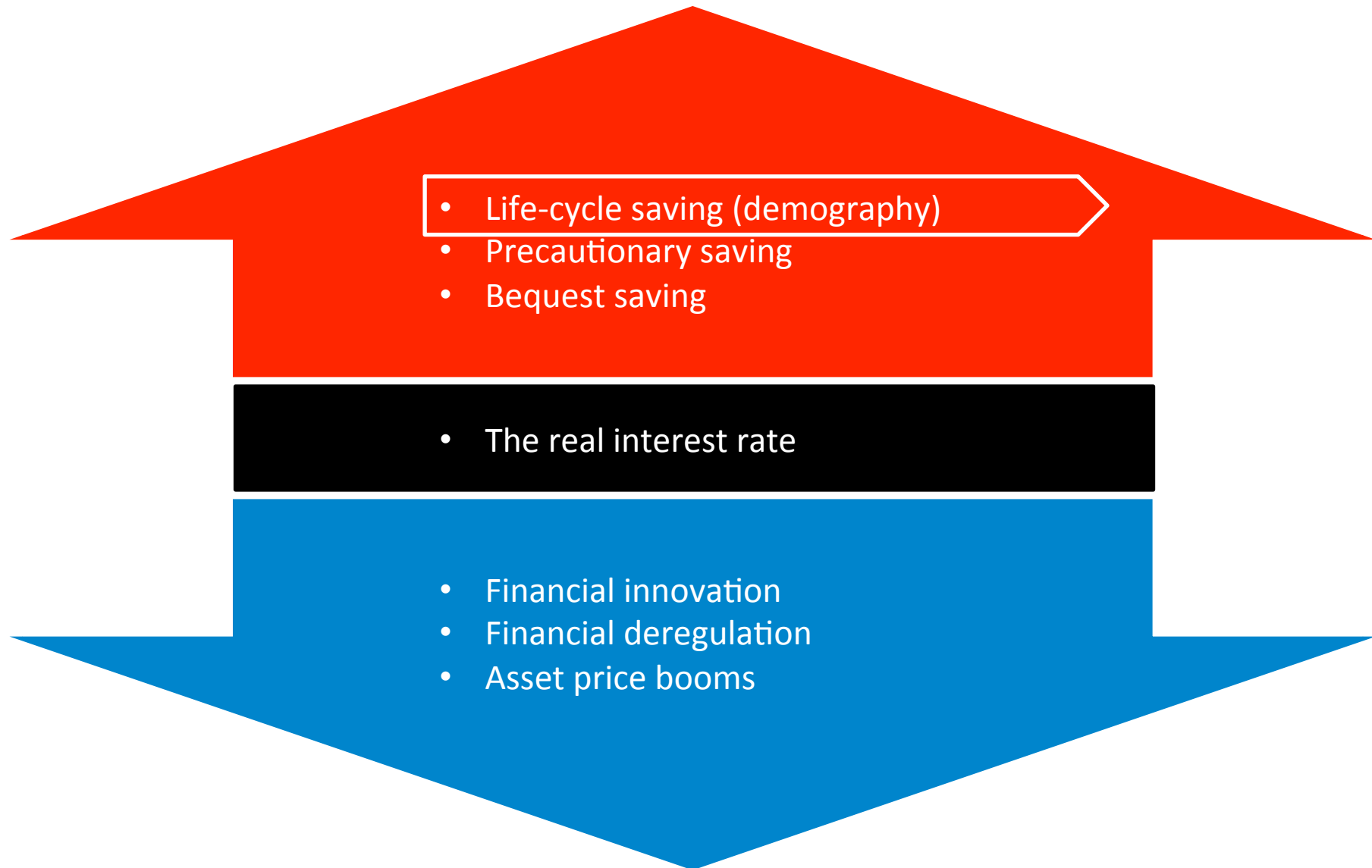
- The demand curve for savings shows how the demand for investment funds, when all else is equal, varies with changes in the real interest rate.
- The supply curve for savings shows how the supply of savings, when all else is equal, varies with changes in the real interest rate.
- Changes in factors other than the real interest rate that affect the supply of funds or demand for funds will shift the curves.

In a closed economy, the real interest rate will adjust so that national savings equals national investment

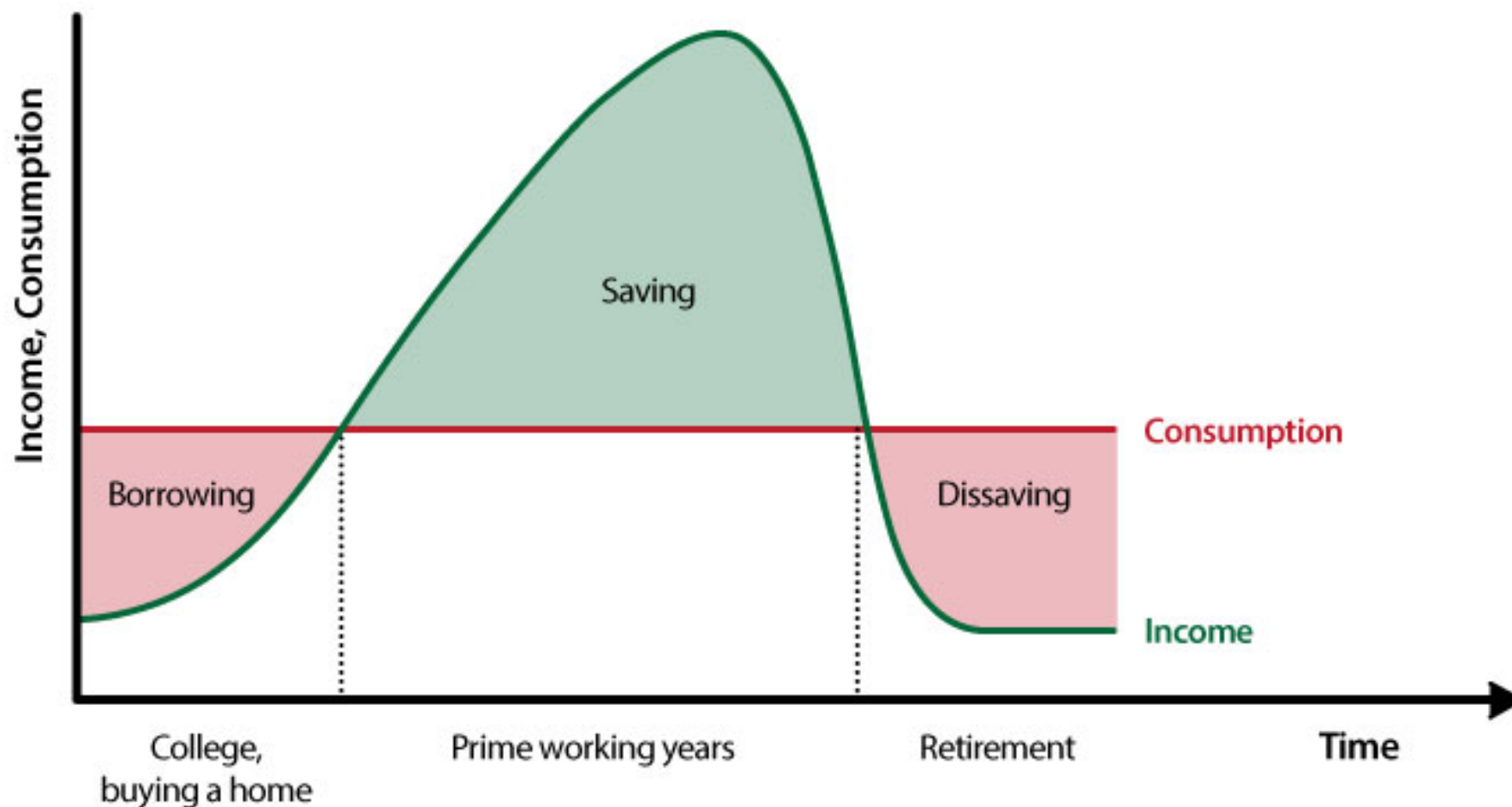
Supply and demand for savings in the financial market



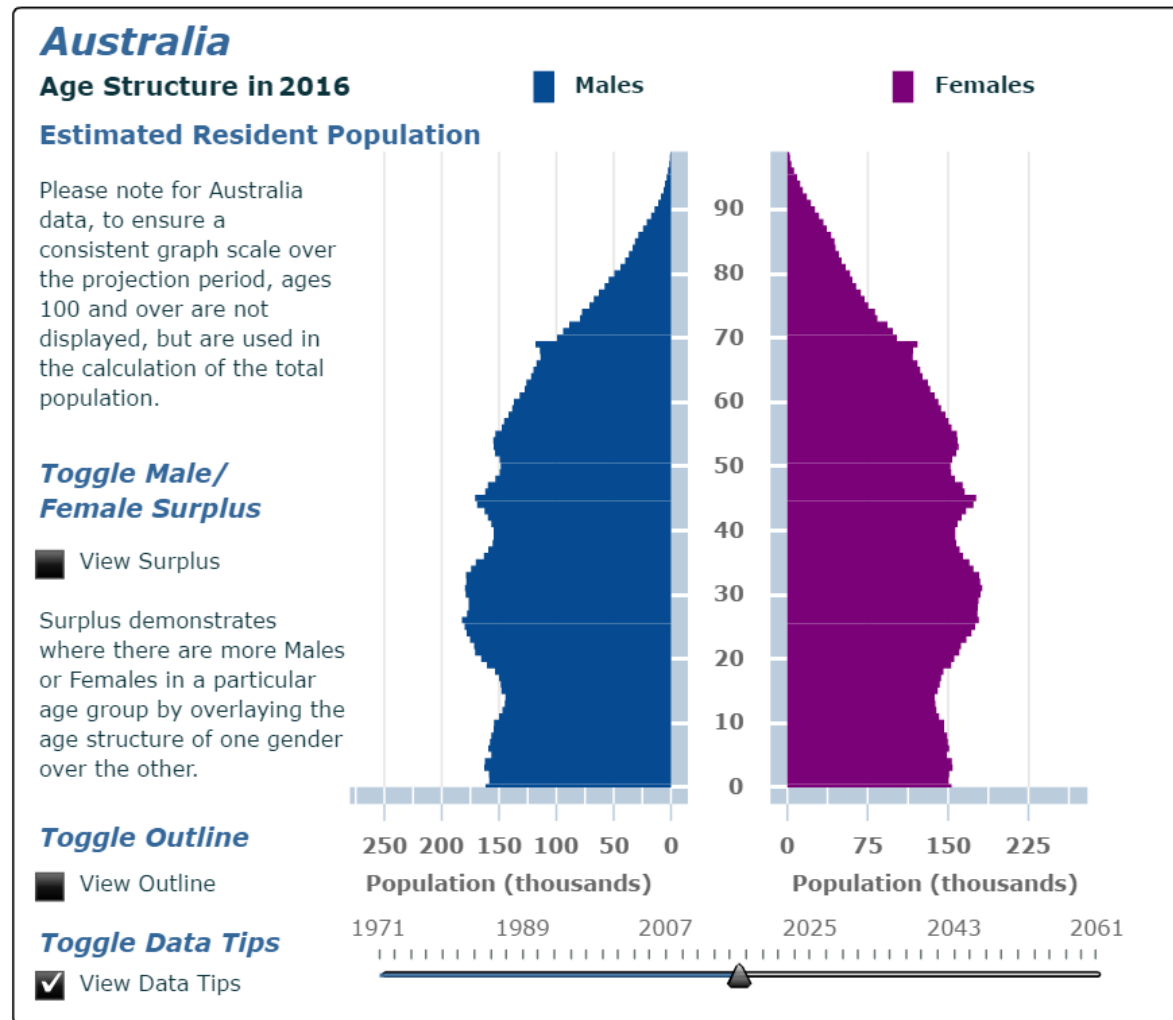
National savings is determined by a variety of forces



The life-cycle saving hypothesis says that people prefer to smooth their lifetime consumption by borrowing and dissaving

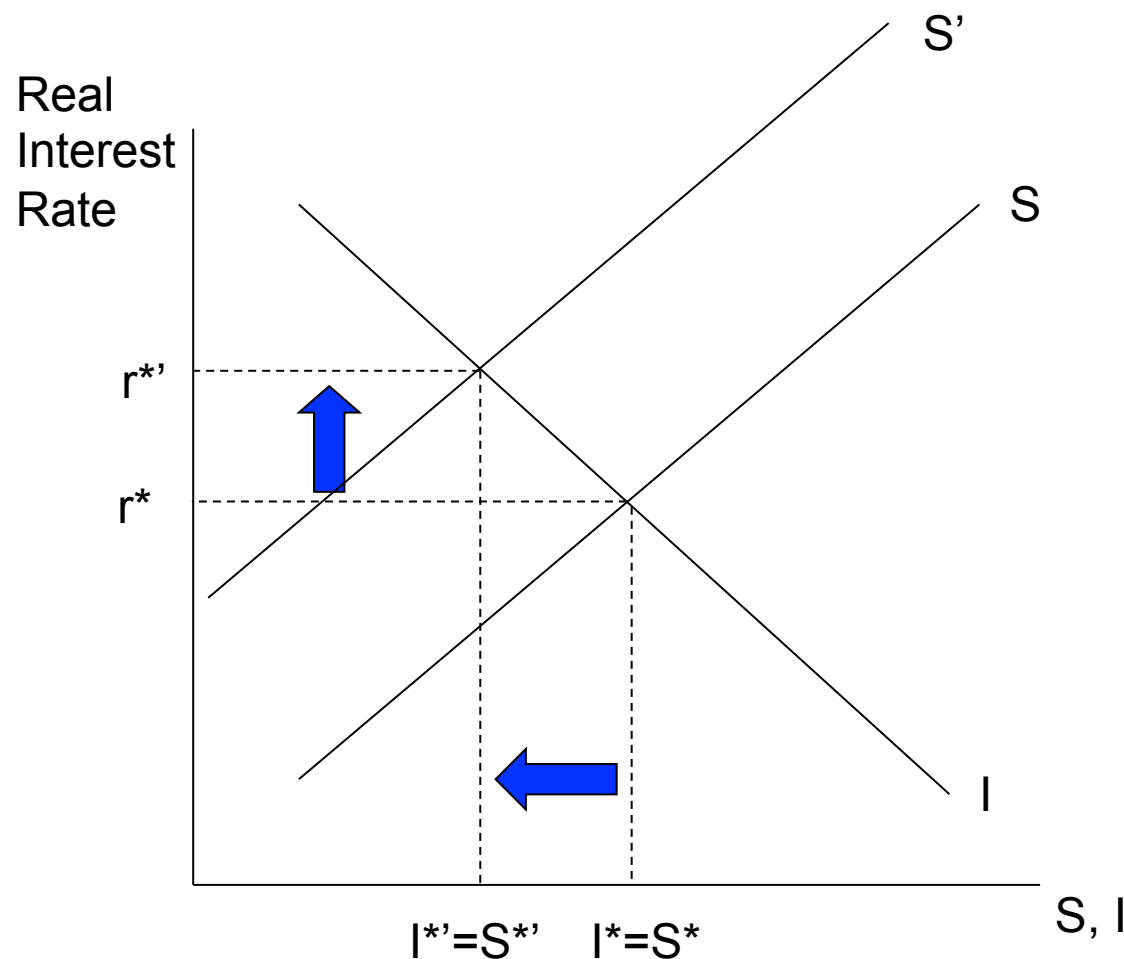


According to this hypothesis demography will play an important role, so we might expect future dissaving as the baby-boomers retire



Video: <http://www.abs.gov.au/websitedbs/d3310114.nsf/home/population%20pyramid%20-%20australia>

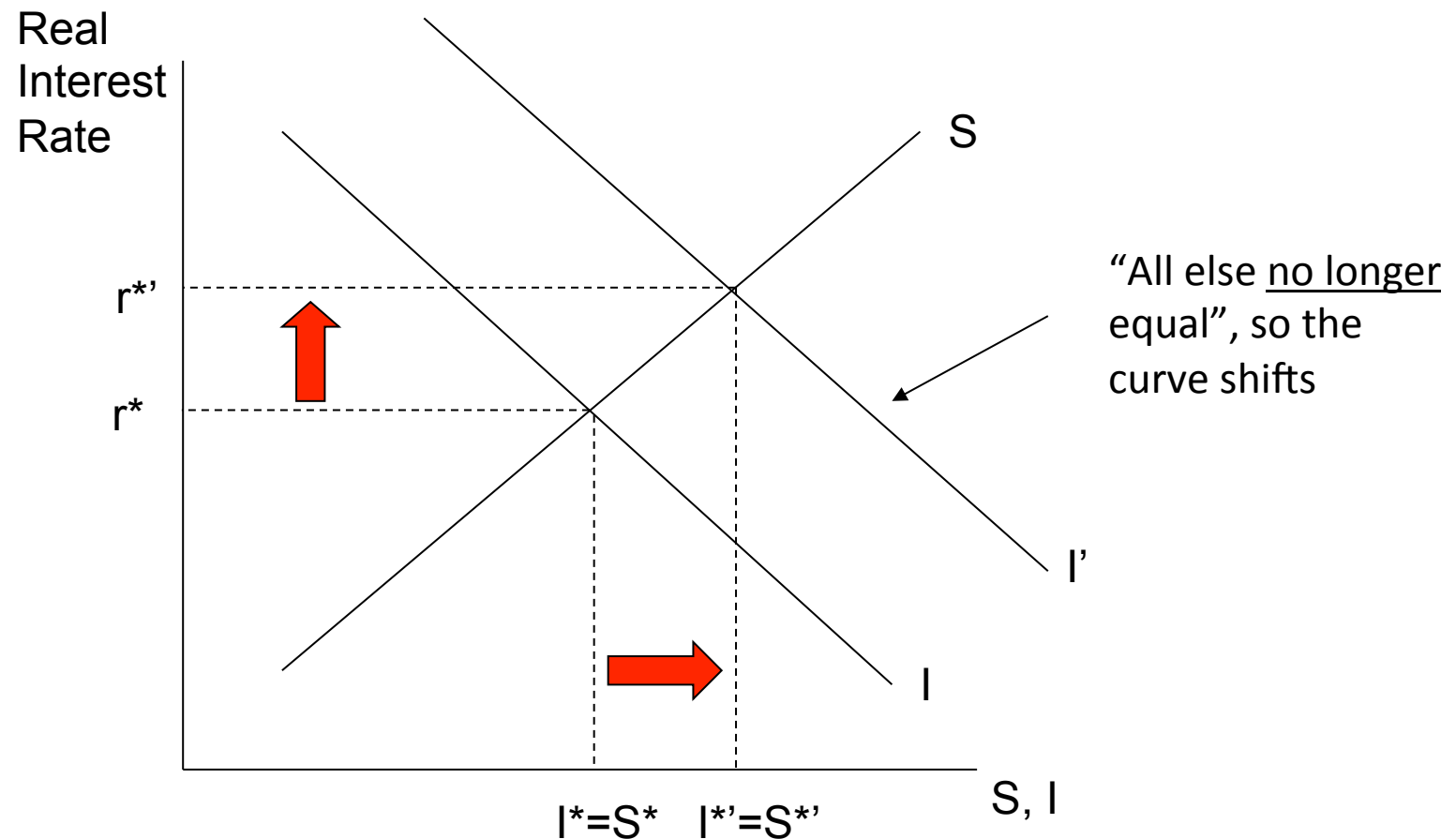
As baby-boomers retire, the supply of savings will fall, raising the real interest rate



Changes in demand for investment

- Anything that changes the marginal product of the investment will shift the demand for investment funds.
- This is because:
 - anything that *decreases* the marginal product of the investment will *reduce* the demand for investment funds, at every interest rate level
 - anything that *increases* the marginal product of the investment will *increase* the demand for investment funds, at every interest rate level.

Example: The effects of new technology.

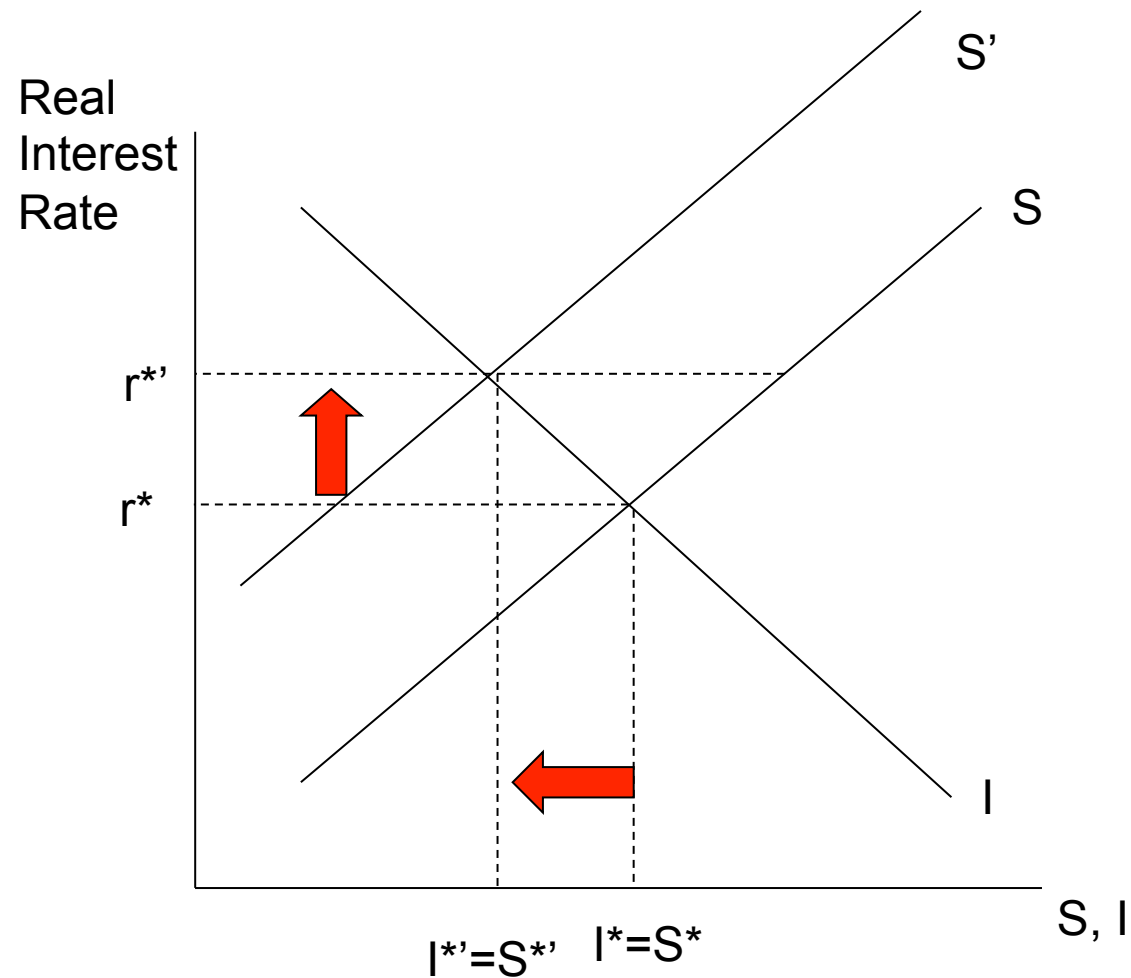


A positive technology shock will increase the returns to investment, raising the real interest rate and moving up the savings curve

Changes in supply of savings

- Anything that changes the level of saving in the economy will shift the supply of savings.
- This is because as saving is made up of public and private saving, anything that makes households, businesses or governments choose to change their saving rate will shift the supply curve.

An increase of Government Budget Deficit



Summary

- It is the level of national saving, not household saving, that matters for a country's economic growth in the long run.
- A higher level of national saving transpires into a higher level of national investment.
- In a closed economy, national saving must equal national investment.
- The real interest rate is a key determinant in saving and investment decisions.
- The demand curve for savings is downward-sloping, meaning people are more willing to borrow money at lower real interest rates.
- The supply curve for savings is upward-sloping, meaning people are more willing to save money at higher real interest rates.
- The financial market is in equilibrium when the demand curve for savings is equal to the supply curve for savings.