National saving

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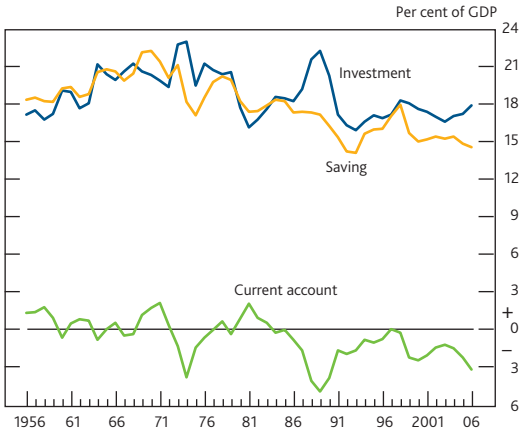
The level of national saving is important for policymakers as it can contain information about future prospects for growth and inflation. This article starts by comparing the current level of saving with a simple benchmark. However, this benchmark ignores important issues such as the relevant measure of saving and capital and the ability to borrow from overseas. The article considers how various measurement issues and economic shocks could allow the level of saving to differ from this benchmark, and also looks at the outlook for national saving in the medium term.

Introduction

National saving is the difference between national income and the amount the nation spends on consuming goods and services. So it comprises saving by households, government, and the corporate sector. Saving helps finance domestic investment which generates future income. For the past 20 years, national saving in the United Kingdom has generally been insufficient to finance domestic investment, and so the United Kingdom has been borrowing from overseas, in other words running a current account deficit (**Chart 1**).

The current level of saving may contain important information for policymakers about future growth in consumption or income, the strength of aggregate demand relative to supply, and so the prospects for inflation. For instance, a low level of current saving may indicate that households expect their income to grow rapidly in the future, or that they are relying on substantial increases in asset prices to provide resources for future consumption. But if those expectations are not fulfilled, consumption would need to moderate to rebuild the level of savings. Corporate and government saving will also potentially affect the decisions households make about their own level of saving by influencing expectations about dividend receipts and future taxes. So this article focuses on national saving and assesses whether national saving might be expected to increase in the medium term, reducing the current account deficit.

Chart 1 National saving, investment and the current account deficit



In a closed economy the only source of funds for the domestic investment required to maintain the capital stock is national saving. So a very simple benchmark, against which to compare the current level of national saving, is to ask how much national saving the United Kingdom would need to maintain its capital stock, without borrowing from overseas. After calculating this benchmark, the article goes on to consider how various measurement issues and economic shocks could allow the current measured level of saving to differ from this simple benchmark, and explores how the ability to borrow from abroad can affect national saving.

A simple saving benchmark

A simple benchmark against which to assess the level of national saving is to ask how much saving is needed to purchase enough capital to keep the capital stock rising in line with output, without borrowing from overseas. With growth in output (Y) of g, a net capital stock (K) depreciating at a rate δ, this benchmark gross national saving rate (S/Y) is:

$$\frac{S}{Y} = \frac{K}{Y}\left(g + \delta\right)$$

So the faster the economy grows and the faster the capital stock depreciates, the higher the saving rate would need to be. The latest ONS estimate of the ratio of net capital to annual

output is around 2.2, where capital includes assets like buildings (excluding land), vehicles, plant and machinery, and a limited amount of intangible assets such as purchased software. Together with a depreciation rate implicit in the ONS capital stock data of around 5%, and assuming output growth of 2½%, that gives a benchmark saving rate of around 17%, around 2 percentage points higher than the current national saving rate of roughly 15% (**Chart 1**). In this simple example, if this saving deficiency persisted, then one of two things would happen. First, the capital-output ratio would decline and hence domestic output would be lower than otherwise. Or, second, domestic capital accumulation would have to be funded by overseas borrowing, implying a higher net interest burden in the future and hence lower national income.

The benchmark calculation takes as given the current level of capital in the economy and calculates how much saving is needed to ensure it rises in line with output. But if the economy had reached the point where the capital stock no longer provided a net return to saving, in other words it had too much capital, then it would make sense for saving to be below this benchmark figure to lower the capital-output ratio to a more productive level. However, because profits comfortably exceed saving, Weale (2005) does not think there is any risk that the United Kingdom has too much capital.

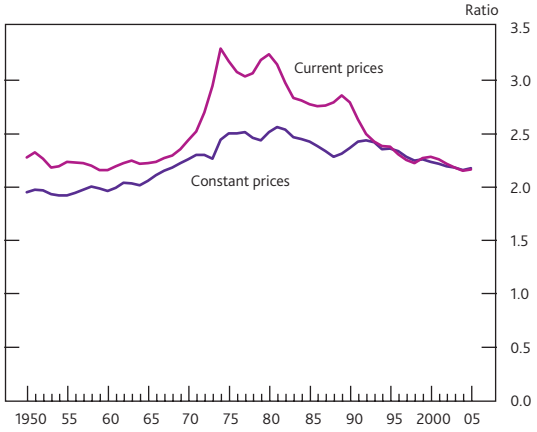
By its nature this simple benchmark calculation ignores important measurement issues, economic shocks, and structural changes in the economy, which affect the interpretation of the level of national saving. The article now goes on to examine these. First, it looks at the measurement of saving, investment and capital. For example, what the impact of broadening out the definition of saving might have, and how a declining relative price of capital might reduce the amount of saving required to maintain the capital stock. Second, it assesses whether saving might be low in response to low long-term interest rates, and increases in asset prices, and sets that in the context of global saving patterns. Third, it discusses reasons why structural changes in the economy may have reduced saving. Fourth, it asks whether we could expect borrowing from overseas, and hence current account deficits, to provide a persistent supplement to national saving. Finally, it looks at what adjustment to national saving might occur in response to rising longevity and the related changes to pension arrangements. Of course several of these factors may have been operating at the same time.

Sensitivities around the benchmark

The measurement of saving and capital

There has been a persistent decline in the relative price of capital goods over the past 20 years (see Ellis and Groth (2003)). That largely reflects a decline in the relative price of plant and machinery, and in particular computers, because of relatively rapid productivity growth reflecting technical progress. In other words, the amount of saving required to buy a given quantity of capital goods to generate future income has declined. So while the capital-output ratio measured in current prices has tended to decline, the quantity of capital relative to real output has been more stable (**Chart 2**). If the price of capital goods relative to output continues to decline — and continued technical progress suggests that it should — then the future share of saving in national income required to maintain a given quantity of capital will tend to be lower than suggested by the simple benchmark above. Trends in the relative price of capital goods over the past 20 years suggest that the saving ratio necessary to maintain the same quantity of capital relative to output could fall by around 0.2 percentage points per year.

Chart 2 Net whole-economy capital-output ratio at current and constant prices(a)



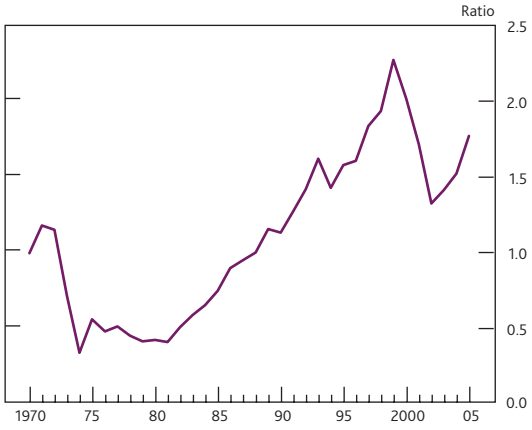
(a) Net of depreciation.

Using alternative definitions, the actual amount of saving in the economy may be higher than currently measured in the National Accounts. In theory, any use of resources that reduces current consumption in order to increase it in the future could be included in 'economic' definitions of saving and investment. So spending on things like R&D, training, and software development could be regarded as additions to the stock of productive capital, whereas spending in these areas is currently recorded by the ONS as a cost of production with no lasting value. The vast bulk of the ONS measure of the capital stock consists of physical assets like buildings and plant and machinery. Hall (2001) points to the increase in the market value of corporations relative to official estimates of the replacement cost of their physical capital as evidence that firms have accumulated large amounts of intangible capital (**Chart 3**).(1)

Marrano and Haskel (2006) estimate that inclusion of intangible spending on in-house produced software, scientific

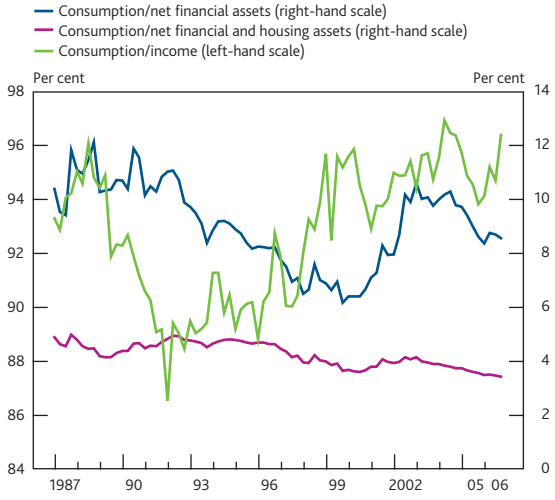
(1) This interpretation relies on various assumptions, for example no change in the degree of monopoly power, and the absence of speculative bubbles in asset prices.

Chart 3 Market value of PNFCs[a] divided by the replacement cost of the net capital stock



(a) Private non-financial corporations.

Chart 4 Household consumption to income and wealth ratios



Sources: ONS and Bank calculations.

R&D, other R&D, advertising, market research, human capital, and firm re-organisation, would approximately double the existing ONS measure of business investment.(1) In this approach less of corporate income would be treated as being 'consumed' in the production process, so corporate saving would also be higher to the same extent. If this additional corporate saving is included, the national saving rate would rise from around 15% to around 21%, well above the benchmark number of around 17%.

However, as the concept of the capital stock has broadened, the benchmark saving rate to maintain it also needs to be adjusted. Marrano and Haskel have not calculated intangible-adjusted capital stock data for the United Kingdom, but work in the United States by Corrado *et al* (2006), on which they have based their analysis, suggests that including intangibles would raise the US capital stock by around 10%. In addition, Corrado *et al* assume that depreciation rates for intangible capital are much higher than for fixed assets. Given the uncertainty about depreciation rates, and the sensitivity of the calculations to these, it is not clear that the gap of around 2 percentage points between actual and benchmark saving would be much smaller if intangibles were included.

Changes in asset prices, low long-term interest rates and global saving patterns

The simple benchmark calculation used at the start of this article determines the level of saving required to make sufficient additions to the capital stock for it to rise in line with output, when capital is measured as the stock of productive capital as recorded by the ONS. Spending on intangibles may legitimately represent a form of 'hidden' saving and capital accumulation. But how should capital gains on financial assets, which are claims on the profits earned on capital be considered? Can these capital gains substitute for saving? For instance, household consumption may appear high relative to income (ie the saving ratio is low), but it is less high relative to net financial wealth (**Chart 4**), and is low relative to a measure of wealth that includes housing assets. Typically the changes in measured wealth arising from changes in asset prices dwarf the contribution from the flow of saving. But depending on the reason for the increase in asset prices, it might be unwise to attach too much weight to capital gains as a substitute for saving.

Auerbach (1985) argues that if saving is the creation of resources today in order to consume more tomorrow, then the issue of whether capital gains should be thought of as a substitute for saving depends on the source of the gain. If share prices rise because capital has become more productive, reflecting technical progress for example, then future resources available for consumption are expected to be higher and so saving today could legitimately be lower. The simple benchmark example does not allow for any capital-saving technical progress, so this type of technical progress would allow national saving to be below the simple benchmark.

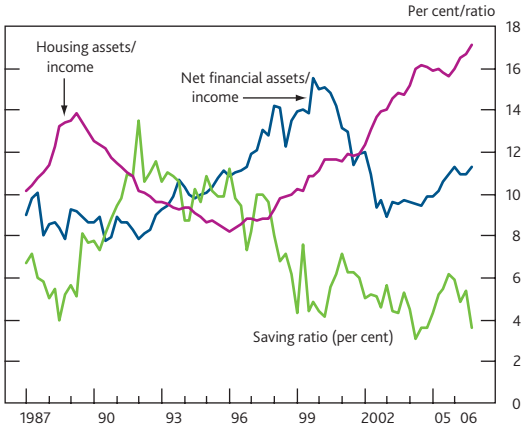
But asset prices may rise for other reasons. If there is a shift in preferences, such as a fall in the rate at which households discount the future, or the compensation they require for risk, then the rate at which future income from capital is discounted will fall, and share prices will rise. But this gain is not associated with any increase in future production or income, and hence resources available for future consumption, so ought not to warrant a decline in the aggregate level of national saving. Some households gain at the expense of others. Those who have already accumulated assets and are nearing retirement enjoy a gain in their equity wealth, so they might reduce their saving.(2) But because the return on saving (discount rate) has fallen, *more* saving is needed by younger

(1) Improvements in the ONS estimates of software investment are being considered as part of the National Accounts revisions for *Blue Book 2007*, see ONS (2007).
(2) In fact even those approaching retirement may not gain. The accumulated assets in a pension fund need at some point to be converted into a flow of future retirement income by purchasing an annuity. If discount rates fall then so will annuity rates, so there may be no increase in these households' pension income following the increase in asset prices.

households to accumulate a given level of wealth. There is in effect a transfer of wealth from future generations, and those who do not yet hold financial assets, to current asset holders.

It is difficult to measure the relative contribution of changes in discount rates and expectations about future productivity to changes in asset prices. Up to 2000, the household saving rate did decline as net financial wealth increased (**Chart 5**), which would have been consistent with an expected increase in productivity growth. But following the sharp correction to equity prices around the turn of the century, there was no subsequent upward adjustment of the household saving ratio, whereas this did occur in the corporate sector. Around that time house price inflation picked up significantly, against a background of low long-term interest rates. It is therefore possible that households saw house price gains as a substitute for saving.

Chart 5 Households' financial wealth, housing assets and saving ratio



Sources: ONS and Bank calculations.

Housing is the largest single asset in the aggregate household portfolio. But housing is very different from other assets because people live in houses. This means that when house prices rise there are losers as well as winners, see Benito *et al* (2006) and Weale (2007). Those planning to 'trade down' to a cheaper home, or sell for the last time, are likely to have more resources available for consumption and can therefore save less. By contrast those renting, intending to buy a home for the first time, or 'trade up', will tend to have fewer resources available for spending on non-housing consumption, and therefore will need to save more. It is therefore unlikely that increases in house prices could allow national saving to remain persistently below the simple benchmark.

If households have misunderstood the implications of higher house prices, and subsequently wish to correct their mistake by increasing their saving, that would pose an upside risk to national saving. The recent prolonged period of low long-term interest rates has also coincided with a broadly based recovery in asset prices. If households have underestimated the extent to which these asset price gains have resulted from lower interest rates, rather than higher expected future income, that might also pose an upside risk to national saving. Low levels of interest rates would have encouraged households to bring consumption from the future to the present, facilitated by borrowing against the increased collateral values in the housing market. Following this intertemporal substitution, weaker growth in consumption and higher saving in the future might be expected as the debt is repaid. But if, in addition, consumption has been boosted because households have overestimated the extent to which asset price gains represent higher future resources available for consumption, then at some point consumption may be further depressed as the 'illusory' saving is reconstituted out of current income, see White (2006).

In assessing risks to the national saving ratio, it is important to understand why real risk-free interest rates have fallen so much. Bernanke (2005) highlights international factors and their role in simultaneously giving rise to low real rates of interest, the low national saving rate in the United States and the current account deficit. Several of those arguments might be applied equally to the United Kingdom. Recent work, for example Caballero (2006) and Caballero *et al* (2006), explains the United Kingdom's low national saving rate and associated current account deficit as part of a global equilibrium outcome of two forces: (a) potential growth differentials among different regions of the world and (b) differences in these regions' capacity to produce financial claims on that growth in which their residents are willing to invest. The growth in the supply of savings from fast-growing emerging regions of the world, like China, has exceeded their ability to produce high-quality domestic financial assets in which to invest. This excess demand for financial assets has led to a flow of savings to countries like the United Kingdom, reduced global long-term interest rates, raised asset prices, and hence lowered domestic saving in the United Kingdom. The outlook for long-term interest rates and national saving will therefore be partly determined by the prospects for rebalancing of saving around the world.

Structural reasons for lower saving

The incentives to bring forward consumption during a period of low interest rates may have been amplified by an easing in credit constraints. Access to credit allows households to smooth their consumption over their lifetime. So an easing of credit constraints would enable today's young households to increase their consumption, and reduce their saving, relative to the behaviour of older households at the same point in their life cycle, when access to credit was more constrained. That will tend to reduce the aggregate saving ratio. While, in the long run, the level of aggregate consumption and saving should return to its previous steady state, it would take a generation before this occurs, as equilibrium is only restored

once all households have been able to smooth consumption following the easing of credit constraints. And liberalisation of credit markets is not a once-and-for-all event but a gradual process, prolonging the effects on aggregate saving.(1) So the process of financial liberalisation could be a relatively persistent reason for national saving remaining below the simple benchmark.

An increase in credit availability might also have meant that households felt less need to accumulate precautionary savings as a buffer against future adverse shocks. This effect on precautionary saving might be reinforced by greater economic stability. Indeed, Fogli and Perry (2006) argue that low US saving, the large US current account deficit, and a declining net US external asset position are all the result of relatively greater stability in the United States than in the rest of the world. A decline in relative volatility reduces residents' incentive to accumulate precautionary savings. Hence they prefer to consume more now rather than in the future, and they fund this by borrowing from overseas. This results in an equilibrium decline in the net external asset position. The United Kingdom has similarly experienced a significant decline in macroeconomic volatility, see Benati (2005) and the Bank of England's submission to the Treasury Committee (2007), so this might also explain why national saving is currently below the simple benchmark level.

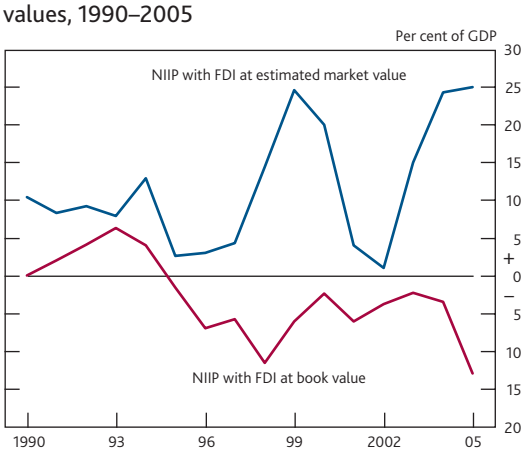
External borrowing constraints

The article has pointed to several shocks in the United Kingdom and the global economy that might explain why UK national saving is currently below the simple benchmark level, and the United Kingdom is borrowing from overseas. Just as efficient international trade generally leads to trade deficits for some goods or services but a surplus for others — for example the United Kingdom has a surplus in trade in services, but a deficit in trade in goods — the efficient allocation of consumption over time may require a current account deficit. But to what extent could UK national saving be persistently supplemented by borrowing from abroad? In other words, could the United Kingdom continue to run a persistent current account deficit?

The analogue of the saving benchmark calculation would suggest that a sustainable current account deficit would correspond to the net external liability position of the United Kingdom being stable. In any period, the change in the net external liability position is equal to the borrowing from abroad implied by the current account deficit, less any capital gain the United Kingdom may have realised on its net external liabilities. The discussion above has centred on whether capital gains on UK assets might be misinterpreted as a form of saving by domestic residents. But if the value of the United Kingdom's assets held overseas increases by more than its liabilities to the rest of the world, then that would allow the United Kingdom to purchase more resources from overseas. So, as Obstfeld and Rogoff (1994) argue, capital gains from the United Kingdom's net external liabilities could legitimately be thought of as a supplement to conventionally measured national saving.

The problem is that these revaluation effects are currently not fully captured in the official data on the United Kingdom's net international investment position (NIIP) — the official term for net external liabilities. While assets and liabilities in the form of bonds and shares are revalued at market prices, net foreign direct investment (FDI) assets are valued at the initial purchase price rather than their current market value. Unlike shares, FDI assets are not regularly traded in financial markets, so their market values need to be estimated. It is possible to estimate the impact of valuing FDI at market prices by looking at the relative movements in equity prices in the United Kingdom and overseas. **Chart 6** shows a measure for the NIIP where this adjustment has been made.(2) It indicates, in contrast to the official data, that despite recent persistent net borrowing from abroad, the United Kingdom remains a net external creditor. That is because net borrowing has been offset by net capital gains.

Chart 6 UK NIIP with FDI at book and estimated market values, 1990–2005



Sources: OECD, ONS, Thomson Datastream and Bank calculations.

The net capital gains partly reflect the fact that the United Kingdom tends to have equity-type investments (direct investment and portfolio equity investment) but debt-type liabilities (debt securities and banking liabilities), see Whitaker (2006). Historically, average capital gains on the former exceed those on the latter, reflecting the equity risk premium. If this continues — and over long periods of time on average it should — then on average there would be upward revaluations of the stock of UK assets relative to UK liabilities. This would allow the United Kingdom to continue borrowing from overseas without increasing its net liabilities.(3) And this

(1) For evidence on UK credit conditions see Fernandez-Corugedo and Muellbauer (2006).
(2) See the article 'Financial globalisation, external balance sheets and economic adjustment', on pages 244–57 in this *Bulletin*.
(3) Kitchen (2006), for example, reports that the United States has also made net capital gains on its net debt position, which similarly have acted to mitigate the impact of cumulative increasing current account deficits.

'sustainable' borrowing from overseas would allow national saving on average to be persistently below the simple benchmark which assumed no borrowing from overseas. Of course, the net capital gains are compensation for the United Kingdom holding assets that are more risky than its liabilities, and there could be prolonged periods of low returns on these risky assets in the future.

Pensions and demographics

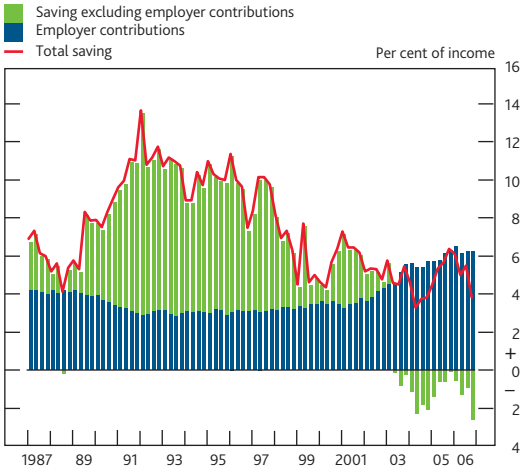
The simple benchmark level of saving identified at the beginning of the article took no account of demographic shocks, like the current and projected further increase in longevity. Without any change in saving or employment behaviour, ageing implies a reduction in the aggregate employment rate and hence output and consumption per capita.

Some pensions are provided by companies and government in a defined-benefit (DB) form, which means they promise to pay a fraction of working salary during retirement. An increase in longevity means the pension is paid over a longer period, raising its total cost. So in that case, unless the pension schemes are changed, companies and government need to save more. Ultimately households as shareholders of companies and taxpayers will bear that cost, through lower dividends or higher tax payments. And, of course, pension schemes are being changed, with a big shift towards households funding their own private defined-contribution (DC) pensions, where the impact of rising longevity is felt directly. If households with DC pensions intend to retire at the same age, despite increased longevity, they need to save more to accumulate a larger pension pot to support retirement income over a longer period. Ultimately the longevity shock must be met by some combination of increased national saving and later retirement, if post-retirement living standards are not to fall.

Companies with DB pensions have been raising their pension contributions, and because the ONS treats this as household income, this has contributed significantly to the household saving rate (**Chart 7**). There is little suggestion that households have raised their saving rates aside from that contribution being made from employers' pension contributions. Indeed excluding these contributions, households have been dissaving recently.

Of course, the timing of the company response may not be a good indicator of how or when the household sector should respond. In particular, much of the considerable — and quite sudden — adjustment undertaken by companies has been influenced by changes in the solvency requirements for pension funds. Households face no such regulatory forces. Their preference to adjust consumption smoothly suggests a more drawn-out response. Alternatively, the risk is that the lack of any obvious response of household saving reflects a misunderstanding of the impact of rising longevity, and when better understood the ultimate response of households may be more sudden than otherwise. It depends whether sufficient numbers of households are forward looking and capable of making these saving decisions, or not. The switch from DB to DC schemes could make the cost of increased longevity, for a given working life, more transparent to households, since the contributions they need to make increase.

Chart 7 Household saving and employer pension contributions



There has been no increase in government saving to reflect the prospective increase in the cost of providing DB pensions for public sector workers. Unlike the private sector, the government sector operates *unfunded* DB pensions which are financed out of general taxation.(1) According to HMT's *Long-term Public Finance Report* (December 2006) spending on pensions for public sector workers is expected to increase from 1.5% of GDP in 2005/06 to around 2% in 2025/26.

Looking at national saving, **Chart 1** suggests that overall there has not yet been any significant response to the prospective increase in longevity. What magnitude of adjustment to the national saving rate might be required? Broadbent (2005) estimates the decline in consumption today that would be sufficient to ensure that consumption can grow sustainably at $2^{1}/_{2}$% per annum in the future in the face of the expected decline in the aggregate employment rate, based on projections by the Government Actuaries Department, assuming no change in working lives. This gives a demographic saving gap of 3% of GDP. This is in addition to the benchmark saving gap of around 2 percentage points already identified. Of course, there is likely to be some adjustment to labour market participation that would account for some of the adjustment in the saving rate. Broadbent (2005) estimates that a gradual increase of five to six years in retirement ages would be enough to stabilise the aggregate employment rate

(1) That is, current workers fund the pensions of current pensioners. There is no implicit fund being accumulated from which the pension is paid.

at current rates. The participation rate of older workers has already started to rise in recent years.

More formally, Bloom *et al* (2002) show how in a standard life-cycle model in which people choose when to retire, the direct effect of an increase in longevity is to raise national saving rates. A rise in life expectancy increases the fraction of life people choose to spend working, but not by enough to offset the increased need for retirement income. So saving rates rise at every age during the accumulation phase. Empirically, using cross-country data, they estimate a one-year increase in life expectancy (which has occurred in the United Kingdom every eight years or so for the past 40 years) is associated with an increase in the national saving rate of around 0.4 percentage points. But the authors point out that health improvements could in theory increase the length of the working life sufficiently to allow saving rates to fall.

However, it is important to realise that these upward pressures on the national saving rate from increases in longevity, while persistent, will ultimately be transitory. This is a simple consequence of the national saving rate being an aggregation across households, some of whom are accumulating assets and others who are decumulating them. Increases in longevity imply that the new stable age structure has a higher proportion of elderly people. So in the long run, the higher saving rates of the young are offset by greater numbers of elderly who are dissaving. But this balancing effect may take 50 years or more to work through. There is expected to be an age-structure effect on national saving associated with the ageing of a large cohort of individuals born between 1946 and 1964 (the 'baby boomers'). As they age, increasing numbers move into the dissaving part of their lives, which other things equal, could lower the national saving rate. Miles (1999) estimated this could lower the national saving rate by 8 percentage points by 2040, with the decline commencing around 2010, as the baby boomers start retiring in large numbers. However, his model assumes, like the life-cycle model, that household saving rates are highly dependent on age, which at face value is not consistent with microdata.

Summarising the demographic factors, the increase in longevity is likely to put upward pressure on national saving in the medium term. But the impact of this could be masked by the bulge of population entering retirement and running down their savings.

Conclusions

The national saving rate is around 2 percentage points below the simple benchmark level required to maintain the capital-output ratio, as measured by the ONS, without borrowing from abroad. That is broadly consistent with the fact that in recent years national saving has been below domestic investment, and so the United Kingdom has been borrowing from overseas and running a current account deficit.

The article has put forward several reasons why national saving could remain below this simple benchmark. One is a declining relative price of capital, which reduces the amount of saving needed to purchase a given quantity of capital. Also, in the context of low long-term interest rates and rising asset prices, sustained by the flow of savings from fast-growing developing countries in search of high-quality investments in developed economies, it may be sensible for the United Kingdom to have brought forward consumption by borrowing from overseas. That intertemporal smoothing will also have been facilitated by credit market liberalisation. Better access to credit and a more stable economic environment may have reduced the amount of precautionary saving by households. And the United Kingdom appears to have been able to run a current account deficit averaging around 2% of GDP over the past 20 years without running down its net international investment position, because of net capital gains on overseas investments. These gains have mitigated the need for the flow of national saving to increase.

If households have overestimated the extent to which increases in asset prices in recent years represent an increase in future resources available for consumption, that might pose an upside risk to national saving. Increases in longevity might also put upward pressure on national saving, though consumption in retirement could instead be supported by longer working lives.

There are huge uncertainties attached to any estimates. While the balance of risks to the national saving ratio over the medium term is probably upwards, the extent of any adjustment is not obviously very large, relative to movements we have seen in the past, and could occur gradually alongside longer working lives.

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