Health spending: it's not just about ageing

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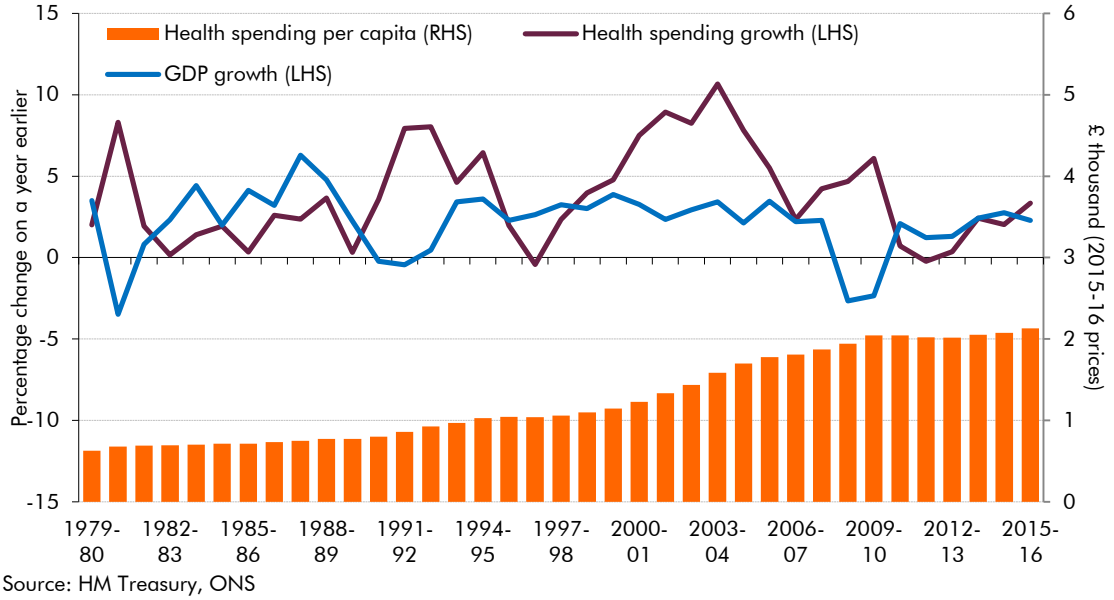
"What can be added to the happiness of the man who is in health, who is out of debt, and has a clear conscience?"

Adam Smith, Theory of Moral Sentiments

1. Introduction and context

Many domestic and international studies foresee upward pressure on health care spending as one of the greatest challenges to long-term fiscal sustainability. The ageing of populations is a commonly cited driver of this pressure, even though historically its contribution has been relatively small. Evidence from the UK (common to other countries) is that health spending has grown faster than the economy over time. In real terms, public spending on health has increased by 3.8 per cent a year on average since 1978-79, while the economy has grown by an average of just 2.2 per cent a year. In real per capita terms, health spending has also increased steadily over time (Chart 1). Population ageing alone cannot account for this increase.

Chart 1: Year-on-year increases in real health spending and GDP in the UK



Source: HM Treasury, ONS

This paper summarises the key findings of a recent review that we undertook at the Office for Budget Responsibility (OBR) of the latest evidence on demographic and non-demographic drivers of health spending in the UK.[1] We find that beyond income and demography, there are important non-demographic drivers (e.g. increasing relative health care costs and technological advances) that have generated further upward pressures on health spending. Even apparently cost-saving developments – such as the use of stents as an alternative to open heart surgery – have generated upward pressure as more patients have been treated. Factoring in these other cost pressures had significant implications for the OBR's long-term fiscal projections.

2. Long-term drivers of health spending

Demographic factors

Demographic change is a key long-term pressure on the public finances. Like many developed nations, the UK's population is projected to age over the next few decades, with the 'old-age dependency ratio' – the ratio of the elderly to those of working age – rising. This reflects increasing life expectancy (particularly among older people), relatively low fertility rates, and baby-boomer cohorts retiring. The number of over-85s is projected to treble between now and the early 2050s and the number of centenarians to increase from 14,500 today to over 450,000 in 2070.[2] As a proportion of the population, the over-85s would rise from 2.4 per cent this year (and just 0.8 per cent in 1970) to 7.3 per cent in 2070.

Demographic factors capture the effect of changes in the size and age structure of the population, including health status at given ages and proximity-to-death-related costs. These affect health spending via two main channels. First, spending increases with the size of the population, as meeting the needs of a larger population is more expensive. Second, spending increases with the proportion of older people in the population, because per capita spending tends to be higher for the old than the young. The second channel is most likely to affect health spending as a share of GDP, since population growth raises GDP as well as health spending.

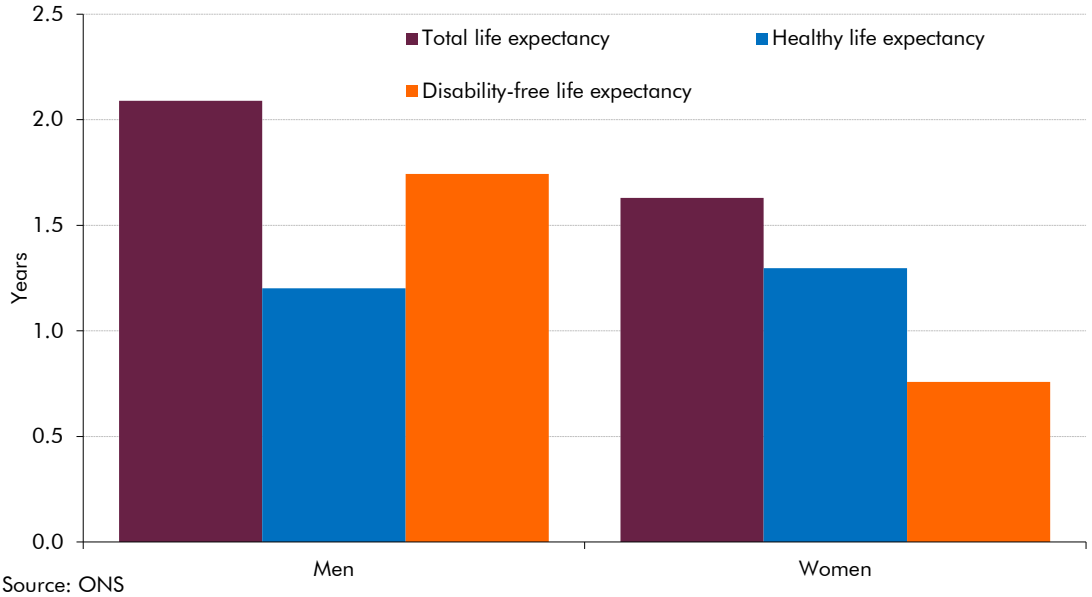
Morbidity – life expectancy spent in ill-health – is an associated demographic driver of health spending. More years spent in ill health (expansion of morbidity), for example if medical technology becomes better at preventing fatal outcomes without altering the underlying prevalence and progression of the disease, increases pressure on health spending. Similarly, more years spent in good health (compression of morbidity), for example thanks to new

[1] See Licchetta and Stelmach (2016) and OBR (2017).
[2] Office for National Statistics (2015).

medical technologies that slow the progression of chronic diseases, might raise GDP by more than any age-related increase in health spending.

The evidence around morbidity in the UK is mixed.[3] Chart 2 shows that both healthy life expectancy and disability-free life expectancy improved in the 2000s, but that neither did so by as much as overall life expectancy, indicating some expansion of morbidity too.

Chart 2: Change in total, healthy and disability-free life expectancy at 65 between 2000-2002 and 2009-2011



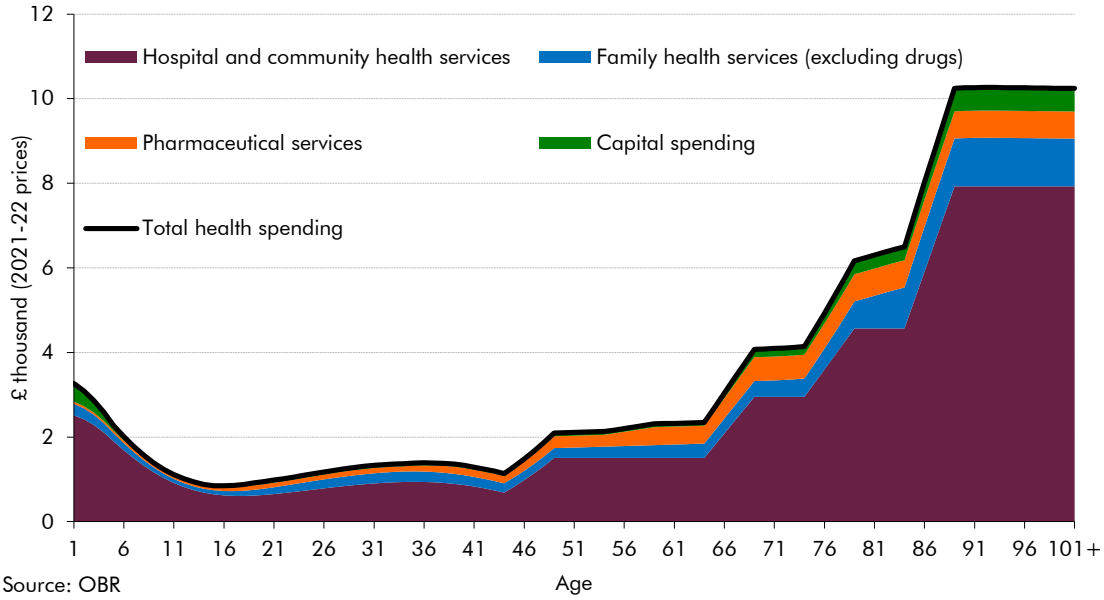
Source: ONS

We model health spending using representative profiles for age-related health spending (Chart 3). These assume that health spending per person is relatively high in early age due to the costs associated with birth and other childhood health needs, such as vaccinations. It is then low during working age before increasing substantially in later life. As a result, unless rising life expectancy is accompanied by more years spent in good health, an ageing population would be expected to raise average health spending per capita and thus both total health spending and spending as a share of GDP.[4]

[3] See Jagger (2015).

[4] The OBR recently moved away from its previous modelling assumption of 'full' expansion of morbidity towards one that reflects some degree of compression, assuming that increases in life expectancy are split between extra time spent in good health and in ill health. See Licchetta and Stelmach (2016).

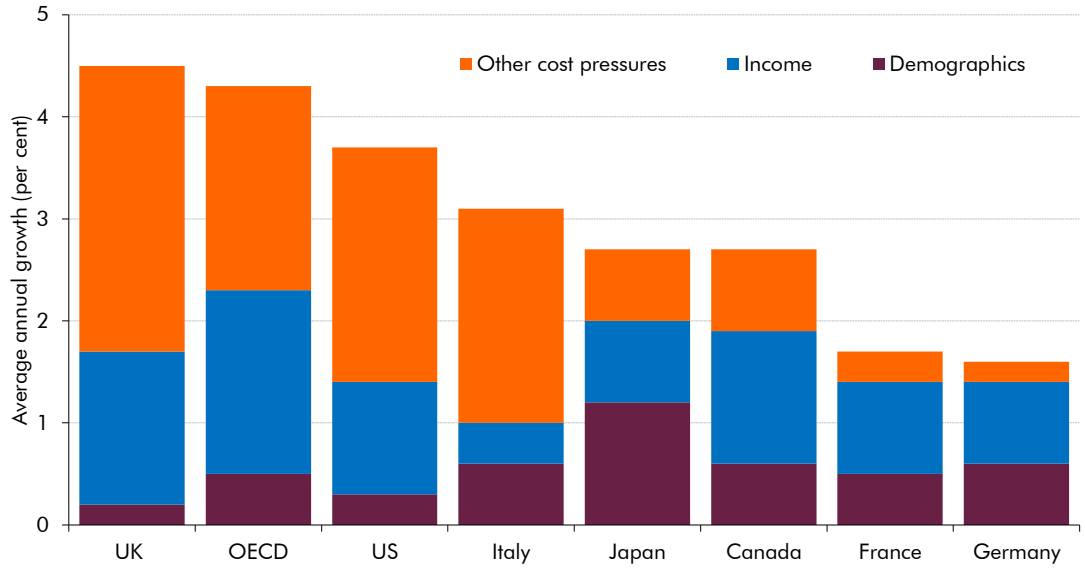
Chart 3: Representative profile for health spending



Source: OBR

Empirical studies have tended to find relatively small effects of ageing on health spending. For example, the OECD found that real public health spending per capita in OECD countries between 1995 and 2009 was mainly driven by rises in income and other non-demographic drivers, rather than demographic effects (Chart 4).[5] In a similar exercise for EU countries, the European Commission (2013) found that population ageing had a positive effect on spending growth, but that it was less important than changes in income, technology and institutional settings.

Chart 4: Growth in public health spending per capita (1995-2009)



Source: OECD

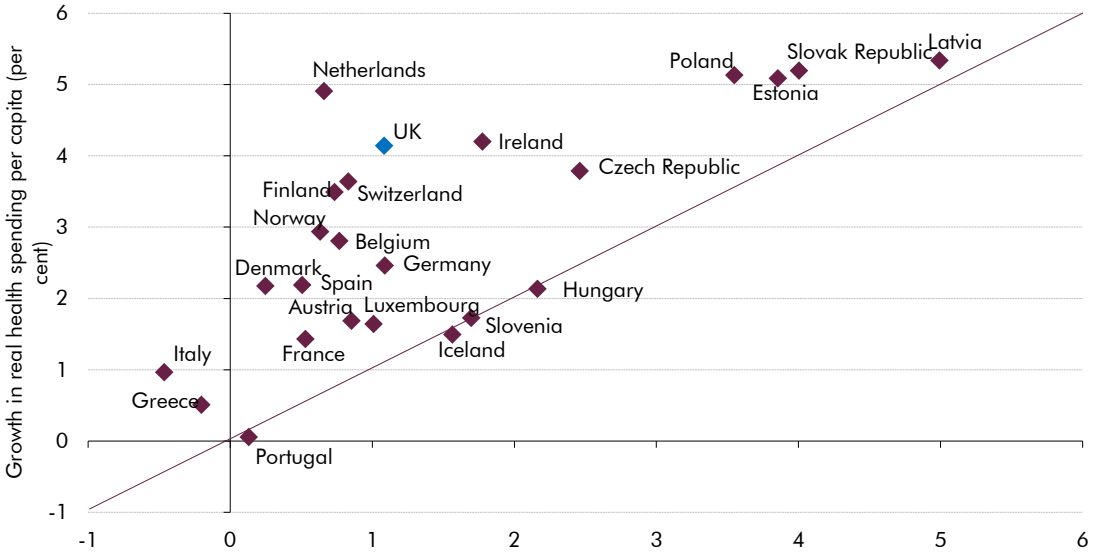
[5] See De la Maisonneuve and Oliveira Martins (2013).

Income effects

Health care is generally seen as a 'normal good', which means that people tend to demand more of it as their incomes rise. This means that spending rises in cash and real terms as incomes rise, but whether spending rises or falls *as a share of GDP* depends on whether the 'income elasticity of demand' is greater or less than one.

Chart 5 shows that health spending has risen faster than GDP in almost all European countries since 2000. Most agree that the relationship between per capita health spending and GDP in OECD countries is positive – that the income elasticity of health spending is above zero – but there remains no consensus on the size of the elasticity. That disagreement partly relates to how much spending growth researchers assign to the income elasticity or to other cost pressures.

Chart 5: Growth of real health spending and GDP per capita (2000 to 2015)



Source: OECD

Other cost pressures

Other cost pressures cover many factors. Key among them are increasing relative health care costs (e.g. reflecting lower productivity growth in health care than the rest of the economy), the effect of technological advances (e.g. medical equipment, techniques and procedures) and the rise of chronic conditions.

Health care provision is relatively labour intensive. For example, the King's Fund found that staff accounted for around 70 per cent of a typical hospital's total costs and that this proportion had risen over time.[6] So we might expect productivity growth to be slower in this sector than in the economy as a whole. Indeed, available estimates suggest that health care productivity has

[6] See Appleby, Galea and Murray (2014).

risen by about 1.2 per cent a year on average between 1979 and 2014 compared to 1.8 per cent in the whole economy. According to the so-called 'Baumol cost disease' theory, real wages in the health care sector must keep pace with the rest of the economy in order to attract and retain staff, but slower productivity growth means that additional input would be needed to achieve a desired increase in care per person.[7]

Exposure to new or better technologies can improve healthy life expectancy but, unlike in other industries, technological innovations in health care have generally been cost-escalating rather than cost-containing. Different studies attribute between 27 and 75 per cent of growth in health spending in advanced economies to technological change.[8] If taking up new technologies improves health outcomes, initially higher spending may be partly recovered via lower spending further in the future. And to the extent that better health outcomes increase employment rates, they would boost GDP and thereby reduce spending as a share of GDP.

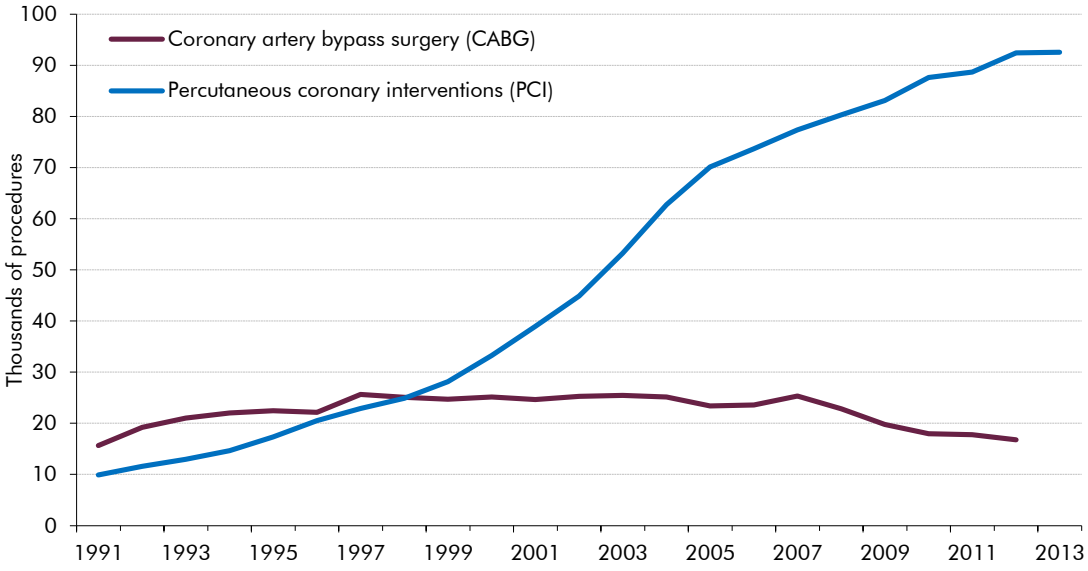
There are several reasons why technology may generate pressure on health spending. New technologies often treat conditions for which there was previously no, or no effective, treatment (e.g. renal dialysis and coronary artery bypass grafts) or expand existing methods to wider patient populations (known as 'treatment expansion'). Even if an advance reduces the cost of treatment, spending can increase if that treatment finds wider medical uses and hence addresses unmet demand for care.

Examining the impact of the diffusion of coronary artery bypass grafts (CABG), a major open-heart surgery usually reserved for severe cases, and stent procedures (PTCA) for coronary heart disease in the UK, McGuire *et al.* (2010) found evidence of treatment expansion.[9] As PTCA is around three times cheaper than CABG, it might be expected that total health care costs would fall due to its use.[10] In fact, while PTCA acted as a substitute for CABG for many patients, it also led to treatment expansion as less severely ill patients were treated.

Chart 6 shows that up until 1997 the number of CABG and percutaneous coronary intervention (PCI) procedures both increased, with PCIs rising faster than CABGs, indicating treatment expansion. After 1997 the trends diverged, with PCIs rising rapidly and displacing CABGs. So, despite moving to a technique with lower unit costs, overall health care costs increased.

[7] See Baumol and Bowen (1966).
[8] See European Commission (2015) and Congressional Budget Office (2008).
[9] Percutaneous transluminal coronary angioplasty (PTCA) is one type of percutaneous coronary intervention (PCI). Others include new percutaneous techniques capable of relieving coronary narrowing.
[10] On the cost differential between CABG and PTCA see the Department of Health (2015) national tariffs database. This is also consistent with previous findings for the US (Cutler and Huckman, 2003).

Chart 6: Number of surgical procedures in the UK



Source: British Heart Foundation

Technological cost growth may also reflect expanded morbidity due to the **growth in chronic conditions**. For example, population ageing and lifestyle trends encourage the development of technology that delays mortality from chronic conditions and improves the quality of life of sufferers. This means that new treatments are constantly in development for conditions including mental health, cardiovascular disease or cancer. These diseases are currently incurable, so medical technology is focused on finding new or better ways to extend or improve sufferers' lives. If they spend longer in need of care as a result, health spending will rise.

3. Other cost pressures in the OBR's long-term fiscal projections

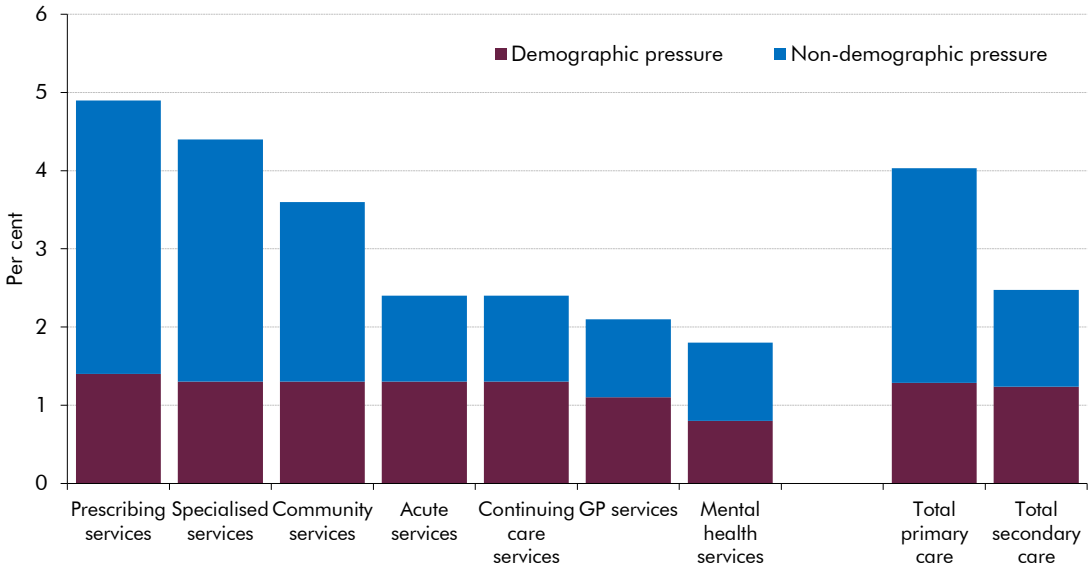
The OBR's long-term fiscal projections did not include explicit adjustments for other cost pressures in the health sector until this year. By contrast, the IMF and OECD consider non-demographic drivers to be a key source of future spending growth. For example, the OECD (2013) assumed in its 'cost-pressure scenario' that other cost pressures increase spending by 1.7 per cent a year beyond what would result from demographic change and income effects. The IMF (2010, 2012) estimated an additional cost pressure for the UK of about 1.5 per cent a year between 1980 and 2008 and 2.2 per cent a year between 1995 and 2008.

Most empirical studies tend to estimate the contribution of demographic and income-related factors explicitly, for example via the sensitivity of health spending to changes in the dependency ratio and in real per capita incomes. Having derived estimates of these factors, the unexplained residual component of spending growth is attributed to other cost pressures. But because of the problems associated with measuring health care productivity, it is difficult to

identify precisely how much of the increase in spending can be accounted for by demographic and income-related factors and, consequently, other pressures.

NHS England (2016) estimated non-demographic cost growth pressures for the NHS up to 2020-21 by stripping out an estimate of demographic cost pressures from activity in 2015-16 (Chart 7). This suggests that, on average in 2015-16, other cost pressures added 2.7 and 1.2 percentage points to growth in primary and secondary care spending respectively. (Secondary care makes up the majority of total spending.[11]) The size of the effect varies significantly by spending category, being particularly large for prescribing and specialised services. By contrast, demographic factors are similar across most services, contributing on average around 1.3 percentage points to growth in total activity.

Chart 7: Demographic and non-demographic pressures (2015-16)



Source: NHS England, OBR

In order to include other cost pressures in the long-term spending projections, we used the NHS England estimate for non-demographic cost pressures in 2015-16 as the starting point, then assumed that these pressures will decline over time, as might be expected as health spending takes up an ever larger share of national income. Specifically, we assumed a linear convergence for both primary and secondary care to a 1 per cent a year increase from 2036-37 onwards.[12]

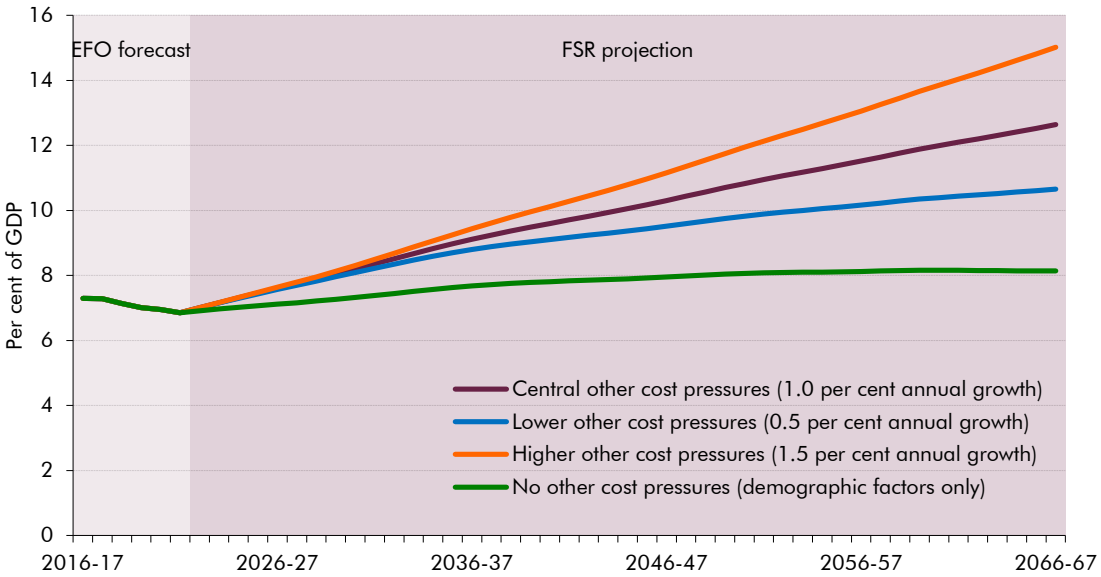
Including other cost pressures had a significant effect on the 2017 health spending projection. Chart 8 shows spending on health rising from 7.3 per cent of GDP in 2016-17 to 12.6 per cent of GDP in 2066-67. This was around 4.6 per cent of GDP higher than the 2015 projection, of which

[11] The weights are based on spending on clinical commissioning group service, NHS England service and other service in 2014.

[12] This is the same steady-state growth rate used by the US Congressional Budget Office when considering the average excess cost growth over the past 30 years and the flexibility to restrain costs in the future.

4.5 per cent of GDP (£88 billion) reflected the new assumption about additional cost pressures. Faster or slower other cost pressure would see health spending rise by more or less than in our central projection.

Chart 8: Health care spending under alternative other cost pressure assumptions

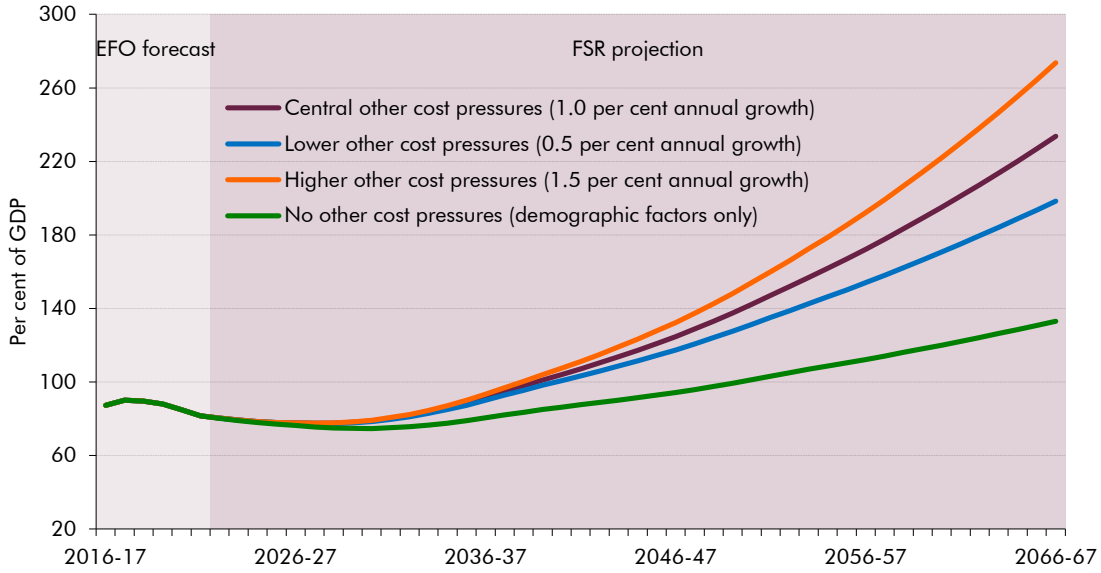


Source: OBR

Given the considerable uncertainty around estimates of demographic and income-related effects, estimates of other cost pressures that are typically calculated by residual are inherently sensitive to assumptions about other factors. Non-linear interactions are also possible, which adds further uncertainty. For example, high other cost pressures might well be partly driven by a high rate of technological advance. That would increase cost, but it could also increase productivity in the health care.

The inclusion of other cost pressures in the long-term health spending projection accounted for the majority of the increase in public sector net debt by 2066-67 presented in the 2017 *Fiscal sustainability report (FSR)*. Excluding the effect of these cost pressures, public debt would have reached 133 per cent of GDP by 2066-67, some 101 per cent of GDP below the central projection that included the extra pressures on health spending (Chart 9).

Chart 9: Sensitivity of net debt projections to health-specific assumptions



Source: OBR

Similar to health spending, the debt projections are very sensitive to assumptions about the pace at which non-demographic cost pressures push health spending up. In particular, under the 'higher other cost pressures' scenario, debt would increase to 274 per cent of GDP by 2066-67, as the difference in annual growth compounds. Under the current policy setting, all scenarios point to significant upward pressure from non-demographic drivers of spending. That would require larger fiscal adjustments to bring public debt more in line with pre-crisis levels.[13]

4. Conclusion

The fiscal challenge from rising health care costs – assuming that future governments spend more to accommodate them – is substantial over the longer term. This represents a key risk to the sustainability of the UK public finances. While ageing will be a growing driver of spending in the future, other non-demographic cost pressures are likely to continue raising health spending too. Given the scale of uncertainty around these pressures, sensitivity analysis is vital when presenting their long-term implications. But on most assumptions they will make it more challenging for the Government to meet its fiscal objective of balancing the budget as early as possible in the next Parliament, and for future governments to keep the public finances on a sustainable path.

[13] For example, assuming that the current policy setting is consistent with other cost pressures growing at 1.5 per cent a year implies that the required adjustment to get debt back to 40 per cent of GDP by 2066-67 would be a one-off 5.2 per cent of GDP from 2022-23. Conversely, under the 'no other cost pressures' scenario, the required one-off adjustment would be 2.1 per cent of GDP (OBR, 2017).

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