

A review of NHS expenditure and labour productivity

The anatomy of health spending 2011/12

Research report

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About this work programme

Understanding how NHS organisations manage their financial performance is critical. The unprecedented financial challenge, and the difficult decisions facing health and social care services in England, make it more crucial than ever to understand how the NHS spends money, and to identify areas of success and failure in financial performance.

Drawing on the accounts data of English NHS organisations, this Nuffield Trust research programme, supported by PwC and McKesson, provides detailed annual analysis of financial performance across acute hospitals (both NHS and foundation trusts) and other providers, as well as commissioning bodies. Although these accounts are consolidated annually and available to the public, central bodies do not conduct detailed historical analysis. This research programme aims to establish the Nuffield Trust as a centre of expertise in the analysis of spending and productivity.

The first output from the programme, published in this report, examines financial performance and labour productivity, using data from 2003/04 to 2011/12. At the time of publication, data from the latest audited accounts were included. The report examines patterns in primary care trust and acute trust spending through the reforms of the Blair Government and the start of austerity.

Further outputs from the programme – *NHS Spending: Monitoring financial performance and productivity* – are due for publication later in 2013. All research outputs will be published on the Nuffield Trust website at www.nuffieldtrust.org.uk/nhs-spending. If you would like to receive updates on the programme, including when new research is published, please sign up for our efficiency email alerts at www.nuffieldtrust.org.uk/newsletter.



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Executive summary

Understanding how National Health Service (NHS) organisations manage their performance with respect to finance and productivity is becoming increasingly important in light of the unprecedented financial challenge facing the NHS in England. This report presents findings of new analysis of the financial performance of the NHS in England and the Department of Health between 2003/04 and 2011/12. It examines recent changes in the labour productivity of acute hospitals (both NHS and foundation trusts), identifies the factors associated with variations in labour productivity and develops a new measure of labour productivity. The report is the first in a series of annual reports on NHS finances from the Nuffield Trust.

Key points:

- 2011/12 was the first year of the government's tight financial envelope for the NHS. Spending on health in England in 2011/12 was £105.4 billion, a 0.3 per cent increase in real terms. Despite this relative squeeze, at the end of the year the health budget was underspent by £1.4 billion.
- Over recent years, spending on health has increased rapidly but the rate of increase has differed markedly between different types of health care. Spending on community services has increased very rapidly – by 6.0 per cent in 2011/12 – in line with the government policy of shifting more care into community settings. Spending on hospital care has also increased, at a much faster rate than primary care or mental health services. Spending on hospital care grew at 1.2 per cent in 2011/12 compared with a 1.2 per cent real-terms reduction in spending on general practitioner (GP) services and a 0.5 per cent a year growth in mental health spending. The more rapid growth in hospital spending relative to primary care raises questions about whether the NHS has the right balance of services for the future.
- While NHS finances nationally look robust, the proportion of trusts in deficit has been rising steadily since 2007/08 – 32 out of 250 trusts failed to achieve financial balance in 2011/12. Seven of these trusts had reported a deficit for three years or more. A number of NHS and foundation trusts are weak financially, and several have limited scope to resolve their financial difficulties. The financing costs of Private Finance Initiative (PFI) contracts are a very small part of NHS spending (less than one per cent overall) but they have increased rapidly since 2009, especially in London. A small number of hospitals are spending a relatively large proportion of their budgets on the PFI.
- Spending on staff employed by the NHS fell in 2011/12 by three per cent in real terms. This was the result of a reduction in staff numbers and a real-terms fall in average pay.
- While measuring productivity in health care is notoriously complex, there appears to have been relatively little improvement in the labour productivity of NHS acute hospitals in recent years. This research finds that hospitals in the South of England seem to have higher labour productivity than hospitals in the North of England.

The exception to this is London, where hospitals appear relatively less productive, possibly due to their greater involvement in teaching and research activities.

- Measures of NHS productivity may underestimate the actual performance of the NHS as spending on community health services has been increasing rapidly but the NHS lacks a comprehensive, consistent measure of the output of these services. Given the growing importance of community health services for spending and the delivery of health care, the NHS needs a much better understanding of the output, cost and productivity of community health services.
- Trusts with a higher proportion of medical and dental staff are more likely to have higher labour productivity levels despite the higher labour costs that this staff mix may imply.
- Financial performance and labour productivity vary across England. This research supports the findings of previous research showing that the South West and East of England regions seem to perform relatively well with regard to labour productivity. The South West also has financially robust hospitals and between 2003/04 and 2011/12 acute care spending grew at the lowest rate of any region. Further research to understand how this region performs so well relative to others would be useful to the NHS.
- Hospitals that have fewer potential competitors in their area appear to have a very small but statistically significant increase in their labour productivity.
- Larger acute hospitals appear to have lower labour productivity, though the effect is small.
- The analysis of labour productivity presents a less optimistic view of the efforts to improve efficiency than the Department of Health headline figure of £2.85 billion of Quality, Innovation, Productivity and Prevention (QIPP) savings from acute providers in 2011/12 would imply. The analysis would suggest that the NHS is struggling to translate this into labour productivity improvements.

1. Introduction

The NHS faces an unprecedented financial challenge as funding is held broadly constant in real terms up to 2015 but the demands on the service continue to rise (Appleby and others, 2010; Roberts and others, 2012). The Department of Health estimates that to maintain the quality of care in the face of rising demands and constrained funding, the NHS will need to make recurrent efficiency savings of up to £20 billion over four years from 2011 (Department of Health, 2012a). This is often described as either the QIPP challenge or the Nicholson challenge and is equivalent to four per cent year-on-year efficiency savings. Nuffield Trust research suggests that the pressures on the NHS are likely to continue to outpace funding, and without further increases in the real resources allocated to health beyond 2015, the NHS will need to continue to deliver efficiency savings at this rate for at least the remainder of the decade (Roberts and others, 2012).

The ability of the NHS to deliver sustained efficiency savings without impacting on the quality of care is the key challenge facing the NHS. This challenge has been brought into sharp relief by the report of the Mid Staffordshire NHS Foundation Trust Public Inquiry (Francis, 2013), which sets out the consequences for patients in Mid Staffordshire when the focus of the trust's board was on cost control at the expense of the safety and quality of care.

This research looks at how the NHS is performing against its financial objectives. It examines the financial performance of the NHS in 2011/12, set in the context of trends in financial performance over the nine years from 2003/04. Given the importance of the productivity challenge, it then seeks to explore changes in NHS labour productivity at the acute hospital level. The analysis considers 110 acute hospitals (NHS and foundation trusts). These were selected as those that operated continuously between 2006/07 and 2011/12, and were not significantly restructured over this period, particularly in relation to taking on community services formerly provided directly by primary care trusts (PCTs). The reasons for excluding the latter of these are described in more detail in the section entitled 'Inputs' in Chapter 3. We only consider 2006/07 to 2011/12 for the labour productivity analysis (rather than from 2003/04 as in the rest of the report) due to availability and quality of output data.

This research is based on an analysis of annual accounts from across the English health sector – strategic health authorities, PCTs, NHS and foundation trusts. These financial accounts are submitted to the Department of Health by strategic health authorities, PCTs and NHS trusts¹ and to Monitor by foundation trusts. They are consolidated into annual accounts produced by the Department of Health (Department of Health, 2012b) and by Monitor (Monitor, 2012); neither organisation provides a detailed historical analysis. Throughout the report we have adjusted for inflation (using the HM Treasury gross domestic product (GDP) deflators as at 28 November 2012) so that all values presented are in 2011/12 prices.

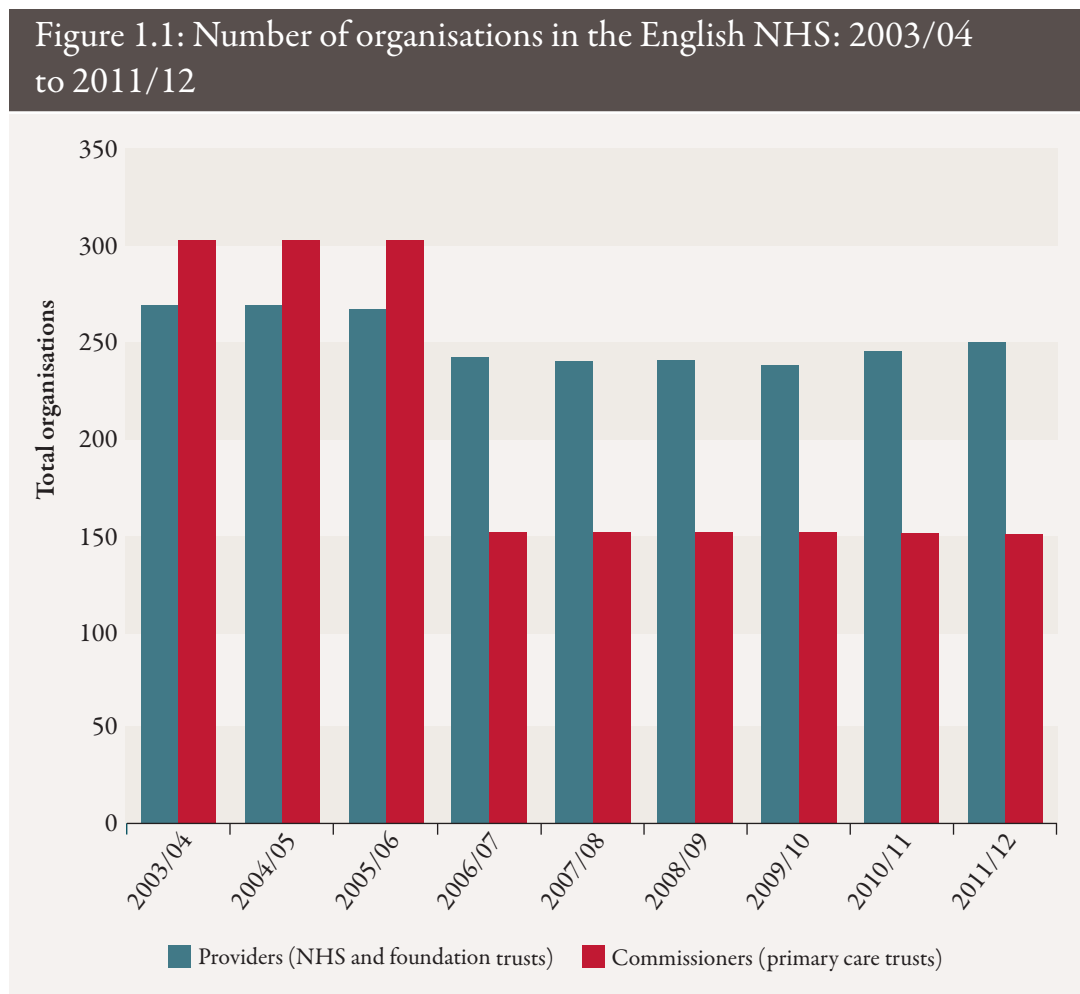
1. Throughout this report, the term 'NHS trust' is used to refer to provider organisations that have not achieved foundation trust status, including acute trusts, mental health service trusts, community service trusts and ambulance trusts.

This report is intended to be the first in a series of annual reports on NHS finances. The research findings use the accounts data described above to link Department of Health financial performance to that of local organisations, such as provider trusts and PCTs. This work builds on the summary analyses for PCTs and NHS trusts that have been produced in recent years by the Audit Commission (see, for example, Audit Commission, 2010). However, the role of the Audit Commission is changing and this function will cease in the future.

Changing NHS organisations

Analysing how well NHS organisations perform with respect to managing finances and productivity is complicated. The NHS comprises many hundreds of separate organisations, and comparing performance over time is made difficult by frequent changes to accounting conventions as well as the organisational entities themselves, which may have merged or split over the period studied.

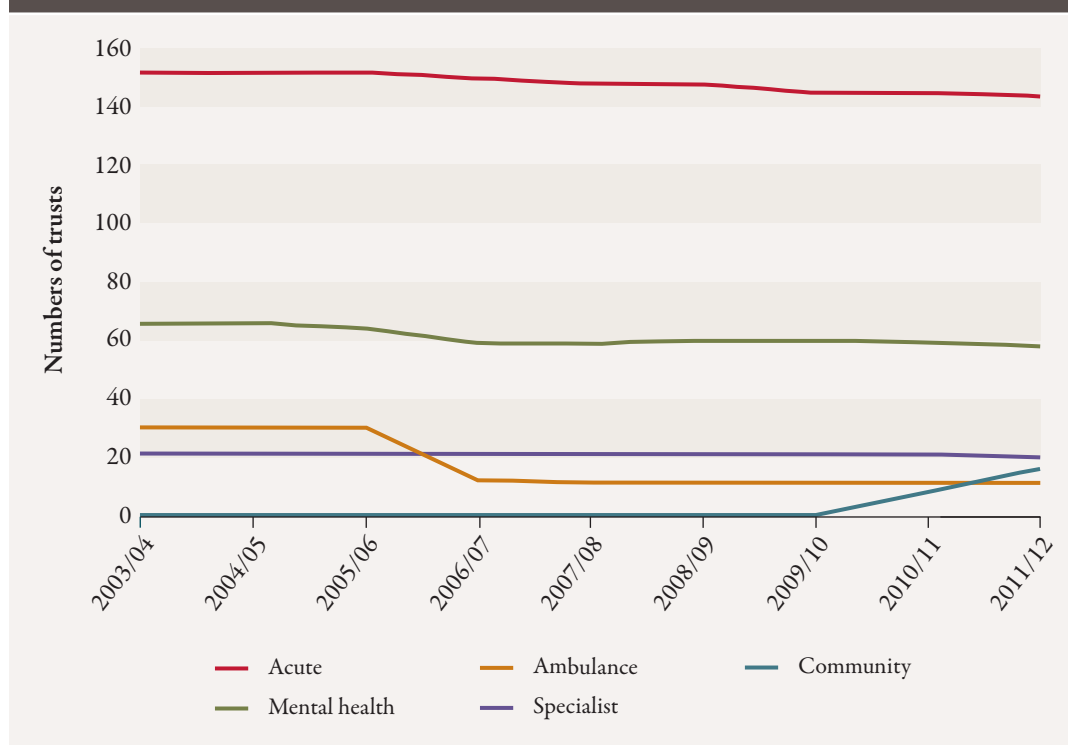
Figure 1.1 shows the number of NHS and foundation trusts (providers) and PCTs (commissioners) for each year since 2003/04.



The number of PCTs has remained broadly the same since 2006/07, when the 303 PCTs reduced in number to 152 to serve larger populations. The only exception to this is in Hertfordshire where the two PCTs there merged to form one in 2010/11.

Figure 1.2 shows how the number and type of provider organisations within the English NHS have changed from 2003/04. Following a period of significant reconfiguration of NHS providers between 1997 and 2002, when there were 112 hospital mergers (Gaynor and others, 2012), there was a further gradual reduction in the number of acute and mental health trusts between 2003/04 and 2011/12. By 2011/12, there were 144 acute NHS providers, of which 79 had achieved foundation trust status and 65 remained as acute NHS trusts. There was a smaller number of mental health trusts – 58 by 2011/12, of which 41 were foundation trusts. There was a small number of specialist trusts (21), with only one merger over the period – Nuffield Orthopaedic Centre merging with Oxford University Hospitals.

Figure 1.2: Number of NHS and foundation trusts by type, England: 2003/04 to 2011/12



The most significant changes to NHS providers over the past decade relate to ambulance trusts and community health services. Ambulance trusts were reorganised from 30 trusts to 11 over two years from 2006 to 2008. For community health services the *Transforming Community Services* programme separated off the community services that had been directly provided by PCTs from 2010/11. From then, the majority merged with acute or mental health trusts, but a small number of standalone community service trusts remained.

Table 1.1: NHS and foundation trusts in England: 2011/12

	Acute	Specialist	Mental health	Ambulance	Community
NHS trust	65	1	17	7	16
Foundation trust	79	19	41	4	0

2. NHS financial performance

Total health spend

Government spending on health across the United Kingdom (UK) in 2011/12 was £121.4 billion or 7.9 per cent of GDP (Public Expenditure Statistical Analyses, 2012). Since the formation of the NHS in 1948, this figure has increased by an average of 3.8 per cent a year in real terms, with only eight financial years where there has been a real decrease (Harker, 2012). Two of these eight years were 2010/11 and 2011/12 (see Table 2.1).

Table 2.1: Government spending on health in the UK: 2003/04 to 2011/12

£ billion	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12
Cash terms	74.9	82.9	89.8	94.7	102.3	110.0	118.2	121.3	121.4
Share of GDP	6.5%	6.8%	7.0%	7.0%	7.1%	7.7%	8.3%	8.2%	7.9%
Real-terms (2011/12)	91.1	98.0	103.7	106.5	112.3	117.5	124.4	124.1	121.4
Real-terms change		+7.5%	+5.9%	+2.7%	+5.4%	+4.7%	+5.9%	-0.2%	-2.2%

Source: Public Expenditure Statistical Analyses, 2012

Of this total health spending, £105.4 billion (87 per cent) was spent on the NHS in England (according to the Department of Health's Departmental Expenditure Limits (DELs) for revenue and capital). The remainder of the total was spent by the devolved governments in Scotland, Wales and Northern Ireland on their health services. A small amount went to the Department for Business, Innovation & Skills and the Department for Culture, Media and Sport. This was funding for the Medical Research Council (£629 million funded through the Department for Business, Innovation & Skills) and the National Lottery Distribution Fund (£44 million funded through the Department for Culture, Media and Sport) (Public Expenditure Statistical Analyses, 2012).

Revenue and capital spending on the English NHS in 2011/12 was below the government's planned level set out in the 2010 Spending Review, resulting in overall Department of Health underspend of around £1.4 billion. A small part of this underspend (£316 million) was added to the Department's spending allocation for 2013/14 but around £1 billion of the health budget had to be returned to the Treasury (Charlesworth, 2012; Department of Health, 2013). Table 2.2 compares actual aggregate health spending in 2011/12 with planned spending.

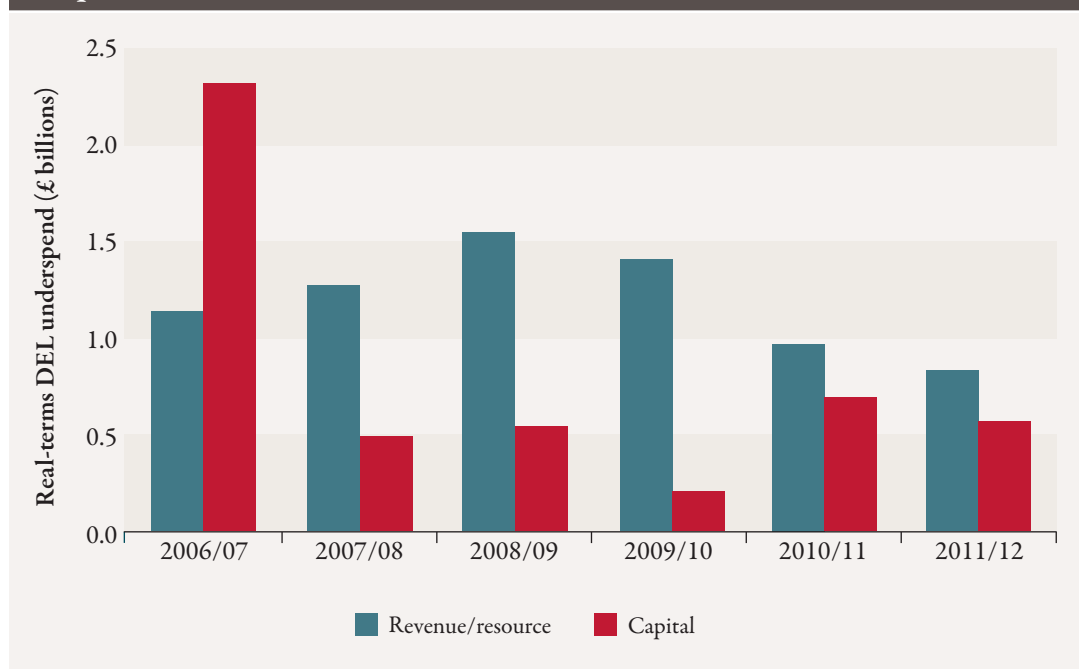
Table 2.2: Spending on health in England: 2011/12

£ billion	Allocation	Outturn spending	Underspend
Revenue/resource	102.4	101.6	0.8
Capital	4.4	3.8	0.6
Total	106.8	105.4	1.4

Source: Department of Health, 2013

Underspending the health budget is not a new phenomenon: it has been a feature of financial management by the NHS and Department of Health for a number of years. Figure 2.1 shows the value of capital and revenue underspends reported by the Department of Health in aggregate for each of the six years from 2006/07. Prior to 2008, the Department of Health was able to carry over underspend under a system known as 'end year flexibility'. This was suspended following the financial crisis in the wider economy in 2008. By the time of the 2010 Spending Review, the Department of Health had accumulated a total underspend of £5.5 billion (cash) (Nuffield Trust, 2010). This was not carried forward into the current spending review period, in line with all departments, and the Treasury introduced a new system of more limited carryover between financial years called the Budget Exchange Scheme (HM Treasury, 2011a). Under this system, departments do not have the automatic right to carry over any underspends in full and need to reach agreement with the Treasury, subject to agreement of a prudent limit.

Figure 2.1: Total health budget underspend compared with the Department of Health allocation: 2006/07 to 2011/12



PCT spending compared with allocations

Allocations from the Department of Health to PCTs account for the vast majority of the Department's budget. In 2011/12, PCTs spent £91.0 billion, either on commissioning services from other NHS and private providers for the population in their local areas, or through PCTs providing services directly themselves. The remainder was spent as follows:

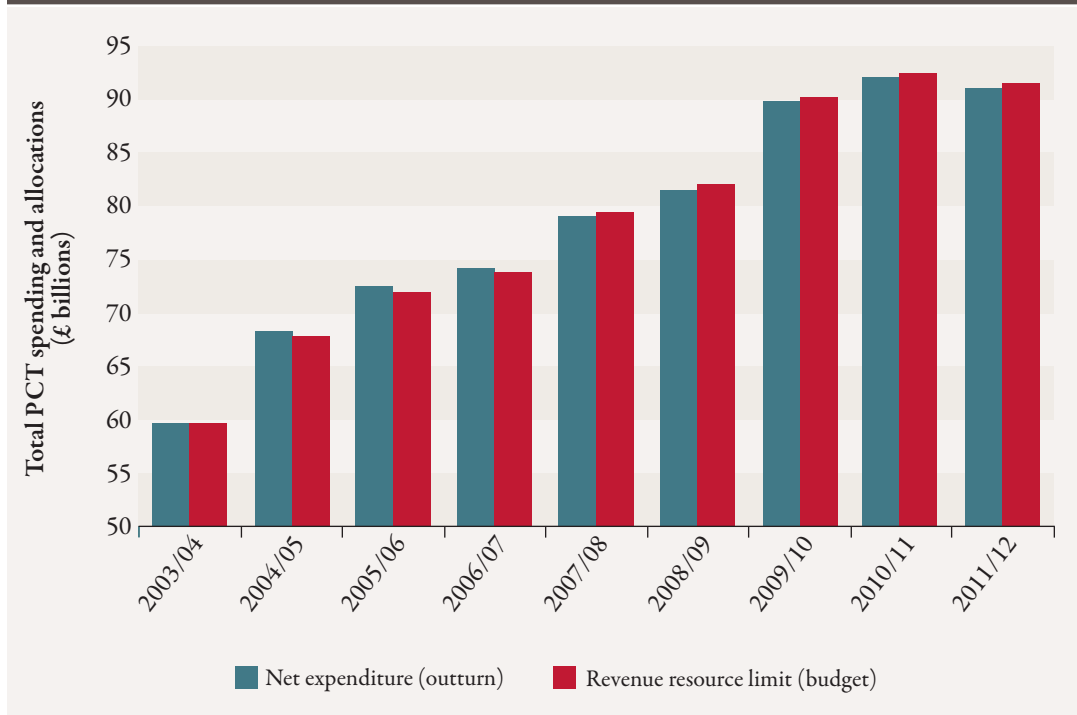
- by strategic health authorities (£5.5 billion), of which the largest element was the Multi-Professional Education and Training (MPET) budget
- by the Department of Health (£4.6 billion)
- by arm's-length bodies (£1.0 billion).

Finally, across NHS providers there was a £0.5 billion surplus in 2011/12, which counted against the Department of Health's calculation of total spending.

A significant element of the total health underspend reported by the Department of Health in 2011/12 resulted from underspending by PCTs compared with their allocations. In 2011/12, allocations to PCTs (revenue resource limits) were £526 million higher than spending.

Figure 2.2 shows how PCT spending compared with allocations to PCTs from 2003/04. Differences between this and Figure 2.1 therefore relate to strategic health authority and central departmental under- or overspends. PCTs significantly overspent from 2004/05 to 2006/07 (with an average overspend of £436 million). Following the reorganisation of PCTs in 2006/07, the financial position was much improved and, in aggregate, they have reported an underspend every year since.

Figure 2.2: PCT spending compared with allocations: 2003/04 to 2011/12 (in 2011/12 prices)



PCTs' use of health care resources

Since 2003/04 there has been a substantial increase in spending on health care. Spending by PCTs to commission and provide health care for their local populations increased by an average of 3.9 per cent a year over and above inflation between 2003/04 and 2011/12. Overall spending by PCTs increased in real terms from £69 billion in 2003/04 to £91 billion in 2011/12. Growth was greatest between 2003/04 and 2009/10. The year 2011/12 marks a break with the recent past: spending by PCTs fell in real terms as the growth in allocations fell and PCTs did not spend all the money allocated to them to commission and provide health services. This change in allocations reflects the movement of learning difficulties provision from PCTs to local authorities in 2011/12; the value of this change was £1.3 billion. On a like-for-like basis PCT allocation showed a small real-terms increase.

In addition to increases in the overall level of spending in the NHS, since 2003/04 there have been important changes in the mix of services that PCTs have chosen to commission and provide. Throughout this period, PCTs have spent the majority of their health care resources on secondary care.¹ In 2011/12, this accounted for three quarters of total spend or £68.8 billion, compared with £21.6 billion on primary care. Secondary care covers a very wide range of services from acute and specialist hospitals to community services such as district nursing. Primary care includes all GP services, their prescribing, and NHS-funded dental care, opticians and high-street pharmacies. PCTs also spent £1.7 billion on non-health care items, including their own running costs.

In real terms, PCT spending on primary care rose by 22 per cent (just under three per cent a year) between 2003/04 and 2011/12, increasing from £17.7 billion to £21.6 billion. Almost all of this increase occurred between 2003 and 2005 with the introduction of the new GP contract in April 2004, which led to a 14 per cent increase in GPs' gross earnings (across General Medical Services (GMS) and Personal Medical Services (PMS) practices) in one year (Health and Social Care Information Centre, 2012c). In comparison, PCT spending on secondary care jumped 40.1 per cent over the same period, increasing from £49.1 billion to £68.8 billion. This is equivalent to an average increase of over five per cent a year.

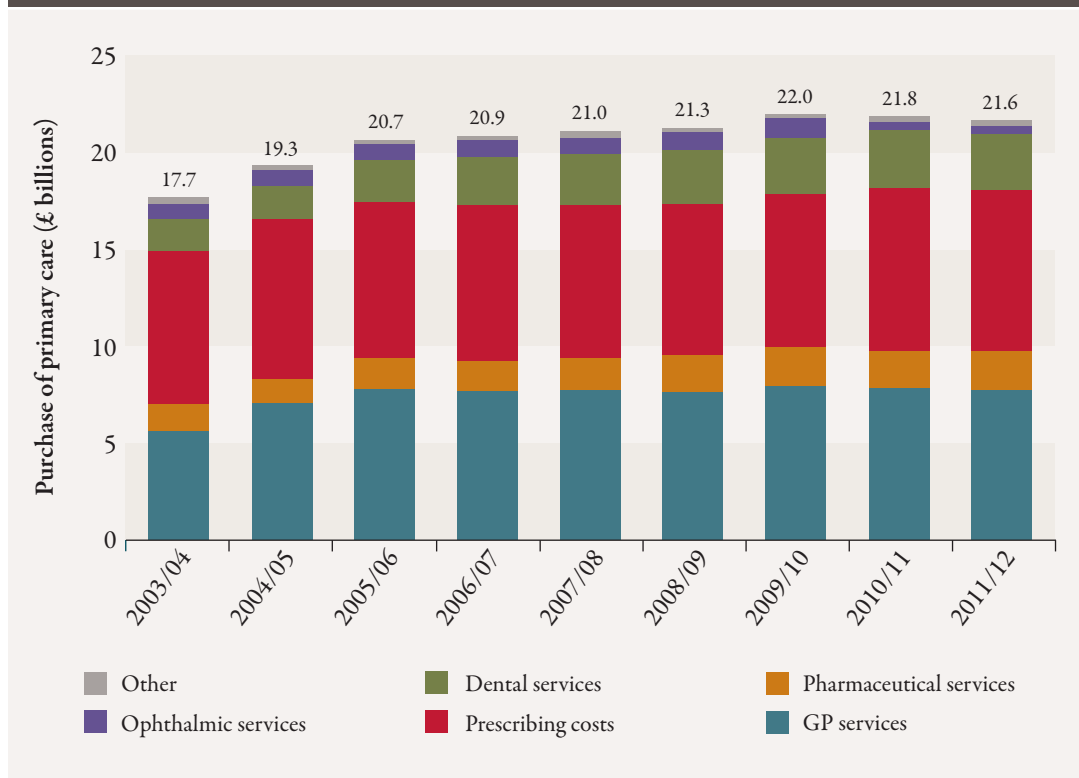
Primary care

Primary care spending as a proportion of overall spending on NHS care by PCTs reduced from 26 per cent to 24 per cent between 2003/04 and 2011/12. Figure 2.3 shows the different types of care included within primary care. It includes spending on general practices (General Medical Services, Personal Medical Services and alternative provider medical services), general dental services, general ophthalmic services, and prescription and pharmacy services. Spending on General Medical Services and general dental services transferred from central government to PCTs in 2004/05 and 2007/08 respectively.

PCT spending on primary care has two key components: GP services and prescribing. Together these account for almost three quarters of spending on primary care. Despite the overall increase in spending on health since 2003/04, spending on GP services has been static since 2005. This may underestimate investment as a result of changes to the provision of GP out-of-hours care. Prior to 2004, GPs provided such a service as part of their contractual arrangements. The new GP contract introduced in 2004 changed these arrangements so that GPs no longer had to provide out-of-hours services, and PCTs

1. Types of care have been grouped into primary or secondary care based on Department of Health financial reporting definitions.

Figure 2.3: PCT spending on primary care in England: 2003/04 to 2011/12



contracted with other providers to deliver this care. These contracts are not listed within PCT accounts as primary care spending, but are recorded as spending on secondary care. Data from the NHS Information Centre (Health and Social Care Information Centre, 2012a) show that from 2007/08 to 2011/12, PCT spending on out-of-hours care increased by two per cent a year to £400 million a year. Including this in general practice spending by PCTs, however, does not change the overall conclusion. Since 2007/08, spending on GP services by PCTs has fallen in real terms by an average of 0.2 per cent a year.

Spending on prescribing by general practice has changed little since 2003/04, increasing by 0.5 per cent a year between 2003/04 and 2011/12. In the past, the cost of prescriptions has tended to increase at a faster rate than overall health care spending; however, this trend has now reversed. This relative slow-down in spending on prescribing has been seen in most countries of the Organisation for Economic Co-operation and Development (OECD) – between 2000 and 2008, health spending across the OECD grew by four per cent a year in real terms while spending on pharmaceuticals grew by 3.5 per cent (Organisation for Economic Co-operation and Development, 2012). This change in prescribing spend in England is not because there are a smaller number of items prescribed – it is because the cost per item (net ingredient cost) has fallen (Health and Social Care Information Centre, 2012b).

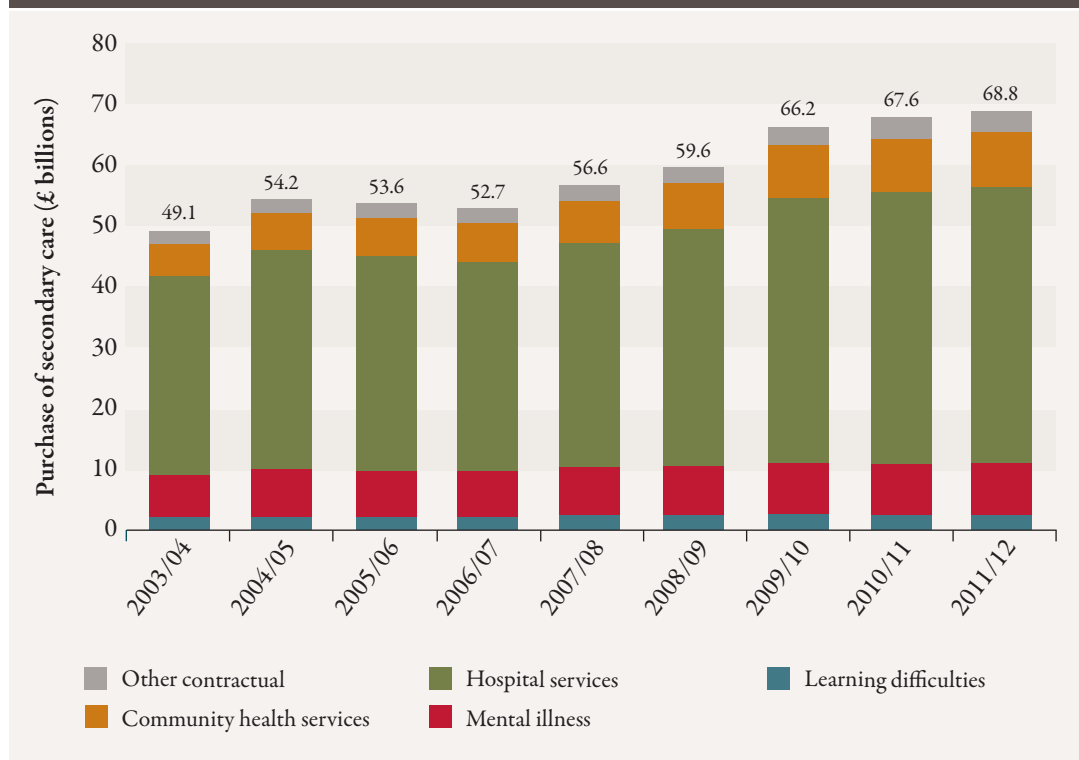
Outside of general practice, NHS spending on pharmaceutical services increased greatly between 2003/04 and 2011/12, rising by £814 million (7.7 per cent a year). Pharmaceutical services include the payments made by PCTs to high-street pharmacists to reimburse them for their work dispensing prescription medicines. The increase in pharmaceutical services spending occurred primarily as a result of the new pharmacy contract introduced in

2006/07, which incentivised pharmacists to provide services other than prescribing, including medicine usage reviews, immunisations and stop-smoking services.

Secondary care

Figure 2.4 shows how spending on the services included within secondary care has changed. This includes all PCT spending plus an additional £1.3 billion of spending on services for people with learning difficulties paid by the Department of Health through the Learning Disability and Health Reform Grant in 2011/12.

Figure 2.4: PCT spending on secondary care in England: 2003/04 to 2011/12



Since 2003/04 there has been a £19.7 billion, or 40 per cent, real-terms increase in secondary care spending across the NHS and private providers. Around £2.8 billion of this has been due to the transfer of market forces factor funding from the central department to PCTs. As a result, this £2.8 billion has not led to a corresponding increase in provider income.

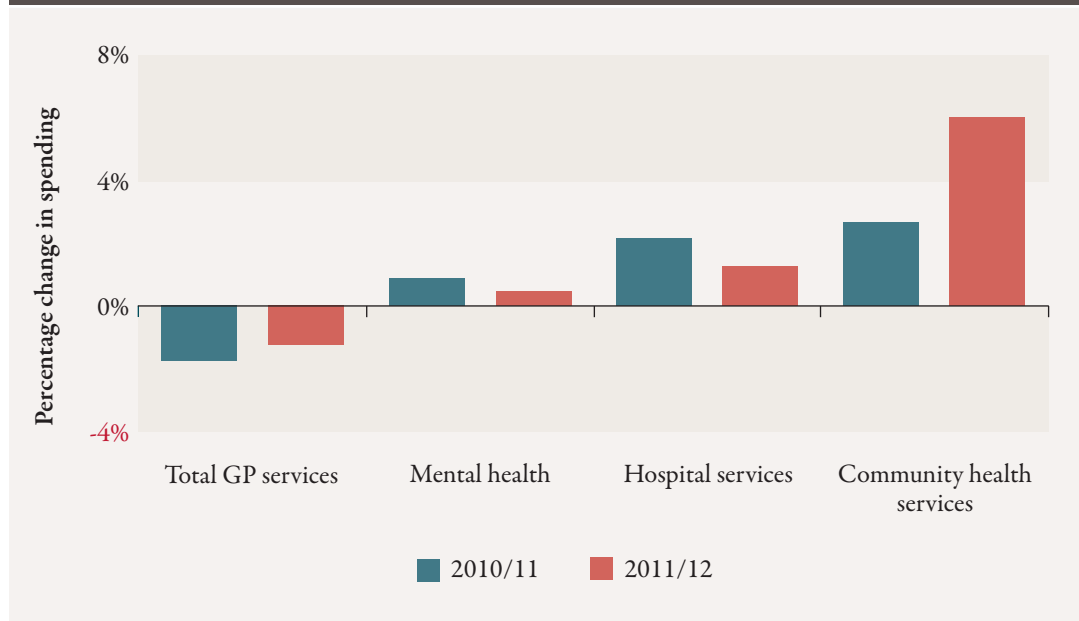
Just over half of the total increase (£10.8 billion) has been spent on general and acute care (an increase of 4.6 per cent a year). While our data do not allow us to remove the expenditure associated with transferring the market forces factor (for PCTs) from the total expenditure on general and acute services (as some of this will need to be allocated to other categories such as accident & emergency and mental health services), we can say that general and acute spending has increased by at least £8.0 billion in real terms (an average of 3.4 per cent a year). A further £4.0 billion of the increase has been spent on community health services (an increase of 9.9 per cent a year), reflecting government policy to increase relative spending on community services in order to move care out of acute settings.

The shifting of responsibility for certain areas of spending from the Department of Health to PCTs makes comparisons over time difficult. However, over the last two years there have been fewer changes, hence comparisons are more valid. Figure 2.5 shows how spending has changed across four broad areas:

- GP services
- mental health
- hospital services (general and acute, accident & emergency and maternity)
- community health services.

As the figure shows, the biggest increase in PCT spending was on community health services, while spending on GP services fell.

Figure 2.5: Percentage changes in spending in England: 2010/11 to 2011/12



Trust revenue and spending

PCTs pay providers to deliver health care to patients in their local communities. Beyond primary care, most of this care is provided by NHS organisations: mental health trusts, specialist trusts, acute hospitals and community trusts. In this analysis we collated the annual accounts of all hospitals (acute and specialist) and NHS mental health and community health providers. These providers can be NHS trusts or the more autonomous foundation trusts, which are regulated by Monitor. This analysis allows us to assess the financial performance of NHS providers and to compare this with the financial position of PCTs.

Revenue and spending

Annual real-terms spending by NHS and foundation trusts increased from £43.8 billion in 2003/04 to £65.5 billion in 2011/12 (an increase of 49 per cent or an average of 6.2 per cent a year). Over the same period, the income of NHS and foundation trusts increased at a faster rate, growing from a combined total of £44.6 billion in 2003/04 to £67.7 billion in 2011/12 (an increase of 52 per cent or an average of 6.5 per cent a year).

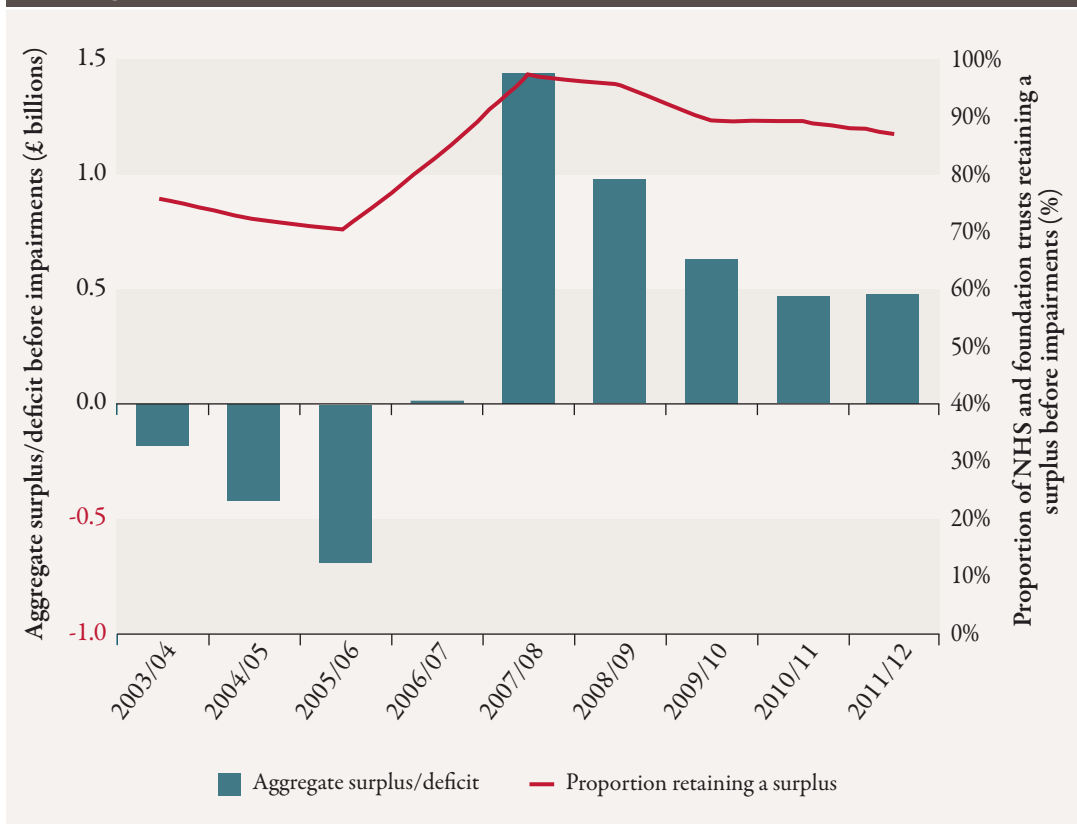
Trusts' spending and income increased across all the English regions but this increase was not uniform. Spending and income increased fastest in the West Midlands, which saw spending by NHS and foundation trusts increase by 8.6 per cent a year over this period, with income growing at 9.0 per cent. Spending in the South Central region grew at the slowest rate of all English regions, increasing by 5.0 per cent each year on average over the nine-year period, with income rising by 5.3 per cent. While income and spending both grew in every region, there were some important differences. Income growth in the North East outpaced spending by an average of 0.6 per cent a year in real terms. Conversely, in London trends in providers' income and spending were much closer. Over the nine-year period the income received by London trusts grew by just 0.1 per cent a year more than their spending.

Surpluses and deficits

As a result of trust income growing at a faster rate than spending in England as a whole, the overall financial position of the trust sector improved between 2003/04 and 2011/12. Throughout this analysis we consider total spending before impairments. Impairments are accounting adjustments made to take account of one-off revaluations of assets and, as a result, they distort year-on-year trends if they are not removed.

At the beginning of this period, the aggregate annual retained deficit before impairments actually worsened, eventually reaching a £682 million deficit in 2005/06. On 1 December 2005, the Secretary of State for Health announced that turnaround teams would be sent into trusts with the largest deficits. Alongside these teams, there were other significant changes to the NHS, including the advent of foundation trusts, the roll-out of Payment by Results (PbR), an increase in PCT size and a PCT assessment system called 'world class commissioning'. Following these changes, there was significant improvement amounting to a £1.4 billion surplus by 2007/08. From 2007/08, the aggregate surplus reduced to £482 million in 2011/12. As shown in Figure 2.6, there has been a slight upward trend in surplus since 2009/10, although this has been from a decreasing proportion of trusts.

Figure 2.6: Aggregate financial position for NHS and foundation trusts in England: 2003/04 to 2011/12

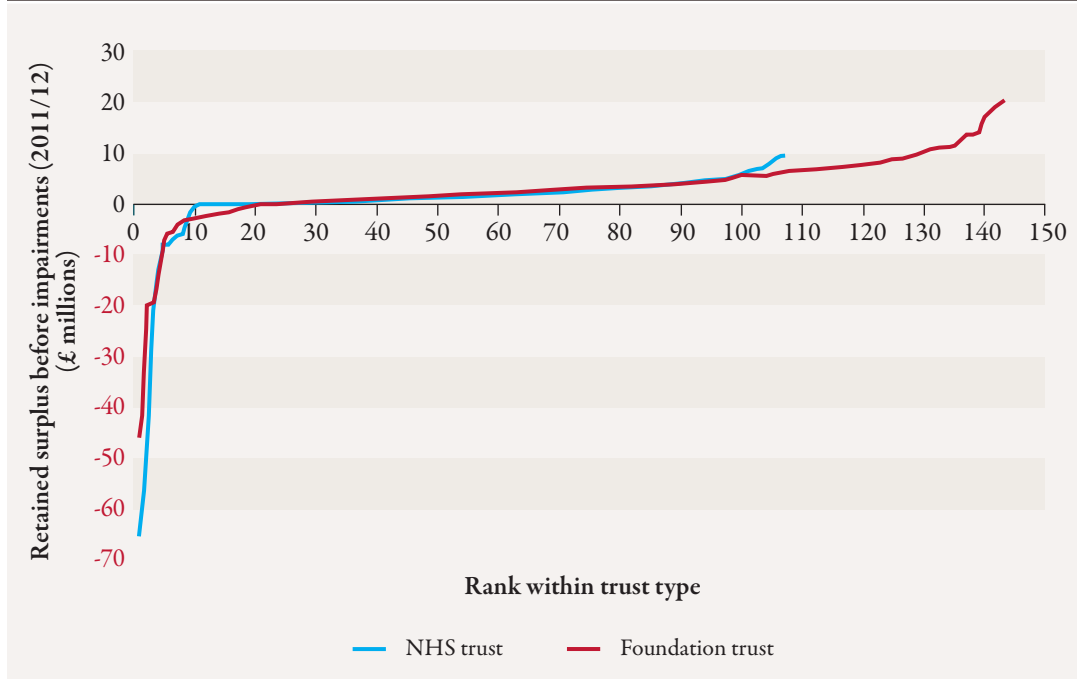


While the overall financial position of NHS and foundation trusts has improved since 2009/10, the proportion of trusts in deficit has increased each year since the turnaround teams left trusts in 2007/08. In 2011/12, 10 NHS trusts and 22 foundation trusts were in deficit¹ compared with 13 of each in 2010/11. However, this still compares positively with the situation in 2005/06 when 69 NHS trusts and 10 foundation trusts failed to achieve financial balance.

1. This differs from Monitor's analysis of the financial performance of foundation trusts (Monitor, 2012) as it includes University Hospital Southampton NHS Foundation Trust, which reported a deficit in the first half of the year before it achieved foundation status.

Figure 2.7 shows how surpluses and deficits were distributed for NHS and foundation trusts in 2011/12. The vast majority (87 per cent) of trusts were in financial surplus in this year. A small number of foundation trusts reported comparatively large surpluses in cash terms. However, around two thirds of NHS and foundation trusts only reported modest surpluses (of less than £5 million).

Figure 2.7: Distribution of surpluses/deficits among NHS and foundation trusts: 2011/12



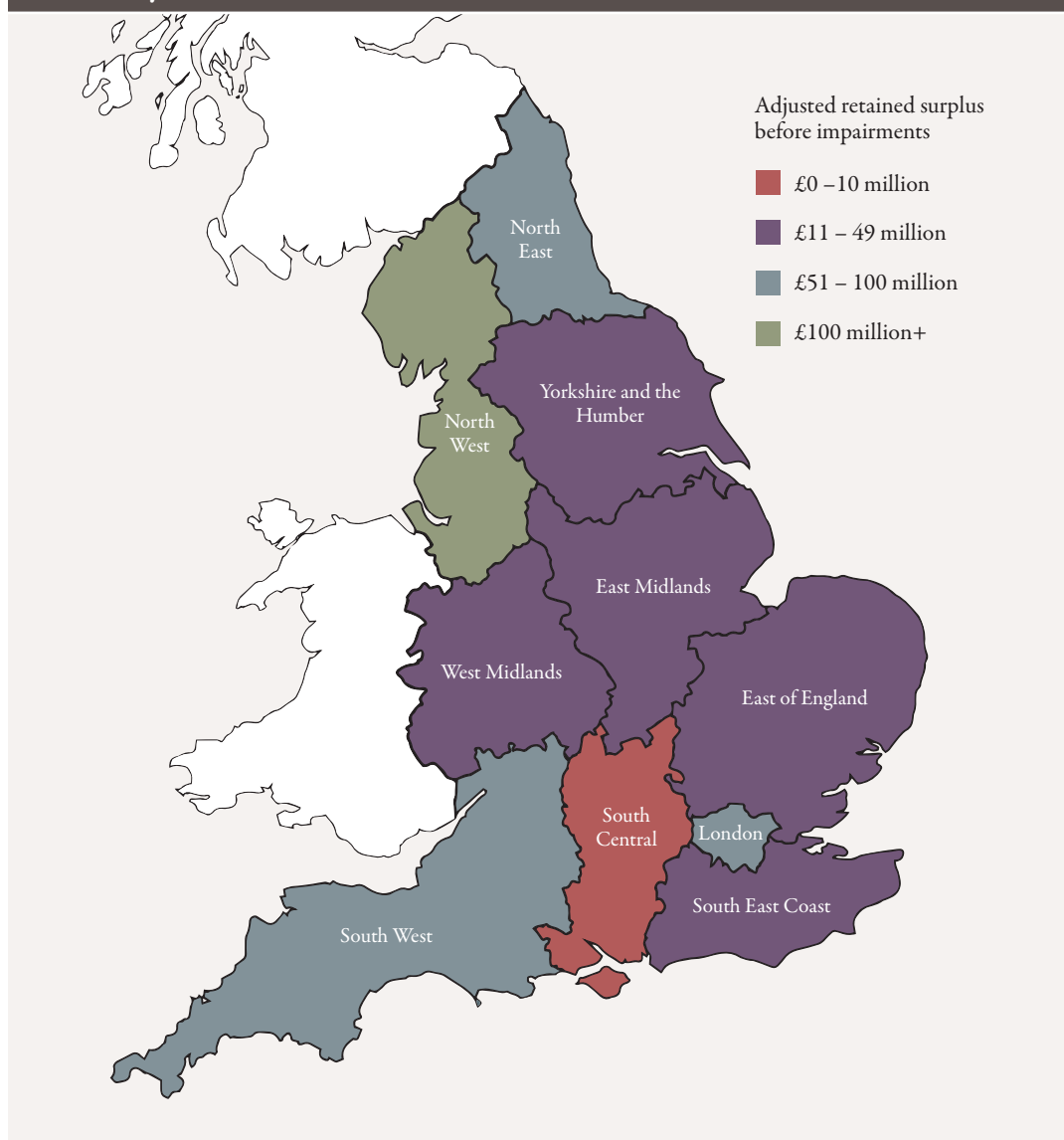
Most organisations only fail to meet financial duties in a single, isolated year. However, a small number of trusts have reported persistent deficits for multiple years up to 2011/12. These are:

- South London Healthcare NHS Trust:¹ eight years
- Barking, Havering and Redbridge University Hospitals NHS Trust: seven years
- Mid Staffordshire NHS Foundation Trust: three years
- Heatherwood and Wexham Park Hospitals NHS Foundation Trust: three years
- North West London Hospitals NHS Trust: three years
- Milton Keynes Hospital NHS Foundation Trust: three years
- Medway NHS Trust: three years.

1. Alternatively, the aggregation of Bromley Hospitals NHS Trust, Queen Elizabeth Hospital NHS Trust and Queen Mary's Sidcup NHS Trust prior to 2009/10.

Figure 2.8 shows how surpluses in NHS and foundation trusts vary by strategic health authority. Financial problems are most concentrated around London and the West Midlands. The West Midlands' position is somewhat surprising given that this is the region with the highest level of income growth in real terms over the period from 2003/04 to 2011/12.

Figure 2.8: Map of aggregate retained surplus by strategic health authority: 2011/12



Breaking down operating spending by providers further, the main elements of spending are as follows:

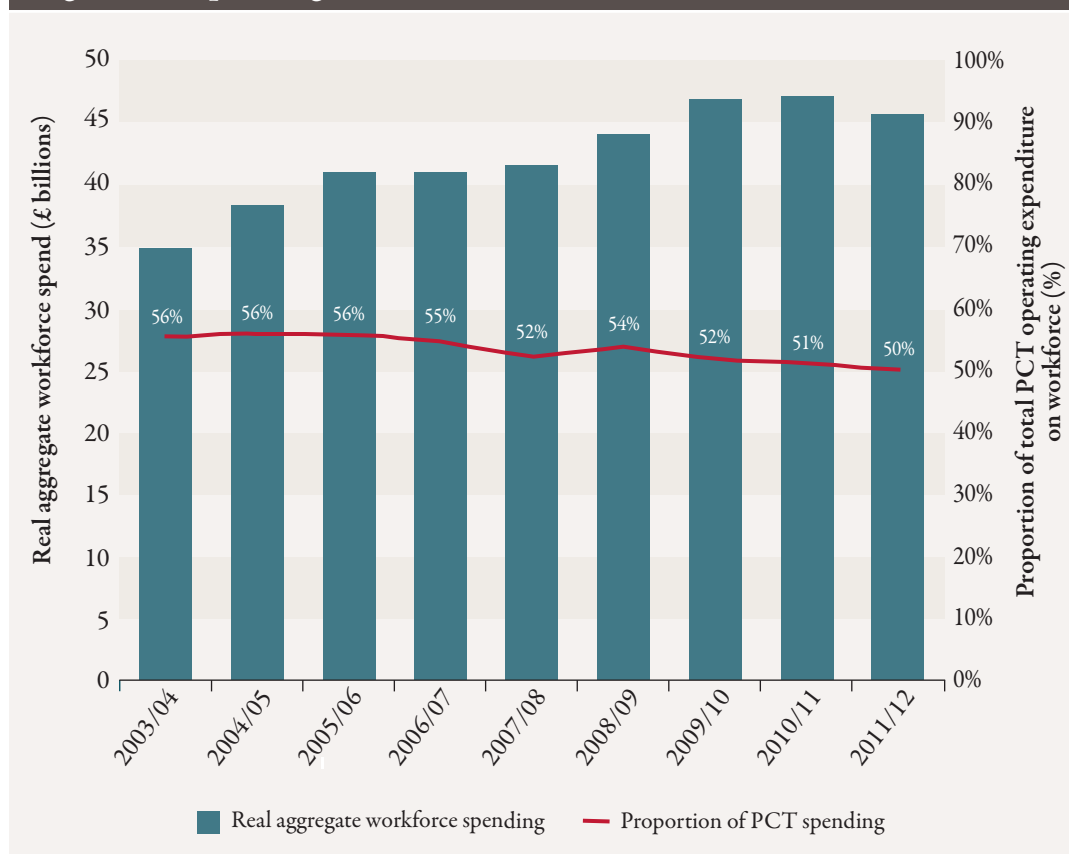
- staff costs: £42.8 billion (64 per cent)
- supplies and services (including the cost of drugs): £11.2 billion (17 per cent)
- premises: £3.3 billion (5 per cent)
- other (including depreciation, transport and clinical negligence): £9.5 billion (14 per cent).

Spending on staff

In our analysis of spending on staff, we have included spending by PCTs as well as NHS and foundation trusts. This is in order to remove the impact of moving staff between PCTs and providers, which has happened particularly in recent years with the Transforming Community Services programme.

We have excluded the cost of independent contractors and their staff from this analysis because far less information on this is available from the accounts. This means that GPs, practice nurses, dentists and pharmacists, for example, are excluded from the workforce spending figures. This gives an artificially low proportion of spending on staff but reflects the different contractual status of these groups, which are not made up of staff directly employed by NHS organisations.

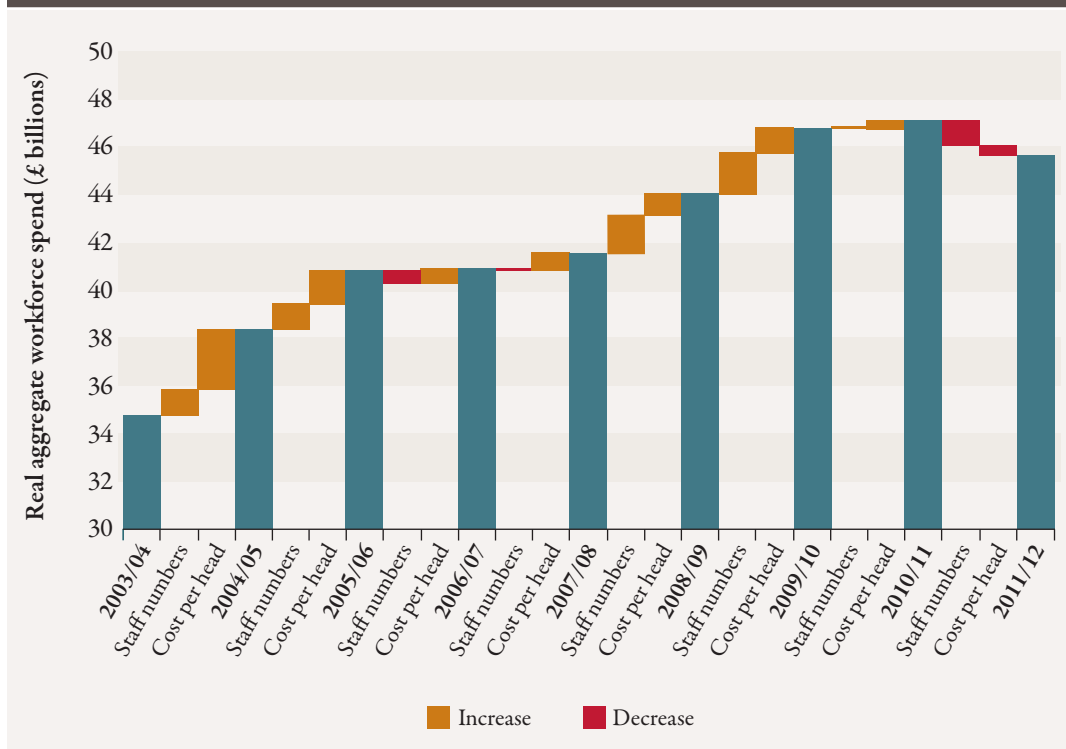
Figure 2.9: Spending on staff: 2003/04 to 2011/12



Real aggregate spend on staff increased by £10.8 billion from 2003/04 to 2011/12 but it fell by six percentage points as a proportion of total PCT spending, as shown in Figure 2.9. Figure 2.10 separates the effects of changing numbers of staff and costs per head on overall spending between any two years. For example, between 2003/04 and 2004/05, total staff numbers increased by 28,700. At the 2003/04 average cost per head (£36,000),¹ this led to an increase in staff spend of £1 billion. On top of this, average cost per head increased by £2,600 (for 994,500 staff), leading to a further increase of

1. In 2011/12 prices to allow for an inflation-adjusted comparison.

Figure 2.10: Spending changes by staff numbers and cost per head: 2003/04 to 2011/12



£2.5 billion. Therefore, in total, spending on staff increased by £3.6 billion¹ from £34.8 billion in 2003/04 to £38.4 billion in 2004/05.

Figure 2.10 demonstrates that growth in spending on staff was driven by both increasing staff numbers and increasing salaries in most years up to 2010/11. The exceptions to this were 2006/07 and 2007/08, when there were small reductions in staff numbers, which were more than offset by increases in cost per head.

The growth in staff spending came to a halt in 2011/12. Between 2010/11 and 2011/12, there was a three per cent reduction in spending on staff (reducing spending by £1.5 billion in real terms). Of this, £1 billion was from a reduction in staff numbers (from 1,107,001 to 1,077,890) and the remaining £0.5 billion resulted from reduced cost per head (from £42,543 a year on average to £42,328). This reduction in spending on staff was probably driven by three complementary government policies:

- reductions in the cost of management and administration, which saw the costs associated with PCT commissioning fall by 18.0 per cent in 2011/12 and the number of staff employed in NHS infrastructure support fall by 3.2 per cent (Audit Commission, 2012)
- the NHS pay freeze, which for 2011/12 led to a real-terms reduction in salaries for all staff earning more than £21,000; this real-terms reduction in cost per head is likely to continue for at least one year.

1. Not £3.5 billion due to rounding.

- the Transforming Community Services programme, which has transferred the providers that PCTs owned and managed to other organisations; in particular, some of these providers transferred to social enterprises, which no longer fall within the remit of NHS accounts, thus reducing NHS-employed staff numbers.

As one might expect, there were significant differences in the proportions of total PCT spending on staff for different regions. These differences were most pronounced between London and other parts of the country. In London, an additional 12 per cent of PCT spending was spent on staff compared to elsewhere, as shown in Figure 2.11.

Figure 2.11: London versus non-London spending on NHS staff in PCTs and NHS providers: 2003/04 to 2011/12



These differences are due in part to higher average wages in London (for which trusts should be reimbursed through a higher market forces factor) and there is also a large number of teaching and research trusts based in London, which have relatively higher staff costs.

Private Finance Initiative schemes

Since 1992, most new capital investment in the NHS has been undertaken through Private Finance Initiative (PFI) schemes. Under these arrangements, the private sector finances the design, build and operation of hospitals, which are then leased back to the public sector. In this analysis, we have considered spending on the interest relating to PFI debt as the other aspects of PFI payments should offset other operational spending relating to buildings or equipment.

Provider spending on repayments of these PFI schemes has increased substantially since 2009/10 as more schemes have been completed. Furthermore, PFI charges on debt interest are typically indexed to the Retail Price Index (RPI) or RPIX (RPI excluding

mortgage interest cost), measures of inflation that tend to be higher than other inflation measures (such as the GDP deflator, which is the government economy-wide measure used for public services). As a result, simply indexing charges using these measures can lead to a real-terms increase. In total, spending on PFI interest increased from £459.0 million in 2009/10 to £628.7 million in 2011/12, an average increase of 18 per cent a year (see Figure 2.12).

Figure 2.12: NHS spending on PFI interest in England: 2009/10 to 2011/12

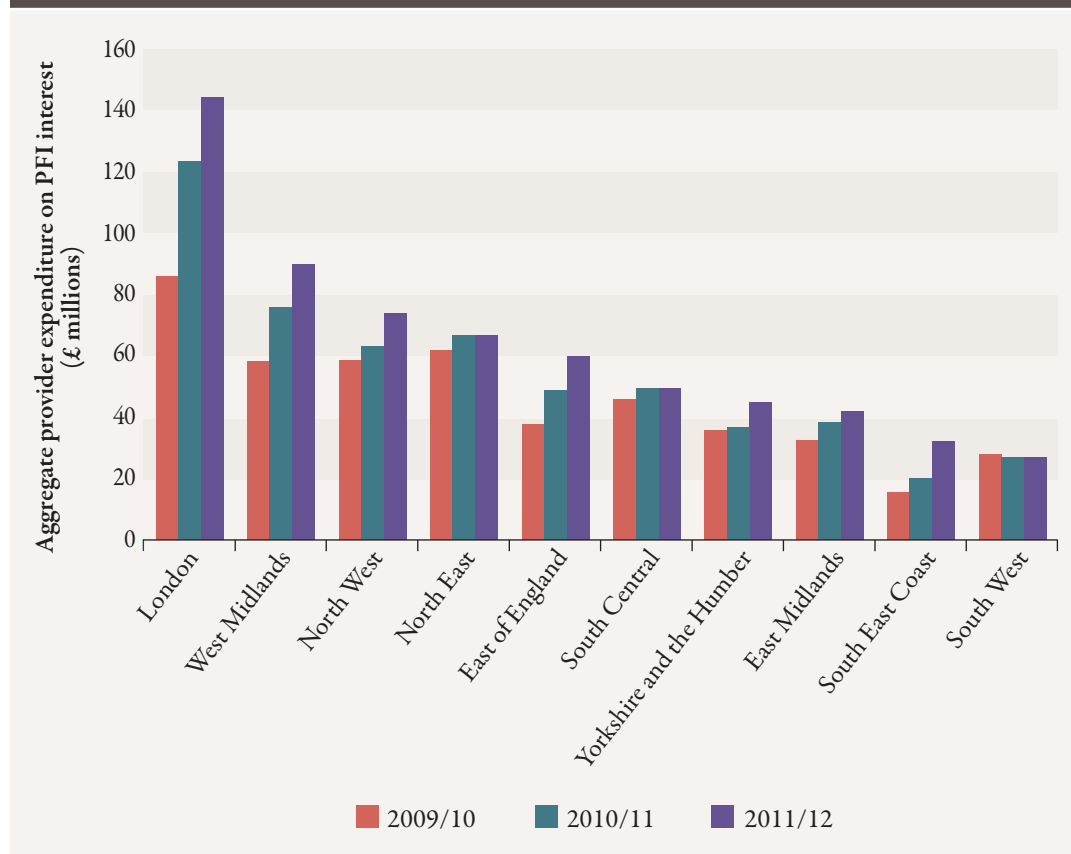


Figure 2.12 demonstrates that these payments have not been evenly spread across England. In particular, spending in London of £143.9 million in 2011/12, was more than five times greater than spending in the South West (£26.9 million in 2011/12).

In recent years, the PFI debt interest payments have started to become a particular burden for a number of trusts. For example, in seven trusts they make up more than five per cent of total revenue and two of these (South London and Barking) have reported deficits for at least the last three years:

- Dartford and Gravesham NHS Trust: 7.9 per cent of spending
- Sherwood Forest Hospitals NHS Foundation Trust: 7.0 per cent
- South London Healthcare NHS Trust: 6.0 per cent
- Norfolk and Norwich University Hospitals NHS Foundation Trust: 5.8 per cent
- Barking, Havering and Redbridge University Hospitals NHS Trust: 5.6 per cent

- Peterborough and Stamford Hospitals NHS Foundation Trust: 5.6 per cent
- St Helens and Knowsley Hospitals NHS Trust: 5.3 per cent.

Other spending

After staff costs, the next largest spending category is supplies and services (including drugs). This amounted to £11.2 billion in 2011/12, or 17 per cent of total trust spending, an increase of £5.4 billion (12 per cent a year) since 2003/04.

In 2011/12, £1.1 billion was spent by providers purchasing services from other NHS bodies (such as other NHS or foundation trusts), a decrease of £312 million in real terms since 2003/04. However, the decrease was partially offset by a £54 million increase in the value of services purchased from non-NHS bodies (from £462 million to £515 million).

There was also a marked increase in real-terms spending on clinical negligence, which increased from £286 million in 2003/04 to £892 million in 2011/12, an average increase of 27 per cent a year.

3. Productivity

Background

The Office for National Statistics (ONS) publishes an annual report investigating productivity in health care in the UK (Peñaloza and others, 2010). The latest of these was released in December 2012 and estimates productivity for publicly funded health care between 1995 and 2010 (Massey, 2012). Measuring productivity is complex, but this is particularly true in health care. Productivity measures aim to compare the service provided with the inputs used to provide the service. Productivity increases if the service provided increases at a faster rate than the inputs used. In health care, the challenge faced in estimating changes in productivity is being clear about the service provided. In particular, is it enough to measure the activity provided? There are two problems with focusing on activity: first, activity alone does not capture changes in quality, yet these are very important outputs of health services; and second, the link between activity and health outcomes is variable. The measurement of productivity of health services is therefore subject to much debate (Black, 2012; Grice, 2012).

The ONS measure attempts to capture quality-adjusted output. This may understate productivity gains for a number of reasons. One key issue, which our analysis highlights, is the lack of comprehensive activity data for all secondary care services. PCTs have increased spending on community health services faster than other services over recent years and this now accounts for 10 per cent of all PCT spending. There are no NHS-wide consistent activity data for community health services, although some data are available from reference cost systems. The choice and comprehensiveness of quality measures, and the relative weight that quality is given in the productivity measure, will also impact on the conclusions that can be drawn.

The ONS defines health care productivity as the ratio of quality-adjusted output to the volume of inputs (Hardie and others, 2011). The outputs are measured as a cost-weighted activity index, covering:

- hospital and community health services, including hospital inpatient, day case and outpatient episodes, distinguished by Healthcare Resource Group
- family health services, including GP and practice nurse consultations, publicly funded dental treatment and sight tests
- GP prescribing.

These outputs are adjusted for quality, based on the extent to which services succeed in delivering their intended outcomes and the extent to which they are responsive to users' needs.

The inputs are measured as spending on the following:

- labour, for example medical staff
- goods and services, such as clinical supplies and electricity

- capital consumption, which is a measure of the extent to which capital stock is used up.

Notwithstanding these limitations, improving the productivity performance of the NHS is critical if it is to sustain the quality and range of health care it is able to provide over the next few years. The Department of Health estimates that in 2011/12, the NHS delivered efficiency savings of £5.8 billion. Half of these savings were reported as being achieved by acute health services (National Audit Office, 2012). In a review of progress in achieving efficiency savings in health, the National Audit Office found that despite the positive aggregate position, there was limited assurance that all the savings were achieved, as PCTs do not measure or report savings in a consistent way. Moreover, it found that central initiatives such as those on pay and administrative cost savings had made a substantial contribution to the existing performance, and that while service transformation is fundamental to making future savings, it could find only limited evidence of such change to date.

Given the scale of savings that are required of the acute sector, and the lack of consistent data on performance, we sought to extend the ONS productivity measure to determine first whether a similar measure can be calculated for individual trusts, and second how productivity performance varies at the individual trust level.

Our measure differs from the ONS measure in the following respects:

- It only looks at the performance of the NHS in England.
- It only includes activity (inpatient admissions, outpatient and accident & emergency attendances) undertaken in NHS and foundation trusts.
- It does not adjust for quality.
- The input measure used is labour input, not the total cost of delivering care.

The absence of quality adjustment reflects challenges in the construction of such measures at the trust level. As such, this work should be viewed as an initial attempt to measure labour productivity at the trust level. To understand labour productivity improvement more fully, the measure should be extended to take into account the quality of care. For this reason, we refer to this as a measure of 'crude' labour productivity, and do not claim it to be comprehensive.

Despite these limitations, we believe such a measure would be worth considering. Measuring labour productivity at an individual provider level is important because it reflects the fact that situations differ greatly between trusts and allows more detailed analysis. Our analysis considered 110 NHS acute trusts and foundation trusts. These were selected as those that had operated continuously between 2006/07 and 2011/12, and had not been significantly restructured over this period, particularly in relation to taking on community services formerly provided directly by PCTs. The reasons for excluding the latter of these are described below in more detail in the section on inputs. We only considered 2006/07 to 2011/12 (rather than from 2003/04 as in the rest of the report) due to availability and quality of output data.

Outputs

This study relates to acute trusts only, so the primary care elements in the ONS calculation of output were not estimated.

Anonymised person-level hospital activity data were derived from the Hospital Episode Statistics dataset with costs applied according to the method used in previous analysis by the Nuffield Trust (Dixon and others, 2011). First, the Healthcare Resource Group for each inpatient's whole stay in hospital was calculated, after which costs were derived by applying PbR rules (Department of Health, 2010a) to combine the Healthcare Resource Group, admission method and other details of the hospital stay. This included the unit cost of the Healthcare Resource Group and any payments due because of an unexpectedly long stay in hospital, or for any specialist care or additional treatments and tests (so-called 'unbundled payments'). Prices were drawn from the 2010/11 PbR national tariff (Department of Health, 2010b).

In cases where the secondary care activity did not have a tariff, costs were estimated from the 2007/08 national reference costs (Department of Health, 2009), which were used to define the 2010/11 tariff. NHS tariff inflation was taken into account in order to make them comparable.

Costs of outpatient care were also calculated according to the PbR rules, with the adjustments set out above.

Between 2006/07 and 2010/11, this activity measure increased by 19 per cent (approximately 4.8 per cent a year). However, in 2011/12, this trend was reversed and there was a one per cent reduction in activity for the 110 trusts considered as part of this analysis.

Inputs

Spending on staff by NHS and foundation trusts increased in real terms from £33.2 billion in 2006/07 to £43.0 billion in 2011/12 (approximately six per cent a year). NHS accounts report data on workforce numbers in addition to their spending on staff. Analysing the staff data provided by NHS organisations (NHS trusts, foundation trusts and PCTs) shows that there has also been a significant change in the make-up of staff. In particular, there was a shift away from employing nurses, towards both relatively higher-cost medical staff and lower-cost health care assistants.

Overall NHS workforce spending fell in 2011/12 by three per cent in real terms. However, in the 110 acute trusts included in the labour productivity analysis, workforce cost increased in real terms. This may reflect the focus on reducing PCT commissioning spending in 2011/12 as a source of workforce savings.

A key difficulty experienced with regard to labour inputs related to the government's Transforming Community Services programme, which transferred community services from the provider arms of PCTs to other organisations in 2010/11 and 2011/12. These other organisations include existing acute and mental health providers, social enterprises and new standalone community trusts. In particular, the transfer to existing acute trusts has increased the labour costs associated with these trusts without changing their crude outputs (as community service activity is not included in the output measure).

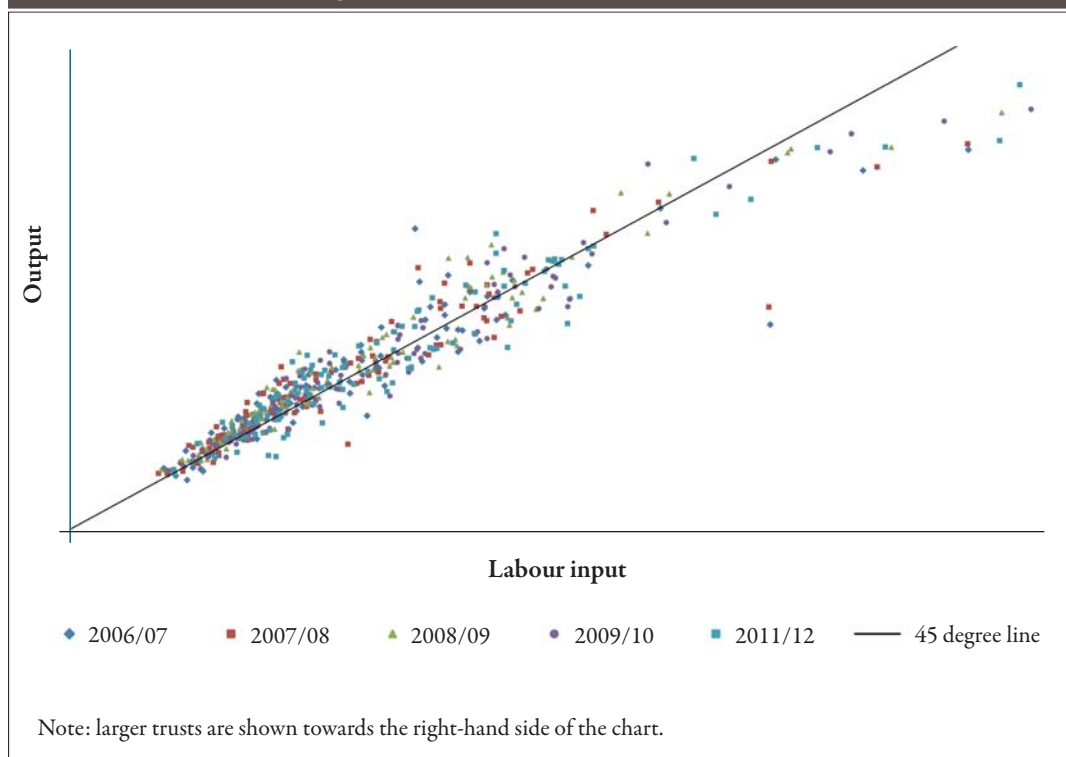
In 2009/10 (before any Transforming Community Services transfers took place), the labour costs associated with the provider arms of PCTs that were later integrated with acute trusts totalled £1.5 billion. Unfortunately, the PCTs did not separately report these costs prior to 2009/10 and, for this reason, the trusts that integrated PCT provider arms were excluded from the analysis of productivity. The impact of this exclusion is described below.

Trust labour productivity

For our productivity analysis, we only included trusts where data (that is, outputs and labour costs) were available for all years from 2006/07 to 2011/12. We also excluded specialist trusts as these were assumed to have fundamentally different costs to non-specialist acute trusts. In particular, these trusts were more likely to take patients who require more complex, and thus relatively more costly, care. The full list of trusts included in the analysis can be found in Appendix 1.

As one would expect, there was a strong relationship between the input and output measures, which Figure 3.1 shows. Interestingly, this relationship was not quite linear, with a distinct reduction in output relative to input for the largest trusts (those towards the right-hand side of the chart). Using our measure of productivity, this suggests that a bigger size of trust may not always be an advantage. However, the diseconomies of scale

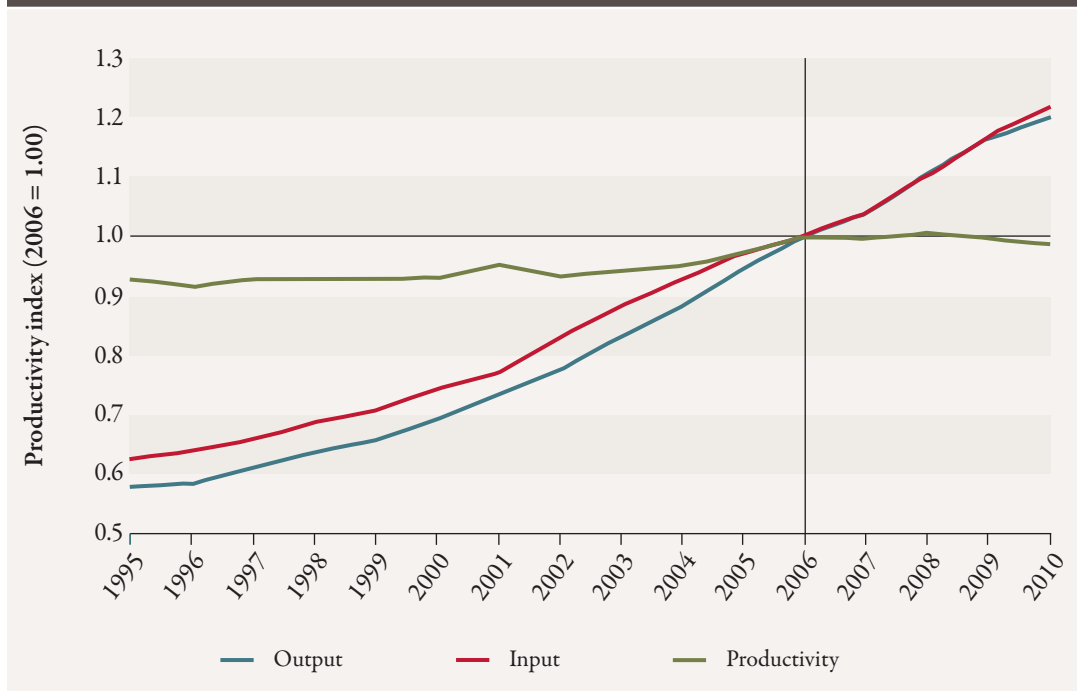
Figure 3.1: Relationship between labour inputs and output in selected NHS providers in England: 2006/07 to 2011/12



suggested by this relationship may not reflect a lack of productivity, but rather may be associated with the fact that the largest trusts undertake activities that are not included in our output measure (such as teaching and research).

At an aggregate level, the ONS measure (Figure 3.2) shows that between 2006 and 2010, inputs and outputs increased at broadly the same rate. As a result, UK-wide health care productivity (including NHS and non-NHS providers) essentially remained unchanged over this period, falling by 1.4 per cent in total.

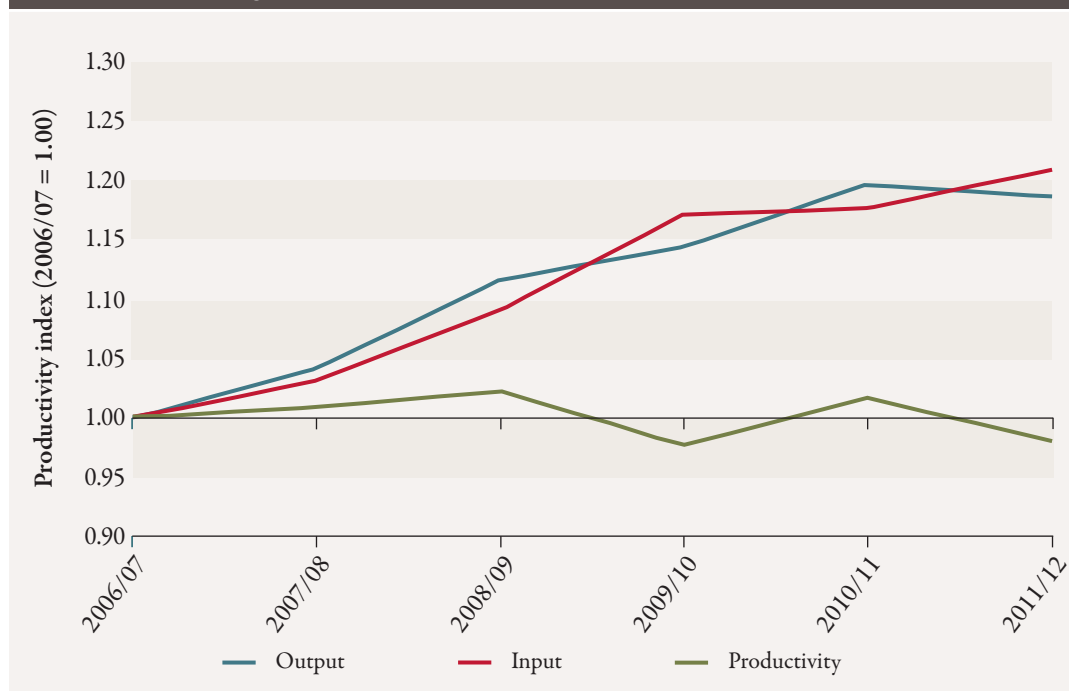
Figure 3.2: Changes in UK health care productivity (NHS and non-NHS providers) – ONS measure: 1995 to 2010



Source: Massey, 2012

Our analysis of labour productivity for selected providers in England (Figure 3.3) produced similar results to the ONS measure, with productivity also fluctuating slightly around the 2006/07 level. This is despite the fact that the ONS measure includes private providers. Key differences, however, included an improvement in labour productivity in 2010/11 as labour cost growth reduced significantly in the acute sector. However, this was not sustained in 2011/12 as output (as measured by cost-weighted activity) fell.

Figure 3.3: Output, input and labour productivity in selected NHS providers in England – Nuffield Trust measure: 2006/07 to 2011/12



One of the key advantages of the provider-level productivity measure over the nationwide one is that it allows us to explore how much variation there is in labour productivity between different organisations. Figure 3.4 shows how the labour productivity index varies by strategic health authority, demonstrating a clear divide between relatively more productive trusts in the South of England and the less productive ones in the North.

The exception to this is London, where trusts were found to be relatively less productive. This is probably a similar effect to the diseconomies of scale identified in Figure 3.1, as above-average amounts of teaching and research, which are not included in our output measure, take place in London, thus leading to a lower apparent labour productivity.

These geographic results differ from previous analysis undertaken at a strategic health authority level, which included all activity and not just non-specialist acute activity (Bojke and others, 2012a). Taking non-acute and specialist activity into account, they found productivity to be highest in the South West and lowest in East Midlands, South Central and Yorkshire and the Humber.

Figure 3.4: Map of the average labour productivity of 110 acute trusts by strategic health authority in England – Nuffield Trust measure: 2011/12

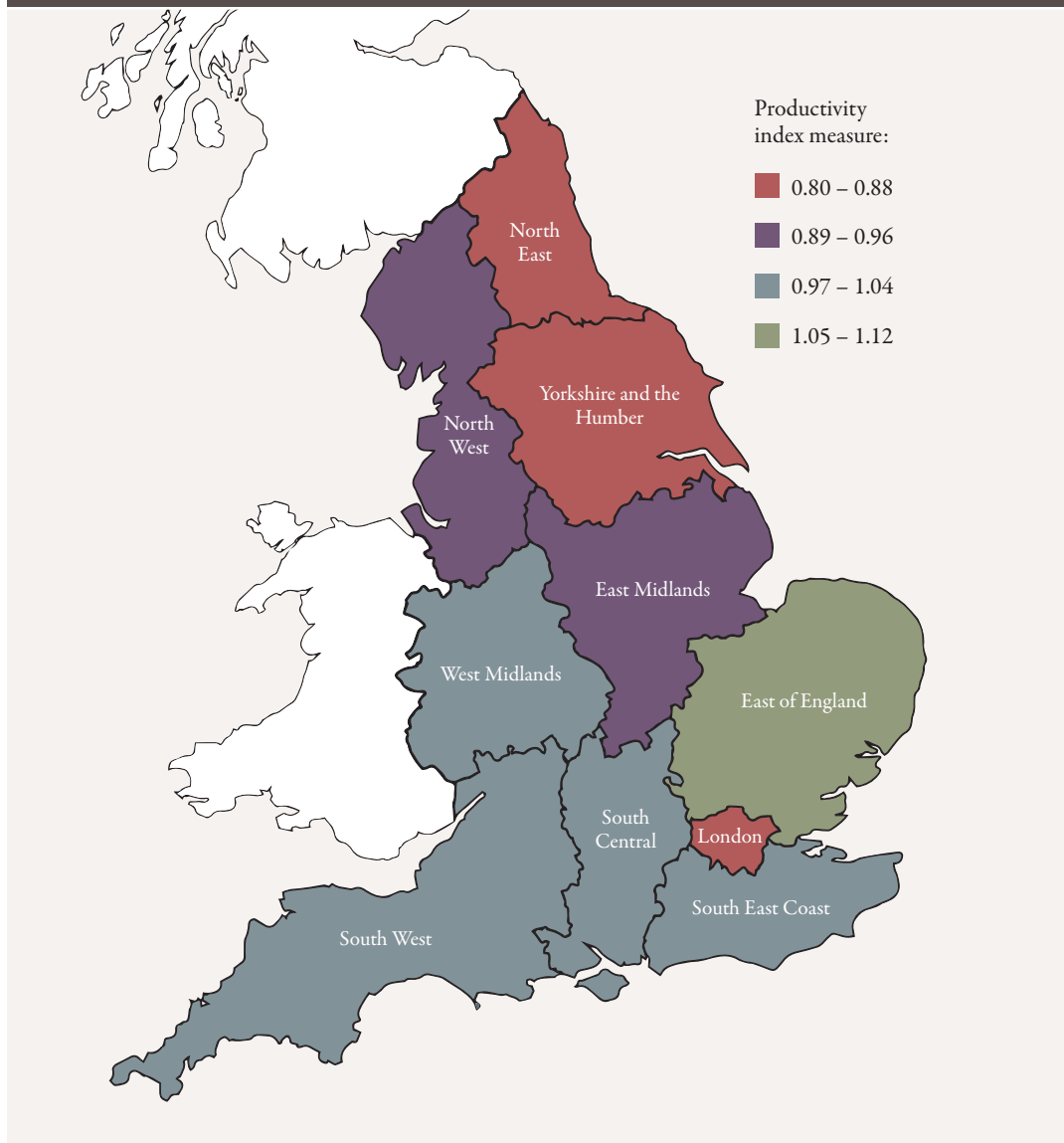
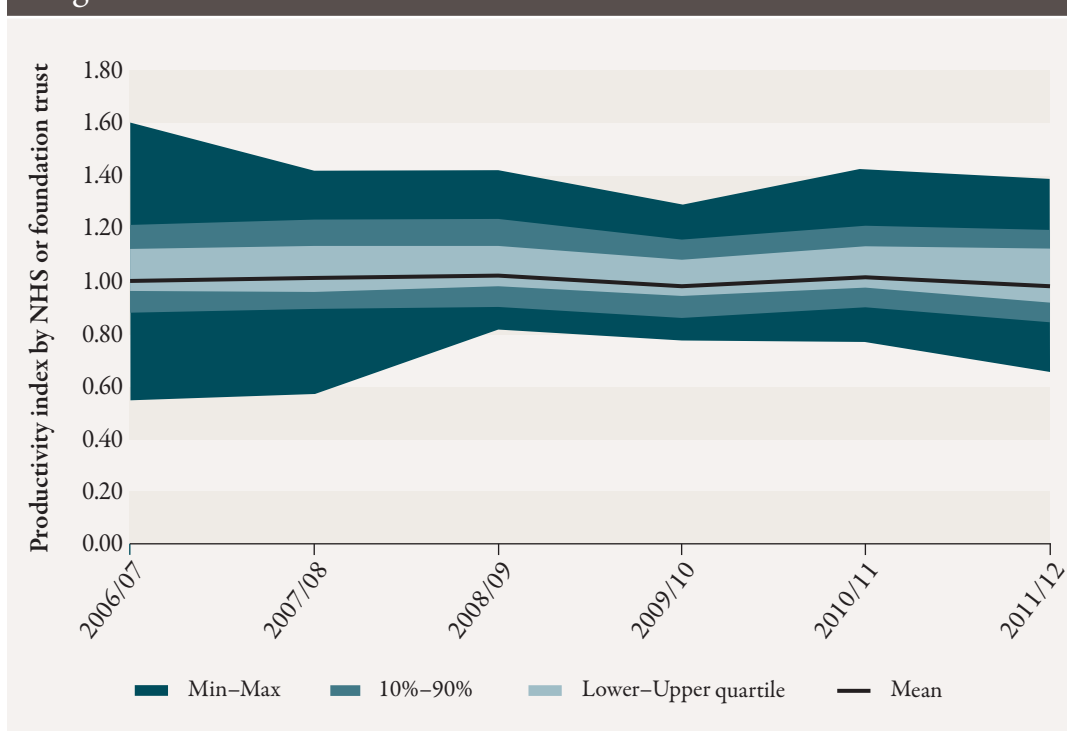


Figure 3.5 shows how this variation in labour productivity has changed since 2006/07. From this analysis, we can see that the range of labour productivity values covering all providers reduced rapidly between 2006/07 and 2009/10 (from an index that spanned 0.54 to 1.60 to one that only covered 0.76 to 1.28). In particular, between 2007/08 and 2008/09, the worst performing trusts were brought far closer to the mean labour productivity level. However, this was matched by an equivalent fall in the best performing trusts.

It is also interesting to note that while there was significant variation for the outliers, that is, those outside the 10th and 90th percentiles, the range between these percentiles and the inter-quartile ranges remained consistent throughout the period analysed. This indicates that, while individual trusts have been successfully targeted for performance improvement, significant labour productivity improvements across the entire provider sector remain a challenge.

Figure 3.5: Variation in labour productivity at selected providers in England: 2006/07 to 2011/12



Factors associated with labour productivity

Having observed differences between trusts in their crude labour productivity performance, we undertook a time-series regression analysis in order to examine whether there were any factors that are associated with difference in labour productivity. (See Appendix 2.)

Labour productivity might be expected to vary according to the characteristics of the provider such as its size and whether it provides other services such as teaching and research. More contentiously, it might also vary according to the external environment in which a trust operates. For example, in standard markets, economic theory would suggest that labour productivity will be higher if organisations are subject to more competition.

We explored the relationship between measured crude labour productivity of individual trusts, and a number of factors that relate to the characteristics of the trust and its external environment. The list of factors is not definitive – there are some key gaps such as the availability and quality of other relevant services, which could influence an acute trust’s activity: social care, community health services and primary care. For example, a trust might find it harder to be productive if patients have difficulty accessing appropriate social care or community health services to enable them to go home after an operation (so-called ‘bed blocking’). The factors we examined are shown in Table 3.1.

Table 3.1: Factors tested in the analysis of labour productivity

Factor	Data used
Geographic location	Dummy variables (1 for trusts located in a strategic health authority and 0 otherwise) for each strategic health authority
Market concentration	Herfindahl–Hirschman Index (HHI). The HHI is an indicator of the amount of market concentration. It measures potential provider competition. An HHI score of 10,000 means that all patients are treated at the same provider. An HHI score of 2,500 is equivalent to four providers each sharing patients equally, and is considered a relatively concentrated market. In 2006/07, the average HHI score for acute providers was 5,371. The HHI was calculated using the approach used by Gaynor and others (2010)
Standards of living in the surrounding area	Index of Multiple Deprivation
Market forces factor	Adjustment made to the national tariff based on variations in the provision of health care costs relating to the local area, that is, staff, buildings, land and equipment
Staff mix	Medical and dental staff as a proportion of total staff numbers
Emergency readmissions at 14 days	<i>Better Care, Better Value</i> indicator
Day case surgery rates	<i>Better Care, Better Value</i> indicator
Outpatient follow-up appointments per first appointment	<i>Better Care, Better Value</i> indicator
Outpatient did not attend (DNA) appointments	<i>Better Care, Better Value</i> indicator
Pre-procedure elective bed-days	<i>Better Care, Better Value</i> indicator
Pre-procedure non-elective bed-days	<i>Better Care, Better Value</i> indicator
Potential bed-day saving if length of stay were reduced	<i>Better Care, Better Value</i> indicator
Proportion of full-time equivalents lost to sickness absence	<i>Better Care, Better Value</i> indicator
Foundation trust status	A dummy variable (1 for foundation trusts and 0 for NHS trusts)
Non-clinical activity	Proportion of total spending on education, training and research
Trust capacity	Total available beds open overnight ¹

1. www.dh.gov.uk/en/Publicationsandstatistics/Statistics/Perfomedataandstatistics/Beds

These factors were selected as:

- they include all of the *Better Care, Better Value* indicators relating to providers;¹ these measures are purported by the NHS Institute for Innovation and Improvement to identify areas for improvement in efficiency
- factors such as strategic health authority, potential for competition, local living standards and the market forces factor should take account of variations due to the geographic locations of trusts
- variables such as foundation trust status, staff mix measures (through the proportion of medical and dental staff), trust capacity (through beds) and spending on education, training and research describe the underlying characteristics of a trust, which may impact on its productivity.

Results

The best regression model from our analysis is shown in Table 3.2. This model explained 29 per cent of the variation in labour productivity between trusts and over time. This is relatively low for a model of this type, reflecting the difficulties in identifying factors explaining labour productivity within trusts, and meaning that substantial variation remains between trusts once the effects of these factors have been taken into account.

Only those factors appearing in Table 3.1 were statistically significant at the 95 per cent confidence level, that is, there was more than a 95 per cent probability that they had a measurable association with labour productivity. These factors had a z-statistic that was greater than 1.96.

Table 3.2 also shows the coefficient values associated with each factor. These are for the relationship between the factor and our labour productivity index, that is, the model estimated that foundation trusts are, on average, 5.57 per cent more productive than NHS trusts. All of the coefficient values shown in the table seem to have a sensible sign, that is, they improve or worsen labour productivity in the way one might expect.

Table 3.2: Factors with statistically significant associations with acute trust labour productivity

Labour productivity driver	Coefficient	Standard error	z-statistic
Foundation trust status	0.0557	0.0184	3.03
Market concentration	2.03×10^{-5}	5.35×10^{-6}	3.80
First to follow-up ratio	-0.0846	0.02	-4.22
Medical and dental staff proportion	2.03	0.309	6.57
Education, training and research spend	-0.931	0.232	-4.02
Trust size	-6.28×10^{-5}	2.02×10^{-5}	-3.11
Constant	0.937	0.0673	13.92

1. www.productivity.nhs.uk

In summary, these results suggest the following:

- Foundation trust status is associated with higher levels of productivity than NHS trusts.
- Trusts with fewer follow-up appointments for each first outpatient appointment are associated with higher productivity. No statistically significant impact was found for any of the other *Better Care, Better Value* indicators.
- Trusts with a higher proportion of medical and dental staff are more likely to have higher productivity levels, despite the higher labour costs that this shift in staff mix may imply.
- Trusts that undertake education, training and research are more likely to have lower productivity levels than those that do not. Valuing these activities and incorporating them into the outputs used would give an improved measure of productivity for future research.
- Trusts situated in areas where there is less competition (indicated by a higher HHI score) are associated with higher productivity.
- Larger trusts (represented by those with a greater number of beds open overnight) experience diseconomies of scale over and above those simply caused by the higher likelihood for them to carry out education, training and research.

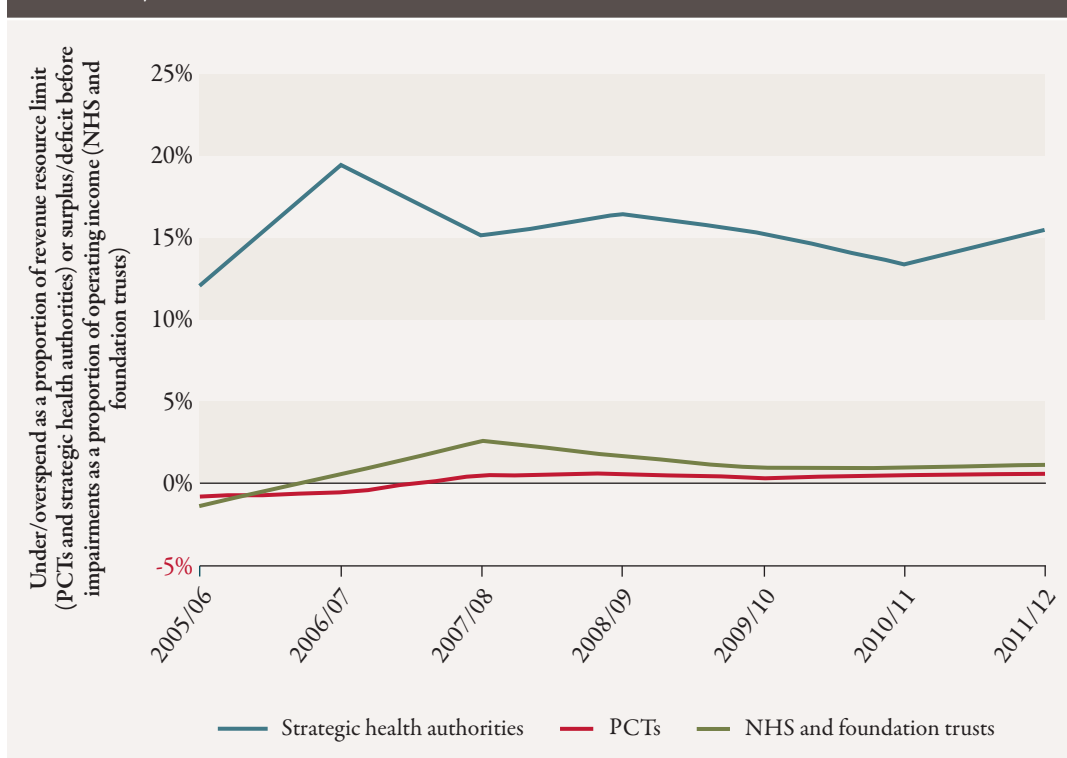
4. Discussion

Overall financial position

Since the Department of Health's financial turnaround programme ended in 2008, the overall financial position for organisations within the NHS is relatively healthy. However, this overall position masks some important differences within the NHS. Figure 4.1 shows the level of surplus as the percentage of organisations' budgets. In particular, in common with reports from the Audit Commission (2010; 2011; 2012), our analysis shows that:

- PCTs across the country routinely spend less than their allocation on commissioning and providing health care for their local populations, but the size of this underspend has been falling recently as the tight financial environment starts to impact on the NHS.
- NHS and foundation trusts have a marginally lower level of underspending than PCTs and an increasing minority of providers are in deficit. There is, however, significant variation between providers, with 32 out of 250 NHS or foundation trusts failing to achieve financial balance in 2011/12, and seven of these having consistently reported a deficit for three years or more.
- Strategic health authorities have significantly underspent their budgets – by over 10 per cent a year – since 2005/06.

Figure 4.1: Overall financial position by organisation type: 2005/06 to 2011/12



As work by both the Audit Commission (2010) and the National Audit Office (2012) shows, there are a number of risks to the financial health of the NHS. In particular, much of the saving to date has come from national, not local, initiatives. These include the government's public sector pay policy: pay awards across the NHS have been limited to £250 for staff earning below £21,000 in 2011 and 2012. All other staff have received no general pay uplift and this is to be followed in 2013 and 2014 with a one per cent cap (HM Treasury, 2011b; NHS Employers, 2012). In addition, there has been a central drive to reduce administrative costs. The scope for further management cost savings is restricted and there will be a limit to pay restraint, particularly as the economy starts to grow and private sector wages begin to increase in real terms.

The Health Select Committee (2012), in its report on public spending, concluded (paragraph 9–10):

The evidence submitted to the committee is therefore unambiguous. The Nicholson Challenge can only be achieved by making fundamental changes to the way care is delivered. We are concerned, however, that evidence does not suggest that the magnitude of the challenge has been fully grasped. Although it is relatively early days, and there are certainly localised examples of welcome innovation, there is also disturbing evidence that the measures currently being used to try to control the financial situation could fairly be described as 'short-term expedients' or salami slicing. We are not persuaded that the actions currently being planned will allow the situation to be sustainable over the four years of the spending review.

The National Audit Office analysed progress with information for the most recent financial year (2011/12). It was similarly concerned about the slow progress on the more fundamental service changes, which it also concluded are a key component of future efficiency savings.

Types of care: relative growth rates

Spending on the NHS in England has increased considerably in real terms since 2003/04. However, the types of care funded through this spending have shifted over this period, with secondary care growing from 73.5 per cent of total spend to 76.1 per cent.

In particular, community health services have experienced particularly rapid growth in spending since 2006/07. Acute spending continues to increase but spending on primary care, and in particular GP services, has been falling in recent years. The service transformation that the Health Select Committee and the National Audit Office point to as being critical for the future achievement of efficiency saving is dependent on more appropriate use of hospital services. To achieve this, effective community health services are important, but primary care also has a key role to play. An example of this is the volume of admissions to hospitals for 'ambulatory care sensitive' conditions. These are conditions for which appropriate management, through better diagnosis and treatment, could have prevented the admission. Primary care services clearly have an important role to play in this.

Achieving QIPP

From 2010/11 we have observed the initial impacts of the government's Quality, Innovation, Productivity and Prevention (QIPP) programme. This is consistent with the National Audit Office and Health Select Committee's analysis of the approach to QIPP to date. In particular, there has been a fall in real-terms spending, which is made up of the following changes:

- a reduction in the cost per NHS employee, as the government's pay policy bites
- a fall in the number of staff employed by the NHS, with the greatest fall being in the number of non-clinical staff (managers and administrative staff).

Labour productivity

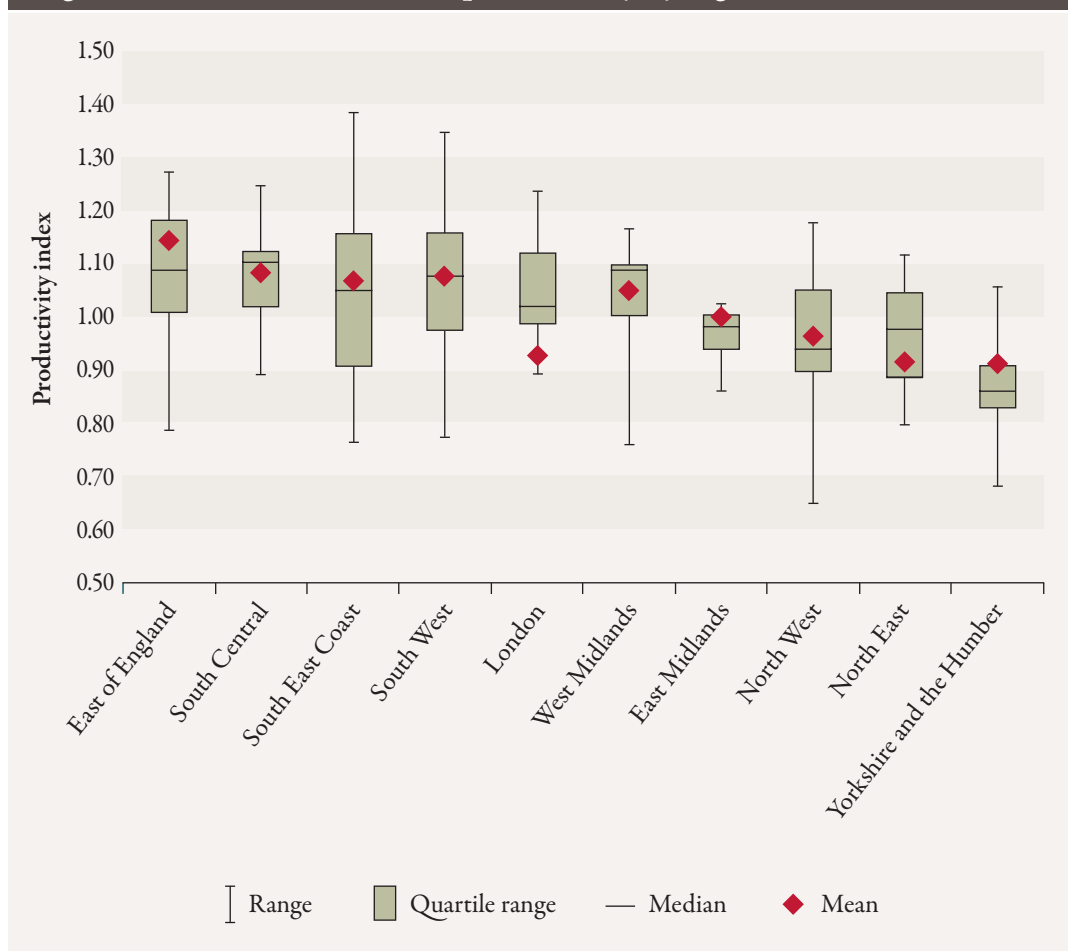
Our analysis of the variation in labour productivity by acute NHS trusts has suggested clear differences in productivity between trusts in the North and the South of England. Figure 4.2 shows that there is also significant variation between trusts in these regions. Regional differences in NHS productivity have also been found by economists at the University of York looking at productivity performance in 2007/08 (Bojke and others, 2012b). This work used a measure of productivity that is more consistent with the ONS measure: it covers all health care (not just care provided by acute hospitals); it adjusts for quality of care alongside the quantity of care provided; and it includes a wider range of inputs (capital and intermediate inputs alongside staff). Despite the different periods being considered and difference in scope of the measure, there are a number of consistent findings between our work and the University of York study:

- The South West and East of England both have relatively good productivity performance compared to other regions (for their acute hospitals and across all services).
- The Yorkshire and the Humber region performs relatively poorly compared to other regions.

Beyond this, our work has a sharper north/south divide, with regions in the North having apparent lower productivity relative to England as a whole and regions in the South having higher productivity. The position of northern regions is sensitive to how inputs are measured. The University of York study found that if the measure was adjusted for the market forces factor (accounting for estimates of the relative cost of staff in different parts of the country), the productivity performance of the South improved relative to England as a whole and some of the northern regions' position fell correspondingly (the North East and the West Midlands). Our measure of labour productivity adjusted for the market forces factor in a similar manner. The other main difference between the findings of the two studies is the position of London. In our analysis, London acute hospitals appeared to have labour productivity levels below the national average. In the York study, London's productivity was above average. The study found that quality adjustment had the greatest impact on the measure of health output in London. Our measure did not adjust for quality and this may account for at least some difference between the two studies. It also reinforces the concerns expressed by Black (2012) and others regarding the sensitivity of productivity measures to both the range of quality adjustments considered and the weight given to differences in quality compared to differences in the quantity of care provided.

Although there are differences in labour productivity between NHS regions, Figure 4.2 shows that there is also substantial variation between NHS trusts within a region.

Figure 4.2: Variation in labour productivity by region: 2011/12



Thus, when considering how best to achieve gains in labour productivity, providers and commissioners need to take account of both regional differences and how this labour productivity varies within a given region.

At a national level, previous analysis has found that NHS productivity improved slightly between 2003/04 and 2009/10, with an annual average increase of 0.1 per cent a year (Bojke and others, 2012a). This study included non-hospital services and measured the change in services as a combination of changes in the volume of activity and the quality of care.

Our analysis of labour productivity presents a less optimistic view of the efforts to improve efficiency than the headline figure of £2.85 billion QIPP savings from acute services in 2011/12 would imply (National Audit Office, 2012). Our analysis suggests that the NHS is struggling to translate headline savings into productivity improvements. There are some real caveats to this tentative conclusion – spending on community health services is growing, but we have no information on the impact of this on overall levels of health care activity, quality or productivity. Furthermore, our measure of acute labour

productivity does not capture improvements in the quality of hospital care, or whether the care that hospitals are providing is now more appropriate, with more patients being treated in the right setting, at the right time. It is also interesting to note that this research finds some evidence of diseconomies of scale, questioning whether merging providers into larger trusts will improve financial performance.

Our regression modelling finds that observable differences in the characteristics of providers and the area they work in explain comparatively little of the variation in labour productivity. In contrast with other sectors we do not find that providers that are subjected to more competitive pressures (as measured by the HHI of market concentration) have higher labour productivity. Neither do we find that differences in the deprivation levels of the local population served by the hospital influence its relative labour productivity. The factor with the greatest association is the proportion of the workforce who are medically qualified. Our results suggest that a richer skill mix is associated with improved labour productivity.

Conclusion

In the first year of broadly flat real-terms NHS funding, the NHS has managed to live within its means and is delivering headline savings. This is encouraging. But below this headline the financial data from the NHS show a more complex picture. On the positive side, PCTs appear to have been investing in community health services, which will be important if they are to realise their QIPP objective to shift more care out of hospitals.

However, the financial data also raise concerns and questions. A number of NHS and foundation trusts look weak financially, and several have limited scope to resolve their financial difficulties, given their high spending on the financing costs of their PFI schemes – although across the NHS as a whole, the costs of financing for PFI schemes are a very small part of NHS spending (less than one per cent). More generally, the much more rapid growth in acute care spending relative to primary care raises questions about whether the NHS has the right balance of services for the future.

Appendix 1: NHS and foundation trusts included in the productivity analysis

The following trusts were included in the productivity analysis as we had complete data for them between 2006/07 and 2011/12, and they are not specialist trusts:

Aintree University Hospitals NHS Foundation Trust
Airedale NHS Foundation Trust
Ashford and St Peter's Hospitals NHS Foundation Trust
Barking, Havering and Redbridge University Hospitals NHS Trust
Barnet and Chase Farm Hospitals NHS Trust
Barnsley District General Hospital NHS Foundation Trust
Basildon and Thurrock University Hospitals NHS Foundation Trust
Basingstoke and North Hampshire Hospitals NHS Foundation Trust
Bedford Hospital NHS Trust
Birmingham Heartlands and Solihull Trust
Bradford Teaching Hospitals NHS Foundation Trust
Brighton and Sussex University Hospitals NHS Trust
Burton Hospitals NHS Foundation Trust
Calderdale and Huddersfield NHS Foundation Trust
Cambridge University Hospitals NHS Foundation Trust
Chelsea and Westminster Hospital NHS Foundation Trust
Chesterfield Royal Hospital NHS Foundation Trust
City Hospitals Sunderland NHS Foundation Trust
Colchester Hospital University NHS Foundation Trust
Countess of Chester Hospital NHS Foundation Trust
Dartford and Gravesham NHS Trust
Derby Hospitals NHS Foundation Trust
Dorset County Hospital NHS Foundation Trust
East and North Hertfordshire NHS Trust
East Cheshire NHS Trust
East Kent Hospitals University NHS Foundation Trust
East Lancashire Hospitals NHS Trust
East Sussex Hospitals NHS Trust
Epsom and St Helier University Hospitals NHS Trust
Frimley Park Hospital NHS Trust
Gateshead Health NHS Foundation Trust

George Eliot Hospital NHS Trust
Gloucestershire Hospitals NHS Foundation Trust
Harrogate and District NHS Foundation Trust
Heatherwood and Wexham Park Hospitals NHS Foundation Trust
Hinchingsbrooke Healthcare NHS Trust
Hull and East Yorkshire Hospitals NHS Trust
Ipswich Hospital NHS Trust
James Paget University Hospitals NHS Foundation Trust
Kettering General Hospital NHS Foundation Trust
King's College Hospital NHS Foundation Trust
Kingston Hospital NHS Trust
Lancashire Teaching Hospitals NHS Trust
Leeds Teaching Hospitals NHS Trust
Luton and Dunstable Hospital NHS Foundation Trust
Maidstone and Tunbridge Wells NHS Trust
Medway NHS Trust
Mid Essex Hospital Services NHS Trust
Mid Staffordshire NHS Foundation Trust
Newham University Hospital NHS Trust
Norfolk and Norwich University Hospitals NHS Foundation Trust
North Cumbria University Hospitals NHS Trust
North Middlesex University Hospital NHS Trust
North Tees and Hartlepool NHS Foundation Trust
Northampton General Hospital NHS Trust
Northern Devon Healthcare NHS Trust
Nottingham University Hospitals NHS Trust
Oxford Radcliffe Hospital NHS Trust
Pennine Acute Hospitals NHS Trust
Peterborough and Stamford Hospitals NHS Foundation Trust
Plymouth Hospitals NHS Trust
Poole Hospital NHS Foundation Trust
Portsmouth Hospitals NHS Trust
Princess Alexandra Hospital NHS Trust
Queen Elizabeth Hospital King's Lynn NHS Foundation Trust
Royal Berkshire Hospital NHS Foundation Trust
Royal Bournemouth and Christchurch Trust
Royal Cornwall Hospitals NHS Trust
Royal Devon and Exeter NHS Foundation Trust
Royal Free Hampstead NHS Trust
Royal Liverpool Broadgreen Hospitals NHS Trust
Royal Surrey County NHS Foundation Trust

Royal United Hospital Bath NHS Trust
Salisbury NHS Foundation Trust
Scarborough and North East Yorkshire NHS Trust
Sheffield Teaching Hospitals NHS Foundation Trust
Sherwood Forest Hospitals NHS Foundation Trust
Shrewsbury and Telford Hospital NHS Trust
South Devon Health Care NHS Trust
Southampton University Hospitals NHS Trust
Southend University Hospitals NHS Foundation Trust
Southport and Ormskirk Hospital NHS Trust
St Helens and Knowsley Hospitals NHS Trust
Surrey and Sussex Healthcare NHS Trust
Tameside Hospital NHS Foundation Trust
Taunton and Somerset NHS Foundation Trust
The Dudley Group of Hospitals NHS Foundation Trust
The Hillingdon Hospital NHS Trust
The Mid Cheshire Hospitals NHS Trust
The Rotherham NHS Foundation Trust
United Lincolnshire Hospitals NHS Trust
University College London Hospitals NHS Foundation Trust
University Hospital Birmingham NHS Foundation Trust
University Hospital of North Staffordshire Hospital NHS Trust
University Hospital of South Manchester NHS Foundation Trust
University Hospitals Coventry and Warwickshire NHS Trust
University Hospitals of Bristol NHS Foundation Trust
University Hospitals of Leicester NHS Trust
University Hospitals of Morecambe Bay NHS Foundation Trust
Warrington and Halton Hospitals NHS Foundation Trust
West Hertfordshire Hospitals NHS Trust
West Middlesex University NHS Trust
West Suffolk Hospital NHS Trust
Weston Area Health NHS Trust
Whipps Cross University Hospital NHS Trust
Wirral University Teaching Hospital NHS Foundation Trust
Worcestershire Acute Hospitals NHS Trust
Wrightington, Wigan and Leigh NHS Foundation Trust
Yeovil District Hospital NHS Foundation Trust
York Hospitals NHS Trust

Appendix 2: Productivity regression analysis

Cross-sectional time-series regression analysis was used to estimate the impact of our potential drivers of labour productivity, while taking into account the inherent relationships between productivity from one year to the next. We chose to estimate a random effects model; that is, a model that assumes hospital-specific time-invariant effects are random. The formulation of our random effects model is as follows:

$$Y_{it} = a_0 + \beta X_{it} + a_i + \varepsilon_{it}$$

Y_{it} Productivity index for hospital i in year t .

β Coefficients of our productivity drivers, that is, the relationship between these and productivity.

X_{it} Each of the productivity drivers (as shown above) for hospital i in year t .

a_0 The y-axis intercept across all trusts.

a_i Hospital-specific time-invariant effects. These are assumed to be normally distributed.

ε_{it} Error terms for each hospital in each time period. These are also assumed to be normally distributed and uncorrelated with the time-invariant effects.

This model used our time-series dataset, which included annual data for potential productivity drivers where these were available and single-year values otherwise. Average values are shown in Table A2.1.

Table A2.1: Average values of productivity and productivity drivers: 2006/07 to 2011/12

Variable	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Productivity index	1.04	1.06	1.06	1.01	1.05	1.02
Proportion of the year as a foundation trust	0.29	0.38	0.46	0.50	0.53	0.55
Years as a foundation trust	0.29	0.67	1.13	1.63	2.16	2.70
Index of Multiple Deprivation	20.74	(Same value used for all years)				
Herfindahl–Hirschmann Index	5,371	5,316	5,220	5,151	4,846	4,544
Market forces factor	1.12	1.12	1.12	1.08	1.08	1.09
Emergency readmissions	5.49	(Same value used for all years)				
Day case surgery rates	78.11	(Same value used for all years)				
Outpatient first to follow-up appointment ratio	2.21	(Same value used for all years)				
Outpatient did not attend appointments	8.15	(Same value used for all years)				
Pre-procedure elective bed-days	0.25	(Same value used for all years)				
Pre-procedure non-elective bed-days	1.80	(Same value used for all years)				
Potential bed-day saving	13.90	(Same value used for all years)				
Proportion of full-time equivalents lost to sickness absence	4.05	(Same value used for all years)				
Proportion of medical/dental staff	0.12	0.13	0.12	0.12	0.13	0.13
Proportion of spend on education, training and research	0.05	0.05	0.05	0.05	0.05	0.05
Available beds open overnight	802	786	788	782	718	732

Interestingly, the productivity of an individual hospital does not vary greatly from one year to the next. The average correlation between productivity indices in any two years is 0.84.

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Glossary of terms and abbreviations

Capital expenditure	Spending on assets considered to have a lifetime of at least one year, for example, property, plant and equipment
DEL	Departmental Expenditure Limit – the annual spending limit set by the Treasury for firm spending plans as part of a spending review covering more than one year. Includes separate revenue/resource and capital expenditure limits
GDP	Gross domestic product
GP	General practitioner
HHI	Herfindahl–Hirschman Index (a measure of market concentration)
Impairment	Revaluation of fixed assets
Market forces factor	An adjustment made to the national tariff (the set price paid to hospitals for patients seen or treated) based on variations in the provision of health care costs relating to the local area, that is, staff, buildings, land and equipment
Monitor	Independent regulator of NHS foundation trusts
MPET	Multi-Professional Education and Training
NHS	National Health Service
OECD	Organisation for Economic Co-operation and Development
ONS	Office for National Statistics
Over/underspend	Primary care trusts and strategic health authorities have individual annual revenue and capital resource limits. These organisations are required to underspend against these limits
PbR	Payment by Results – the payment system under which commissioners pay health care providers for each patient seen or treated
PCT	Primary care trust
PFI	Private Finance Initiative
QIPP	Quality, Innovation, Productivity and Prevention

Real terms/cash	The purchasing power of money changes over time. When comparing financial data over time they are expressed in 'real' terms, taking inflation into account, rather than using the nominal cash amount. This allows like-for-like comparison over time. We used the HM Treasury GDP deflators as at 28 November 2012
Revenue/resource expenditure	Spending on day-to-day operating or running costs
Surplus/deficit	NHS and foundation trusts do not have a revenue spending limit. Financial performance in these organisations is measured as either a surplus or a deficit of income against expenditure
UK	United Kingdom
WTE	Whole-time equivalent – the whole-time equivalent for each part-time staff member is calculated as the number of contracted hours worked divided by the standard number of hours for the role undertaken, for example, a person who is contracted for 18.5 hours while the standard for the role is 37 hours is 0.5 WTE.

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This report is the first in a series of annual publications and other activities from the Nuffield Trust that will examine the financial performance of the NHS in England over the coming years. The programme *NHS Spending: Monitoring financial performance and productivity* is supported by PwC and McKesson. Background information on our supporters is detailed below.

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