CHAPTER 5: THE UK'S PRODUCTIVITY PUZZLE[1]

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5.1 Introduction

In June 2008 the UK was hit by the biggest recessionary shock in living memory. The shock, which has subsequently come to be known as the "Great Recession", was felt across most developed economies in the world and many in the developing world. Its origins lay in a global banking crisis, linked to exposures to bad mortgage debts in the United States. The era of sustained economic growth enjoyed in the UK for nearly two decades was reversed almost overnight. Stock market crashes throughout the world were precipitated by investor uncertainty, firms suffered from sudden credit tightening, and demand for goods and services started falling. Whilst many of these immediate responses to the banking crisis were common across the world, each country faced specific difficulties due to differences in the nature of their economies and institutions and the position they were in when the crisis hit. The UK economy has performed particularly poorly in the intervening 6-7 years. In 2014, output per hour remained 0.4 percentage points below the level seen in the pre-recession year of 2007 (Figure 5.1). This meant that labour productivity in the UK was 15-16 percentage points below the counterfactual level had productivity grown at its average rate before the recession; this compares with a productivity gap of around 6 percentage points for the rest of the G7 (Office for National Statistics, 2015b).[2]

[2] Even if one shares the concerns of other commentators (Riley *et al.*, 2014b; Pessoa and Van Reenen, 2014) that a linear extrapolation of the productivity growth that occurred prior to recession does not offer a reasonable counterfactual against which to judge the impact of the recession, it is nevertheless a useful starting point against which to make international comparisons.

[INSERT FIGURE 5.1 HERE]

The fact that output per hour remained below its pre-recession peak so long after the onset of recession is quite remarkable. In purely accounting terms, the decline in productivity growth can be traced to two rather surprising trends. The first is the period of low output growth which, as Figure 5.2 shows, is unprecedented.[3] It was only in 2013 Q3 that output returned to the previous peak seen in 2008 Q1, although comparatively strong growth in subsequent quarters left UK gross domestic product (GDP) 3.5 per cent larger by the end of 2014 (Office for National Statistics, 2015c).

[INSERT FIGURE 5.2 HERE]

Second, the UK has been a victim of one particular success, namely the muted labour market response to the recession. Although employment fell in the quarters after the recession, the decline was nothing like that experienced in the recessions of the 1980s and 1990s (Figure 5.3) and it was considerably smaller than the decline in GDP. Furthermore, employment recovered more quickly, exceeding its pre-recession level in 2012 Q3 (a full year before the recovery in output).

[3] Indeed, the pace of recovery has even been slower than that following the depressions of the 1920s and 1930s.

[INSERT FIGURE 5.3 HERE]

Poor GDP growth and sustained employment levels thus combined to push down output per *worker*. The fall in output per *hour* was not as substantial in the period immediately after recession, since a growth in part-time working meant that hours per worker fell more steeply than employment; but there has been no overall progress on either measure of productivity since 2007 (Figure 5.1). In this sense the UK stands in contrast with the United States where output per worker and output per hour have both risen steadily over the past 6-7 years and now stand around 7 percentage points above the level seen at the end of 2007 (Office for National Statistics, 2015b).

Simply pointing to the trends in the numerator and denominator is only a starting point in seeking to understand what has become known as the UK's "productivity puzzle". There are really two puzzles. First, why has economic growth taken quite so long to recover in the UK? And second, why has the labour market responded so differently to recession this time compared to earlier recessions? These are the questions addressed in this chapter. Throughout our discussion, we focus primarily on the trends in output per worker or output per hour worked. However, we also consider trends in total factor productivity (TFP), since changes in TFP emerge as a key component of the overall story.

The remainder of this chapter comprises three sections. The first reviews the extensive literature on the UK's productivity "puzzle", examining some of the main culprits or suspects that may

explain recent trends. The second section contributes to the empirical literature by testing some hypotheses in new ways, in order to shed further light on patterns of productivity growth among British workplaces over the period 2004-2011.[4] The third and final section looks to the future and comments on the prospects for UK productivity growth over the next decade or so.

5.2 The usual suspects in the UK's productivity puzzle

In this section we consider some of the key arguments that have been put forward for the two factors behind the UK's productivity puzzle, namely the slow rate of GDP recovery and the muted employment response to low growth.

5.2.1 Measurement error

There are some commentators who have cautioned that the UK productivity puzzle is not as puzzling as it may, at first, seem, because measurement errors in both output and employment may accentuate the real underlying trends. Although employment and hours figures may have become harder to collect with recent increases in immigration and rising self-employment, they are unlikely to be so problematic as to require a full reappraisal of the UK productivity puzzle.

[4] The data used to perform this analysis are the 2011 Workplace Employment Relations Survey 2011 (WERS) which is nationally representative of British workplaces with 5 or more employees (Department for Business Innovation and Skills *et al.*, 2015). The survey does not cover Northern Ireland, which is why we talk of Britain, not the UK, when we refer to its findings.

Calculating GDP is more difficult. Although often subject to revision, Grice (2012) argues that these revisions are not sizeable enough to explain away the puzzle. However, Barnett *et al.* (2014b: 118) suggest that, taken together, measurement issues and output revisions could explain up to 4 percentage points (one quarter) of the productivity shortfall since the onset of recession. Inter alia they point to declining output in the North Sea oil and gas sector since the early 2000s which, if not fully accounted for, overstate the pre-recession growth trend.

Finance has also attracted attention in this regard. It is possible that the reversal in GDP with the recession may have been exaggerated by pre-recessionary growth in the Finance sector, if this growth was illusory, reflecting over-exposure to bad debts and the production of over-valued assets. In fact, Finance is treated as an intermediate input in national accounts so is not counted in the value-added underpinning GDP growth (Oulton, 2013). It is true that productivity grew rapidly in the Finance sector prior to the recession: gross value added per employee rose 156% in Finance between 1995 and 2007 compared with 65% in the economy as a whole (Bell and Van Reenen, 2010: 13). The Finance sector has also seen one of the largest falls in productivity of any sector since 2008 (Wales and Taylor, 2014: Figure 7). However, Finance only contributed around 10 per cent of the 2.7 per cent growth in value added per hour that occurred in the market sector over the period 1979-2007 (Corry *et al.*, 2012), and it is estimated that productivity losses within Finance accounted for less than one fifth of the overall drop in output per hour from 2008-2013 (Wales and Taylor, 2014: Figure 8).

Finally, one might also be concerned that the GDP figures are not as bad as they look because they do not capture intangible assets which, it is argued, are particularly large in the UK.

Although they do not appear on balance sheets because they are too short term, they can be the basis for future revenue generation.[5] However, the most recent attempts to re-estimate productivity trends after capitalising R&D suggest that the picture changes very little (Goodridge *et al.*, 2015). In summary, it does not seem that the productivity puzzle can primarily be explained through measurement issues.

5.2.2 The Role of the Finance Sector in the Broader Economy

Although productivity losses since the onset of recession can be partly attributed to losses within the Finance sector itself (see above), the fact that the recession was triggered by a banking crisis has broader implications. The international operations of the Finance sector mean that it is a much larger part of the UK economy than in most other countries in the world. One of the government's main priorities in the immediate aftermath of the Crash was ensuring stability in the banking sector. To this end, it underwrote the sector to the tune of £1.162 billion, and nationalised RBS and other parts of the banking sector.[6] These actions were successful in

[5] They have traditionally been treated as intermediate consumption rather than a form of investment. However, from 2014 R&D is treated as an investment and appears in the *Blue Book* as part of gross fixed capital formation, thus contributing to GDP.

[6] This is a National Audit Office estimate in relation to the provision of guarantees and non-cash support (e.g. the Credit Guarantee Scheme, Special Liquidity Scheme and Asset Protection Scheme) and the provision of cash including loans to the Financial Services Compensation Scheme and insolvent banks to support deposits, as well as the purchases of share capital in the Royal Bank of Scotland and Lloyds Banking Group. See National Audit Office (2015).

staving off a full-scale banking collapse, but they were expensive, both in government time and in taxpayers' money, crowding out efforts which might otherwise have been devoted to stimulating demand with a view to returning to growth. That stimulus did follow with quantitative easing injecting close to £400 billion into the UK economy (Kay, 2013). However, the stimulus was not on the scale of that undertaken in the United States and much of this money found its way onto company balance sheets, rather than flowing round the British economy, due to investor and consumer uncertainty. Uncertainty is known to play an important role in constraining corporate investment (Bloom *et al.*, 2007; Bloom, 2009), but it may have played a particularly important role in the current recession, in part due to the policy uncertainty surrounding the sovereign debt crisis that unfolded in the Eurozone shortly after the Crisis began (Lane, 2012). That said, there is no indication in the OECD's standardised set of Business Confidence Indicators that the UK suffered a particularly dramatic decline in business confidence in the aftermath of recession relative to other countries (OECD, 2015).

The banking crisis therefore had direct repercussions for productivity growth through its impact on output in the Finance sector (see Section 5.2.1 above) and by absorbing public finances that might have been put to good use elsewhere, but it may also have had indirect repercussions for productivity elsewhere in the economy through credit constraints placed on borrowers, especially for small and new businesses. Evidence suggests that both the availability and cost of bank credit were adversely affected by the onset of recession (Riley *et al.*, 2014a). However, the significance of credit constraints in driving productivity weakness is less clear. First, banks are not a major source of credit for many companies in Britain: money for expansion often comes from internal resources or share issuance. Second, unlike the previous recession of the

early 1990s, company profitability had been high prior to the 2008 recession, such that many companies were cash rich and therefore capable of investing in growth if they wished, while interest rates were low. The fact that they chose not to do so reflected deep unease about the future prospects of the British economy.[7]

An alternative perspective is that, far from credit drying up, banks and other creditors may have shown some forbearance to indebted firms. The fact that liquidations spiked briefly post-recession but began to fall again shortly afterwards (Figure 5.4) is consistent with banks being reluctant to call in 'bad' debts, leading to the survival of what appear to be highly unproductive firms (sometimes referred to as "zombie" firms). This may have occurred if banks and other financiers were loathed to declare bad loans at a time when their own balance sheets were vulnerable. Pessoa and Van Reenen (2014) speculate that political pressures may also have played a part since the government, as the new owners of banks such as RBS, may have promoted forbearance to avoid politically damaging rising unemployment. However, Arrowsmith *et al.* (2013) find little evidence of substantial forbearance outside the commercial real estate sector.[8]

[7] Corporations' failure to invest has also been a preoccupation in the United States pre-dating the recession. Lazonick (2014) reveals that between 2003 and 2012 the S&P 500 companies used 54% of their earnings - amounting to $2.4 trillion - to buy back their own stock, while dividends absorbed another 37% of earnings.

[8] Arrowsmith *et al.* (2013) found that only 6 per cent of companies outside commercial real estate were benefitting from bank forbearance in 2013.

[INSERT FIGURE 5.4 HERE]

An empirical investigation of the influence of bank lending on productivity trends, in fact, finds only limited evidence that sectors with higher levels of bank dependence fared much worse in productivity terms through recession than did sectors with lower levels of dependence (Riley *et al*., 2014a; Riley *et al.*, 2015). There is some evidence that the relationship between firm growth and relative labour productivity was weaker in the Great Recession in sectors with many small and bank dependent businesses, but the effect was short-lived (Riley *et al.*, 2015). Hence, whilst bank lending to companies did fall more sharply in this recession than it did in the three other post-1970 recessions, this would seem to have accounted for only a small part of the overall decline in aggregate productivity.

5.2.3 A Limited Cleansing Effect?

Although there is little evidence of widespread bank forbearance, higher than expected employment rates and lower than expected bankruptcies suggest any cleansing effect arising from the recessionary shock was small. The "cleansing hypothesis" predicts productivity growth post-recession through the death of the least productive firms. The death of the least productive firms would raise aggregate productivity, albeit at the expense of rising unemployment, via a compositional change in the stock of firms. If this had occurred, one would anticipate some compression in output and productivity following the removal of less productive firms from the economy. In fact the variance in output rose after the recession across sectors (Pessoa and Van Reenen, 2013: Figure 13), as did the variance in gross value added

(Barnett *et al.*, 2014a: R38; Barnett *et al.*, 2014b: 123). The variance of productivity across establishments also rose, even within the same sector (Field and Franklin, 2013).

Other firm-level and workplace-level estimates also suggest any cleansing effect of the recession may have been muted. Riley *et al.*'s (2014b) decomposition of UK market sector productivity growth between 2002 and 2011 indicates that the contribution of company entry and exit did not change very much over time. The proportion of loss-making firms in the economy rose significantly during post-recession (Barnett *et al.*, 2014b: 124-125), and direct evidence on the rate of workplace closures indicates they were no different in the period affected by recession (2004-11) than they were in the more benign conditions in the period 1998-2004 (Van Wanrooy *et al.*, 2013). Harris and Moffat (2014b) even find evidence to suggest that, at least in manufacturing, it was the more productive workplaces (as measured by TFP) that closed in the period 2007-2012, running wholly counter to a 'cleansing' phenomenon.[9] Redundancies did rise immediately after the shock, but returned to pre-recession rates shortly thereafter, indicating a short-run impact of recession (Broadbent, 2012: Chart 4).

In their analysis, Barnett *et al.* (2014c) attribute one-third of the slowdown in aggregate labour productivity between 2007 and 2011 to impaired resource reallocation across firms. A diminution in the reallocation of factors of production towards more productive sectors via firm

[9] In an earlier version of their paper, Harris and Moffat find a reduced annual rate of workplace closure in the Annual Respondents Database between 2007 and 2011 relative to the late 1990s and early 2000s.

entry and exit and labour movement can therefore explain some of the fall in productivity.[10] But, as both Riley *et al.* (2014b) and Barnett *et al.* (2014b) show, the chief contributor to falling productivity post-recession is attributable to *within-sector* and *within-firm* factors (Figure 5.5).[11] The implication is that, in order to further investigate the productivity puzzle, one needs to focus on firm behaviour – looking at issues such as labour hoarding, capital investment and innovation.

[INSERT FIGURE 5.5 HERE]

[10] In the manufacturing sector in the United States there has not been the same degree of resource reallocation to more highly productive firms as occurred in the 1980s (Foster *et al.*, 2013).

[11] Intriguingly, a decline in TFP within-firms also appears to have occurred in the recession of the early 1990s, at least in manufacturing; but the extent of the decline was less extensive than in the most recent recession (Riley *et al.*, 2014b).

5.2.4 Labour Hoarding

The short-term spike in redundancies and the low rates of bankruptcies, liquidations and closures, are consistent with labour hoarding, that is, the retention of staff in spite of a substantial downturn in demand for goods and services. As an indication, Butcher and Bursnall (2013: Table 6) compare levels of employment contraction in ongoing firms over the periods 2004-7 and 2008-11, and find no greater level of contraction in aggregate after the onset of recession. Furthermore, Barnett *et al.* (2014c) show that the proportion of firms with shrinking output but constant employment doubled through recession, from 11% in 2005-2007 to 22% in 2011.

Labour hoarding is most likely to occur when firms are uncertain about the timing of an up-turn in demand, and are thus prepared to hang onto staff rather than incur the costs of firing and rehiring (Martin and Rowthorn, 2012). The muted unemployment response to falling GDP is uncontested. However, the labour hoarding interpretation of this phenomenon is disputed: can firms really be underutilising labour so long after the recessionary shock? Some argue that firms are retaining high skilled labour having learned that they let high value-added workers go too cheaply in the previous recession.[12] It is possible that the returns to firm-specific human capital have increased since the last recession, making skilled labour turnover even more costly. However, Goodridge *et al.* (2013) argue that skilled labour retention does not constitute hoarding. Rather, skilled workers may be producing intangible capital which is not measured.

[12] Qualitative evidence in support of this proposition comes from the Bank of England's Agents (Barnett *et al.*, 2014b: 120).

This could explain why we observe something which looks like skilled labour hoarding but is, in fact, mis-measurement of the output of skilled labour. Furthermore, higher-than-expected employment levels are due not only to lower-than-expected flows out of employment, but also to hiring rates which have been at or above their pre-recession average (Barnett *et al.*, 2014b: 121) and healthy rates of job creation in ongoing firms (Butcher and Bursnall, 2013: Table 6). It is difficult to characterise these patterns as labour "hoarding".

5.2.5 The Flexible Labour Market

Whether it is characterised as labour hoarding or not, firms are employing far more individuals than one might have anticipated given the sustained reduction in output. So why might this be? One possibility is that firms are taking advantage of the UK's flexible labour market. The UK is known for low levels of labour market regulation and, as such, we might expect to see higher employment levels and, perhaps, higher labour "churn", than in some countries. Certainly, the UK was experiencing historically high levels of employment prior to the onset of recession in 2008, measured both in terms of the total numbers in the workforce and labour market participation rates. But what is at issue here is the labour market's response to that downturn. As noted in Section 5.1, the UK economy has more jobs today than it did at the pre-recession peak. It is true, however, that workers began working fewer hours, on average, with the onset of recession, which is why the immediate fall in labour productivity was not as dramatic when measured as output per hour compared with output per head (see Figure 5.1). The difference was accounted for by the increasing percentage of employees working part-time, and by a reduction in the average hours worked by full-time employees. The UK economy has effectively adjusted at the intensive, as opposed to the extensive, margin.

This has resulted in a growth in "under-employment" among those in the labour force, with the percentage of employees wishing to work more hours outstripping the percentage wishing to work fewer hours (Figure 5.6). However, there has been a recent increase in average hours worked such that they have returned to the hours worked shortly before the recession.[13]

[INSERT FIGURE 5.6 HERE]

Further evidence of labour force flexibility is evident in the growth of self-employment: the number of workers who were self-employed in their main job rose by 367,000 between April-June 2008 and April-June 2012, most of the increase occurring between 2011 and 2012. This is an increase in the rate of self-employment from 13.0 to 14.1% (Table 5.1). However, not all forms of flexible employment contract have risen dramatically. In contrast to other European countries such as France, there has been no substantial growth in the use of temporary contracts, for example.

[INSERT TABLE 5.1 HERE]

[13] The seasonally-adjusted series for all workers (Office for National Statistics, 2015e) indicates that average weekly hours were 32.2 (37.4 for full-timers) in 2008 Q1 just prior to the recession. They fell to 31.5 (36.6) in 2009 Q1, only recovering to their pre-recession level in 2010 Q4 for full-timers (37.4 hours) and 2014 Q2 (32.2 hours) for all workers.

5.2.6 Declining real wages

Since the onset of recession, the UK has experienced large and unprecedented reductions in real wage growth, with wages falling by more in the UK than in most other OECD countries (OCED, 2014). Real wage losses have been experienced across the wage distribution, and the overall trend contrasts sharply with that seen in earlier recessions in the UK, when real wage growth was either broadly unaffected (as in the 1980s) or merely slowed down (as in 1990s). A substantial percentage of employees have also suffered nominal wage freezes, especially in the public sector (van Wanrooy *et al.*, 2013), with pay freezes being just as common among union covered employees as they have been in the uncovered sector (op. cit.). Further, many employees have suffered nominal wage reductions, due to a combination of falling bonus payments, and reductions in overtime and normal hours, but many who have remained in the same job have even suffered reductions in basic hourly pay (Gregg *et al.*, 2014b).

This weakness in real wages has made labour particularly cheap for employers such that incentives to substitute labour for capital have increased. This may lie behind labour "hoarding" and healthy hiring rates, since a higher labour to capital ratio may be optimal for profits compared with the pre-recessionary period.

To date analysts have been largely unable to identify the precise mechanisms by which labour market flexibility and real wage decline have occurred, though there does appear to be a strong correlation between movements in labour productivity and mean hourly total compensation (Gregg *et al.*, 2014b: Figure 7). The decline in real wages is not due to the changing composition of the workforce (Blundell *et al.*, 2014). Instead, real wage decline has occurred among

individuals staying within the same job year-on-year (Blundell *et al.*, 2014; Stokes *et al.*, 2014). The relatively high level of inflation in the UK since the onset of recession is likely to be one factor, since it is known that employees are less sensitive to real than nominal wage decline.[14] It is notable, however, that the rate of real wage growth first began to decline in the early 2000s, well before the onset of recession. The reasons are not well understood (see Gregg *et al.*, 2014a, for a discussion), but one hypothesis is that the bargaining power of workers has declined, partly due to the long-run decline in trade union collective bargaining coverage, and partly through changes in the UK's unemployment benefits regimes which require benefit recipients to actively seek work and accept job offers even if they are not offering the wages or job prospects job seekers would ideally like.[15] Consistent with this, Gregg *et al.* (2014a) demonstrate a marked increase in the sensitivity of real wages to unemployment in the 2000s, one that is particularly marked in the non-union sector. Another factor has been the growth in the labour force since 2008: the UK's population rose from 61.4 to 63.1 million between 2008 and 2014, partly due to immigration, a labour supply shock that may have helped to dampened real wages. Indeed,

[14] Askenazy *et al.* (2013) discuss wage dynamics across Europe in the crisis. Figures 6 and 7 of their report show that price inflation was particularly high in the UK, relative to large European countries, over the period 2009-11.

[15] This has spawned debate about labour's share and, in particular, whether wages have kept up with productivity growth. It does appear that real wage growth, measured as real producer wages, has fallen behind growth in output. However, part of the explanation lies in the increasing percentage of all labour costs going to pensions. When this is accounted for the gap is not apparent (Pessoa and Van Reenen, 2013).

Manning (2015: Figure 5.2) shows that, for a given level of unemployment, the share of hires from non-employment has risen in the UK since about 2000, suggesting that employers may have a larger reserve army of labour from which to fill vacant posts.

5.2.7 Capital shallowing

As noted in the previous section, another candidate for the decline in labour productivity which has attracted a great deal of attention is capital shallowing, that is, the decline in the capital-labour ratio. This occurs when there are substantial shifts in the relative price of factor inputs, as happened with real wages in the UK. The UK has experienced one of the lowest rates of growth in hourly labour costs through recession: according to Eurostat, in 2013 they stood at 20.9 Euros per hour, compared to the EU28 average of 24.2 Euros (Eurostat, 2015). The UK's hourly labour costs were static between 2008 and 2013, rising more slowly than all but three of the EU's 28 countries.[16] At the same time, the cost of capital has risen, despite low interest rates, due to banks' reluctance to lend (Broadbent, 2012; Pessoa and Van Reenen, 2013). These trends create incentives for firms to reduce levels of capital investment and increase their labour usage. The increase in new hires since 2008 is striking and is consistent with "capital shallowing" (Broadbent, 2012: Chart 4). When uncertainty is rife, firms may feel more

[16] On average, hourly labour costs rose by 13% over the period in the EU. Only Greece, Cyprus and Hungary experienced declines in hourly labour costs. Average hourly labour costs are computed as total labour costs divided by the number of hours worked by the yearly average number of employees. They concern all employees except those in public administration, defence and social security.

comfortable with investments in human capital than fixed capital since human capital is less "sticky" and can therefore be off-loaded if expectations regarding growth are not forthcoming (Bloom *et al.*, 2007).

The availability of good-quality data on capital per worker has historically been limited in the UK, and so researchers have often compiled their own series, leading to different views on the changing role of capital in the economy. For their investigation of productivity trends, Pessoa and Van Reenen (2014) constructed an estimate of capital stocks using the perpetual inventory method, estimating that capital per worker *declined* by 5 percent between the second quarter of 2008 and the second quarter of 2012. Their subsequent decomposition of changes in labour productivity suggested that capital shallowing caused by changes in factor prices could account for two-thirds of the decline in labour productivity since the beginning of the crisis. The decline in average hours per worker contributed another quarter in their analysis, while changes in Total Factor Productivity (TFP) accounted for under one-tenth.

However, Oulton (2013) has argued that Pessoa and Van Reenen's series over-estimates the pre-crisis capital stock, and thus over-states the decline. Moreover, the relatively large contribution of capital shallowing to poor productivity growth that is suggested by Pessoa and Van Reenen has been challenged from a number of quarters. Field and Franklin (2014) compile their own measure of capital stocks and, using a growth accounting framework, suggest that much of the year-on-year change in labour productivity between 2008 and 2012 reflects changes in TFP. Their estimates suggest that capital deepening made modest positive contributions to annual labour productivity growth between 2008 and 2011, before contributing a small amount

to negative growth in 2012. Harris and Moffat's (2014a) work is supportive of Field and Franklin. They find no capital shallowing in the period 2007-12. In fact, on the contrary, there appears to have been some capital deepening, something they argue occurred across nearly all sectors. Instead, they point to a decline in intermediary inputs as a critical factor in explaining declining labour productivity in manufacturing while the decline in labour productivity in services is attributed exclusively to declining TFP.[17]

Further evidence to downplay the role of capital in depressing productivity comes from recently-compiled series of capital services. Oulton (2013) and others have argued that capital services are to be preferred to capital stocks as a measure of capital input into production, and two new series show little evidence of capital shallowing (Goodridge *et al.*, 2015; Murphy and Franklin, 2015). Moreover, growth accounting estimates which utilise these new capital services series find a very minor role for capital in explaining the downturn in productivity growth (Goodridge *et al.*, 2015; Connors and Franklin, 2015). Instead, the productivity puzzle appears primarily to be a puzzle about the slowdown in TFP growth.

5.2.8 Incentives to innovate

The opportunity cost of time and resources is low during recessions due to depressed demand, potentially encouraging firms to focus on the reallocation of capital and labour to increase

[17] The explanation for declining labour productivity for services appears quite common across sub-sectors whereas the authors' sub-sector analysis points to more heterogeneity within manufacturing.

productivity in time for an up-turn (Geroski and Gregg, 1997: 11). There appears to be a moderate degree of work reorganization taking place within workplaces but these changes are not significantly associated with the degree to which workplaces were adversely affected by recession (Van Wanrooy *et al.*, 2013: 183-184). Instead the extensive work reorganisations uncovered by workplace surveys "serve as indicators of managers' willingness to innovate, whether in good times or bad" (op. cit., 184). This is also the conclusion Geroski and Gregg (1997) came to in their firm-level investigation of resource allocation after the recession of the early 1990s.

However, the UK Innovation Survey conducted for the Department for Business Innovation and Skills by ONS indicates a marked decline in the rate of both product and process innovation in UK firms, although the real expenditure on R&D has remained broadly constant. On the basis of these figures Bank of England analysts estimate, however, that the fall in the number of product innovators may account for only 1 percentage point of the productivity shortfall between 2008 and 2012 (Barnett *et al.*, 2014b: 122-123).

5.2.9 Summary

In summary, the 2008 Great Recession was notable in the UK for three things: the enormity of the output shock; the muted unemployment response; and the very slow rate of recovery. At the time of writing employment levels are above those experienced prior to the recession, despite the fact that these were already high by historical standards. However this positive employment story appears to have come at the expense of an unprecedented decline in real wages. Real

wages only began rising in the last quarter of 2013, around five years after the beginning of the recession. Output only recently exceeded pre-recession levels.

In contrast to countries such as France, the productivity issue has been centre-stage in academic and policy debates. A range of factors have been explored in the research literature, ranging from measurement error to labour hoarding and capital shallowing, and most of them have been found to have at least some degree of salience in explaining recent trends. But for the most part, their contributions have been judged to be relatively minor. Perhaps the most important conclusion from the work to date is that most of the decline in productivity is within sector and within firm. These trends cannot be accounted for by sector-specific shocks and credit constraints; instead, a prime contribution appears to have come from declines in TFP. It is against this backdrop that we turn to a micro-analysis of workplace-level behaviour between 2004 and 2011 to gain insights into the processes that may have contributed to this aggregate picture.

5.3 New evidence on the UK's productivity puzzle: a workplace perspective

In this section we use the Workplace Employment Relations Survey (WERS) to test some - but by no means all - of the hypotheses that might shed light on trends in labour productivity. Our focus is on the private sector where the puzzle is most apparent. The unit of analysis is British workplaces. The survey is nationally representative of workplaces with 5 or more employees across most sectors of the economy but we focus solely on private sector workplaces. Box 5.1 contains details of the survey. The analyses undertaken in this section focus on the two cross-sections of workplaces in 2004 and 2011 (plus some analysis of the 1998 cross-section) and the

panel of workplaces surveyed in 2004-2011 which permit investigations of within-workplace change, something that is particularly useful since estimates of productivity decline from both the Bank of England (Barnett *et al.*, 2014b) and Riley *et al.* (2014b, see Figure 5.5 earlier) suggest this was primarily a within-firm, rather than between-firm phenomenon.

Box 5.1: The Workplace Employment Relations Survey

- **National survey:** mapping employment relations in workplaces across Britain.
- **Unique and comprehensive:** data collected from managers, worker representatives and employees in 2,700 workplaces with 5+ employees.
- **Well-established:** 1980, 1984, 1990, 1998, 2004, 2011
- **Linked employer-employee:**
    - 2004 and 2011 cross-sections
    - 2004-2011 panel

5.3.1: The 'cleansing' hypothesis

If, as suggested in Section 5.2, the 'cleansing' effect of the recession was muted, we might expect workplace performance prior to recession to have a muted impact on workplace survival subsequently. Our analysis of WERS showed that workplaces' financial performance in 2004 was predictive of whether they had closed by 2011 (Table 5.2). But the overall rate of workplace closure between 2004 and 2011 did not differ relative to that observed in the more benign period of 1998-2004.

[INSERT TABLE 5.2 HERE]

Nineteen percent of workplaces in 2004 had closed by 2011, but the rate was 29% among those whose financial performance in 2004 was "below" the industry average compared with 8%

among those with financial performance "a lot better" than the industry average. This 21 percentage point difference is statistically significant. It falls to a 17 percentage point differential when controlling for other factors, but remains statistically significant. In contrast, financial performance in 1998 was not significantly associated with closure by 2004, a period when economic conditions were relatively benign. These results are consistent with recession having a "cleansing" effect by "killing" the poorest performers. However, poor labour productivity relative to the industry average in 2004 did not influence closure probabilities by 2011 suggesting that, if recession did have a "cleansing" effect in the private sector it operated by reducing the survival probabilities of *less profitable* establishments, rather than those of the *less productive* establishments.

5.3.2: Technological and Organisational Innovations

If the opportunity costs of production encourage workplaces to innovate when faced with recession-induced shocks to demand, we should see a positive correlation between innovation and the size of the demand shock experienced by workplaces. However, this prediction is predicated on the assumption that the demand shock is temporary, not permanent. If, in fact, there continues to be uncertainty facing employers, they may choose to delay innovations until they sense an upturn.

In both 2004 and 2011, the Workplace Employment Relations Survey asked HR Managers: "Over the last two years has management here introduced any of the changes listed on this card?....introduction of performance related pay; introduction or upgrading of new technology (including computers); changes in working time arrangements; changes in the organization of

work; changes in work techniques or procedures; introduction of initiatives to involve employees; introduction of technologically new or significantly improved product or service; none of these".[18] In general, the incidence of innovation in the two years prior to 2011 was not significantly different relative to the two years prior to 2004, although the percentage of workplaces reporting *changes to work organization* rose significantly from 32% to 37%.

Evidence on the incidence of innovation does not provide direct evidence regarding the role of recession in workplace innovation, nor its links to workplace performance. To investigate this we examined whether there was any correlation between the amount and type of innovation undertaken at the workplace and the degree to which HR managers thought their workplace had "been adversely affected by the recent recession" (where responses were coded "no adverse effect; just a little; a moderate amount; quite a lot; a great deal"). This measure of recession is intended to approximate the "shock" workplaces received as a result of the recession.[19] In fact, it was not associated with the degree to which workplaces innovated in the two years prior to the 2011 survey, the only exception being a reduced likelihood of introducing performance pay.

[18] This 2011 item combines new technology and computers whereas they were contained in separate items in 2004.

[19] How adversely workplaces were affected by recession was hard to predict using workplace characteristics in 2004, confirming that it came as a "shock" (Van Wanrooy *et al.*, 2013: 16-18).

Product market conditions did, nevertheless, affect the rate of workplace innovation. The number of innovations undertaken in the two years prior to 2011 were negatively associated with HR managers saying the market for their main product or service was "declining" or "turbulent", consistent with the conjecture that uncertainty regarding future demand inhibits innovation. The size of these effects is substantial. The mean number of innovations undertaken out of a total of up to seven was 2.2. Ceteris paribus, compared to being in a "growing" market, being in a "declining" market reduced the number of innovations by 0.5 while being in a turbulent market reduced the number by 0.3 - reductions of 23% and 14% respectively.[20]

Workplaces benefited from the number of workplace innovations they undertook, both in terms of workplace performance and in terms of their ability to come out stronger from the recession. HR managers were asked to rate their own workplace relative to the industry average on three dimensions: financial performance; labour productivity; and the quality of product or service. In the survey, responses to these questions on workplace performance are coded on a 5-point scale from "a lot better than average" to "a lot below average". The number of innovations workplaces put in place was statistically significantly associated with higher labour productivity relative to the industry average, and to higher quality of output relative to the industry average,

[20] In addition to the variables capturing the impact of recession, the location of the market and the state of the product/service market, these models contain the following controls: establishment size, single-establishment firm, single-digit industry, region, workplace age, union recognition, largest non-managerial occupational group, number of competitors, perception of high market competition, perception of high degree of overseas competition.

but not with financial performance. These results are robust to the inclusion of control variables, including the impact of the recession. The implication is that more innovative workplaces had higher productivity, both in terms of the quantity and quality of output, but that those innovations were costly to make, thus making no significant difference to short-term profitability. Nevertheless, the number of innovations undertaken was significantly associated with a lower likelihood of agreeing to the statement: "This workplace is now weaker as a result of its experience during the recent recession". This association is robust to controlling for other variables, including the extent to which the workplace had been adversely affected by the recession. The addition of one innovation reduced the probability of agreeing that the workplace was weaker as a result of the recession by 3%. Innovating workplaces therefore came through the recession in a better state than non-innovating workplaces, but there is some evidence that the rate of innovation was depressed among those experiencing a downturn in demand.

5.3.3: Labour hoarding

Between 2004 and 2011, among those private sector workplaces that survived the period, the mean number of employees rose from 38 to 47. When expressed as a percentage relative to the average level of employment across the two years, this represents an average growth rate of 11 percentage points, so a little over 1 percentage point per annum. However this average growth rate hides huge heterogeneity across workplaces, as indicated in Figure 5.7.

[INSERT FIGURE 5.7 HERE]

If we simply characterise workplaces according to the change in their employment level between 2004 and 2011, we can identify three types of workplace: those who experienced a fall in employment of over 20 percent ("shrinkers"); those experiencing growth in employment of 20% or more ("growers") and those in between ("no change"). One-fifth (21%) shrank; two-fifths (41%) grew; and the remaining two-fifths (39%) experienced no change (Table 5.3).

[INSERT TABLE 5.3 HERE]

For workplaces with at least 10 employees we can compare workplace growth and shrinkage in 2004-2011 with rates of employment change in 1998-2004. The patterns are remarkably similar with a quarter of workplaces shrinking, a third growing and two-fifths remaining broadly similar in size (rows 2 and 3 in Table 5.3). Measuring employment change as the difference in levels expressed as a percentage of average employment size in the two periods indicates employment grew by 6.2 percentage points between 1998 and 2004 and 5.7 percentage points between 2004 and 2011. Here the lack of a sharp distinction between the pre-recession and post-recession periods accords with the evidence of Butcher and Bursnall (2013). On the face of it, this evidence appears consistent with a labour hoarding story, in the sense that employment growth patterns appear unaffected by the onset of recession in 2008.

However, there is clear evidence that the impact of the recession *did* dramatically affect employment growth in workplaces. The degree to which HR managers said their workplace had "been adversely affected by the recent recession" was strongly negatively associated with employment growth (Table 5.4). Whereas 60% of workplaces who had been unaffected by the

recession reported employment growth of at least 20%, this was only the case for one-third (33%) of those who said they had been adversely affected "a great deal". Conversely, only 7% of those unaffected had shrunk by at least 20% compared with 30% of those affected "a great deal". Put another way, those unaffected by recession only accounted for 3% of shrinkers, but 11% of growers, whereas the figures for those affected "a great deal" were 29% and 16% respectively.

[INSERT TABLE 5.4 HERE]

Being adversely affected by the recession was still negatively correlated with the rate of employment change among private sector panel workplaces when controlling for observable differences between workplaces measured back in 2004. Indeed, in these models - which accounted for up to 17 percent of the variance in employment growth between 2004 and 2011 - the size of the recession effect did not alter significantly with the addition of workplace controls.[21] When all of the evidence is considered, then, it appears that the recession did lead to employment shrinkage in a substantial proportion of workplaces, but there were enough workplaces throughout the economy that retained or grew their employment numbers to dilute the overall effect on employment growth as shown in Table 5.3.

[21] These 2004 controls were: being a single-site firm; industry; region; workplace age; union recognition; largest occupational group; and employment size. Other variables performed as expected: for instance, employment levels in 2004 were negatively correlated with growth, as one would expect given regression to the mean.

The labour hoarding hypothesis implies that workplaces may have maintained employment levels to the detriment of labour productivity and, perhaps, financial performance. There is some support for this proposition. In the period 1998-2004, workplace financial performance was independently positively associated with employment growth, ceteris paribus, as one might anticipate since it is usually successful firms that grow. By 2004-2011 this was no longer the case.[22]

One possible reason for labour hoarding might be the uncertainty surrounding the timing of an upturn in the demand for a workplace's goods or services. It is true that workplaces experiencing the onset of "turbulent" market conditions nevertheless managed some, albeit low, employment growth (Table 5.5). The only workplaces experiencing declining employment were those whose market had been in decline in both 2004 and 2011 (Table 5.5). These effects were robust to controlling for observable differences across workplaces, including the extent to which the HR Manager said the workplace had been adversely affected by recession. If the onset of market turbulence is an indicator of greater uncertainty, there is no clear evidence here that it was linked to labour hoarding.

[INSERT TABLE 5.5 HERE]

[22] In a similar vein Riley *et al.* (2015) find that the positive correlation between surviving firms' employment growth and their relative productivity ranking broke down after 2007/08.

As noted earlier in the chapter, a variant of the labour hoarding hypothesis is that firms have hoarded skilled labour. Indeed, WERS shows that skilled employees constituted a growing percentage of all private sector employees between 2004 and 2011. Among private sector workplaces present in both 2004 and 2011, the percentage of skilled employees - defined as those in the top three occupational classifications, namely managers, professionals and associate professionals and technical employees - rose five percentage points, from 26% to 31%. However, what is striking is that this growth was negatively correlated with workplace employment growth. In workplaces that had shrunk by at least 20%, the increase in the percentage of employees who were skilled was 9 percentage points, whereas it was only 2 percentage points in workplaces that had grown by at least 20%. The negative correlation between workplace employment growth and skilled employment was robust to controlling for workplace characteristics.[23] This is suggestive evidence that workplaces faced with shrinking workforces may have been hoarding skilled labour. However, there was no association between changes in the percentage of skilled employees and how adversely workplaces were affected by the recession, nor product market conditions.

If "hoarded" skilled labour was generating intangible capital then one might anticipate a link between a growth in the percentage of skilled employees and a workplace's ability to innovate.

[23] A 1 percentage point decline in employment was associated with a statistically significant 0.7 percentage point increase in the percentage of skilled employees in models containing the same controls as indicated in footnote 21.

However, there was no association between growth in skilled employment and workplace innovation using the measures of innovation introduced in Section 5.3.2.

Intuitively, if labour hoarding has been taking place, one might also expect an increase in job tenure. There has been a statistically significant increase in employees' workplace tenure since 2004. In the private sector, mean workplace tenure was under two years in one-third (33%) of workplaces in 2004, falling to 29% in 2011. The percentage with an average of at least 5 years' tenure rose from 37% to 44%.

This section adds to the macro-level data on employment by using workplace-level data to show that employment levels *within* British private sector workplaces held up over the course of the recession, perhaps to a surprising degree given the recessionary shock. It is true that the impact of recession and the disruption to product markets clearly had a significant impact on employment, but there was no extensive shake-out of jobs in British workplaces and the positive link between financial performance and employment growth evident in the late 1990s and early 2000s disappeared in the period 2004-11. Furthermore, the percentage of employees in skilled occupations rose, especially in those workplaces whose total employment shrank. Together, these findings offer some, albeit limited, evidence in favour of the labour hoarding hypothesis.

5.3.4: A slowdown in HRM investments?

One area that has not been discussed a great deal in the broader literature on the productivity puzzle is that of HRM investments, that is, the human resource practices that managers may implement in pursuit of higher productivity. If the recession had reduced the rate at which HRM

investments were made – or lowered the rate of return on such investments - this might have contributed to a slow-down in productivity growth.

The broad literature on HR practices and workplace performance (e.g. Huselid, 1995; Bloom and Van Reenen, 2010a) tends to focus on three sets of practices which are expected to have positive implications for productivity: first, work organisation practices which give workers a greater level of autonomy, aid collaboration and raise their skills; second, performance or quality management practices which seek to more closely manage workers' effort and output; and third, incentive pay schemes which seek to motivate workers through financial incentives.

It is apparent from existing work (e.g. Wood and Bryson, 2009) that some of the practices cited above, such as team-working and the use of quality targets, became more prevalent in Britain over the period 1998-2004, when the economy was growing strongly. Here we investigate whether the rate of growth of these practices might have slowed since the mid-2000s, or whether the returns to such HR practices might have diminished, in such a way as to have contributed to the general slowdown in productivity growth.

Alongside the three sets of practices considered above, we also look at arrangements for employee voice. Collective employee representation through trade unions was known to be negatively associated with workplace performance in Britain in the 1980s and 1990s, but unionisation is known to have weakened in recent decades, whilst arrangements for direct communication between managers and employees have grown in popularity (Blanchflower and Bryson, 2009).

Our analysis again calls on the Workplace Employment Relations Survey, but this time employs data from the cross-section surveys of 1998, 2004 and 2011. We use data on private sector workplaces with 10 or more employees and, first, chart the incidence of the HR practices discussed above over the course of the three surveys. We then examine the associations between these HR practices and a subjective measure of workplace productivity in each year, as a rough indication of whether there may have been changes in returns.

Table 5.6 shows the percentage of employees who work in establishments where the specified practices operate.[24] Considering first those practices relating to work organisation and skills, we see increases in the use of team working, in the use of functional flexibility and in the intensity of training between 2004 and 2011. The rise in team working reversed an earlier decline seen between 1998 and 2004, whilst the increased intensity of training represented the continuation of a prior trend.

[INSERT TABLE 5.6 HERE]

Turning to quality and performance-management practices, we see a decline in the use of problem-solving groups and a rise in the use of performance appraisals but, again, neither change was unique to the period 2004-2011. On incentive pay, we see a small decline in the

[24] We prefer this employment share to the share of workplaces with a practice, since larger workplaces contribute disproportionately to aggregate levels of productivity.

prevalence of share ownership schemes, and in respect of voice, we see the continuation of a shift away from sole reliance on representative arrangements and towards the use of direct forms of communication, either alone or in combination with forms of employee representation.

On the whole, these patterns indicate a progressive shift away from formal, collective approaches to the management of employees and employee performance (i.e. problem-solving groups, group-based incentive pay and engagement with unions) towards a more individualistic focus that encompasses up-skilling and the direct management of quality and performance. However, there appears to be no obvious change in trajectory between 1998-2004 and 2004-2011. These patterns do not therefore suggest that that the recent period of recession in Britain was characterised by any particular slow-down in the diffusion of 'productivity-enhancing' HR practices.

The evidence for any changes in returns is also weak, insofar as we can gauge with our data. WERS only provides accounting data on performance for a small subset of workplaces and so we must rely on the subjective rating given by the workplace manager. As noted earlier, they are asked to rate the level of labour productivity at their workplace relative to the average for their industry and answer on a five-point scale from 'A lot above average' to 'A lot below average'. We can then investigate whether specific practices are associated with levels of productivity in a given year and whether these 'returns' appear to change over time. If the returns diminish, this might suggest that increased diffusion of the practice is making a smaller contribution to productivity growth going forward. One must, however, accept that there are

considerable caveats, given the cross-sectional nature of the data and the subjective nature of the performance rating.

The results of this analysis are presented in Tables 5.87 and 5.8. In the first of these tables, the individual practices shown in Table 5.6 are included together in an ordered-probit regression of the workplace's subjective productivity rating. Once we control for a set of observable workplace characteristics, including the size of the workplace, its industry sector and its location, we see no consistent pattern of changing returns. The most notable patterns are a reduction between 2004 and 2011 in the productivity advantage conferred by functional flexibility, and a reduction between 1998 and 2004 in the productivity disadvantage associated with reliance on representative voice.[25] Table 5.8 replaces the first six practices with a count variable, since key parts of the HR literature argue for the importance of bundles of practices (e.g. MacDuffie, 1995). The mean value of this count variable rises from 3.03 in 1998 to 3.11 in 2004 and 3.46 in 2011, with the increase between 2004 and 2011 being statistically significant at the 1 per cent level. In the regressions it appears that the coefficient on the count variable declines between 2004 and 2011, but statistical tests cannot reject the null hypothesis that the coefficients are the same in both years.

[INSERT TABLE 5.7 AND TABLE 5.8 HERE]

[25] This accords with the more general picture of a diminution of 'negative' union effects set out by Blanchflower and Bryson (2009).

Taken together, these results do not indicate any particularly notable break, either in the diffusion of HR practices in Britain during the recent recession, or in their impact. The overriding impression is, instead, of a continuation of earlier trends towards greater up-skilling and more systematic monitoring and assessment of quality and performance.

5.3.5: Falling real wages

The weakness of real wages was one of the most striking aspects of the recession in the UK, and it is strikingly apparent in the WERS data. Asked "Which, if any, of these actions were taken by your workplace in response to the recent recession?" private sector HR managers identified "Freeze or cut wages" in 38% of cases, making it the most commonly cited of the fourteen options identified on the survey show-card. This corresponded with employees' experience. When asked "Did any of the following happen to you as a result of the most recent recession whilst working at this workplace?" one-quarter (26%) of private sector employees said "My wages were frozen or cut", making it the most common response alongside "My workload increased". Unsurprisingly the incidence of pay cuts and freezes was strongly associated with the extent to which workplaces were adversely affected by the recession. In four-fifths (82%) of the cases where HR managers reported freezing or cutting wages, it was accompanied by at least one other action, usually to cut costs. For example, over one-third (36%) of those freezing or cutting wages had also instituted a freeze of filling vacant posts, 28% had reduced paid overtime, 28% had "postponed plans to expand", 27% had made "changes in the organisation of work", and 22% had made compulsory redundancies.

Further insights can be gleaned regarding pay setting during the recession in relation to the last pay settlement for the largest non-managerial occupation at the workplace. The percentage of settlements resulting in a pay freeze or cut doubled between 2004 and 2011 from 12% to 26%. Again, the influence of recession was in clear evidence: whereas only 15% of workplaces who reported no adverse effect of the recession had instituted a pay freeze or cut in the last pay settlement for the largest non-managerial occupation, this rose to 36% where the HR manager said the workplace had been affected "a great deal".

As noted earlier, the decline in real wages in Britain since the onset of recession is almost unprecedented in a period of low inflation, raising questions as to how management has been able to make such sizeable wage adjustments. One common hypothesis is that the reduced incidence of collective bargaining and a loss of union bargaining power has limited unions' ability to block pressures for wage reductions. The incidence of workplace trade unions and membership density changed little between 2004 and 2011, although there was a reduction in the scope of collective bargaining in the private sector which may be indicative of unions' reduced ability to maintain influence over a wide bargaining agenda (van Wanrooy *et al.*, 2013). However, unionisation is not correlated with the likelihood of managers saying they froze or cut wages in response to the recession, nor to wage freezes or cuts in the last pay settlement for the largest non-managerial occupational group. Nor has there been a noticeable decline in the size of the union wage premium - instead we see counter-cyclical movement, consistent with previous studies (Figure 5.8). It is therefore difficult to pinpoint a break in union power which may have provided employers with the opportunity to downwardly adjust real wages. If such a change has occurred, it may date back further than the onset of the recession itself.

[INSERT FIGURE 5.8 HERE]

There are two other changes which analysts point to as potential reasons for the weakness of real wage growth since the recession: welfare reform and immigration. Welfare reform in the UK has been extensive in recent years and has focused on increasing labour market participation of the inactive and unemployed (OECD, 2013a: 67-77). It can affect employer wage setting and job seeker behaviour in a variety of ways that can limit real wage growth. For instance, unemployed job seekers may be prepared to accept job offers at lower rates of pay than might have been the case in the absence of reform. We are able to identify those workplaces most likely to draw applicants from welfare benefit recipients, and thus those most likely to be affected by welfare reform, through two data items in WERS, namely whether the workplace used the public job placement service to fill vacancies for the largest non-managerial occupation at the workplace in the last twelve months, and whether the workplace had special procedures to encourage job applications from those who had been unemployed for at least twelve months. Neither were associated with pay freezes or cuts in the last pay settlement for the workplace's largest non-managerial occupational group, nor were they associated with freezes or cuts in wages, or the reduction of non-wage benefits, in response to the recession. Thus, to the extent that welfare reform might be expected to impact most on employers engaging with the public job placement service and drawing from the unemployed for recruits, there was no discernible direct effect of welfare reform on these aspects of wage setting. Of course, it is quite possible that the reforms have had other direct effects on wage setting, and that they have had broader, less direct effects on the operation of the labour market in general.

Although the UK has experienced a very substantial inflow of migrants in the last few years - a labour supply shock that could, in principle, slow the rate of real wage growth - the empirical evidence on the link between immigration and wages is heavily contested (see Ruhs and Vargas-Silva, 2014). In 2011, for the first time WERS collected information on the number of non-UK nationals employed at the workplace, distinguishing between those from the European Economic Area (the EEA) and those outside.[26] Private sector workplaces employed a mean of 7.6% non-UK nationals in 2011, of whom 3.0% were non-EEA nationals. Although the percentage of non-UK nationals employed at the workplace had no bearing on wage freezes or cuts that were directly attributed to the recession, and no effect on cuts to non-wage benefits in response to the recession, the probability of a pay freeze or cut for the largest non-managerial occupational group in the last pay settlement rose with the proportion of non-EEA nationals employed by the workplace. One-quarter (26%) of private sector workplaces had instituted a pay freeze or cut for the largest non-managerial group of employees in the last pay settlement. An increase in 1 percentage point in the number of non-EEA nationals employed at a workplace raised the probability of a wage freeze or cut by roughly 0.4 of a percentage point.[27] The proportion of EEA nationals was not statistically significant. One potential explanation for this

[26] The EEA comprises the European Union, Iceland, Liechtenstein, Norway and Switzerland.

[27] The coefficient on the proportion of non-EEA nationals was -0.52 in the absence of controls (t-stat of 3.95), falling to -0.38 (t=2.23) with controls for number of employees, single establishment organization, industry, region, union, and largest occupational group. Full results are available on request.

finding is that a workplace's ability to employ non-EEA nationals reduces the bargaining power of employees at that workplace, thus limiting their ability to resist wage freezes or cuts.

If wages have fallen in response to changes in productivity levels we might expect to see "Productivity levels within the organisation or workplace" featuring prominently as an influence on the last pay settlement for the largest non-managerial occupation in the workplace. Table 5.9 compares the influences on pay settlements in 2011 with those in 2004 for all settlements and those that resulted in a freeze or cut versus a pay increase. The most commonly cited influence is "The financial performance of the workplace or organisation": it accounted for over one-third (36%) of responses in 2011, up from 30% in 2004, and was particularly salient in settlements leading to a freeze or cut. "Rises in the cost of living" was the second most commonly cited factor, and was more salient in cases where the settlement led to a pay rise. "Industrial Action threatened or taken" rarely featured in employers' considerations at all, perhaps indicating the limitations of unions' influence over pay awards.

Productivity levels accounted for around one-fifth of responses, but they were no more heavily cited in 2011 than they were in 2004, nor did they feature more in cases where there was a pay freeze or cut. There is therefore little to indicate that productivity had become a more common consideration in wage setting as a result of the recession.[28]

[28] These figures are based on the subset of coded responses available in 2004 and 2011. In 2011 a more extended set of options was provided including reference to the national minimum wage for example. Productivity levels accounted for 16% of this more extended set of influences in

[INSERT TABLE 5.9 HERE]

5.3.6: Working harder or not so hard?

There are two competing hypotheses regarding the potential effect of the recession on individuals' labour productivity. The first is that the combination of lower product and service demand with labour hoarding has created "slack" such that employees are not required to work as hard or as "smart" as they were previously. Declining real wages may have contributed to this trend since employees may lack the incentive to put in additional effort. The alternative hypothesis is that recession has placed additional pressures on employees to increase their efforts, either directly following the loss of co-workers, or indirectly through the threat of dismissal or replacement by job-seekers.

Although we lack direct measures of individual productivity, employees were asked how strongly they agree with the statement "My job requires that I work very hard". The percentage of employees who "strongly agree" with this statement increased significantly from 25% in 2004 to 32% in 2011. This difference remains statistically significant and actually grows in size when controlling for observable differences in employees' demographic, job and workplace characteristics. How hard people thought they were required to work was not associated with how adversely the workplace had been affected by the recession. Instead it was positively

2011, a figure that did not differ according to whether the settlement resulted in a pay increase or not. Financial performance was mentioned almost twice as many times (31%).

associated with HR Managers' perceptions of the degree of market competition the workplace *currently* faced. Furthermore, it was positively associated with the number of changes employees said had been made to their jobs as a result of the recession.[29] Further investigation revealed this association was driven by those who said "My workload increased", a response given by one-quarter (26%) of private sector employees. The evidence is therefore supportive of the proposition that employees were working harder than prior to the recession, partly as a result of changes made by management in response to recession, but also due to highly competitive market conditions. However, there is little evidence that management were able to translate that hard work into a more productive workplace since how hard employees said their jobs required them to work was not significantly correlated with HR Managers' perceptions of the workplace's productivity relative to the industry average.[30]

5.3.7: The UK's "flexible labour market"

[29] Those who had been in the same workplace during the recession were asked "Did any of the following happen to you as a result of the most recent recession?" and were offered nine responses.

[30] Analyses of the panel of private sector workplaces revealed that, although there was a positive correlation between the mean workplace score for how hard employees worked and the workplace's labour productivity and financial performance, this association disappeared having accounted for fixed workplace unobservable characteristics (both in workplace fixed effects and first difference models) - so there was no association between change in employees working hard and improvement in workplace performance.

The UK is often characterised as an economy with a very flexible labour force relative to many of its EU counterparts for two reasons. First, it is fairly lightly regulated such that employers face relatively low dismissal costs and face minimal constraints in terms of the sorts of labour contracts they can utilise (OECD, 2013b). The second aspect, touched upon already, is the low incidence and relative weakness of trade unions. For many years it has been argued that unions face declining bargaining power and, as such, a reduced ability to influence both wage setting (see above) and restrictions on work practices and labour supply. Employers in Britain may avail themselves of this labour market flexibility when setting wages, as discussed above, but they may also take advantage of it in configuring their workforce.

WERS asks HR managers what types of workers they use, either under contract, or directly as employees, to undertake the workplace's business. These include shift-working, fixed-term and temporary contracts, freelancers, agency workers, home-workers, zero-hours contracts and annual-hours contracts, as well as part-time workers. Such contracts offer employers numerical flexibility which can be useful when seeking to adjust the amount of labour they need in response to changes in demand such as the onset of recession.

Workplaces were more likely to resort to numerical flexibility via these contracts in 2011 than they were in 2004: excluding the use of part-time workers (who were present in 76% of private sector workplaces in 2004 and 77% in 2011), half (50%) of workplaces had used at least one form of flexible contract in 2004, but this had risen to two-thirds (65%) by 2011 (van Wanrooy *et al.*, 2013: 40). There were no striking increases in the use of a particular type of contract, with the exception of shift-working which was used in 24% of private sector workplaces in

2004 and 32% in 2011. Instead, usage increased marginally across a range of contract types. The percentage using two or more such contracts rose from 43% to 57%.

However, the use of numerical flexibility was not associated with HR managers' perceptions of how adversely their workplace had been affected by the recession. Instead, if one considers the actions employers said they took in response to the recession they tended to involve cost cutting, for example through compulsory redundancies, and work reorganisation (van Wanrooy *et al.*, 2013: 19), consistent with the managerial prerogatives that characterise Britain's "right-to-manage" model of employment relations. Managers were actually more likely to say they had cut the number of agency or temporary staff in response to recession, rather than increase them (13% reduced them compared to 3% who increased them), perhaps as a further cost-cutting exercise, in the knowledge that core employees could be relied upon to offer numerical flexibility through reduced paid overtime (19% of workplaces), and even reduced basic hours (15% of workplaces).

To see if workplaces appeared to benefit from greater use of numerical flexibility we sought to identify whether there was any correlation between a workplace's use of numerical flexibility, its strength emerging from the recession, and its performance in 2011. Conditioning on how adversely the workplace had been affected by recession, plus other standard controls (size, single workplace organisation, age, industry, region, unionised, and largest non-managerial occupational group), there was no association between the intensity with which numerical flexibility was used (as measured by the number of types of flexible contract worker used) and how strongly the HR manager agreed with the statement "This workplace is now weaker as a

result of its experience during the recent recession". Replacing this count variable with the variables identifying the type of numerical flexibility used, two practices - shift-working and the use of fixed term contracts - were actually associated with a greater likelihood of emerging weaker from recession. Similarly, conditioning on the same set of controls, the number of numerical flexibility practices was not associated with labour productivity or financial performance in 2011. Two practices - fixed term contracts and annualised hours contracts - were significantly associated with lower labour productivity than the industry average.

Analyses of the panel of private sector workplaces indicate that workplaces that increased their use of numerical flexibility between 2004 and 2011 experienced a deterioration in workplace performance, as captured by an additive scale combining scores for financial performance, labour productivity and quality of output. This effect was statistically significant and apparent in both first difference and workplace fixed effects estimates which account for unobserved fixed differences across workplaces. The workplace fixed effects estimates also revealed a negative correlation between changes in labour productivity relative to the industry average and increased use of numerical flexibility.[31] Of course it is not possible to infer causality from such estimates. It is possible, for instance, that it is those workplaces whose performance is deteriorating who resort to more numerical flexibility practices. Nevertheless, these results provide robust evidence that the numerical flexibility employers can use as a result of Britain's flexible labour market model is not beneficial in terms of workplaces' performance and productivity.

[31] Full results are available on request.

A priori it is perhaps unclear what impact unionisation may have had on workplace productivity. On the one hand, if unions have limited bargaining strength, not only is the upward pressure on wages likely to diminish as discussed earlier, but employers are at liberty to pursue profit maximisation without regard to their employees' collective voice. This may be advantageous to firms if managers have the information and capability to follow the right course of action. It may not be so beneficial to firms if, as some argue, managers benefit from effective worker voice - as, for example, in the case of firms adopting a "mutual gains" approach whereby firms seek to maximise profits via worker involvement, subject to workers benefiting through an increased share of those profits (Kochan, 1994).

Neither the presence of a union recognised for pay bargaining nor union density are significantly associated with workplace performance in 2011, whether performance is measured in terms of the additive performance scale, financial performance or labour productivity. However, analyses of the panel reveal that workplaces that experienced an increase in union density between 2004 and 2011 also improved their performance relative to the industry average, both on the additive scale and in terms of labour productivity. Similarly, in some estimates workplaces that became unionised experienced improved workplace performance, though this finding is less robust.[32] This is limited evidence in favour of the proposition that unionisation may be beneficial to workplaces seeking to improve their performance after the

[32] Full results are available on request.

recession, perhaps because unions may have adopted a "mutual gains" stance. It runs counter to the proposition that firms benefit from a highly deregulated and non-unionised environment.

5.3.8 Summary

The picture regarding the genesis and explanations for the productivity puzzle derived from micro-analyses of the Workplace Employment Relations Surveys is one of complexity and heterogeneity. We find clear evidence of labour intensification but employers appeared incapable of turning this effort into improved workplace level productivity. There is substantial evidence of widespread pay freezes and cuts which help explain the substantial decline in real wage growth since the on-set of recession. Pay freezes and cuts were often initiated by workplace managers in direct response to the recession. It remains unclear why such wage adjustments were possible in this recession when they have been largely absent in earlier recessions, but it is possible that employers faced "softer" constraints emanating from union power and the need to maintain wage levels to recruit and retain staff. Immigration may have played a role: downward wage adjustments were more likely in workplaces using non-UK nationals from outside Europe. Workplace closure rates were little different to those experienced in more benign conditions prior to the recession, but there is some evidence of a "cleansing" effect with poorer performing workplaces being more likely to close.

Employment growth rates vary greatly across workplaces but, on average, they have held up well during recession. However, this observation overlooks the impact the recession had in workplace shrinkage, especially among those facing declining demand for goods and services. There is some evidence of labour "hoarding", especially hoarding of high skilled labour: this

has had no discernible impact on the rate of innovation. There appeared to be little change in the overall rate of workplace innovation but declining or turbulent demand for goods and services limited the degree of innovation in processes and products. There was no discernible impact of recession on either the number of HRM practices workplaces invested in, nor their returns on those investments. There is no evidence that workplaces have benefited from Britain's "flexible" labour market as indicated by using recruitment channels used by welfare recipients or the use of numerically flexible workers. On the contrary, workplaces with increasing unionisation appeared to benefit in terms of improved workplace performance.

5.4 The Future

The old orthodoxy that recessions tend to have short-term impacts on output has recently been challenged. Instead, a consensus has emerged that "hysterisis" - a long-term effect of recession on output due to reduced capital accumulation, scarring effects on workers through job loss, and disruptions to economic processes underlying technological progress - is likely. In his analysis of 23 OECD countries Ball (2014) finds the Great Recession has had a large impact on countries' productive capacity (as measured by estimates of potential output) and that the growth rate of potential output is well below what it was before 2008 meaning "the level of potential output is likely to fall even farther below its pre-crisis trend in the years to come" (Ball, 2014: 2).

Preoccupied with which policy levers to pull and when, economists at the Bank of England and elsewhere have been trying to grapple with the evidence to date on the sources of the UK's productivity puzzle so as to distinguish cyclical from more persistent economic difficulties. In

a recent review Barnett *et al.* (2014b) emphasise the continued weakness of growth in the UK's labour productivity, suggesting that strength in labour hiring and "modest pickup in productivity growth suggest that spare capacity within firms is unlikely to explain much of the current weakness". Instead, they emphasise the potential for the financial crisis to have a persistent effect on productivity levels. Their estimate is that these more persistent factors, such as reduced investment in physical and intangible capital, together with impaired resource allocation, may account for between 6 and 9 percentage points of the 16 percentage point shortfall in labour productivity relative to the pre-crisis trend. At the same time they recognise that "there remains considerable uncertainty around any interpretation of the puzzle".

In his analysis of OECD countries Ball (2014: Table 1) suggests the rate of growth in the UK's productive capacity is two-thirds of its pre-recession rate, a recessionary "hit" similar in magnitude to that experienced by France, much smaller than the impact on Spain, and much larger than the impact on Germany.

At the time of writing the UK's labour market was hotting up. Unemployment has been falling quite quickly and some real wage growth has returned. Some fear wage "catch up" as workers seek to make up for the lost wages incurred since the recession hit. But this scenario assumes a degree of worker bargaining power that is not in evidence. As noted earlier, union reach continues to decline, albeit slowly, and some parts of its traditional power base - notably public sector - face the biggest challenges. There is evidence that a wedge is opening up between productivity growth and wage growth, especially among lower paid workers, consistent with low and/or diminishing bargaining power. High labour market participation rates may help

account for such trends since unemployed labour may more easily substitute for existing labour. As Gregg *et al.* (2014b) note wage growth is unlikely without productivity growth and, they maintain, with real wages remaining low, firms' incentives for capital investment remain muted. There is thus a 'vicious circle' in which poor productivity begets low wage growth and vice versa.[33]

But perhaps the "acid test" of the recession's impact on the UK's longer-term productivity performance is what has happened to TFP. Pessoa and Van Reenen (2013) argue that there has been only a small drop in TFP but, as noted earlier, most other researchers who have investigated this particular issue judge that the drop in TFP was substantial and forms a key part of the story for the UK. For instance, Barnett *et al.* (2014a) argue that "the change in the capital to labour ratio since the crisis can only account for a small part of the shortfall in productivity relative to its pre-crisis trend. Therefore, it is likely that much of the fall in measured labour productivity is accounted for by a fall in TFP...We make the inference that the loss in labour productivity identified...will largely reflect a loss in measured aggregate TFP due to the misallocation of capital across sectors". They suggest the process of capital reallocation since 2008 has been "unusually slow...relative to previous UK recessions and other banking crises" (p. R35), consistent with the possibility that efficient resource allocation may impair the UK's longer-term growth prospects.

[33] The public sector may be an exception: here government intervention in wage setting and employment levels will continue, potentially driving productivity growth.

In the longer run the UK's productivity trends are likely to reflect the long-tail of poorly performing firms that the UK has been noted for over many years. Some of this is due to structural factors such as the role of family owned firms, and "poor management" more generally in Britain (Bloom and Van Reenen, 2010b). Furthermore Britain continues to be characterised by laissez-faire economics and politics in the Thatcher mould such that it eschews state intervention and shies away from industrial strategy and protects managers' right-to-manage, even when those managers appear poorly equipped for the job.

However, there are some areas where optimism is merited. London is a global centre, one of only a few truly international 'hub' cities benefiting from agglomeration and networking. It continues to thrive and prosper, offering safe haven for international capital, migrant labour flows and talented entrepreneurs. More broadly, a number of reforms have been undertaken in the UK since the 1980s which have provided a foundation for a continuation in the long-term productivity catch-up that the country began relative to its competitors in the 1980s. These reforms include the expansion of higher education, reforms to welfare systems and labour law, and deregulation of capital flows (Aghion *et al.*, 2013). The UK has invested very heavily in human capital via growth in participation in higher education. Reforms in other areas, such as the welfare system and labour law, also provide for a flexible labour market capable of absorbing future shocks, while the deregulation of capital flows and a relatively liberal immigration policy ensure the free flow of capital and labour. It remains to be seen whether the UK can benefit from these good foundations to make up for the ground it has lost in recent years.

REFERENCES

Aghion, P., Besley, T., Browne, J., Caselli, F., Lambert, R., Lomax, R., Stern, N. and Van Reenen, J. (2013) *Investing for Prosperity: Report of the LSE Growth Commission*, London: LSE.

Arrowsmith, M., Franklin, J., Gregory, D., Griffiths, M., Wohlmann, E. and Young, G. (2013) "SME forbearance and its implications for monetary and financial stability", *Bank of England Quarterly Bulletin*, Q3: 296-303.

Askenazy P, Bozio A and García-Peñalosa C (2013) "Wage dynamics in times of crisis", *Les Notes du Conseil d'Analyse Économique*, No. 5, April.

Ball, L. M. (2014) "Long-term Damage From the Great Recession in OECD Countries", NBER Working Paper No. 20185.

Barnett, A., Broadbent, B., Chiu, A., Franklin, J. and Miller, H. (2014a) "Impaired Capital Reallocation and Productivity", *National Institute Economic Review*, 228: R35-R48

Barnett, A., Batten, S., Chiu, A., Franklin, J. and Sebastia-Barriel, M. (2014b) "The UK Productivity Puzzle", *Bank of England Quarterly Bulletin*, Q2: 114-128.

Barnett, A, Chiu, A, Franklin, J and Sebastia-Barriel, M (2014c), 'The productivity puzzle: a firm-level investigation into employment behaviour and resource allocation over the crisis', Bank of England Working Paper No.495.

Bell, D. and Blanchflower, D. G. (2015) "The Bell-Blanchflower Under-employment Index, Quarter 2 2001 – Quarter 3 2014". Data last downloaded 9th May 2015 from: http://www.theworkfoundation.com/Datalab/The-BellBlanchflower-Underemployment-Index

Bell, B. and Van Reenen, J. (2010) "Bankers' Pay and Extreme Wage Inequality in the UK", Centre for Economic Performance Special Paper No. 21

Blanchflower D. and Bryson, A. (2009) “Trade union decline and the economics of the workplace”, pp.48-73 in W Brown, A Bryson, J Forth and K Whitfield (eds) *The Evolution of the Modern Workplace*, Cambridge University Press.

Bloom, N. (2009) "The Impact of Uncertainty Shocks", *Econometrica*, 77: 623-685

Bloom N. and Van Reenen J. (2010a) "Human Resource Management and Productivity", Chapter 19 in D. Card and O. Ashenfelter (eds) *Handbook of Labour Economics: Volume 4*, Elsevier.

Bloom, N. and Van Reenen, J. (2010b) "Why Do Management Practices Differ across Firms and Countries?", *Journal of Economic Perspectives*, 24, 1: 203-224

Bloom, N., Bond, S. and Van Reenen, J. (2007) "Uncertainty and Company Investment Dynamics: Empirical Evidence from UK firms", *Review of Economic Studies*, 74: 391-415

Broadbent, B. (2012) "Productivity and the allocation of resources", Speech, Durham Business School.

Blundell, R., Crawford, C. and Jin, W. (2014) "What Can Wages and Employment Tell Us About the UK's Productivity Puzzle?", *The Economic Journal*, 124, 377-407

Butcher B and Bursnall M (2013) “Commentary: how dynamic is the private sector? Job creation and insights from workplace-level data”, *National Institute Economic Review*, 225: F4-F14.

Connors E and Franklin M (2015) *Multifactor Productivity (Experimental), Estimates to 2013*, London: Office for National Statistics.

Corry, D., Valero, A. and Van Reenen, J. (2012) "UK Economic Performance Under Labour", *Renewal*, 20, 1: 56-69

Department of Business Innovation and Skills, Advisory, Conciliation and Arbitration Service and National Institute of Economic and Social Research (2015)*Workplace Employee Relations Survey, 2011* [computer file]. *6th Edition.* Colchester, Essex: UK Data Archive [distributor], February 2015. SN: 7226, http://dx.doi.org/10.5255/UKDA-SN-7226-7

Eurostat (2015) *Labour Costs Annual Data.* Eurostat code: TPS00173.

Field, S. and Franklin, M. (2014) *Multi-factor Productivity, Indicative Estimates to 2012*, London: Office for National Statistics.

Field, S. and Franklin, M. (2013) *Micro-Data Perspectives On The UK Productivity Conundrum*, London: Office for National Statistics.

Foster, L., Grim, C. and Haltiwanger, J. (2013) "Reallocation in the Great Recession: Cleansing or Not?", US Census Bureau, mimeo

Geroski, P. A. and Gregg, P. (1997) *Coping with Recession: UK Company Performance in Adversity*, Cambridge: Cambridge University Press

Goodridge, P., Haskel, J. and Wallis, G. (2013) "Can intangible investment explain the UK Productivity Puzzle?", *National Institute Economic Review*, 224: R48-R58

Goodridge, P., Haskel, J. and Wallis, G. (2015) “Accounting for the UK productivity puzzle: current data and future predictions”, Imperial College Business School, mimeo.

Gregg, P., Machin, S. and Fernandez-Salgado, M. (2014a) "Real Wages and Unemployment in the Big Squeeze", *The Economic Journal*, 124, 576: 408-432

Gregg, P., Machin, S. and Fernandez-Salgado, M. (2014b) "The Squeeze on Real Wages - And What It Might Take to End It", *National Institute Economic Review*, 228: R3-R16

Grice J (2012) *The Productivity Conundrum: Interpreting The Recent Behaviour Of The Economy*, London: Office for National Statistics.

Harris, R. and Moffat, J. (2014a) "The UK Productivity Puzzle 2008-2012: Evidence Using Plant-level Estimates of Total Factor Productivity", Durham University Business School, mimeo

Harris, R. and Moffat, J. (2014b) "What UK Productivity Puzzle? Market reallocation and aggregate productivity, 2008-2012", Durham Business School mimeo

Huselid, M (1995) "The impact of human resource management practices on turnover, productivity and corporate performance", *Academy of Management Journal*, 38, 3: 635-72.

Insolvency Service (2014) *Insolvency Statistics: April to June 2014*, The Insolvency Service.

Kay A (2013) "Quantitative easing", Written evidence submitted to the Treasury Select Committee, January. URL: http://www.publications.parliament.uk/pa/cm201213/cmselect/cmtreasy/writev/qe/m18.htm [Last accessed: 8th May 2015]

Kochan, T. A. (1994) *The Mutual Gains Enterprise: Forging a Winning Partnership Among Labor, Management and Government*, Boston, MA: Harvard Business School Press.

Lane, P. R. (2012) "The European Sovereign Debt Crisis", *Journal of Economic Perspectives*, 26, 3: 49-68

Lazonick, W. (2014) "Profits without Prosperity", *Harvard Business Review*, September, pp. 47-55.

MacDuffie J (1995) “Human resource bundles and manufacturing performance: flexible production systems in the world auto industry”, *Industrial and Labor Relations Review*, 48, 2: 197-221.

Manning A (2015) “Shifting the balance of power: workers, employers and wages over the next parliament”, pp.47-52 in G Kelly and C D’Arcy (eds) *Securing a Pay Rise: The Path Back to Shared Wage Growth*, London: Resolution Foundation.

Martin B and Rowthorn R (2012) *Is the British Economy Supply Constrained II?A Renewed Critique of Productivity Pessimism*, Centre for Business Research, University of Cambridge.

Murphy J and Franklin M (2015) *Volume Index of Capital Services (Experimental), Estimates to 2013*, London: Office for National Statistics.

National Audit Office (2015) *Taxpayer Support for UK Banks: FAQs*. URL: http://www.nao.org.uk/highlights/taxpayer-support-for-uk-banks-faqs/ [Last accessed: 8th May 2015]

NIESR (2015) *NIESR Monthly Estimates of GDP*. May 2015. London: NIESR. Available online at: http://www.niesr.ac.uk .

OECD (2013a) "Labour market, welfare reform and inequality" in *OECD Economic Surveys: United Kingdom 2013*, Paris: OECD Publishing.

OECD (2013b) *OECD Employment Outlook 2013*, Paris: OECD Publishing.

OECD (2014) *OECD Employment Outlook 2014*, Paris: OECD Publishing.

OECD (2015) *Standardised Business Confidence Indicator*. URL: http://stats.oecd.org/index.aspx?queryid=299 [Last accessed: 9th May 2015]

Office for National Statistics (2015a) "Labour Productivity, Q4 2014", ONS Statistical Bulletin, 1 April 2015.

Office for National Statistics (2015b) "International Comparisons of Productivity – Final Estimates, 2013", ONS Statistical Bulletin, 20 February 2015.

Office for National Statistics (2015c) *United Kingdom Economic Accounts*, series YBEZ.

Office for National Statistics (2015d) *Integrated Labour Market Database*, series DYDC (All workforce jobs, seasonally adjusted).

Office for National Statistics (2015e) *Integrated Labour Market Database*, series YBUV (All workers: main and second jobs) and YBUY (Full-time workers: main job).

Oulton, N. (2013) "Has the Growth of Real GDP in the UK been overstated because of Mis-Measurement of Banking Output?", *National Institute Economic Review*, 224, May, R59-R65

Pessoa, J. P. and Van Reenen, J. (2013) "The UK Productivity and Jobs Puzzle: Does the Answer Lie in Labour Market Flexibility?", Centre for Economic Performance Special Paper No. 31

Pessoa, J. P. and Van Reenen, J. (2014) "The UK Productivity and Jobs Puzzle: Does the Answer Lie in Labour Market Flexibility?", *The Economic Journal*, 124, 433-52

Riley, R., Rosazza-Bondibene, C. and Young, G. (2014a) "The Financial Crisis, Bank Lending and UK Productivity: Sectoral and Firm-level Evidence", *National Institute Economic Review No. 228*: R17-R34

Riley, R., Rosazza-Bondibene, C. and Young, G. (2014b) "Productivity Dynamics in the Great Stagnation: Evidence from British Businesses", Centre for Macroeconomics Discussion Paper No. 2014-07

Riley, R., Rosazza-Bondibene, C. and Young, G. (2015) "The UK Productivity Puzzle 2008-2013: Evidence from British Businesses", NIESR Discussion Paper No. 450.

Ruhs, M. and Vargas-Silva, C. (2014) *The Labour Market Effects of Immigration*, Migration Observatory Briefing, University of Oxford .

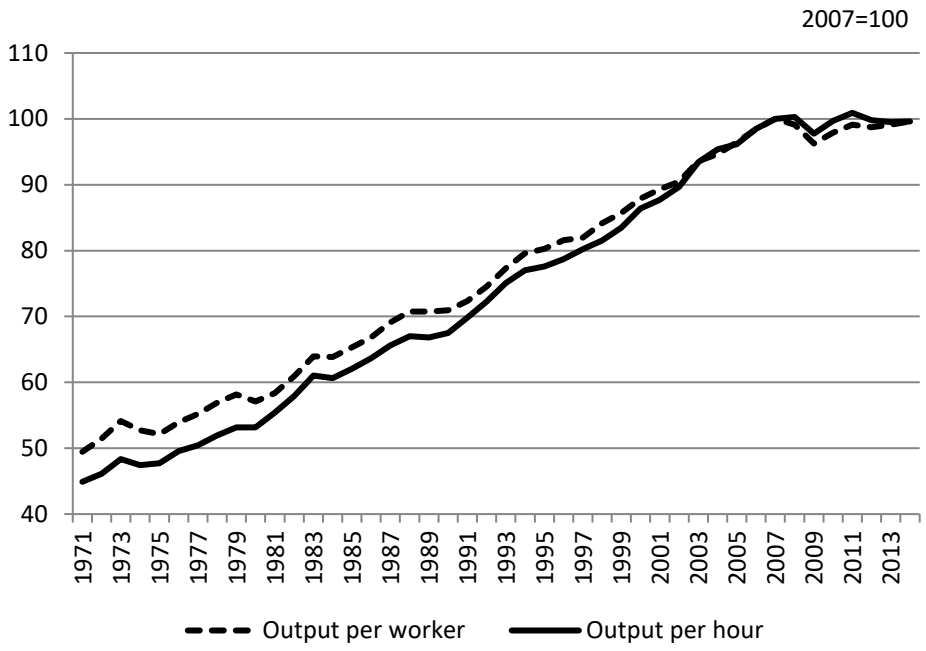
Stokes, L., Bryson, A., Forth, J. and Weale, M. (2014) "Who Fared Better? The Fortunes of Performance-pay and Fixed-pay Workers Through Recession", NIESR Discussion Paper No. 440.

Van Wanrooy, B., Bewley, H., Bryson, A., Forth, J., Stokes, L. and Wood, S. (2013) *Employment Relations in the Shadow of Recession: Findings from the 2011 Workplace Employment Relations Study*, Basingstoke: Palgrave MacMillan

Wales, P. and Taylor, C. (2014) *Economic Review, April 2014*, London: Office for National Statistics.

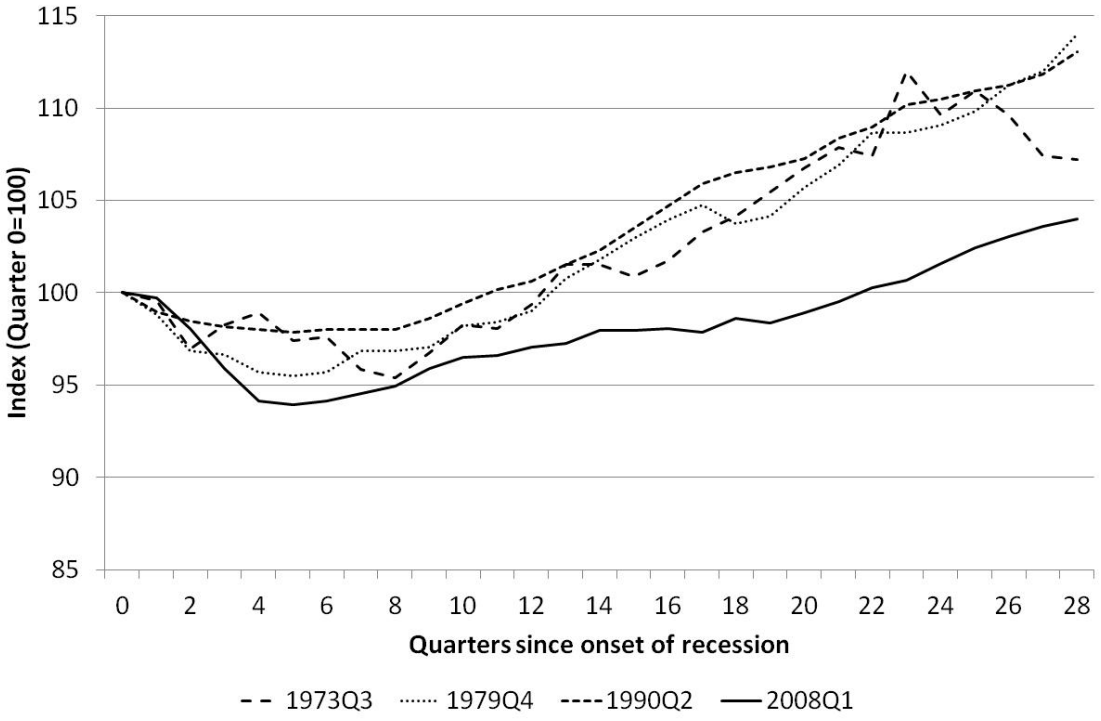
Wood S. and Bryson A. (2009) “High involvement management”, pp.151-175 in W Brown, A Bryson, J Forth and K Whitfield (eds) *The Evolution of the Modern Workplace*, Cambridge University Press.

Figure 5.1 Labour Productivity Growth in the UK, 1971-2014



Source: ONS (2015a: Table 1).

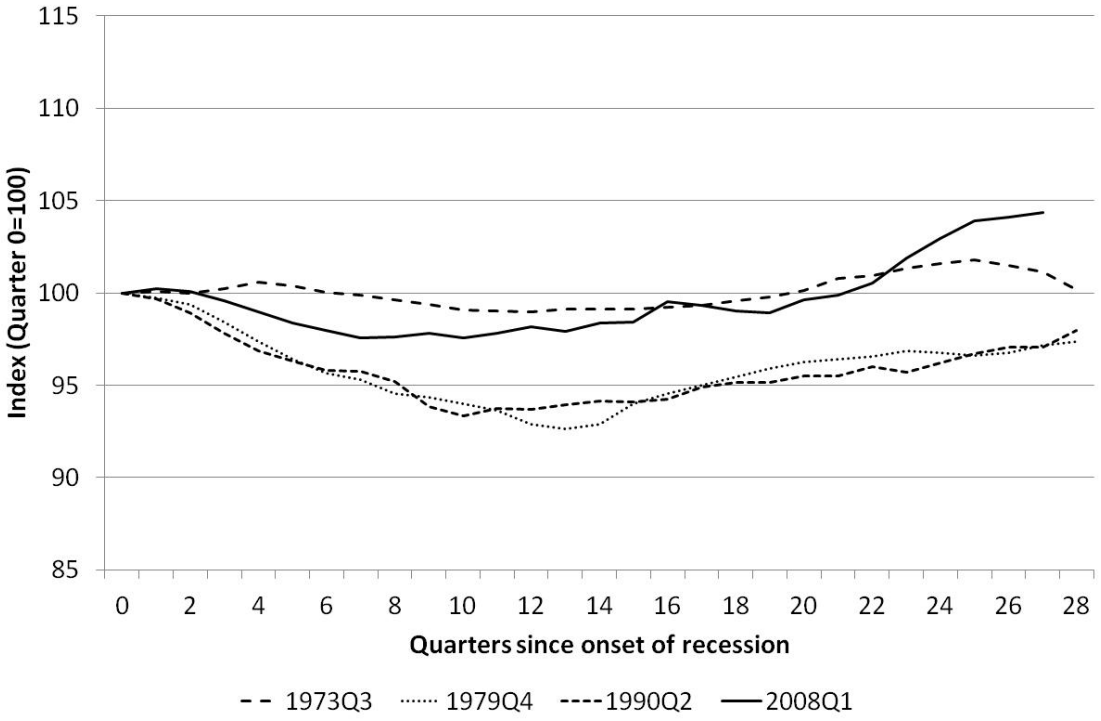
Figure 5.2: Speed of Recovery from Recession in the UK



Source: Author's calculations from NIESR (2015).

Note: Quarterly average of monthly GDP at market prices.

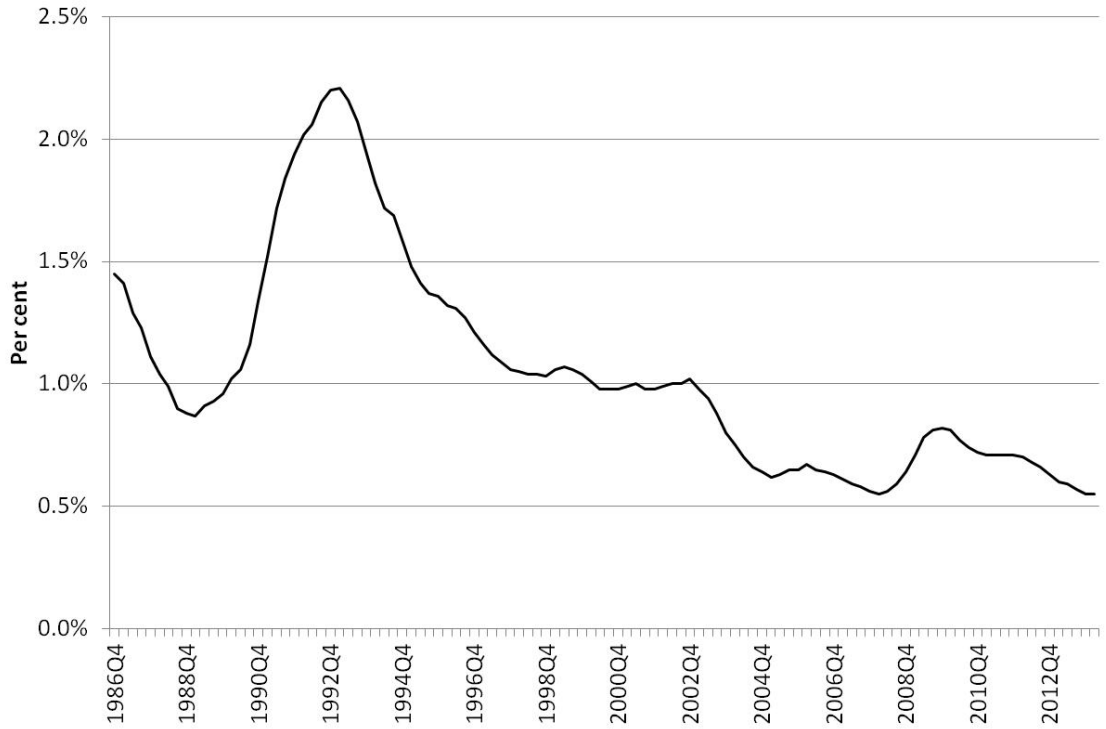
Figure 5.3: Employment levels in recent recessions



Source: Office for National Statistics (2015d)

Note: All workforce jobs (seasonally adjusted)

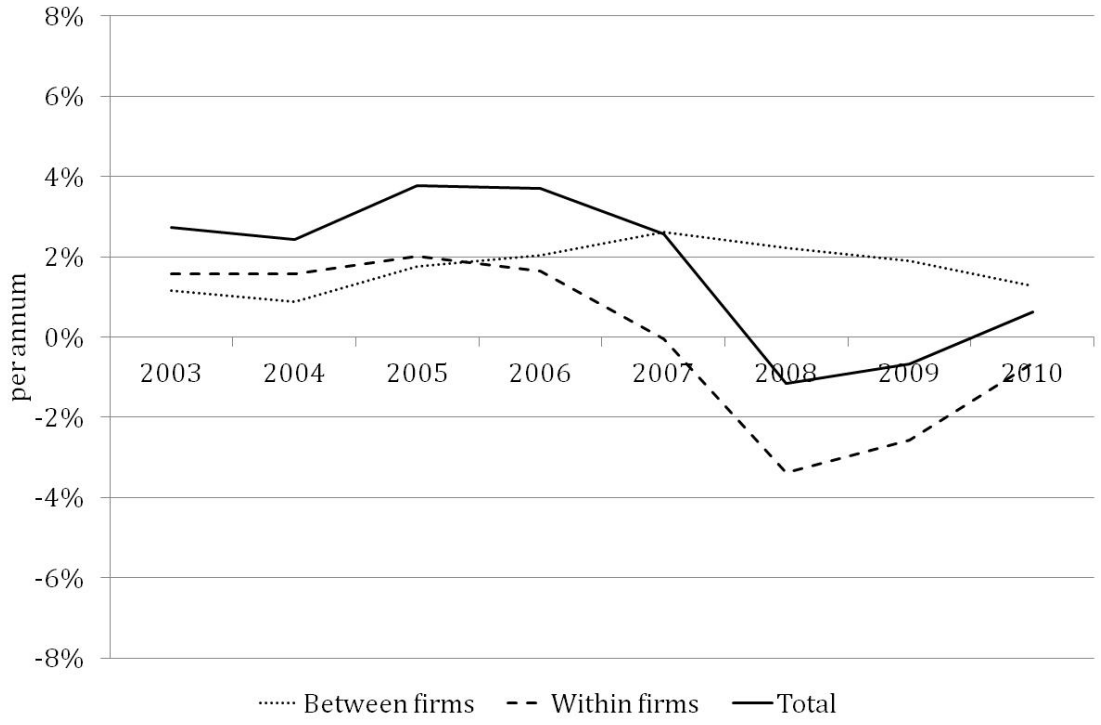
Figure 5.4 Liquidations as a percentage of all companies on the register



Source: Insolvency Service (2014)

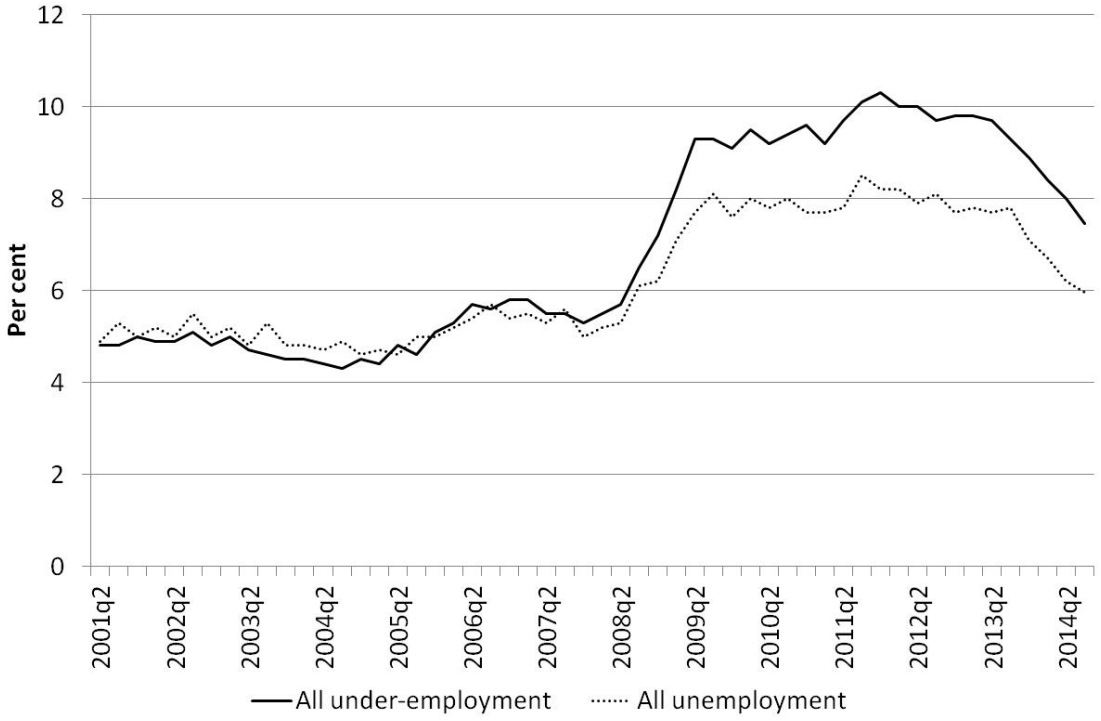
Note: The Enterprise Act (2002) introduces a discontinuity to the series in September 2003, as it introduced a streamlined process for administrations whereby companies can, in some circumstances, be dissolved without recourse to liquidation.

Figure 5.5: Decomposition of labour productivity growth into within and between firm components



Source: Riley *et al.* (2014b)

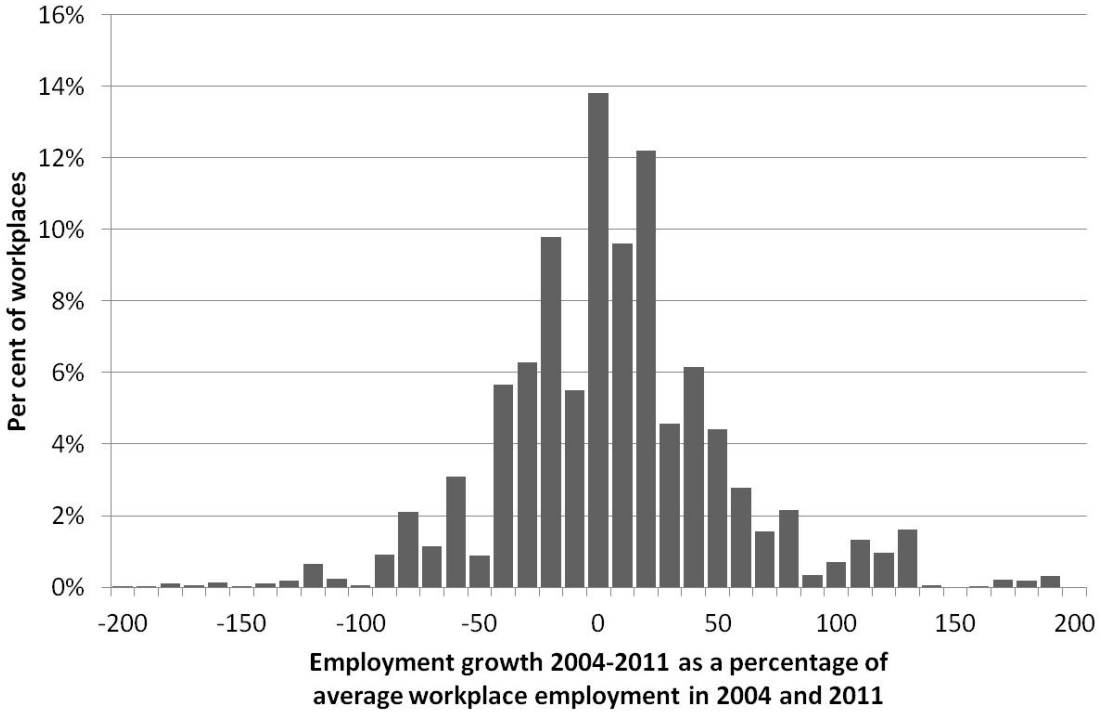
Figure 5.6 Under-employment versus unemployment, 2001-2013



Source: Bell and Blanchflower (2015)

Note: The underemployment index measures the excess supply of hours in the economy. It compiles a total measure of surplus hours by adding together (i) the hours that the unemployed would work if they could find a job and (ii) the change in hours that those already in work would prefer. This is then expressed as a percentage of the sum of hours worked and surplus hours to give the under-employment rate.

Figure 5.7: Employment Growth, 2004-2011, private sector panel



Source: Workplace Employment Relations Survey

Figure 5.8: Union Membership Wage Premium, 1994-2012

Source: Authors' calculations from Labour Force Survey

Table 5.1 Numbers of self-employed and employees in the UK, April-June, 2008-2012

	Self-employed (Thousands)	Employees (Thousands)	Self-employment rate (%)
2008	3,810	25,416	13.0
2009	3,790	24,817	13.2
2010	3,896	24,783	13.6
2011	3,957	25,011	13.7
2012	4,176	24,983	14.1

Source: Labour Force Survey

Table 5.2: Rates of workplace closure 2004-2011 by relative financial performance in 2004

Financial Performance relative to industry average in 2004:	**Raw:**		**Controls:**	
	Closure rate	**Marginal Effect**	**Closure rate**	**Marginal effect**
Below	.29	-	.25	-
Average	.17	-.12	.17	-.09
Better	.20	-.10	.21	-.04
A lot better	.08	-.21	.08	-.17

Notes: Managers are asked: "Compared with other workplaces in the same industry how would you assess your workplace's financial performance...a lot better than average, better than average, about average, below average, a lot below average". We combine the last two categories. Marginal effects are estimated relative to base case of "below average" performance. Underlined marginal effects are statistically significant at a 95% confidence level. Models based on 1,527 observations (1,525 with controls). Controls are: single digit industry; region; single-establishment firm; establishment size; workplace age; largest occupational group.

Source: Workplace Employment Relations Survey

Table 5.3: Employment Change as a Percentage of Base Year Employment Level, Private Sector Panel

	Shrunk by at least 20%	No Change	Grew by at least 20%
2004-11, at least 5 employees:	21	39	41
2004-11, at least 10 employees:	25	40	34
1998-2004, at least 10 employees:	24	42	34

Notes: (1) row percentages (2) Row 1 N=1,370; Row 2 N=1172; Row 3 N=591

Source: Workplace Employment Relations Survey

Table 5.4: Employment Change and Impact of Recession, 2004-2011

Row percentages

Recession Impact:	Shrunk by at least 20%	No Change	Grew by at least 20%
None	6.9	33.1	60.1
A little	10.3	38.5	51.2
Moderate	16.8	46.8	36.5
Quite a Lot	25.7	34.9	39.4
A great deal	29.7	37.7	32.6
All	20.4	39.0	40.7

Notes: (1) Row percentages (2) Private sector panel, all with 5+ employees (3) N=1,366 (4) Recession impact are responses to the question "Looking at this card, can you tell me to what extent your workplace has been adversely affected by the recent recession?"

Source: Workplace Employment Relations Survey

Table 5.5: Employment Change in 2004-2011 and Changing Demand for Goods and Services, Panel Workplaces in Private Trading Sector

Product/service demand:	Growing	Turbulent	Declining
Always	20.2	9.7	-25.6
Started	19.5	5.0	7.5
Stopped	4.6	19.4	31.5
Never	11.1	12.7	10.4

Notes: (1) Figures are mean employment change between 2004 and 2011 expressed as a percentage of the average employment level for the workplace in 2004 and 2011 (2) Demand for services/goods based on responses to the question: "Looking at this card, which of these statements best describes the current state of the market in which you operate [for your main product or service]...the market is growing, the market is mature, the market is declining, the market is turbulent". (3) N=1,257

Source: Workplace Employment Relations Survey

Table 5.6: Share of employment in private sector workplaces with specific HR practices, 1998-2011

	1998	2004	2011	2004 v 1998	2011 v 2004	2011 v 1998
	%	%	%	Signif.	Signif.	Signif.
Work organization:						
Semi-autonomous team-working[+]	44	35	48	***	***	
Functional flexibility[+]	79	78	82		**	
Training for 80%+ experienced employees[+]	21	41	49	***	***	***
Quality management:						
Problem-solving groups	49	34	30	***	*	***
Quality targets	55	58	63			
Appraisals for 80%+ non-managerial employees	53	69	78	***	***	***
Incentives:						
Profit-related pay	53	44	43	***		***
Share-ownership scheme	32	33	28		**	
Voice:						
Representative + Direct	26	31	33	**		***

Representative only	43	28	24	***	*	***
Direct only	11	21	23	***		***
Neither	20	20	19			

Base: employment in private sector workplaces with 10+ employees

Notes: + for the largest occupational group

Key: *** = sig. at 1 per cent; ** sig. at 5 per cent; * sig. at 10 per cent

Source: Workplace Employment Relations Survey

Table 5.7: Ordered probit regression of labour productivity on specific HR practices, private sector, 1998-2011

	1998	2004	2011	1998	2004	2011
Controls?	*No*	*No*	*No*	*Yes*	*Yes*	*Yes*
Semi-autonomous team-working^	0.162	0.045	0.048	0.097	-0.022	0.062
	[1.26]	[0.44]	[0.50]	[0.80]	[-0.21]	[0.63]
Functional flexibility^	0.303**	0.278**	0.010	0.393***	0.264**	0.055
	[2.16]	[2.51]	[0.10]	[2.94]	[2.46]	[0.53]
Training for 80%+ experienced employees^	-0.067	0.027	-0.059	-0.073	0.006	-0.112
	[-0.49]	[0.25]	[-0.63]	[-0.51]	[0.05]	[-1.15]
Problem-solving groups	0.071	0.129	-0.049	0.045	0.119	0.011
	[0.61]	[1.06]	[-0.39]	[0.41]	[0.96]	[0.08]
Quality targets	0.065	-0.072	0.196**	0.138	-0.052	0.157
	[0.58]	[-0.65]	[2.04]	[1.18]	[-0.46]	[1.65]
Appraisals for 80%+ non-managerial employees	0.096	0.218*	0.122	0.024	0.253**	0.157
	[0.76]	[1.93]	[1.17]	[0.19]	[2.04]	[1.40]
Profit-related pay	0.011	0.181*	0.098	0.184	0.216**	0.067
	[0.08]	[1.71]	[0.99]	[1.36]	[2.08]	[0.66]
Share-ownership scheme	0.163	-0.213*	0.050	0.213	-0.211	0.075
	[1.18]	[-1.73]	[0.41]	[1.59]	[-1.62]	[0.60]

Voice (ref = None):						
Representative + Direct	-0.111	0.062	0.191	-0.159	0.237	0.160
	[-0.67]	[0.39]	[1.39]	[-0.98]	[1.51]	[1.05]
Representative only	-					
	0.399***	-0.053	0.021	-0.436***	0.249	-0.001
	[-2.75]	[-0.34]	[0.13]	[-2.95]	[1.54]	[-0.01]
Direct only	0.084	0.194	0.153	0.050	0.081	0.133
	[0.43]	[1.43]	[1.27]	[0.26]	[0.59]	[1.08]
N	*1259*	*1210*	*1337*	*1258*	*1210*	*1337*

Base: private sector workplaces with 10+ employees

Control variables: workplace size; industry sector; region; largest occupational group; whether part of multi-site organisation; number of competitors in main market; degree of competition in that market; whether market local/regional/national/international; whether market growing/mature/ declining/ turbulent.

Key: ^ questions refer to the largest occupational group at the workplace

*** = sig. at 1 per cent; ** sig. at 5 per cent; * sig. at 10 per cent [t-statistics in parentheses]

Source: Workplace Employment Relations Survey

Table 5.8: Ordered probit regression of labour productivity on count of HR practices, private sector, 1998-2011

	1998	2004	2011	1998	2004	2011
Controls?	*No*	*No*	*No*	*Yes*	*Yes*	*Yes*
Count of HR practices	0.113***	0.103***	0.051	0.111***	0.091**	0.057
	[2.77]	[2.75]	[1.53]	[2.92]	[2.32]	[1.60]
N	*1259*	*1210*	*1337*	*1258*	*1210*	*1337*

Base: private sector workplaces with 10+ employees

HRM count is a count of the number of HR practices from (min=0; max=6).

Control variables: as listed under Table 5.7, plus whether any profit-related pay, any share ownership scheme, and type of voice arrangement.

Key: *** = sig. at 1 per cent; ** sig. at 5 per cent; * sig. at 10 per cent [t-statistics in parentheses]

Source: Workplace Employment Relations Survey

Table 5.9: Influences on the Most Recent Pay Settlement for the Largest Non-Managerial Occupation

	2004			2011		
	All	**Freeze/cut**	**Increase**	**All**	**Freeze/cut**	**Increase**
Financial Performance	30	36	29	36	44	34
Productivity levels	21	23	21	19	18	19
Changes in Cost of Living	24	11	26	21	17	22
Recruitment and Retention	21	16	21	13	11	14
Industrial Action	<1	<1	<1	<1	<1	<1
None of these	4	14	3	12	11	12
N workplaces	*1750*	*182*	*1587*	*1756*	*379*	*1346*

Notes: (1) Responses to question: "Looking at this card, which of the factors listed influenced the size of the pay settlement or review for [largest occupational group]?" (2) Figures are column percentages based on N responses, so adding to 100.

Source: Workplace Employment Relations Survey