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# Growth Sectors: Data Analysis on Employment Change, Wages and Poverty

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# Growth Sectors: Data Analysis on Employment Change, Wages and Poverty

Professor Anne Green, Dr Neil Lee and Dr Paul Sissons

Institute for Employment Research, University of Warwick;  
Geography and Environment, London School of Economics and  
Political Science

Centre for Business in Society, Coventry University;

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For further information please contact:

Emyr Williams

Public Policy Institute for Wales

Tel: 029 2087 5345

Email: [Emyr.Williams@ppiw.org.uk](mailto:Emyr.Williams@ppiw.org.uk)

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## Summary

This paper is concerned with setting the context for a focus on growth sectors in the light of two key policy issues. The first is an ongoing concern with in-work poverty which the analyses presented here show is more apparent in some sectors than in others. The second is renewed policy interest in a place-sensitive industrial strategy, with elements of sectoral focus as well as concerns with cross-sectoral issues. It explores the extent to which there is, or could be, overlap between these key policy issues.

It outlines different interpretations of ‘growth sectors’ and sets out key features of projected employment change. It then presents the results of quantitative analysis of sectoral patterns of pay and poverty using the Labour Force Survey, the Family Resources Survey and Understanding Society. The paper finds that:

- ‘Growth sectors’ may be defined as sectors where Gross Value Added (GVA) and/or employment are projected to increase over the medium-term and/or where there is a policy intent to increase them. Given the current concern with ‘harnessing growth sectors for poverty reduction’ the particular concern here is on employment growth.
- Medium-term employment projections indicate that there are important sectoral and occupational differences in likely future employment openings – with some of the greatest projected employment growth being in low-paid occupations in sectors such as accommodation and food services and in care.
- While the incidence of in-work poverty is not confined to a small number of sectors but rather is relatively diffuse over the whole economy, the relative risk of poverty is much higher in some sectors than in others.
- A range of individual characteristics – such as gender, age and qualifications – are associated with low pay, with low pay being more likely for women than for men, for the younger rather than older age groups and for those with no/low qualifications than for those with high-level qualifications.
- However, the analyses also isolate a ‘sector effect’ of being in low pay, in poverty and escaping low pay (over the short-term) independent of the individual characteristics of workers in different sectors.
- Controlling for individual characteristics the highest probabilities of low pay are in accommodation and food services, residential care, wholesale and retail, and agriculture, forestry and fishing – so suggesting that a focus on these sectors might be a useful way for targeting policies tackling low pay.

- Family characteristics – notably the number of workers in a family – play an important role in mediating the relationship between low pay and poverty outcomes at household level. However, poverty persists in some sectors despite families having dual earners.
- Analyses at the household level show the composite effect of combinations of individuals' labour market experiences and family characteristics in generating poverty outcomes, including the association between employment in some low paid sectors and an increased risk of poverty.
- Aggregate employment growth at local level is more important than employment growth in specific sectors in influencing individuals' wage growth. This underlines the importance of the level of the overall demand for labour locally for poverty reduction.
- Wage increases at individual level are positively associated with mobility between sectors and between local areas.
- Analyses indicate that individuals in the public sector are more likely than average to escape low pay. This suggests that the public sector is important in enabling wage progression.
- The fact that the data analyses point to some marked sectoral variations in low pay and the existence of specific 'sectoral effects' in determining patterns of low pay/in-work poverty once other individual and household factors have been taken into account, suggests that a sectoral approach may be a useful way to target low pay and reduce in-work poverty. Such a focus resonates with how the economy operates in practice and with current policy focus at national and local level on 'growth' / 'key' / 'priority' sectors.
- Yet the fact that it is the aggregate level of local labour demand change, rather than sector-specific employment change, which is the key determining factor in wage increase, indicates that a sector policy needs to be considered in a broader local ecosystem perspective and needs to be sensitive to place-specific factors.

# Introduction

This section introduces and sets the context for the report and other elements of the broader research project on ‘Harnessing Growth Sectors for Poverty Reduction’. It begins by providing an overview of labour market change and the increasing policy concern with in-work poverty in the United Kingdom (UK). It then sets out the rationale for a focus on ‘growth sectors’ in the context of concerns with poverty reduction. While the analyses in subsequent data analysis sections focus of sectoral variations across the whole economy, the rationale is presented for a focus on a subset on six sectors - Financial and professional services, Manufacturing, Energy and environment, Construction, Social care and Hospitality (including tourism) - in other parts of the research.

## Labour market change and in-work poverty

Recent decades have seen considerable change in the UK labour market, as in other advanced economies. Key features of labour market change include:

- A continuing decline in the number and share of jobs in manufacturing and growth in many service sectors (as outlined in Section 2);
- An increase in higher-skilled occupations along with (albeit to a lesser extent) growth in some low-skilled occupations, and a hollowing out in the middle-skilled occupations as the occupational structure has polarised (Autor et al., 2006; Goos and Manning, 2009; Holmes and Mayhew, 2010; Sissons, 2011; Wilson et al., 2014); and
- An increase in women in employment – reflected in a rise in numbers of both full-time and part-time employees, while amongst men there has been a decline in full-time employment, especially in periods of recession, but a growth in part-time employment from a relatively low base.

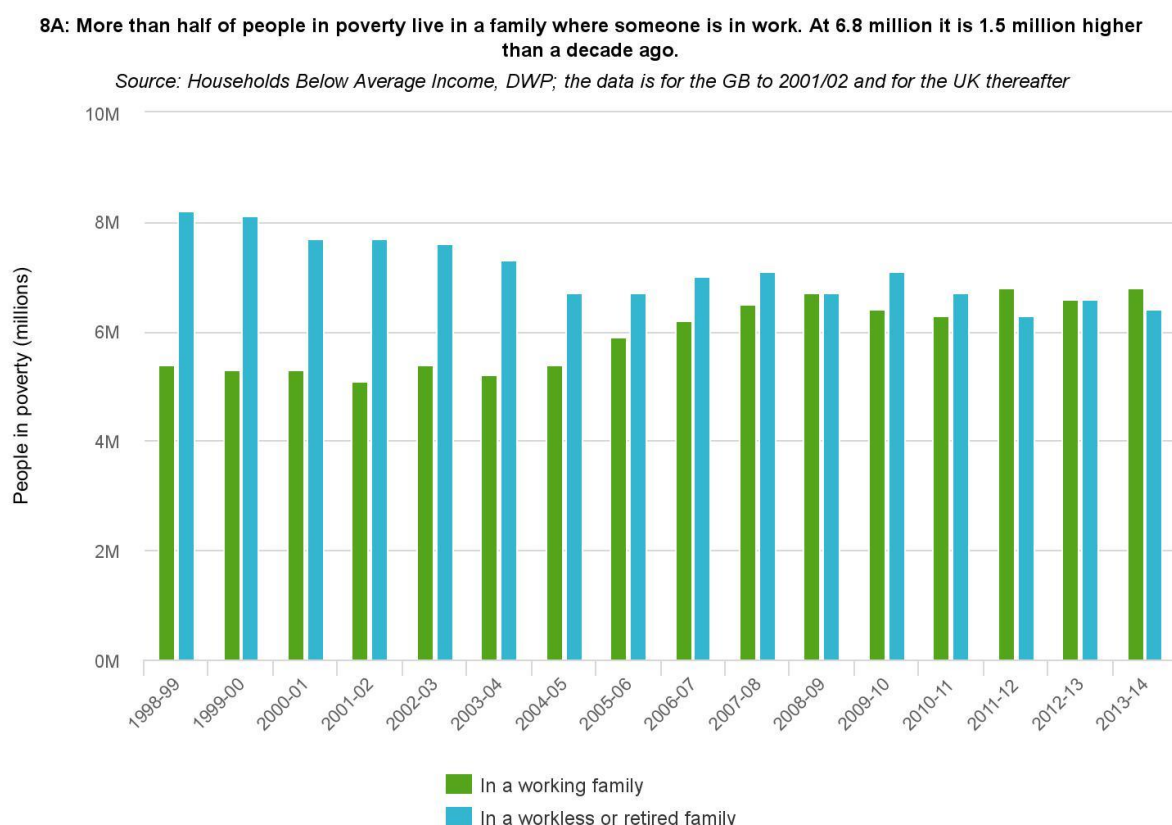
Alongside the changes in the broad profile of employment, wider changes in labour market institutions and employment relations, aimed at reducing regulation and increasing labour market ‘flexibility’, have had implications for conditions of employment (Greer, 2016). There has been a particular focus on increased precarity for workers employed in insecure and low quality jobs (Lindsay and McQuaid, 2004; Standing, 2011; Rubery et al., 2016). Quantifying the number of workers facing precarious employment is not a straightforward exercise. Gregg and Gardiner (2015) estimate that in aggregate the proportion of workers in insecure employment has not increased significantly in the last couple of decades (32 per cent of the working age population [excluding full-time students] were classified as being insecure in 2014, compared with 30 per cent in 1994), although they suggest that that specific forms of low-quality employment – including involuntary part-time and temporary working, less secure self-employment and zero

hours contract working – have grown in prevalence. Green and Livanos (2015) highlight that involuntary ‘non-standard’ employment is most apparent in weaker regional economies.

The changing sectoral and occupational profile of employment combined with institutional and regulatory changes in the labour market have led to a range of concerns about low-pay, poor job quality, limited social mobility and poverty. These concerns are evident in several countries, but are particularly apparent in the UK where the incidence of low-paid employment is relatively high in the UK by international standards (Mason et al., 2008).

The increasing prevalence of in-work poverty is of growing concern in the UK. At the start of the 2000s 7.7 million people in poverty were in non-working families and 5.3 million were in working families – the split was 60:40. By 2008/09 the split was 50:50. Since then the number of people in poverty in working and non-working families has fluctuated as unemployment overall increased and then fell (see Figure 1). In 2013/14 6.8 million people in poverty were in families where someone was in work: 400,000 more than the number in poverty in families where no one was in work, including pensioner families at 6.4 million (MacInnes et al., 2015).

**Figure 1: Trends in In-work poverty in Great Britain, 1998-99 to 2013-14**



Source: MacInnes et al. (2015)

This growth in in-work poverty challenges policymakers’ traditional approach of lauding of employment as a crucial route out of poverty (Kemp et al., 2004; Scott, 2006; Lewis, 2011;

Shildrick and Rucell, 2015) and their focus on labour market activation to increase employment rates as a means of addressing poverty and disadvantage (Mason et al., 2006; Lindsay and Dutton, 2013). Yet, as the data shows, the nature and extent of low pay means that, while employment can be an important route out of poverty, concerns about poverty remain (Smith and Middleton, 2007; Browne and Paull, 2010; Jenkins, 2011). There is a growing realisation that entry into employment is, while necessary in most cases, not a sufficient condition to leaving poverty (Lewis, 2011). This raises the issue of whether there is an appropriate balance between 'work first' and 'career first' policies in the broader context of longer-term concerns about the 'long-tail' of low-paid/low-skilled work in the UK (Finegold and Soskice, 1988; Wilson, Hogarth et al., 2003; Wright and Sissons, 2012; Williams and Green, 2016).

For some individuals, low-paid work and in-work poverty is associated with the low-wage/no-wage cycle – as individuals find it difficult to sustain (let alone progress) in work (Shildrick et al., 2010; Luchinskaya and Green, 2016). There is also evidence that a sizeable group of workers remain in low-paid work for extended periods of time, experiencing little wage progression (D'Arcy and Hurrell, 2014). At an individual level this may reflect limited interest in progression (Hay, 2015), concern that progression will jeopardise the ability to work reduced hours or that it will result in additional responsibilities for limited increases in pay (Devins et al, 2014; Kumar et al., 2014). From a structural perspective it may reflect that because internal progression pathways are weak and organisational hierarchies are relatively flat there are limited opportunities for workers to grow their earnings (Lloyd and Payne, 2012), and/or that opportunities for progression through external labour markets are limited. From a policy perspective it should be noted that an individual's appetite for progression is partly shaped by their workplace context and the opportunities perceived to be available, and so can alter should opportunities become more accessible (Ray et al., 2010).

In-work progression as a means of addressing in-work poverty is an area of growing policy interest in the UK (see Sissons et al., 2016, for a review of the evidence on initiatives to foster in-work progression). Universal Credit - a single working-age benefit payable to both those out of work, and those in work and on low-pay<sup>1</sup> – is being rolled out. It includes in-work conditionality, with an expectation that very low earners will seek to increase their wages and/or hours worked. Simultaneously fiscal austerity has meant reductions in public spending on welfare, including on in-work benefits. Most recently a National Living Wage<sup>2</sup> was introduced in April 2016 at £7.20 in April 2016 (and with the intention of this rising to £9 by 2020); (a lower National Minimum Wage remains in place for young workers). Together the changes in policy outlined above are projected to culminate in income reductions for some low-income households (due to changes

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<sup>1</sup> See <https://www.gov.uk/universal-credit/overview> (accessed 7 January 2017).



in benefits) with only limited compensation from wage and tax changes, with a slight overall increase in poverty expected (Finch, 2015).

In 2015 the then Chancellor for the Exchequer, George Osborne, described the direction of policy change indicated above as reflecting a desire to move: *“from a low-wage, high-tax, high-welfare economy to the higher wage, lower tax, lower welfare country”*. This foregrounds first, a policy emphasis on employment – encompassing individual workers and (increasingly) employers and suggests that progress on poverty is becoming more dependent on employment trends. Moreover, in the context of selected devolution to cities, including some powers in relation to skills, there is greater responsibility at a local level for delivering improved labour market outcomes. Hence there is a concern locally as well as nationally with employment.

## Linking growth sectors and poverty reduction

This paper and the research project of which it is part adopts a sectoral perspective. This subsection sets the context for a focus on growth sectors in the light of concerns about in-work poverty.

It makes sense to adopt a sectoral perspective from academic, practical and policy perspectives because:

- Data are routinely recorded and projections of medium-term growth and decline are made by sector.
- Sectors capture the way work is structured and a sectoral basis is “how the world thinks and acts”.<sup>2</sup>
- Sectors are characterised by very different employment conditions, job quality, average skill levels and poverty rates (Cribb et al., 2013).
- Sectors and sectoral bodies are the focus for some forms of policy interventions and approaches which are either sector-specific or have a strong sectoral dimension (Leitch, 2006; Payne, 2007; Ward et al., 2016).

From a policy perspective a case can be made for targeting sectors for growth from:

- An economic competitiveness perspective – with output (Gross Value Added [GVA]) as a key indicator; and/or from
- A social inclusion perspective – with employment as a key indicator.

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<sup>2</sup> CBI, *Government and business must work together to revitalise modern industrial strategy*, Speech by Carolyn Fairbairn, CBI Director-General, 5 May 2016, <http://www.cbi.org.uk/news/government-and-business-must-work-together-to-revitalise-a-modern-industrial-strategy/> (accessed 6 January 2017)

To illustrate how these two perspectives might result in different sectoral foci Table 1 shows GVA and employment by sector in the UK in 2011, with values and percentage share of the UK total recorded for each indicator.

**Table 1: UK GVA and employment by sector, 2011**

Category	Sector	Output (GVA)		Employment	
		£m	% Share	Thou.	% Share
Low-Med Tech Manuf.	Food, Beverages & Tobacco	27,771	2.0%	399	1.3%
	Metal, plastic and non-metal mineral products	28,005	2.0%	584	1.9%
	Other Manufacturing	21,046	1.5%	566	1.8%
	Shipbuilding	1,246	0.1%	32	0.1%
Med-High Tech Manuf.	Chemicals	16,926	1.2%	119	0.4%
	ICT & Precision Instruments	8,393	0.6%	138	0.4%
	Automotive	6,955	0.5%	133	0.4%
	Aerospace	5,610	0.4%	112	0.4%
	Machinery, Electrical & Transport Equipment	22,748	1.7%	412	1.3%
	Pharmaceuticals	10,023	0.7%	38	0.1%
Other Production	Agriculture, Forestry & Fishing	9,122	0.7%	409	1.3%
	Mining & Quarrying	39,646	2.9%	61	0.2%
	Utilities	37,762	2.7%	327	1.0%
	Construction	91,681	6.7%	2,036	6.5%

Knowledge Services	Communications	23,028	1.7%	227	0.7%
	Digital, Creative & Information Services	61,821	4.5%	1,174	3.7%
	Financial Services	128,830	9.4%	1,116	3.6%
	Business Services	97,528	7.1%	2,235	7.1%
	Research & Development	4,290	0.3%	125	0.4%
	Education	89,676	6.5%	2,722	8.7%
Other Services	Hotels & Restaurants	39,601	2.9%	1,990	6.3%
	Retail	71,016	5.2%	3,070	9.8%
	Transport, Storage & Distribution	149,580	10.9%	3,183	10.1%
	Real Estate	98,091	7.1%	417	1.3%
	Administrative & Support Services	65,509	4.8%	2,432	7.8%
	Public Admin & Defence	67,915	4.9%	1,654	5.3%
	Health & Social Care	106,766	7.8%	4,079	13.0%
	Community, Social and Personal services	42,814	3.1%	1,591	5.1%
	Whole Economy	1,373,399		31,378	

Source: BIS analysis of ONS data, Table 2.1, BIS (2012).

Note: shading indicates that a sector accounts for a greater share of employment than of GVA.

It is apparent that the other services broad category (notably hotels & restaurants, retail, administrative & support services, health & social care and community, social and personal service sectors) accounts for a considerably larger share of employment than of GVA, while in medium-high technology manufacturing the position is reversed. In knowledge services the picture is more mixed, with education accounting for a greater share of employment than of GVA and vice versa for financial services. In simple terms adopting a 'growth sector for competitiveness' perspective would mean a focus on sectors with relatively high GVA while a 'growth sector for inclusion' perspective would place greater emphasis on employment.

The central concern here is on 'growth sectors': in simple terms, sectors where GVA and/or employment is projected to increase over the medium-term. The focus of this research is on 'harnessing sectors for poverty reduction' implies a particular focus on employment growth,

given evidence showing that growth in employment rather than growth in GVA has a greater impact on poverty (at least in the short-term) (Lee et al., 2014).

## **Scope and structure of data analyses**

The remainder of the paper is structured as follows. Section 2 focuses on defining growth sectors. Given the importance of growth in employment for poverty reduction, the section begins by outlining key features of medium-term employment projections by sector, drawing on *Working Futures*. A distinction is made between ‘expansion demand’ (i.e. net change in employment over a defined projection period) and ‘replacement demand’ (i.e. employment openings arising because of the need to ‘replace’ workers due to labour turnover [notably retirements]). While the particular focus is on sectoral variations in projected employment change, some information is also presented on projected occupational change by sector. The section then moves on to consider the role of policy in defining growth sectors, with particular reference to a discussion of Industry Strategy. Finally the sectors selected for particular attention in accompanying project papers on employment entry, progression and job quality are highlighted.

Section 3 provides a broad labour market overview of low pay, drawing on data from the Labour Force Survey (LFS). It details sectoral variations in the percentage of individuals in low pay and in short-term earnings mobility (i.e. the probability of moving out of low pay). Importantly the analyses isolate a ‘sector effect’ of being in low pay independent of the individual characteristics of workers in different sectors.

Section 4 shifts attention to the household scale in addition to the individual level and examines the role of sector of employment in influencing poverty outcomes, using data from the Family Resources Survey (FRS). The analyses demonstrate the important role which household characteristics (including the number of earners in a household) play in determining poverty outcomes. However it also demonstrates a relationship between sector of employment and household poverty: although a second earner in a household decreases poverty risk significantly, household poverty persists in some sectors characterised by low pay despite having dual earners.

Section 5 introduces a local dimension into the analyses, using data on changes in individual wages by sector and local area from Understanding Society (US) - a nationally representative long-term longitudinal study in the UK, alongside employment data from the Business Register and Employment Survey (BRES). Analyses highlight the importance of aggregate employment growth at local level as opposed to employment growth in specific sectors in influencing individuals’ wage growth.

Section 6 draws conclusions and policy implications from the quantitative evidence presented. It raises and discusses issues such as the appropriate balance between supply- and demand-oriented policies; 'job first' and 'career first' policies; and sector-focused and non-sector focused policies.

# Defining Growth Sectors

This section first provides an overview of projected sectoral variations in medium-term employment change. It then considers the occupational profile of employment change in selected sectors, given that the extent to which sectoral employment growth is likely to offer opportunities for moving out of poverty is determined, at least in part, by the nature of the occupational profile of employment change and associated earnings; (analyses of earnings by sector are presented in subsequent sections). The discussion then moves on to consider how growth sectors are defined for policy purposes, with particular reference to the evolving nature of Industrial Strategy. Finally, the selection of sectors for focus in further elements of the project is considered.

## Defining growth sectors on the basis of employment trends

### *Medium-term projected employment change by sector*

There are relatively few sources that routinely provide information on projected future employment trends by sector and occupation. *Working Futures 2012-22* (Wilson et al., 2014) is the fifth in the set of medium-term projections (looking over a period of ten years) of the UK labour market. It draws on a macroeconomic model<sup>3</sup> to provide projections of employment.

*Working Futures* makes a distinction between:

- Expansion demand - projected net change in employment over the projection period;<sup>4</sup> and
- Replacement demand - employment openings arising because of the need to 'replace' workers due to labour turnover (notably retirements, but also occupational and geographical mobility).<sup>5</sup>

Even in a sector where employment levels are projected to remain constant (i.e. where expansion demand is zero) or where employment levels are projected to decrease (i.e. where expansion demand is negative) exits from that sector can result in a relatively large replacement demand. Hence, in any particular sector the overall 'net requirement' is the sum of expansion demand and replacement demand.

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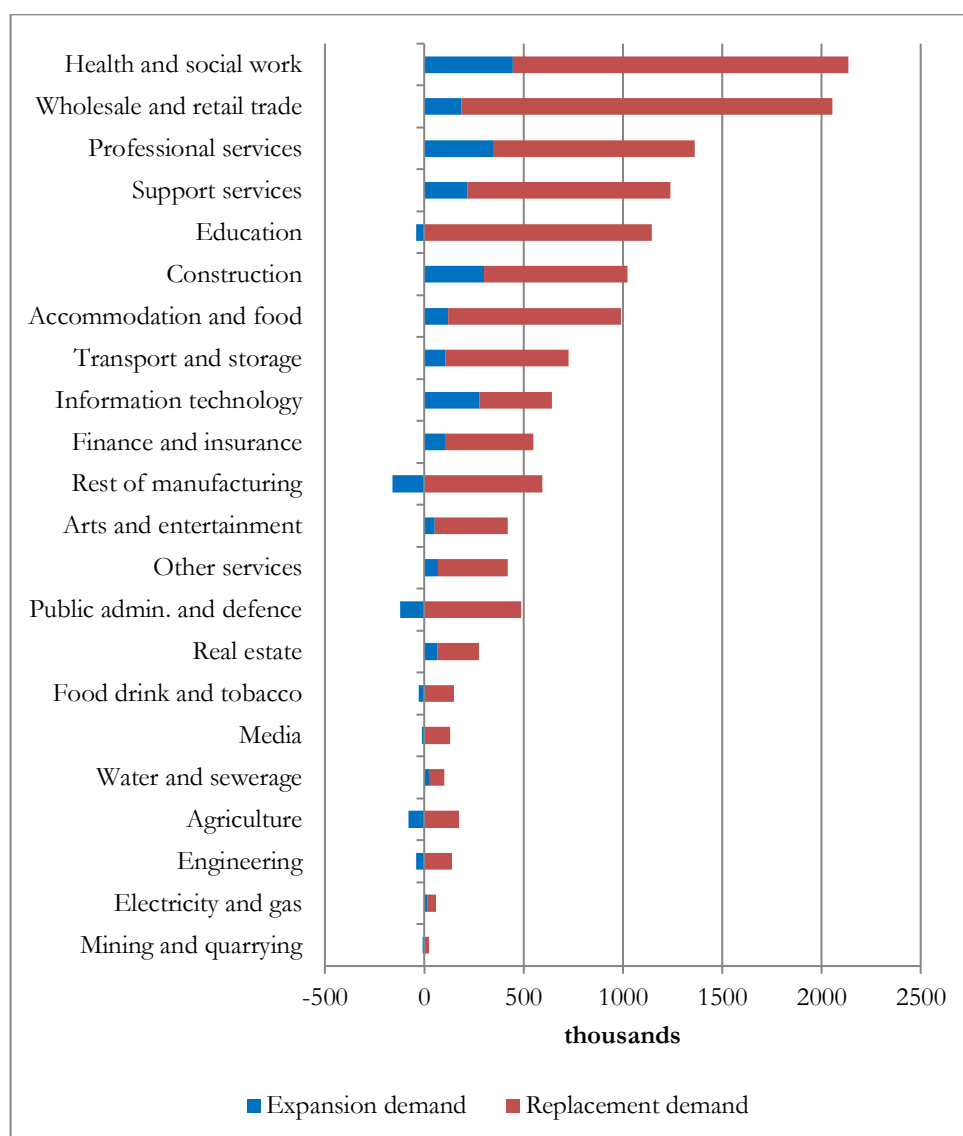
<sup>3</sup> The Cambridge Econometrics' MDM-E3 model, which has a Keynesian structure incorporating an input-output system by sector and region/nation of the UK.

<sup>4</sup> In this case 2012 to 2022.

<sup>5</sup> In *Working Futures* projections the main source of information that has been used to generate replacement demand estimates is the LFS. This includes estimates of the various flows in and out of the labour market, as well as information on age structure. Benchmark projections of replacement demand in *Working Futures* take into account retirements only. Occupational mobility is an important source of loss for some occupations although not for all. Analyses of inter-occupational flows at UK level show that some occupations (including corporate managers and administrators) tend to gain employment as people are promoted from other occupations; hence many of the losses due to retirement are 'automatically' dealt with by the normal process of promotion and upward occupational mobility. However, for those occupational categories (at lower- and intermediate-skill levels) which provide the people who are promoted this means that losses due to retirement will understate the overall replacement demands.

Figure 2 shows the projected net requirement from 2012 to 2022 (based on the *Working Futures 5* projections) (Wilson et al., 2014). In all sectors the net requirement over the projection period is positive and in all instances replacement demand exceeds expansion demand in absolute terms. Net requirements are largest in absolute terms in the health and social work and wholesale and retail trade sectors, followed by professional services. Accommodation and food services and construction are also characterised by positive expansion and replacement demand. By contrast in engineering (which overlaps to some degree with the medium/high tech category in Table 1) the net requirement is relatively modest in absolute terms, by comparison with many of the services sectors.

**Figure 2: Expansion and replacement demand by 22 sectors, 2012-2022, ranked by absolute net requirement, UK**



Source: Working Futures 5

### ***Occupational profiles of projected net requirements in selected sectors***

The extent to which sectors for which employment growth is projected are likely to provide opportunities for moving out of poverty (either through employment entry or in-work progression) depends, at least in part, on the occupational profile of employment change and associated earnings. Figures 3-6 provide examples of projected occupational change by sector (with Standard Occupational Classification Major Groups classified into 'high pay' [SOC Major Groups 1-3<sup>6</sup>], 'intermediate' [SOC Major Groups 4, 5 and 8<sup>7</sup>] and 'low pay' [SOC Major Groups 6, 7 and 9<sup>8</sup>] categories [following Clayton et al., 2014]). Four sectors are selected for illustrative purposes: accommodation and food services and residential care (part of the health and social care sector characterised by relatively low pay) – each of which is characterised by higher than average employment growth and a larger than average share of employment in 'low pay' occupations, and professional services (a high employment growth sector) and engineering (a low employment growth) – each of which were highlighted in the previous section of this paper as key sectors from a competitiveness perspective.

In accommodation and food services (Figure 3) the largest net requirement is in low pay occupations. The dominant category here is elementary occupations, which has positive expansion demand, albeit this is easily outweighed by positive replacement demand. The next largest projected absolute net requirement is for high pay occupations, notably managerial staff. The projected net requirement for intermediate occupations is limited – highlighting a 'missing middle' in employment growth opportunities which may signal difficulties for in-work progression. The residential care (Figure 4) sector is also characterised by a bi-polar pattern of projected occupational change, with greatest net requirements in high pay occupations (notably professional occupations, but also associate professional & technical occupations) and low pay occupations – where caring, leisure & other service occupations are easily dominant. In intermediate pay occupations employment is projected to remain fairly stable.

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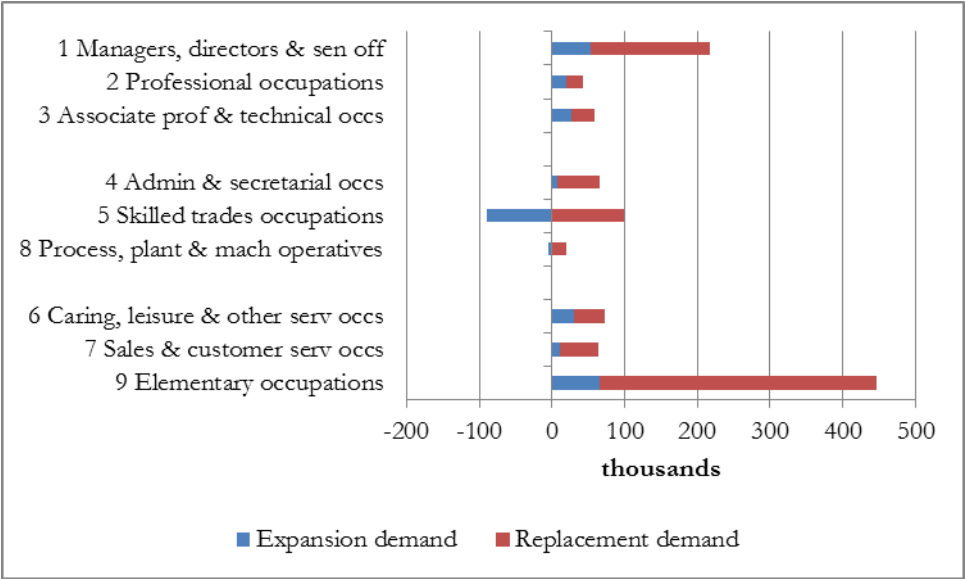
<sup>6</sup> SOC Major Group 1: Managers, directors & senior officials; SOC Major Group 2: Professional occupations; SOC Major Group 3: Associate professional & technical occupations. It should be noted that SOC Major Group 1 encompasses a broad range of managers and of pay amounts. This should be borne in mind when interpreting results for particular sectors.

<sup>7</sup> SOC Major Group 4: Administrative & secretarial occupations; SOC Major Group 5: Skilled trades occupations; SOC Major Group 8: Process, plant and machine operatives.

<sup>8</sup> SOC Major Group 6: Caring, leisure & other service occupations; SOC Major Group 7: Sales & customer service occupations; SOC Major Group 9: Elementary occupations.

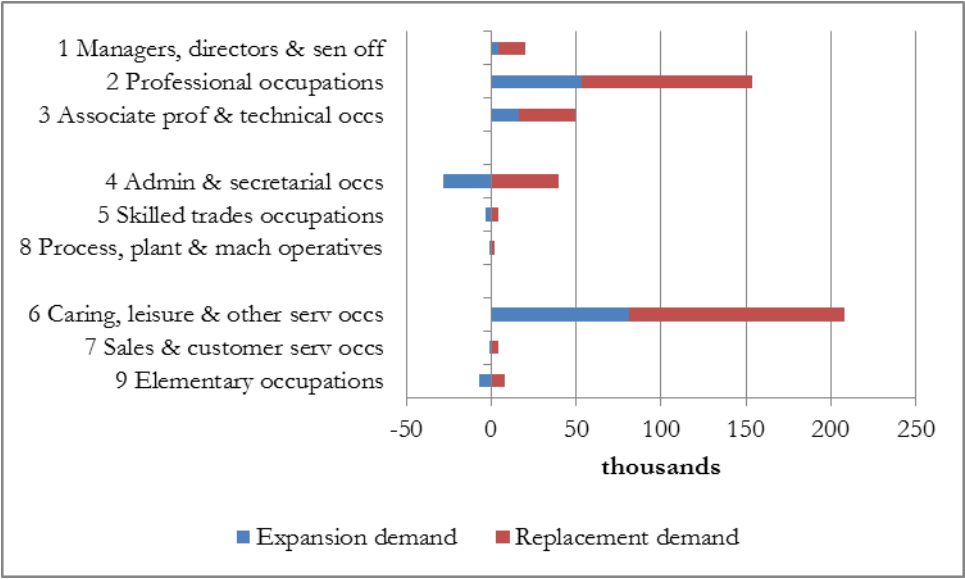


**Figure 3: Expansion and replacement demand in accommodation and food services, 2012-2022, UK**



Source: Working Futures 5

**Figure 4: Expansion and replacement demand in residential Care, 2012-2022, UK**

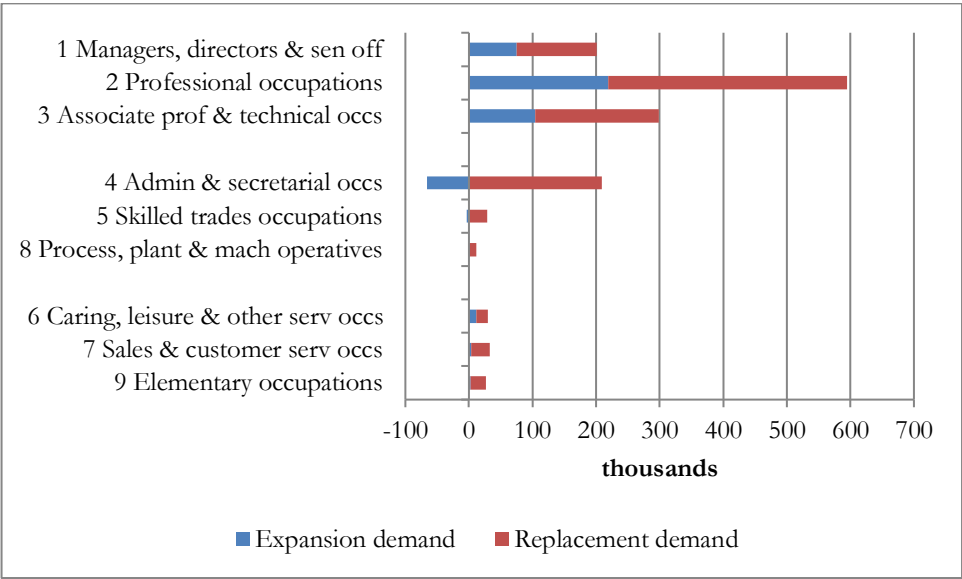


Source: Working Futures 5

By contrast in professional services (Figure 5) high pay high skilled occupations dominate projected net requirements over the medium-term. Expansion demand is positive for professional, associate professional & technical and managerial occupations. Outside these three occupational categories, the next largest is administrative & secretarial occupations, where replacement demand is larger than the net contraction in employment. Likewise in engineering (Figure 6) high pay high skilled occupations dominate projected net requirements

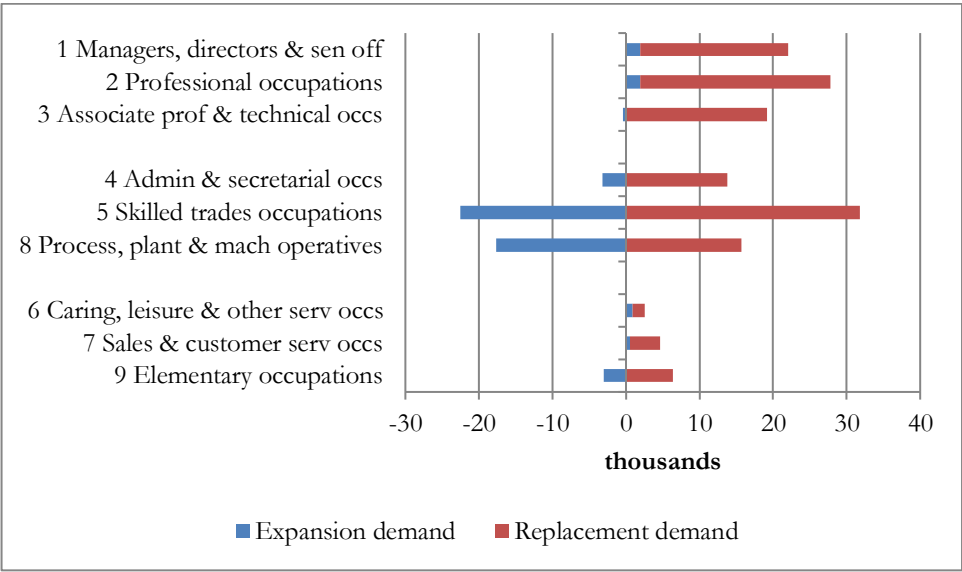
over the medium-term, albeit there are projected employment opportunities in intermediate pay occupations (notably skilled trades) resulting from positive replacement demand.

**Figure 5: Expansion and replacement demand in professional services, 2012-2022, UK**



Source: Working Futures 5

**Figure 6: Expansion and replacement demand in engineering, 2012-2022, UK**



Source: Working Futures 5

**Overview**

The data on medium-term employment projections indicate that there are important sectoral differences in likely future employment openings. Moreover, within sectors there are marked projected differences in net requirements by occupation. The projections point to substantial growth in occupations characterised by low pay in sectors such as accommodation and food

services and residential care, but in the context of a polarising labour market relatively fewer opportunities intermediate pay occupations to progress into. By contrast, in professional services projected employment growth is concentrated in occupations associated with high pay, whereas in engineering, despite limited aggregate employment growth projected there replacement demand points to opportunities in intermediate occupations.

## **Defining growth sectors for policy purposes**

### ***Industrial strategy and selection of growth sectors for policy purposes***

A policy with a key emphasis on sectors is Industrial Strategy. There is no single definition of ‘industrial strategy’ – rather it means different things in different contexts (Colebrook, 2016). Rhodes (2016) uses a relatively straightforward definition of ‘industrial strategy’ as referring to government intervention which seeks to support or develop some industries to enhance economic growth.

In simple terms, the types of interventions taken to support or develop industries comprise:

- Horizontal policies – which address market-wide issues and provide the resources and environment (e.g. adjustments to regulatory frameworks, policies fostering innovation and skill development, etc.) to make it easier for businesses and individuals to be productive.
- Sectoral policies – focusing on specific sectors of the economy (e.g. support for research and development in particular industries).

Colebrook (2016) has formulated a four-fold industrial strategy typology which highlights the different general forms that industrial strategy might take; (albeit at any one time actual policy might be somewhat hybrid in nature and there may be some differences in detail by sector):

- Command and control – characterised by interventions to support incumbent industries, including through public ownership of firms, planning agreements with individual firms to secure commitments on future investment and job creation, and state rescue of struggling firms.
- Co-ordinated capitalism – which nurtures and builds on existing supply-side strengths, including public investment banks providing finance to small and medium-sized businesses, a strong regional dimension to public investment decisions, and stage ownership of companies.
- Liberal capitalism plus – featuring state-run research programmes, public research and innovation institutions, public investment in early-stage research identified as promising/essential, and state rescue of firms in extreme circumstances.
- Liberal capitalism – where government stands aside to foster growth, but has horizontal policies such as providing stable and low business taxation, tax reliefs on investment and

research, deregulation, and skills and infrastructure policies aimed at securing a favourable business environment.

In the last decade there has been a revival of policy interest in industrial policy and industrial strategy at national and local levels in the UK, in part spurred by a need to stimulate economic growth in the wake of the financial crisis and also in an attempt to rebalance the economy sectorally and spatially (Mayhew and Keep, 2014; Sissons and Jones, 2016). In 2008 the then Business Secretary called for “market-driven industrial activism”, characterised by “closer integration and partnership between Government and business and between public and private sectors”.<sup>9</sup> Previously a non-interventionist philosophy – i.e. Liberal capitalism - prevailed. That said, while Governments have generally not taken ownership of key firms within sectors they view as important, neither have they left the market unfettered to dictate the industrial structure of the economy.

The subsequent Coalition Government continued to pursue such an approach, which included sector partnerships. National-level UK Industrial Strategy (BIS, 2012; HM Government, 2014) focused on 11 sectors and support for eight key technologies (see Table 2). In summary these sectors encompass three broad categories:

- advanced manufacturing – characterised by technological strength and innovation, and supply of ‘high value’ products;
- knowledge intensive traded services – where the UK has a comparative advantage, with expanding use and development of technology and important links to other parts of the economy; and
- ‘enabling industries’ - which are sectors that have a significant impact on enabling or constraining growth in other parts of the economy.

This list of sectors suggests that at national level industrial strategy has targeted some tailored support to sectors from a global and national ‘competitiveness’ perspective, focusing on those with particular potential for creating future GVA and of long-term strategic importance to the UK economy where there were barriers to growth that government could help to remove. From the perspective of the concern of this research with harnessing growth sectors for poverty reduction, this points to a disconnect between policy which is focused on economic growth and policy focused on poverty which would target high employment sectors.

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<sup>9</sup> Mandelson P. in *Oral Evidence: Industrial Strategy, HC 616*, House of Commons Business, Energy and Industrial Strategy Committee, 15 December 2016, <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/business-energy-and-industrial-strategy-committee/industrial-strategy/oral/44726.html> (accessed 6 January 2017).

**Table 2: UK Coalition Government, 2010-15: sectors and key technologies**

Sectors	Key technologies
Aerospace	Big data
Agricultural technology	Space
automotive	Robotics and autonomous systems
Construction	Synthetic biology
Information economy	Regenerative medicine
International education	Agri-science
Life sciences	Advanced materials
Nuclear	Energy
Offshore wind	
Oil and gas	
Professional and business services	

Taking up office as UK Prime Minister in July 2016, Theresa May emphasised the aim of making “the economy work for everyone”, so suggesting a more inclusive approach. She indicated that she wanted a “proper industrial strategy to get the whole economy firing” and highlighted that accompanying regional policy would “help not one or even two of our great regional cities but every single one of them”:<sup>10</sup> a recognition of the spatially uneven nature of growth across the UK. Subsequently, in August 2016 the House of Commons Business, Innovation and Skills Committee launched an inquiry into the Government’s industrial strategy with a remit including an exploration of the pros and cons of a sectoral approach and possible geographical emphasis.<sup>11</sup>

At the time of writing, under the May Government horizontal policies to support competitiveness and invest in science and innovation remain important; indeed Greg Clark, Secretary of State for Business Energy and Industrial Strategy,<sup>12</sup> noted in September 2016 that many of the policies forming the industrial strategy would not be about sectors, but rather would be cross-cutting. He also went on to note that for too long government policy had treated all places as if

<sup>10</sup> Conservative Party, *We can make Britain a country that works for everyone*, Speech by Theresa May, 11 July 2016, <http://press.conservatives.com/post/147947450370/we-can-make-britain-a-country-that-works-for> (accessed 5 January 2017)

<sup>11</sup> <https://www.parliament.uk/business/committees/committees-a-z/commons-select/business-innovation-and-skills/news-parliament-2015/industrial-strategy-launch-16-17/> (accessed 6 January 2017)

<sup>12</sup> A new Department – with ‘Industrial Strategy’ in its name.

they were identical, when in reality each place is different – and strategy needs to reflect that.<sup>13</sup> This accords with McCann’s (2016) diagnosis of the UK regional-national economic problem that top-down economic governance (i.e. a spatially-blind) approach, only works well in a context of spatial homogeneity (see also Martin et al., 2015). Similarly, Colebrook (2016) argues for a spatial dimension to industrial strategy, suggesting that ‘levelling up’ growth and productivity in the regions and nations of the UK should be a core aim of a UK industrial strategy, alongside other elements such as spurring innovation to boost productivity, pay and the quality of work.

In January 2017, the UK government released its *Building our Industrial Strategy* Green Paper which set out proposals on what the post-Brexit Industrial Strategy might look like. This had a strong focus on sectors, with the aim of: “cultivating world-leading sectors” building on competitive advantage, while at the same time targeting areas of low productivity (HM Government, 2017: 11). Sectors are being encouraged to organise and develop ‘Sector Deals’ through which they can negotiate with central government in areas such as exporting, research commercialisation and regulatory barriers. Low wages were seen in productivity terms: “If we want to see faster growth in wages, sustained over the long term and experienced across the country, the UK needs to address the productivity gap with other leading countries.” (HM Government, 2017: 12). Hence, the sectoral approach is seen as important in addressing the productivity challenge which is partly behind low pay. With regard to place the ambition is to drive growth across the whole of the country, creating “a framework to build on the particular strengths of different places” (HM Government, 2017: 11) and addressing factors which hold particular places back.

### ***Selection of Growth Sectors for this Research***

The data analysis presented in subsequent sections of this paper focuses on all sectors, predominantly with a geographical focus at UK level, although there is a local labour market focus in the analysis of Understanding Society data. However, for some qualitative elements of this research on harnessing growth sectors for poverty reduction (covered in accompanying research papers), the decision was taken to include a subset of sectors based on a mixture of:

- 1) sectors characterised by high GVA (see Table 1);
- 2) sectors projected to generate significant employment growth (see Section 2 for further details);
- 3) the gender profile and spatial footprint of sectors (in order that one gender and some types of areas are not well-represented across the entire selection); and

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<sup>13</sup> *The importance of industrial strategy*, Speech by Greg Clark to the Institute of Directors, 27 September 2016, <https://www.gov.uk/government/speeches/the-importance-of-industrial-strategy> (accessed 5 January 2017)

#### 4) sectors of strategic and policy focus.

Information from *Working Futures* projections (Wilson et al., 2014) provided insights on the first three indicators. With regard to sectors of strategic and policy focus, Table 2 lists key sectors identified at UK level. In the case of the devolved nations, and at sub-national, level governments and other bodies have identified their own growth sectors (also sometimes called 'priority sectors' or 'key sectors' as a focus for policy intervention). While there are some differences between sectors identified at sub-national level, Peck et al. (2013) have argued that sub-national bodies have tended to focus on a relatively narrow range of fashionable growth sectors – such as digital and creative, the digital economy, advanced manufacturing, business and professional services, low carbon/renewable energy and life sciences. This is borne out by the growth / priority / key sectors presented in Table 3, for a subset of devolved nations and local enterprise partnerships / combined authorities in England,<sup>14</sup> so as to provide an indication of sector selections made. For each of the five nations/areas listed there are between six and ten sectors identified.

The sectors most frequently identified across these five areas are:

- Creative and digital industries;
- Business, professional and financial services;
- Visitor economy, tourism and hospitality;
- Low carbon, environmental technologies, energy (including renewables); and
- Advanced manufacturing and materials, together with specific types of manufacturing or manufacturing as a whole.<sup>15</sup>

There are examples of sectors of particular local / national importance being identified: food and farming (in the case of Wales) and agri-food (in the case of Greater Lincolnshire), as well as those identified at national level as being of strategic importance from a competitiveness perspective. Only in one area (the West Midlands Combined Authority) have retail and the public sector – both high employment sectors - been identified.<sup>16</sup> There are two instances of the care sector being identified – once alongside lifesciences and once alongside health.

The growth sectors selected for focus in accompanying papers addressing specific issues of policy and practice in this research are listed below. Given the focus on harnessing growth sectors for poverty reduction, the list includes some large employment sectors associated with

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<sup>14</sup> Selected to provide contrasts across the urban-rural spectrum.

<sup>15</sup> In the case of Greater Lincolnshire.

<sup>16</sup> The West Midlands Combined Authority terms these two sectors (along with the cultural economy) as 'enabling sectors', in contrast to the other seven 'transformational' sectors identified – see West Midlands Combined Authority (2016) <https://westmidlandscombinedauthority.org.uk/media/1205/wmca-sectoral-analysis-2016.pdf> (accessed 6 January 2016).

low pay (see sections 3-5 in this paper), as well as sectors which are typified by higher wage jobs but with relatively high barriers to entry, and sectors which are a focus for policy (either nationally or sub-nationally). They are:

- Financial and professional services;
- Manufacturing;
- Energy and environment ;
- Construction;
- Social care; and
- Hospitality (including tourism)



**Table 3: Growth / priority / key sectors in selected devolved nations and sub-regions in England**

Sectors	Wales	Scotland	West Midlands Combined Authority	Leicester & Leics	Greater Lincs
Food & farming	√				
Agri-food					√
Food & drink		√		√	
Energy (incl. renewables), low carbon, environmental technologies	√	√	√	√	
Advanced manufacturing & materials, engineering	√		√	√	
Textiles manufacturing				√	
Manufacturing					√
Lifesciences	√	√	√ (& social care)		
Health and care					√
Construction (building technologies)	√		√		
Logistics, distribution, transport technologies			√	√	√
Retail			√		
Business, professional and financial services	√	√	√	√	
Info. & communications technologies	√				
Creative and digital industries	√	√	√	√	
Cultural economy (including sport)			√		
Visitor economy, Tourism, Hospitality	√	√		√	√
Public sector			√		

The rationale for a focus on these growth sectors in accompanying papers is that:

- Growth sectors are generating opportunities from those out of work or those in low pay in other sectors to potentially move into, and therefore understanding what works in linking people in poverty to these opportunities is an important aim.
- Where growth sectors are targeted by industrial strategy this can create opportunities for policy to help support the growth and widening of opportunity, for example through provision of business support services and integrated strategies for economic development and skills policy which encourage firms to upgrade strategies.
- Fast growing sectors are more likely to experience skills shortages, which can encourage employers to seek to engage with publicly funded skills and training provision.
- Where growing sectors experience high levels of staff turnover this may act as a driver to target approaches to make employment in the sector more attractive, for example through developing more clearly defined progression opportunities.
- More generally a sector focus is of interest because public policy may have more traction in some sectors than others (Schrock, 2013).

Subsequent sections of this paper provide details of sectoral variations in low pay and differences in sectoral prospects for earnings mobility.

## Sectoral Employment and Poverty:

### Individual-level Analysis from the Labour Force Survey

This section uses data from the Labour Force Survey (LFS) to address three questions:

- How do patterns of low pay vary by sector?
- To what extent do sectoral variations relate to worker characteristics, rather than sector variation independently (i.e. are sectoral variations in low pay explained by a so-called ‘compositional effect’)?
- How do probabilities of leaving low pay vary by sector (and by worker characteristics)?

The first and second questions are addressed using pooled data from the quarterly LFS for the period 2010 to 2014. For the third question data from the longitudinal LFS, providing repeated data for the same individual over five successive quarters, are used. The 21 sectors used in the analyses presented are adapted from the 2007 Standard Industrial Classification.

#### **How do patterns of low pay vary by sector?**

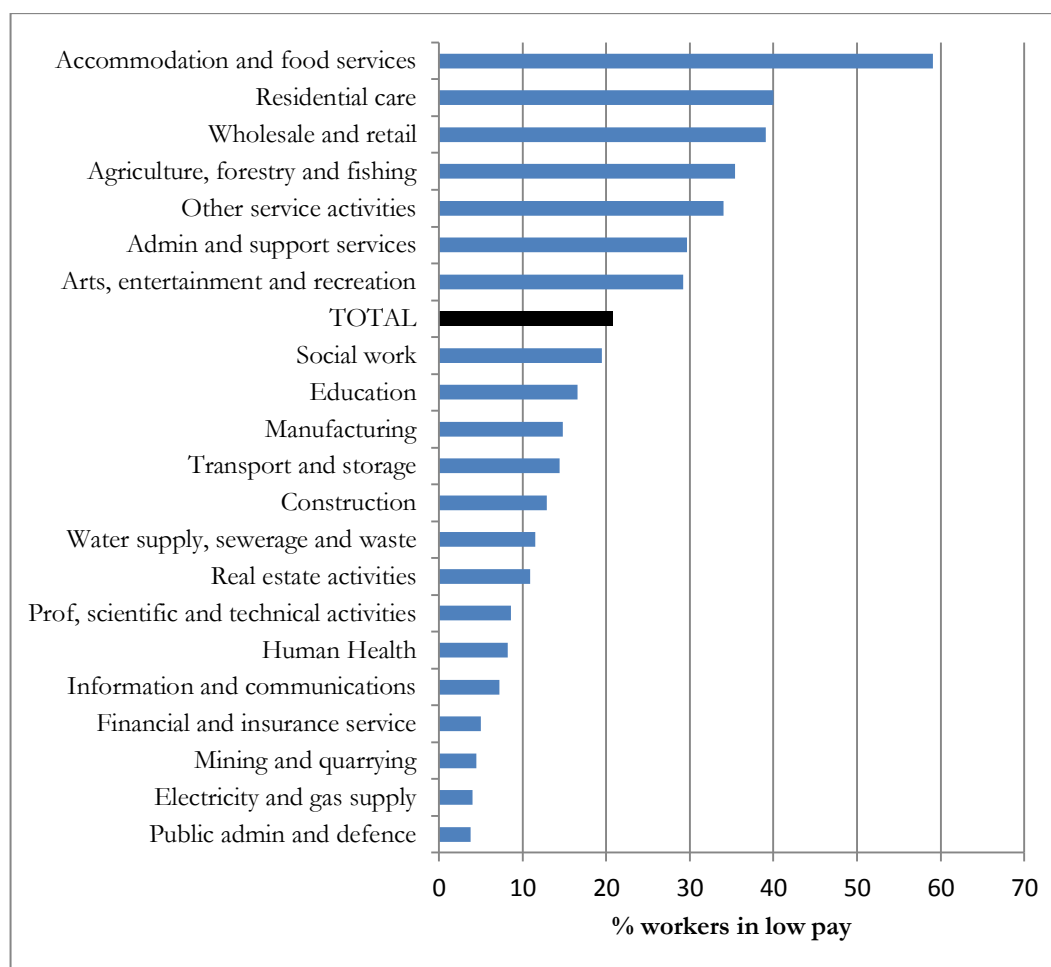
There are no independent measures of ‘low pay’ / ‘in-work poverty’ in the LFS. Here a common definition of low pay (Gardiner and Millar, 2006; Solow, 2008; Corlett and Gardiner, 2015) - hourly wages below two-thirds of gross median hourly pay<sup>17</sup> for all employees – is used to define low pay. This equates with a monetary value of £7.43 (indexed to 2015 money).

Figure 7 shows that there are pronounced sectoral differences in low pay. Workers in accommodation and food Services are particularly likely to be in low pay, with almost 60 per cent of the workforce in this category. Residential care and wholesale and retail also have high rates of low pay, with around 40 per cent of workers in this category, compared with just over 20 per cent of workers in aggregate. Aside from agriculture, forestry and fishing all of the sectors with higher than average proportions of workers in low pay are from the service sector. By contrast in public administration and defence and in the finance sector the shares of workers in low pay are 5 per cent or lower.

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<sup>17</sup> This is self-reported pay.

**Figure 7: Percentage of workers in low pay by sector, 2010-2014, UK**



Source: Quarterly LFS, 2010-14

Since sectors vary in size in terms of their contribution to total employment it is important to consider also the proportion of all workers who are low paid who are in each sector. Table 4 shows statistics on the proportion of total employment and of low paid employment accounted for by the sectors revealed in Figure 7 as being characterised by higher than average proportions of low pay. Over a quarter of the total low paid are in the wholesale and retail sector (27 per cent), with a further 16 per cent in accommodation and food services. Together the sectors characterised by higher than average shares of workers in low pay account for 58 per cent of all low paid employment, compared with a third of total employment. Statistics are also presented for two further sectors – education and manufacturing – where the shares of total employment accounted for by low pay are smaller than average, but which nevertheless are shown to account for relatively large shares of low pay employment overall (around 9 per cent and 8 per cent, respectively).

**Table 4: Percentage of total low paid employment in selected sectors, 2010-14, UK**

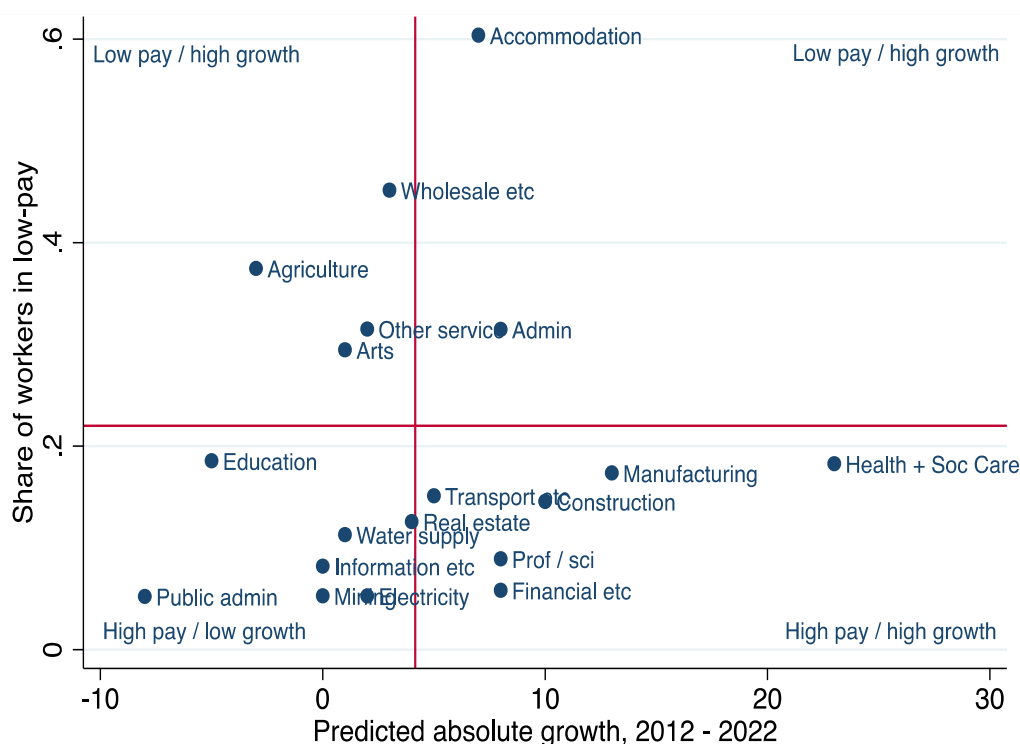
Sector	Low paid employment	Total employment
Accommodation and food services	15.8	5.7
Residential care	6.3	2.4
Wholesale, retail	27.4	14.5
Agriculture	1.0	0.6
Other service activities	3.3	2.2
Admin and support services	6.2	4.4
Arts, entertainment, etc.	3.1	2.2
Education	9.0	11.3
Manufacturing	7.7	10.7

Source: Quarterly LFS, 2010-14

Looking ahead over the medium-term, it is salient from a policy perspective to look at the extent to which employment is likely to grow in sectors characterised by low pay vis-à-vis other sectors. Drawing on the Working Futures analysis presented in the previous section, Figure 8 shows projected employment growth in different sectors by the share of low pay in those sectors holding the share of low pay in the sectors constant and taking no account of projected occupational change.

There is no clear correlation between low pay and projected employment growth – suggesting that structural change is not closely associated with a clear trend for increasing or decreasing low pay. Arguably sectors characterised by relatively high shares of projected employment growth and low pay are candidates for policy prioritisation. Two stand out in this respect: accommodation and food services, which is expected to experience significant growth, and health and social care (which includes residential care).

**Figure 8: Projected employment growth (in thousands), 2012-22, UK and percentage of workers in low pay by sector, 2011 - 2014**



Source: Working Futures, 2012-22 and quarterly LFS, 2010-14

### Are there distinctive sectoral effects in low pay?

A key question from a policy perspective is whether the differences in low pay by sector are merely a function of differences in worker characteristics or whether there is there a separate sectoral effect? This has potential implications for whether policy should be focused on factors such as skills, irrespective of sector, or whether a sectoral focus is likely to be important. If the latter, policy could be focused on sectors / through sectoral bodies.

This question was investigated using multiple regression models. Table A1 shows the results of probit regression models of probabilities of low pay using cross-sectional quarterly LFS data. Column 1 includes only year / quarter dummies to control for time-trends; (these are essentially a statistical significance test for the descriptive statistics, controlling for changing overall low pay rates). Column 2 includes controls for personal characteristics such as education, age, ethnicity, gender and hours of work, which, are likely to influence low pay. With regard to age, human capital theory suggests that as workers age and develop skills and experience the probability of low pay will decrease, but the benefits of skills and experience may diminish over time. In the case of ethnicity and gender there are longstanding concerns about labour market discrimination, which might be expected to lead to increased probabilities of low pay. Part-time workers might be expected to be particularly likely to experience low pay. As the chances of being in low pay are conditional on entry to low pay in the first instance, Column 3 gives the

results of a Heckman selection model which controls both for personal characteristics and selection into the labour market (i.e. labour force participation independent of sector of employment). Marginal effects are presented, giving percentage changes controlling for other factors.

Focusing on sectoral results where the reference category is manufacturing, first without controls, and then controlling for personal characteristics, the highest probabilities of low pay are in:

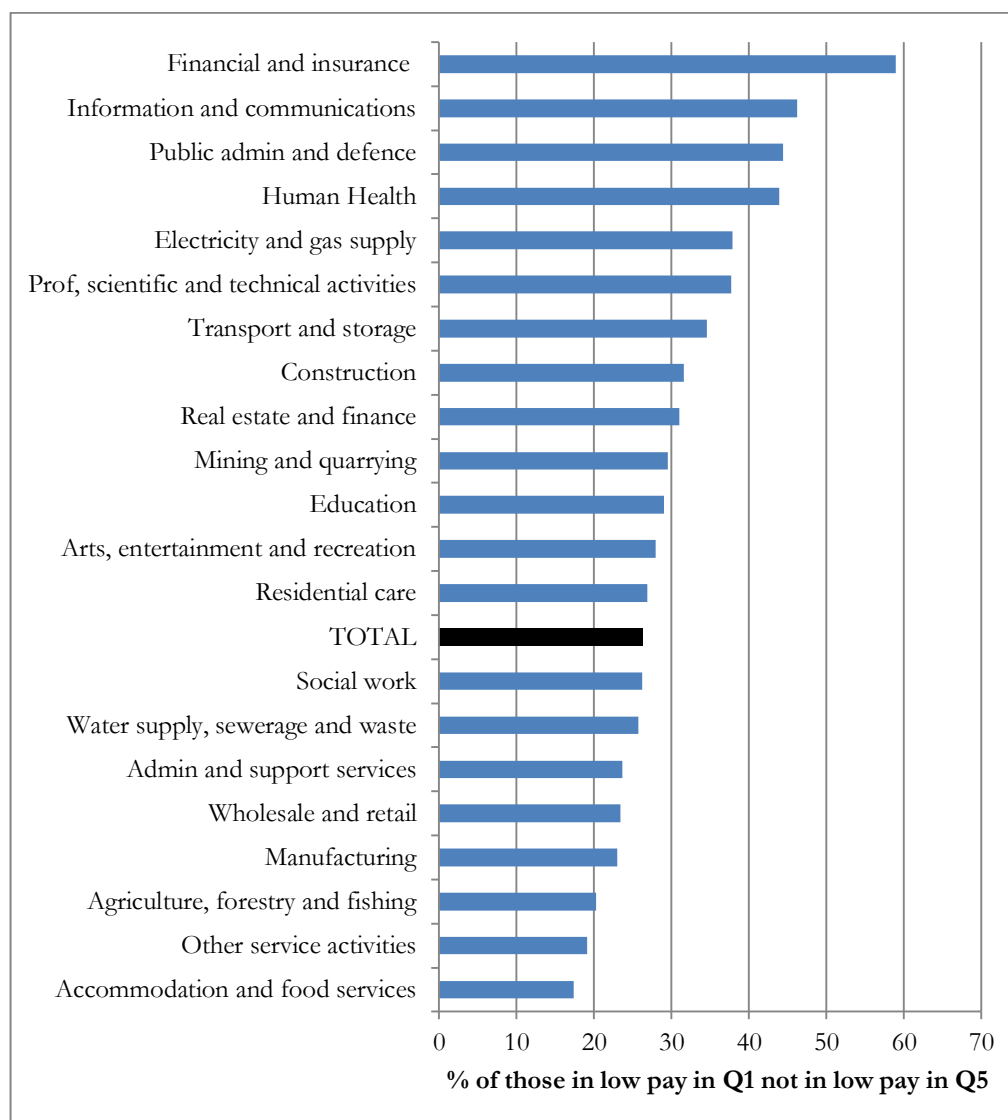
- Accommodation and food services – an individual in this sector is 45 per cent more likely to be in low pay than in manufacturing, and 25 per cent more likely controlling for personal characteristics
- Residential care - an individual in this sector is 27 per cent more likely to be in low pay than in manufacturing, and 18 per cent more likely controlling for personal characteristics
- Wholesale and retail – an individual in this sector is 24 per cent more likely to be in low pay than in manufacturing, and 12 per cent more likely controlling for personal characteristics
- Agriculture, forestry and fishing - an individual in this sector is 22 per cent more likely to be in low pay than in manufacturing, and 16 per cent more likely controlling for personal characteristics

From a policy perspective this suggests that focusing policy on these sectors might be a useful way to target low pay, independent of horizontal policies.

### **How do probabilities of leaving low pay vary by sector?**

If low pay is a short-term experience and workers increase their earnings quickly it matters less from a poverty perspective than if workers remain in low pay. To investigate this longitudinal analysis is required. Using data from the five-quarter longitudinal LFS, Figure 9 shows the share of those in low pay in Quarter 1 (Q1) who leave low pay by Quarter 5 (Q5) while remaining in employment (whether or not they remain in the same sector). A high value indicates that it is easier to leave low pay – although this may be either through a small increase in pay over the ‘low pay’ boundary or a larger increase.

**Figure 9: Share of low paid workers in Quarter 1 leaving low pay by Quarter 5, 2010-14, UK**



Source: Longitudinal LFS, 2010-14

Figure 9 shows that there are marked differences between sectors in the probability of a worker who is in low pay remaining in low pay a year later. 59 per cent of workers in financial services and insurance in low pay are not a year later; (this is a markedly larger proportion than in any of the other sectors). At the opposite end of the spectrum less than 20 per cent of workers in accommodation and food services, other services, and agriculture, forestry and fishing are out of low pay in Q5, so demonstrating the persistence of low pay in these particular sectors. Analysis shows that the relationship between the share of workers in low pay and the share of low-paid workers in low pay in Q1 who leave it by Q5 is negative and statistically significant – i.e. workers in the sectors with the highest share of low-paid workers have the lowest chance of leaving low pay.



Table 5 shows the proportion of low-paid workers in Q1 who are not low-paid in Q5 who left their Q1 sector of employment compared with the proportion that remained. In aggregate 15 per cent of workers moving out of low pay remained in the same sector, but in the case of accommodation and food services 34 per cent and in arts, entertainment and recreation the proportion was similar.

Results of probit regression modelling (not reported in detail here) show that controlling for personal characteristics and selection into low pay, sectors with higher probabilities than manufacturing of leaving low pay are: human health, finance and insurance, and public administration and defence. Hence, overall the analyses suggest that sector matters for upwards earnings mobility – low paid workers in these sectors have a higher chance of not being low paid a year later.

**Table 5: Share of low-paid workers in Q1 leaving low pay by Q5 by sector, 2010-14, UK**

Sector	% of workers in sector in low pay in Q1 not in Q5	% of low paid in Q1 who are non-low paid in Q5	
		Leave sector	Remain in sector
Financial and insurance	59.0	23.2	76.8
Information and communications	46.2	8.5	91.5
Public admin and defence	44.4	11.8	88.2
Human Health	43.9	8.6	91.4
Electricity, gas supply	37.9	-	-
Prof, scientific and technical activities	37.7	5.6	94.4
Transport and storage	34.6	11.3	88.7
Construction	31.6	11.5	88.6
Real estate	31	6.2	93.8
Mining	29.5	22	78.1
Education	29.0	5.1	95
Arts, entertainment and recreation	28.0	33.2	66.8
Residential care	26.9	14.3	85.7
Social work	26.2	16.5	83.6
Water supply	25.7	38.9	61.1
Admin and support	23.7	22.4	77.6
Wholesale, retail	23.4	17.2	82.8
Manufacturing	23	8.1	91.9
Agriculture	20.3	6.0	94
Other service activities	19.1	13.1	86.9
Accommodation and food	17.4	33.5	66.6
TOTAL	6.7	15.3	84.7

Source: Longitudinal LFS, 2010-14

## Conclusions and policy implications

The analyses presented in this section show pronounced sectoral variations in low pay and earnings mobility, once individual characteristics have been controlled for. This suggests that there is a ‘sector effect’ which is independent from the personal characteristics of workers in the sector. For policymakers, focusing interventions – for example, skills upgrading or developing career ladders – in these sectors might be a useful way to target low pay.

There are also pronounced sectoral variations in whether workers are able to make short-term movements out of low pay, even after selection into low pay is controlled for, so suggesting that some sectors are better able to facilitate upward earnings mobility than others. Many of the sectors with high probabilities of the upward earnings mobility, for example human health or education, are dominated by the public sector. This suggests an important role for the public sector in helping people escape low pay, but also that for some workers changing sector will be a better way of leaving low pay than remaining in the same sector. If policy is focused on improving living standards for those already in work, some form of targeting by sectors is likely to matter.

# Sectoral Employment and Poverty: Insights at Household level from the Family Resources Survey

This section introduces a household element into the analysis using data from the Family Resources Survey (FRS). It examines the following issues:

- Why focus on the household/family level?
- How do poverty rates vary by sector for individual workers?
- What do poverty outcomes look like by household structure and sector of employment?
- What is the role of sector of employment in household poverty once other factors influencing are taken into account?

## A household level focus

The focus on families and households is important because the relationship between individual low pay and household poverty is mediated by other household factors, particularly family size and the presence and level of earnings from other family members. Hence an individual may be employed in a low-paid job but might not experience poverty because another family / household member is in a high-paid job.

To enable a focus at the household level the analyses presented in this section use data from the FRS which has been matched to household poverty measures contained in the Households Below Average Incomes (HBAI) data set. The FRS is a large annual survey providing detailed information about living conditions in the UK (DWP, 2014)<sup>18</sup>. Here FRS data is pooled across three years – 2009/10; 2010-/2011 and 2011/2012. Two sets of analyses are presented: the first using individual level data (to address the second issue outlined above), the second data for families (to address subsequent issues). The analysis of families is focused on single benefit unit households (i.e. excluding complex households). The sample is limited to those of ‘working-age’, defined as being aged 16-64 for individuals or having a member within families aged 16-64 for the family-level analysis, and excludes the self-employed.<sup>19</sup> In the household level analyses four categories of family are identified:

- All families – all benefit units;

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<sup>18</sup> The End User Licence (EUL) version of the FRS is used here. The FRS weights will be revised to reflect updated population bases from the 2011 Census. The new weights were not available at the time of analysis so the weights based on 2001 Census figures were used. For further details see [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/321819/frs-grossing-methodology-review-2011-census-updates.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/321819/frs-grossing-methodology-review-2011-census-updates.pdf)

<sup>19</sup> Self-employed incomes are thought to be subject to greater inaccuracy in reporting in household surveys (DWP, 2013); there are also discrepancies between reporting of (high) relative income poverty and (lower) material deprivation measures for the self-employed (Ray et al, 2014).

- Single person families;
- Dual earner households – those with two workers; and
- Dual (or more) person families with a single earner.

Where a ‘main earner’ is referred to in the analyses this is the highest paid family member.

A measure of Poverty After Housing Costs (AHC) is used in the analyses presented in this section. This is a relative measure of poverty, benchmarked against national median household level incomes. The reference level for ‘poverty’ is set at 60 per cent of the median income level, equivalised for family size.

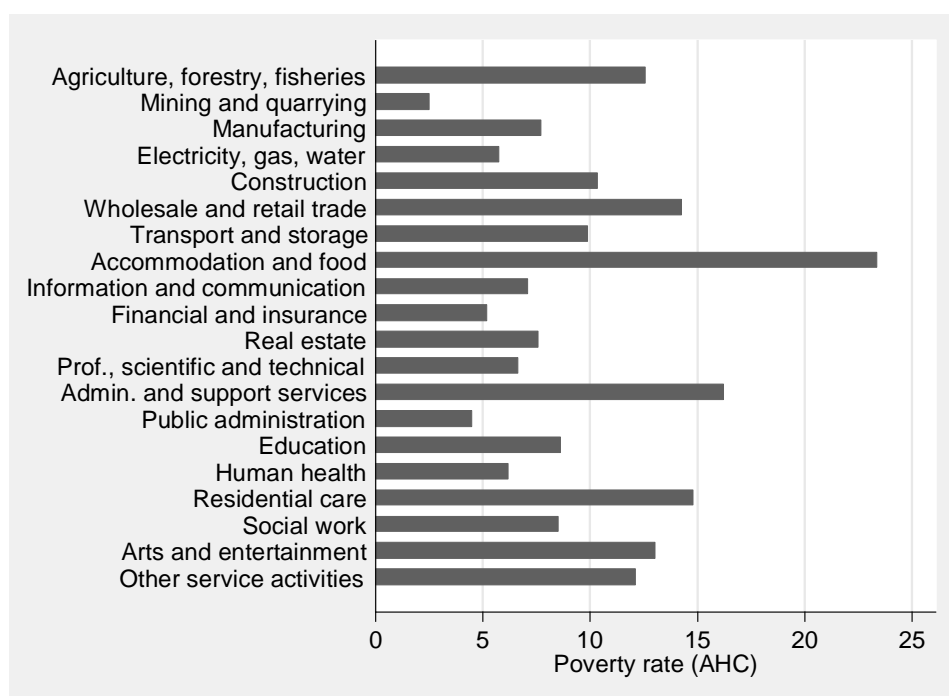
The sectors used in the analyses broadly mirror the 2007 Standard Industrial Classification, with some minor adjustments made to combine sectors with small employment sizes and to disaggregate some sub-sectors within larger heterogeneous sectors.

### **Variations in household poverty rates vary by sector for individual workers.**

At individual level the highest poverty rate (AHC) is among those working in the accommodation and food service sector (at 23 per cent), followed by administrative and support services (16 per cent), residential care (15 per cent) and the wholesale & retail trade (14 per cent) (Figure 10). These sectoral rates compare to an average across sectors of 9.5 per cent.

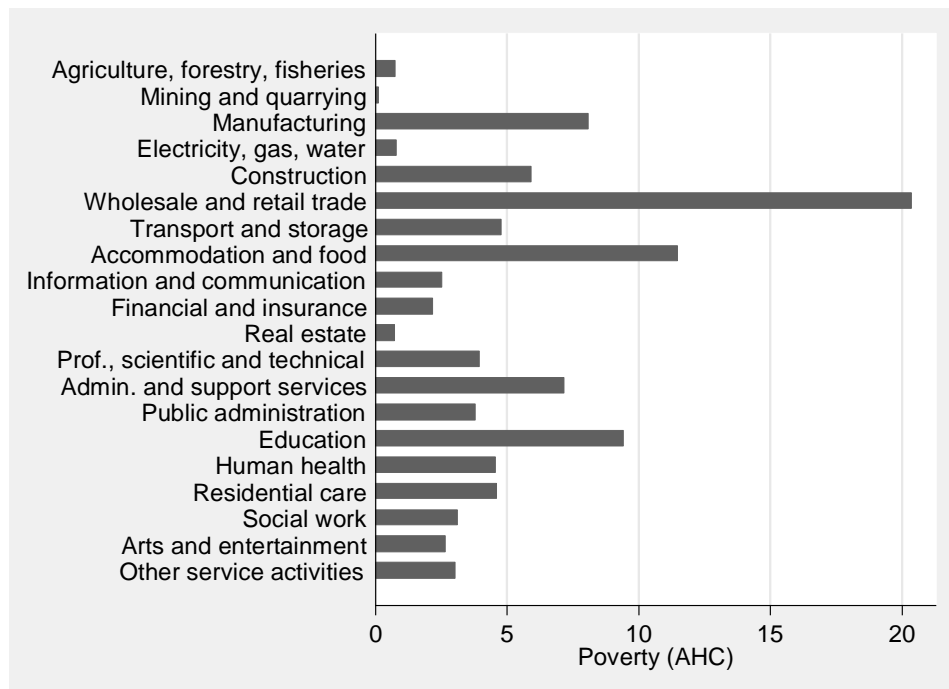
Yet in absolute terms the wholesale & retail trade accounts for over 20 per cent of individuals in poverty (AHC) and accommodation & food services for just over 12 per cent; next come sectors less associated with low pay: Education (nearly 10 per cent) and manufacturing (8 per cent) of the total (Figure 11). This highlights the relatively widespread nature of in-work poverty across sectors. These patterns of sectoral variation are similar to those shown for the LFS in the previous section.

**Figure 10: Poverty rate (AHC) for individuals by sector, 2009-12, UK**



Source: Authors' estimates from the FRS/HBAI, 2009-12

**Figure 11: Poverty rate (AHC) across sectors for individuals, 2009-12, UK**

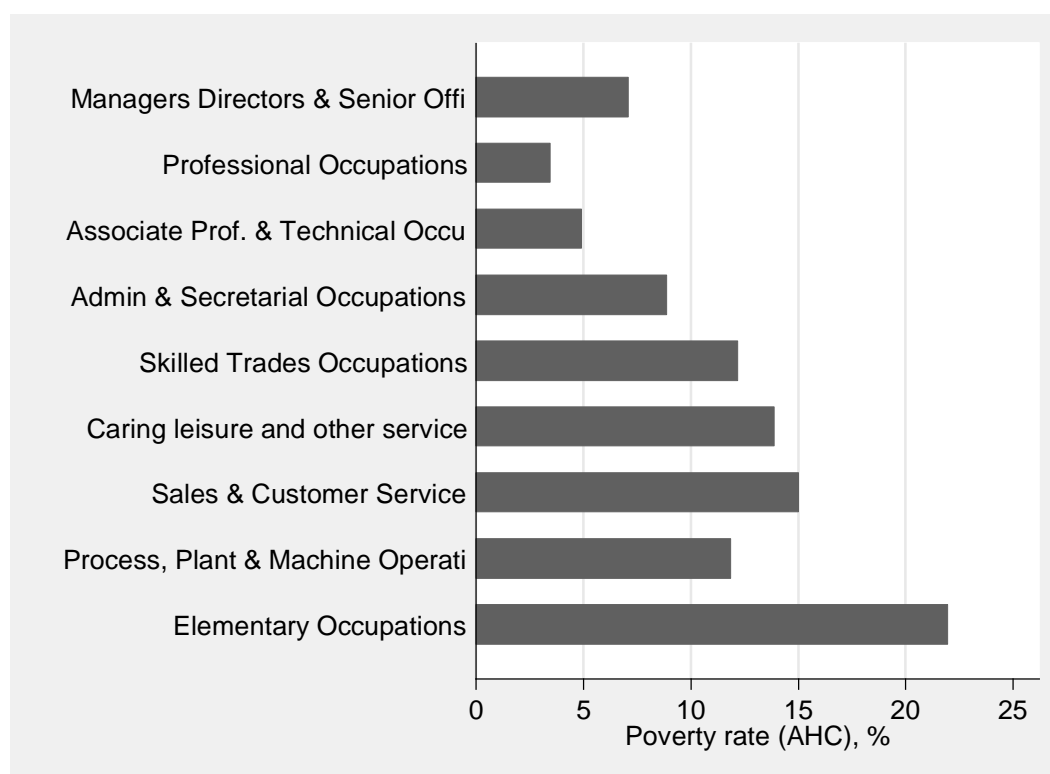


Source: Authors' estimates from the FRS/HBAI, 2009-12

Note: The values across all sectors sum to 100 per cent

Analysis of FRS data by occupation<sup>20</sup> shows highest poverty rates in elementary occupations, followed by sales & customer service occupations and caring, leisure & other service occupations (i.e. the ‘low pay’ occupations used in the presentation of the Working Futures analyses). By contrast rates are much lower in professional occupations and associate professional & technical positions (see Figure 12).

**Figure 12: Poverty rate (AHC) for individuals by occupation, 2011-12, UK**



Source:

Authors' estimates from the FRS/HBAI, 2009-12

The characteristics of individuals working within different sectors will vary (for example, by age, qualifications and household economic characteristics). To examine these factors alongside sector of employment a probit regression model is estimated. The dependent variable is whether an individual lives in a household in poverty or not. The independent variables are the sector of employment, household economic activity, level of qualifications, age, number of dependent children, and region of residence. For this analysis a modified version of the sector variable is used which combines a number of smaller sectors together<sup>21</sup>.

The results are shown in Table A2, with coefficients reported in relation to a reference category which is recorded in the table. As would be expected the economic position of other household

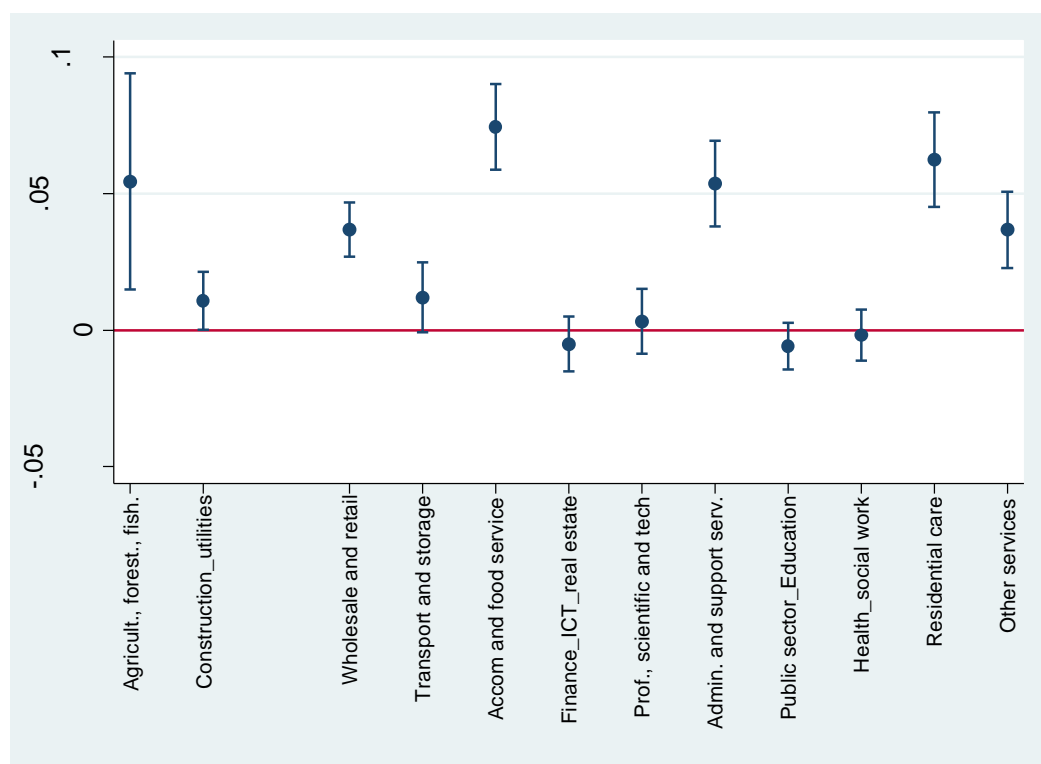
<sup>20</sup> The analysis is limited to data from 2011/12 only because of changes to the Standard Occupational Classification in the previous year.

<sup>21</sup> These changes include aggregating Utilities employment (gas, electricity and water) with Construction, as well as combining Finance, ICT and Real estate, and Public administration with Education.

members is important, with lower work intensity within households associated with higher poverty. Compared to families with all workers in full-time employment, all other economic position categories are associated with higher poverty. The effect is large in single earner couple households and those with no full-time workers. Having a larger family, having lower qualifications and being in the youngest age group (16-24 years) are also associated with higher poverty.

With regard to sector of employment the findings of the descriptive analysis are confirmed, with being in employment in accommodation and food services, admin and support services, Residential care, agriculture and wholesale & retail all significantly raising the likelihood of household poverty compared to the reference category of employment in manufacturing. Figure 13 shows the average marginal effects (along with the 95 per cent confidence intervals) from the probit regression model. The marginal effects represent the percentage point change in the probability of poverty associated with the individual sectors relative to the reference category (manufacturing). The largest marginal effect (at the point of the central estimate) is in accommodation and food services at around 7 percentage points, in residential care the effect size is around 6 percentage points, in admin and support services and agriculture it is 5 percentage points and in wholesale & retail it is 4 percentage points.

**Figure 13: Average marginal effects of sector of employment on poverty (AHC) for individuals, 2009-12, UK**



Source: Authors' estimates from the FRS/HBAI, 2009-12



## **Poverty outcomes by family structure and sector of employment.**

In this sub-section the analysis is focused on families (benefit units). This includes an assessment of outcomes for different types of family economic position (as outlined at the start of the section). A focus on families is important as the family mediates the link between individual sector of employment and poverty outcomes.

Table 6 shows poverty rates AHC by sector for different types of families.<sup>22</sup> Poverty rates are considerably higher (26 per cent across the whole economy) for dual adult families with a single earner than for such families with two earners (4 per cent across the whole economy) – and this general pattern is replicated across sectors; overall, poverty rates for single earner dual person families are between five and seven times greater than for dual-earner families across sectors.

It is clear that where a main earner is in a low-paid sector the likelihood of in-work poverty increases across all family types. However the household type in terms of number of earners is particularly critical. The poverty rate for families with the main earner in accommodation and food services is 37 per cent across all households (compared with 65 per cent in single-earner dual adult families and 11 per cent in dual earner families), for residential care the poverty rate it is 22 per cent across all families (compared with 31 per cent in single-earner dual adult families and 9 per cent in dual earner families), and for wholesale & retail it is 20 per cent across all families (compared with 38 per cent in single-earner dual adult families and 8 per cent in dual earner families). These descriptive statistics indicate that household labour supply can play an important role in mediating poverty, but that household poverty persists in some sectors characterised by low pay despite families having dual earners.

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<sup>22</sup> Agriculture and mining employment is excluded because of relatively small sample sizes under some household economic activity categories; Real estate is combined with Finance and insurance for the same reason.

**Table 6: Poverty rates (AHC) within sector for household main earner by household economic situation, 2009-12, UK**

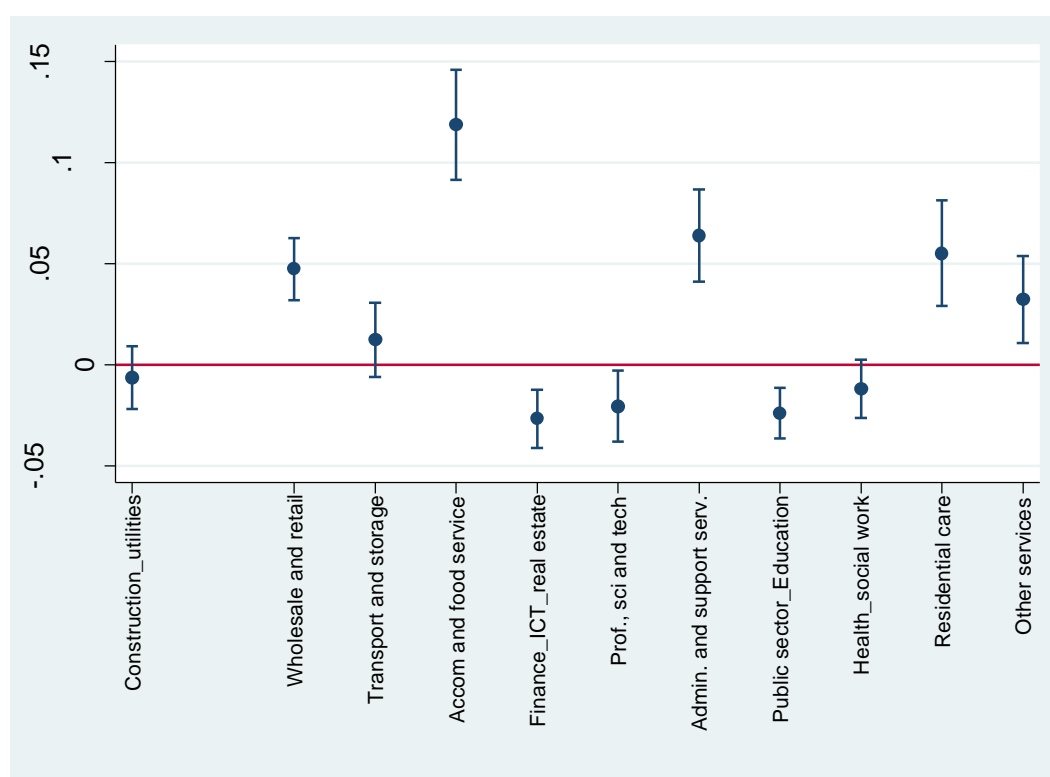
Sector	All	Single person family	Dual-person family - dual earner	Dual-person family - single earner
Manufacturing	9.4	9.7	3.5	24.0
Electricity, gas, water	5.7	4.0	1.7	16.8
Construction	10.4	12.0	3.6	26.3
Wholesale and retail	20.1	22.8	8.0	38.2
Transport and storage	11.0	8.7	3.8	28.2
Accommodation & food services	36.5	36.8	10.5	64.6
Information and communication	7.0	9.8	4.0	11.7
Financial and insurance	6.1	5.2	2.6	16.3
Prof., scientific and technical	6.8	8.0	2.1	16.9
Admin. and support services	21.1	24.1	9.4	35.9
Public administration	5.3	6.0	1.8	14.1
Education	10.3	12.0	2.7	24.4
Human health	8.1	7.2	3.3	21.0
Residential care	21.9	25.3	9.2	30.8
Social work	11.6	10.5	4.1	27.7
Arts and entertainment	19.4	22.6	6.0	39.0
Other service activities	14.3	17.6	7.1	22.5
TOTAL (all sectors)	11.9	13.8	4.2	26.4

Source: Authors' estimates from the FRS/HBAI, 2009-12

The analysis of sectors and poverty outcomes is extended in Table A3 by modelling poverty outcomes as a function of the sector of employment of family wage earners (the sectors of main and second earners are included) as are a range of other characteristics (including the qualifications of the highest qualified family member, the age of the family reference person and the number of dependent children). Controls are included for the hours worked by the main earner, region of residence and year. The results demonstrate the influence of sector of employment once other factors are controlled for.

Considering first the sector of employment of the main wage earner (see Figure 14), the patterns observed in the descriptive analysis largely hold. Relative to the reference category of manufacturing, a statistically significant higher chance of in-work poverty is observed in accommodation and food service, administrative and support services, residential care, wholesale & retail and other services. The effect size is particularly large in accommodation and food services. Lower rates of poverty are associated with the main earner being in employment in finance, ICT & real estate, professional, scientific & technical services, and the public sector & education.

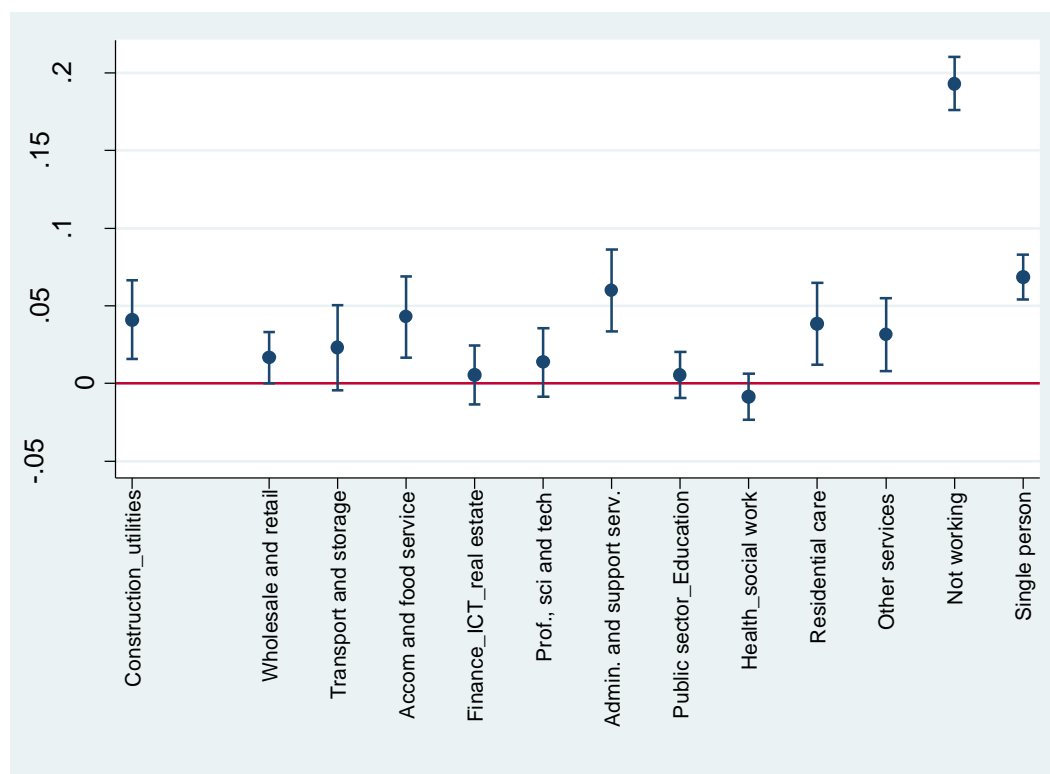
**Figure 14: Average marginal effects of sector of employment of main earner on poverty (AHC) for individuals, 2009-12, UK**



Source: Authors' estimates from the FRS/HBAI, 2009-12

These patterns are largely mirrored when considering the role of sector of second earners (see Figure 15). There is a strong association with increased poverty outcomes and second earner employment in accommodation and food service, administrative and support services, residential care, wholesale and retail, and other services. In contrast there is also a positive relationship between second earner employment in construction and utilities and in-work poverty (a possible explanation here is the more fragmented nature of employment in construction with less consistency of working hours).

**Figure 15: Average marginal effects of sector of employment of second earner on poverty (AHC) for individuals, 2009-12, UK**



Source: Authors' estimates from the FRS/HBAI, 2009-12

Where there is no second earner the poverty risk increases very significantly for dual person families and to a lesser extent for single earner families. Being in a lower qualified household raises the likelihood of poverty. Poverty is also most strongly associated with younger households and increases with the number of children.

These results demonstrate the composite effect of combinations of individual labour market experiences and family characteristics in generating poverty outcomes. They show that the sector of employment influences the likelihood of being in poverty. There are of course complexities about relationships between sector of employment and household characteristics which the model does not capture fully. Moreover it is important to note that there are differences between sectors in terms of accessibility to those with caring and other non-work responsibilities – and here sectors like retail & wholesale, accommodation & food services and residential care are characterised by both relatively easy access and geographical ubiquity and so may – in non-pay terms – offer attractive opportunities for employment entry.

## Conclusions and policy implications

This section has examined the link between sector of employment and poverty outcomes at the family level. The focus on the family is important because the relationship between individual

low-pay and household poverty is mediated by other household factors, particularly family size and the presence and level of earnings from other family members.

There are quite clear sector patterns associated with household poverty. The poverty rate tends to be significantly higher than average in a number of sectors, including accommodation & food services, admin & support services, residential care and wholesale & retail. When looking at the distribution of poverty across sectors, wholesale & retail is the sector which accounts for the largest proportion of poverty; but there are also sizeable proportions in accommodation & food services, education and manufacturing.

The structure and economic position of the family has a strong influence on poverty; rates of poverty are much higher within single earner couple families across all sectors, highlighting the importance of household labour supply in helping to insulate against poverty. However, the patterns of poverty by sector remain when a range of household and individual characteristics are accounted for. Focusing on the sector of the main earner within families also presents a consistent picture of a group of high poverty sectors.

Overall the data shows that while poverty is relatively diffuse across the economy (i.e. it is not confined to a small number of sectors) there are a number of sectors where a policy focus on tackling poverty may have the greatest impact, these include those sectors with high poverty risk, as well as those sectors which account for a large proportion of poverty (with there being considerable overlap in practice between these two groups). The results suggests that seeking to improve employment conditions in low-paid and large in-work poverty sectors has a role to play in addressing poverty, alongside policies aimed at encouraging work entry and provision of financial support for low-earning households.

# Sectoral Employment and Poverty: Local Labour Markets and Transitions from Low Pay

This section introduces a local labour market dimension into the analysis on transitions from low pay. It examines the following issues:

- Why is a local dimension to analysis important?
- Do workers gain from employment growth in their local sector of employment or aggregate employment growth in their local labour market?

The analyses presented use longitudinal data from Understanding Society (US) and employment change data from the Business Register and Employment Survey (BRES).

US is a nationally representative long-term longitudinal study in the UK.<sup>23</sup> The analysis presented in this section is based on the first five waves of the data for the period 2009-13; (it should be noted that this period covered recession and subsequent recovery and is somewhat unusual in relation to a longer-term temporal perspective in that there was a decline in real wages at this time). Over 25,000 private households were randomly selected to take part in the survey, with annual interviews conducted face to face with all adults in a household, if possible. Information on each individual in the US includes job characteristics, wages and travel-to-work area (TTWA) as an indicator for local labour market area.

BRES is the official source of employee and employment estimates by detailed geography and industry. The survey collects employment information from a sample of businesses<sup>24</sup> across the whole of the UK economy for each site that they operate.

## Why a local focus matters

There is value in introducing a local focus alongside that on sectors into the analysis from both a policy and a theoretical perspective. As noted in the introductory section, many local areas have identified sectors of strategic importance and in terms of policy implementation a local sectoral focus accords with the reality of how labour markets operate in practice. Sectors matter for the experiences of workers in particular local labour markets because different sectors offer different prospects for career and wage progression for local workers. Factors other than sectoral composition are likely to matter too for individuals' labour market outcomes; notably the relative level of demand for labour at local level.

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<sup>23</sup> It is the follow up to the British Household Panel (BHPS) survey which has been used for similar applications by authors such as Longhi (2013).

<sup>24</sup> BRES excludes very small businesses neither registered for VAT nor Pay-As-You-Earn (PAYE).

Results of previous studies suggest that the size and characteristics of local labour markets may be expected to shape the extent and speed with which workers are able to grow their earnings. For example, Gordon et al. (2015) identified ‘escalator’ and ‘elevator’ effects (associated with agglomeration effects and the relative tightness of local labour markets) while an urban wage premium literature (see Glaeser and Mare, 2001; D’Costa and Overman, 2014; Phimster et al., 2006; Culliney, 2016) has pointed to higher wages and greater probabilities of leaving low pay in larger urban areas.

A growing local labour market may increase the quality of matching, enabling workers to attain better returns for their skills. One avenue for this would be where workers are employed in jobs which under-utilise their skills (Sissons and Jones, 2016). Of course, this is dependent on the nature of job creation rather than simply the volume of jobs. It is also possible that growing availability of jobs may reduce risk-aversion and encourage workers to change jobs, so leading to a more dynamic local labour market with greater possibilities for wage progression.

A local focus also matters from an individual perspective. Many individuals – and especially those with poor skills / in jobs characterised by low pay (vis-à-vis those with higher qualifications and higher pay) – are dependent on opportunities in their local labour market.

## **Overall job creation, growth sectors and wage progression in local labour markets**

A regression modelling approach is used to investigate the relationship between local employment growth in aggregate, local employment growth by sector and wages between 2009 and 2013<sup>25</sup>. Following and adapting the approach of Gordon (2015), local labour market change over time is treated as a function of both initial individual characteristics and geographical characteristics over time. The dependent variable is the growth rate in wages for an individual in their local labour market, and the independent variables of interest are: (1) change in aggregate local employment, and (2) the change in sectoral employment for the sector in which the worker is employed. In addition controls are introduced for a set of personal characteristics that might be expected to be associated with changes in wages – gender, qualifications (as a proxy for skill), age, ethnic background, and whether born in the UK, and personal behaviour/experiences. Two controls for changes over the period are included: first, whether the individual changes TTWA, and secondly, whether the individual changes sector. In some

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<sup>25</sup> Earnings can be highly erratic over time (Hills, 2014). To minimize the effect of year on year variation, the log difference in earnings between the start and end point of the data (2009-2013) is used. Earnings can be defined in several ways, but for this analysis there is interest in increased labour demand which can be felt in terms of both increased wages and/or increased hours worked. Hence usual gross pay per month was used as the dependent variable (adjusted for inflation using the Consumer Price Index). Because of the complications in measuring self-employment income, the self-employed are excluded. Extreme outliers are a potential problem so values are winsorised at the 1<sup>st</sup> and 99<sup>th</sup> percentile.

models a control for initial occupation is used, since wage growth may be related to changes in occupational structure.

The main results from a series of models (technical details not presented here) are:

- Growth in aggregate local employment has a strong and significant relationship with earnings growth.
- Employment growth in an individual's own sector seems to have no relationship with wage increases.
- Changing TTWA, and especially changing sector, are both positively associated with individual wage increases.

Further modelling work (details not reported here), making adjustments for endogeneity (i.e. co-relationship between wage increases and employment change in the local economy) which might bias model coefficients, suggests this effect can be interpreted as causal.

Robustness checks – including: (1) excluding London from the analyses, (2) testing for 'big city' effects, (3) using an unemployment measure to test for initial weak labour market conditions, and (4) excluding workers in public sector dominated sectors – led to little impact on the main results from the models. Analyses by skill level indicated that benefits of aggregate local employment growth were shared across skill groups.<sup>26</sup>

## Conclusions and policy implications

Using longitudinal data for UK workers for the period 2009-13 at local labour market level the conclusions from the analyses are:

- Workers gain from location in a local labour market characterised by aggregate employment growth.
- There is no statistically significant evidence for workers benefiting in terms of wage growth from being in a sector which is growing in employment terms in the local labour market.

The results suggest that general job creation matters significantly for wage increases (and by sequence moves out of poverty). From a policy perspective this highlights the importance of a focus on local economies as an ecosystem, where the gains from growth in one sector spill over into others, including a focus on the inter-relations between sectors.

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<sup>26</sup> This finding is contrary to expectations based on the literature, which suggest that higher skilled groups are most likely to see benefits. However, the result obtained here might reflect the time-specific factors related to deep recession and subsequent recovery.



# Conclusion and Recommendations

## Key findings on employment change, wages and poverty

### ***Projected employment change***

- Some of the greatest projected opportunities for employment openings in the medium-term are in sectors characterised by substantial employment in occupations associated with low pay.

*Working Futures* medium-term employment projections indicate that there are important sectoral and occupational differences in likely future employment change (as measured by 'expansion demand') and employment openings (as measured by 'replacement demand'). Sectors with amongst the largest net requirements for labour over the medium-term include health and social work, wholesale and retail trade, professional services, support services, education, construction, and accommodation and food services. With the exception of construction these are all private and public sector service sectors. By contrast, the net requirement in manufacturing and agriculture is much more limited.

Employment projections point to substantial growth in occupations characterised by low pay in sectors such as accommodation and food services and residential care, but in the context of a polarising labour market there are relatively fewer opportunities intermediate pay occupations to progress into. By contrast, in professional services projected employment growth is concentrated in occupations associated with high pay, whereas in engineering, despite limited aggregate employment growth projected replacement demand points to opportunities in intermediate occupations.

### ***Low pay and poverty by sector***

- The relative risk of low pay / poverty is much higher in some sectors than in others.

Using a common definition of low pay as hourly wages below two-thirds of gross median hourly pay for all employees analysis of earnings from the LFS data show pronounced sectoral variations in low pay. The percentage of workers in low pay is higher than average in accommodation and food services, residential care, wholesale and retail, agriculture, forestry and fishing, other service activities, admin and support services, and arts, entertainment and recreation. Analysis of poverty using data from the FRS highlights similar sectoral variations.

- Yet the risk of low pay / in-work poverty is not confined only to a few sectors.

Despite these sectoral differences indicated above, analyses of the LFS and FRS looking at the distribution of low pay / poverty by sector reveals that it is relatively diffuse across sectors, rather than being confined to a small number of sectors. Wholesale & retail is the sector which

accounts for the largest proportion of low pay / poverty; but there are also sizeable proportions in accommodation & food services, education and manufacturing.

### ***Mobility out of low pay***

- Mobility out of low pay has distinct sectoral patterns.

Analyses of LFS data show that in accommodation and food services almost 60 per cent of the workforce who were low-paid at the outset remained in low pay 12 months later, compared with fewer than 5 per cent in the finance sector. This indicates that low-paid workers in some sectors are far less likely to move out of low pay than others are. Many of the sectors associated with high probabilities of the upward earnings mobility, for example human health or education, are dominated by the public sector.

- Mobility out of low pay is positively associated with aggregate local employment growth and sectoral and geographical mobility.

Analysis of US data over the period from 2009 to 2013 show that aggregate employment growth at local level is more important than employment growth in the specific sector in which the individual is employed in influencing individuals' wage growth. This underlines the importance of the level of the overall demand for labour locally for poverty reduction. The US data analysis also shows that wage increases at individual level are positively associated with mobility between sectors and between local areas.

### ***Sector-specific effects and low pay***

A range of individual characteristics – such as gender, age and qualifications – are associated with low pay, with low pay being more likely for women than for men, for the youngest than for older age groups and for those with no/low qualifications than for those with high-level qualifications. Yet these 'compositional effects' do not account fully for sectoral differences in low pay.

- The analyses isolate a separate 'sector effect' of being in low pay and escaping low pay (over the short-term) independent of the individual characteristics of workers in different sectors.

Controlling for individual characteristics the highest probabilities of low pay are in accommodation and food services, residential care, wholesale and retail, and agriculture, forestry and fishing. For instance, analyses of LFS data show that an individual employed in accommodation and food services is 25 per cent more likely to be in low pay than an individual employed in manufacturing once factors such as age, gender and qualifications have been controlled for. This suggests that there is a 'sector effect' in explaining low pay.

### ***Sectors of employment, family characteristics and poverty outcomes***

A focus on the family is important because the relationship between individual low-pay and household poverty is mediated by other household factors, particularly family size and the presence and level of earnings from other family members. Family characteristics – notably the number of workers in a family – play an important role in determining poverty outcomes. Rates of poverty are much higher within single earner couple families across all sectors, highlighting the importance of household labour supply in helping to insulate against poverty.

- Analyses at the household level show the composite effect of combinations of individuals' labour market experiences and family characteristics in generating poverty outcomes.

Nevertheless the FRS analysis indicates that sectoral effects remain important:

- Patterns of poverty by sector remain when a range of family and individual characteristics are accounted for.
- Poverty persists in some sectors despite families having dual earners.

### **A focus on harnessing 'growth sectors' for poverty reduction**

The data analyses point to the existence of specific 'sectoral effects' in determining patterns of low pay / in-work poverty once other individual and household factors have been taken into account. This suggests that for policymakers, focusing interventions – for example, skills upgrading or developing career ladders – in sectors characterised by low pay might be a useful way to target low pay and reduce in-work poverty. A focus on sectors does resonate with how the economy operates in practice and with current policy focus at national and local level on 'growth' / 'key' / 'priority' sectors.

Yet as the review in this paper has outlined, there is no single clear definition of 'growth sectors'. In practical terms they may be defined as sectors where Gross Value Added (GVA) and/or employment are projected to increase over the medium-term. Given the focus on 'harnessing growth sectors for poverty reduction' the particular concern here is on employment growth. There is something of a mismatch here, in that the majority of 'growth' sectors identified for policy purposes may be thought of as 'growth sectors for competitiveness' (i.e. the focus is on GVA growth) rather than 'growth sectors for inclusion' (i.e. being identified on the basis of projected employment growth).

There are several ways in which a sector-based approach might operate.

- A focus on issues contributing to low living standards for some groups of workers in a particular sector and looking how these might be addressed in terms of wraparound support, work organisation and job design issues, training, etc.

- The sector providing a focal point for coordination of employment and skills activities, with the sector focus being a facilitator for developing partnerships, knowledge and capacity between providers and employers to identify areas of mutual benefit, and to effectively tailor provision.
- Related to the above, identification and promotion of career advancement paths within sectors, and tailoring of training, skills development and information, advice and guidance activities accordingly.
- A sector-focused approach may be integrated with place-based approaches, including to local economic development. These suggest that sectors targeted should offer good quality (as measured by wages) entry level positions, opportunities for worker career development, as well as have an economic rationale for selection (for example the sector is growing or is a particular focus of regional/local economic development strategy – as is the case typically in identification of ‘growth’, ‘key’ priority’ sectors).

While it is possible to present a plausible rationale for a sector-focused approach in seeking to reduce poverty a number of factors highlight the limits of a sector-focused approach:

- Wages and career development opportunities will in part relate to employer business models irrespective of sector. Hence within sectors there are likely to be substantial differences in prospects for moving out of poverty. This reference to business models points to the importance of demand-side policies alongside those focused on labour supply.
- The data analysis suggests that for some workers changing sector may be a better way of leaving low pay than remaining in the same sector. This suggests that there might be value in configuring a broader approach encompassing several linked sectors with possibilities for mobility – but such an approach might make employer buy-in more difficult if fears of poaching of staff are paramount. For individuals, however, it does point to the role of careers advice new entrants to the labour market and for those in employment, and suggests that there may be some value in ‘career first’ as opposed to ‘job first’ policies.
- The US data analysis point to the importance of demand across the local economy as being of key importance for moving out of low pay. This does not necessary negate the value of sector-based approaches, but rather highlights the importance of locating them in a broader local ecosystem approach.

## Appendix: Long tables

**Table A1: Probit regressions: probability of low pay, 2010-2014, UK**

	(1)	(2)	(3)
Dependent variable:	Low pay (<2/3 <sup>rd</sup> Median wage)		
Estimation method	Probit	Probit	Probit with selection equation for employment
A Agriculture, forestry and fishing	0.221*** (0.0202)	0.163*** (0.0199)	-0.0301 (0.0383)
B Mining and quarrying	-0.121*** (0.0124)	-0.0845*** (0.0131)	-0.523*** (0.0930)
D Electricity, gas, air cond supply	-0.127*** (0.00928)	-0.0984*** (0.00935)	-0.605*** (0.0790)
E Water supply, sewerage, waste	-0.0373*** (0.0126)	-0.0350*** (0.0111)	-0.144*** (0.0511)
F Construction	-0.0223*** (0.00633)	-0.0164*** (0.00596)	-0.331*** (0.0218)
G Wholesale, retail, repair of vehicles	0.244*** (0.00621)	0.120*** (0.00571)	0.381*** (0.0158)
H Transport and storage	-0.00441 (0.00644)	-0.00959 (0.00587)	-0.0796*** (0.0218)
I Accommodation and food services	0.450*** (0.00828)	0.254*** (0.00920)	0.569*** (0.0195)
J Information and communication	-0.0893*** (0.00564)	-0.0432*** (0.00661)	-0.274*** (0.0302)
K Financial and insurance activities	-0.118*** (0.00456)	-0.0952*** (0.00447)	-0.556*** (0.0314)
L Real estate activities	-0.0453*** (0.0112)	-0.0486*** (0.00967)	-0.276*** (0.0450)
M Prof, scientific, technical activ.	-0.0732*** (0.00509)	-0.0300*** (0.00581)	-0.265*** (0.0237)
N Admin and support services	0.160*** (0.00852)	0.102*** (0.00801)	0.193*** (0.0204)
O Public admin and defence	-0.137***	-0.110***	-0.585***

	(0.00341)	(0.00328)	(0.0267)
P Education	0.0197***	0.0320***	0.113***
	(0.00508)	(0.00528)	(0.0178)
R Arts, entertainment and recreation	0.155***	0.0626***	0.0527**
	(0.0110)	(0.00946)	(0.0264)
S Other service activities	0.187***	0.116***	0.0394
	(0.0110)	(0.0103)	(0.0243)
Human health	-0.0786***	-0.0755***	-0.355***
	(0.00441)	(0.00396)	(0.0218)
Residential care	0.265***	0.178***	0.546***
	(0.00949)	(0.00958)	(0.0225)
Social work	0.0510***	0.0211***	-0.00683
	(0.00801)	(0.00724)	(0.0241)
Disabled		0.0457***	0.304***
		(0.00544)	(0.0355)
UK Born		-0.0411***	-0.163***
		(0.00540)	(0.0156)
Education (Low)		0.259***	0.825***
		(0.00537)	(0.0188)
Education (medium)		0.118***	0.496***
		(0.00289)	(0.0106)
Age		-0.0305***	-0.122***
		(0.000602)	(0.00608)
Age <sup>2</sup>		0.000322***	0.00128***
		(7.31e-06)	(7.50e-05)
Non-white		0.0667***	0.179***
		(0.00548)	(0.0188)
Male		-0.0506***	-0.0832***
		(0.00257)	(0.00555)
Part-time		0.142***	0.107***
		(0.00328)	(0.00342)
Observations	129,250	127,987	273,528
Pseudo R2	0.131	0.260	
Year / quarter dummies	Yes	Yes	Yes
Region dummies	No	Yes	Yes
Observations	129,250	127,945	273,019

Pseudo R2	0.1317	0.2606	
LR Test			31.44
			0.0000
Wald Chi <sup>2</sup> -value			26756.40
			0.0000

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Note: Marginal effects presented. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: LFS 2010-14

**Table A2: Probit regressions: individual poverty probabilities (AHC), 2009-12, UK**

Dependent variables	<i>b</i>	Standard Error
(Ref: Manufacturing)		
Agriculture, forestry, fisheries	0.3584058***	0.111036
Construction_utilities	0.0836267**	0.042098
Wholesale and retail	0.2584288***	0.036236
Transport and storage	0.0937133*	0.049715
Accommodation and food services	0.4614492***	0.045432
Finance_ICT_real estate	-0.0430914	0.044013
Prof., scientific and technical	0.0259441	0.04915
Admin. and support services	0.3546351***	0.048437
Public sector_Education	-0.0506383	0.037008
Health_social work	-0.0155879	0.03975
Residential care	0.4009638***	0.050829
Other services	0.2575863***	0.047263
(Ref: All working full-time)		
Couple/one in full time, one part time	0.0798689***	0.025945
Couple, one full time one not working	0.8117466***	0.026745
No full time, one or more part time	0.9147241***	0.025826
(Ref: High qualifications)		
Medium quals	0.1063995***	0.020298
low quals	0.31578***	0.025823
(Ref: 25-34)		
Age 16 to 24	0.1098206***	0.031526
Age 35 to 44	-0.0614256**	0.02497
Age 45 to 54	-0.108009***	0.025486
Age 55 to 59	-0.2030321***	0.037861
Age 60 to 64	-0.6255409***	0.056022
(Ref: No dependent children)		
1	0.1814181***	0.025237
2	0.2014748***	0.025996
3 or more	0.3551118***	0.03616



\_cons

-2.047331\*\*\*

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Observations: 49,233. Pseudo R2. = .1340.

Controls included for year and Government Office Region.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Following good practice recommendations from the data owner, the standard errors for this and the subsequent regression have been adjusted using a bootstrapping estimation technique.<sup>27</sup>

Source: Authors' estimates from the FRS/HBAI, 2009-12

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<sup>27</sup> This approach in relation to the FRS is explained in DWP (2014b). The approach is likely to slightly overestimate the precision of estimates. Confidence intervals were also approximated using an adjustment for design effects, these confidence intervals were consistent with, but generally somewhat larger than, those yielded through bootstrapping.

**Table A3: Probit regressions: family poverty probabilities (AHC), 2009-12, UK**

Dependent variables	<i>b</i>	Standard Error
MAIN EARNER (Ref: Manufacturing)		
Construction_utilities	-0.0431569	0.053747
Wholesale and retail	0.2728735***	0.045667
Transport and storage	0.0787318	0.058956
Accommodation and food service	0.5908175***	0.061912
Finance_ICT_real estate	-0.1959348***	0.055257
Prof., scientific and technical	-0.146267**	0.066493
Admin. and support service	0.3534825***	0.060408
Public sector_Education	-0.1736477***	0.045342
Health_social work	-0.0823194	0.050428
Residential care	0.3113664***	0.069271
Other services	0.1933857***	0.062772
SECOND EARNER (Ref: Manufacturing)		
Construction_utilities	0.4162621***	0.124349
Wholesale and retail	0.2010338*	0.106003
Transport and storage	0.2636054*	0.148276
Accommodation and food service	0.4302327***	0.127133
Finance_ICT_real estate	0.0715708	0.127938
Prof., scientific and technical	0.1669417	0.135221
Admin. and support service	0.5502427***	0.119736
Public sector_Education	0.073001	0.103696
Health_social work	0.0730012	0.114693
Residential care	0.3977139***	0.129844
Other services	0.3386058***	0.125364
Not in work	1.178487***	0.093721
Single adult	0.6050984***	0.09278
(Ref: High qualification levels)		
No high quals	0.2258839***	0.024799

(Ref: 30-44)		
16-29	0.2461865***	0.033345
45-54	-0.0517748*	0.029462
55 and over	-0.4978043***	0.042695
(Ref: No children)		
1	0.1204218***	0.032954
2	0.1702716***	0.033376
3 or more	0.2880536***	0.045971
_cons	-1.250087***	

Observations 26,439. Pseudo  $R^2$  = .2029.

Controls included for Year, Region and hours worked of main earner.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Source: Authors' estimates from the FRS/HBAI, 2009-12

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## Author Details

Professor Anne Green is Professorial Fellow at the Institute for Employment Research at the University of Warwick

Dr Neil Lee is Assistant Professor in Economic Geography in the Department of Geography and Environment at the London School of Economics and Political Science

Dr Paul Sissons is a Senior Research Fellow in the Centre for Business in Society at Coventry University



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