Job displacement and the polarisation of the labour market in Northern Ireland

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Summary: Rapid advancements in artificial intelligence, robotics and other forms of automation technologies have unsurprisingly led to a re-emergence of 'automation anxiety' and suggestions by some that we are near the 'end of work'. We seek to evaluate previous employment adjustments in terms of job quality to understand how impending automation technologies may affect the quality of jobs in the future. We argue for the consideration of job quality when thinking about the impacts of automation technologies on the labour market. While much of the attention in the media has focused on job losses from advances in automation technologies, there has been little focus on the quality of jobs lost and the quality of jobs that have been 'replacing' them.

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Job Displacement

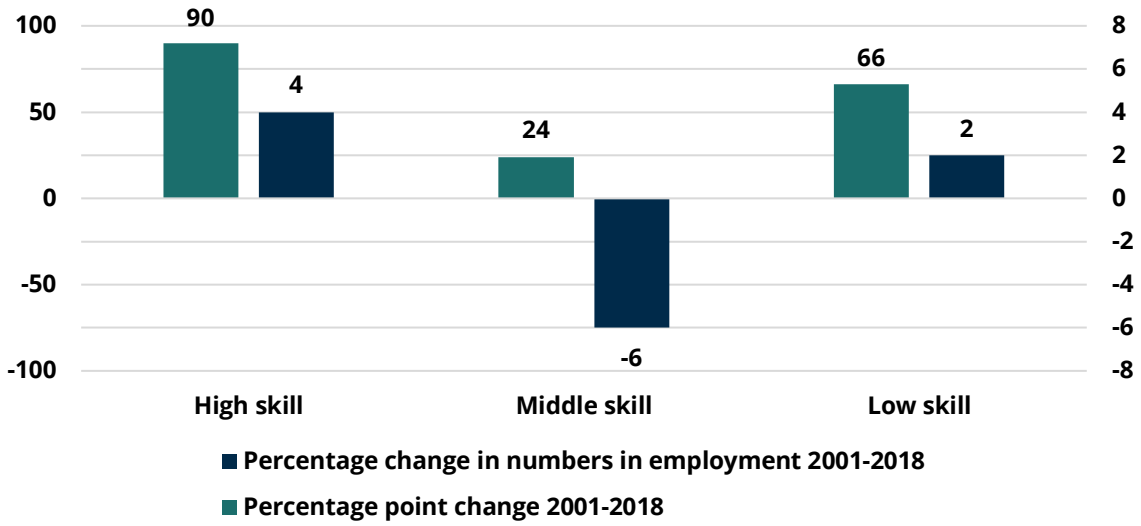
Examining evidence of the displacement of workers across occupations as a result of technological changes, we look at changes overtime in the broad occupational structure of the labour market. The first point to make is that there is no evidence of technological unemployment across each of the skill levels over the period 2001 to 2018. As shown in Figure 1, over the period 2001 to 2018 there has been a 90 per cent increase in the number of high-skilled workers, a 66 per cent increase in the number of low-skilled workers, and a 24 per cent increase in the number of middle-skilled workers.

However, what becomes clear from an examination of changes in the share of the labour market comprised of different skills levels over time is the general trend towards a polarisation of the labour market. Specifically, looking at the percentage-point change in the share of employment comprised of different broad occupational skills groups the most notable shift occurs in middle-skilled occupations, which experience substantial decline.

Importantly, however, the decline in the percentage-share of employment comprised of by middle-skill occupations has not been driven by an overall decline in the number of workers employed in middle-skill occupations, but by fact that the relative number of workers in high-skilled and low-skilled occupations has increased to a greater extent than middle-skilled occupations. Thus, while traditionally most new jobs were middle-skill jobs, this is no longer the case. New jobs are predominantly in high- and low-skilled occupations and middle-skilled occupations are being crowded out. This means that workers are more likely to find new employment in either of the opposite sides of an increasingly polarised labour market.

Thinking about this data one might lean toward the conclusion that the impact of recent technological advances has been skill-biased, in that it favours skilled labour over lower/un-skilled labour. However, while this theoretical framework is useful to some extent, it cannot explain the growth in employment amongst low-skilled occupations as evidenced in Figure 1 below. Rather, as argued in Mac Flynn and Wilson (2019) the routine-biased technological change model which argues that computers tend to substitute for workers in routine tasks that follow well-defined rule-based procedures offers a more accurate account of the data. This is because non-routine tasks tend to dominate in higher-skill and lower-skill occupations and routine tasks tend to be dominant in middle-skill occupations. Thus, we argue that the theoretical proposition of the routine-biased technological change model can more accurately describe the impact which advances in technology are already having in terms of the skills distribution of the labour force.

Figure 1: Percentage change in numbers in employment 2001-2018 & percentage-point change as a share of employment 2001-2018, by broad occupational skills group



Source: Labour force Survey

Polarisation

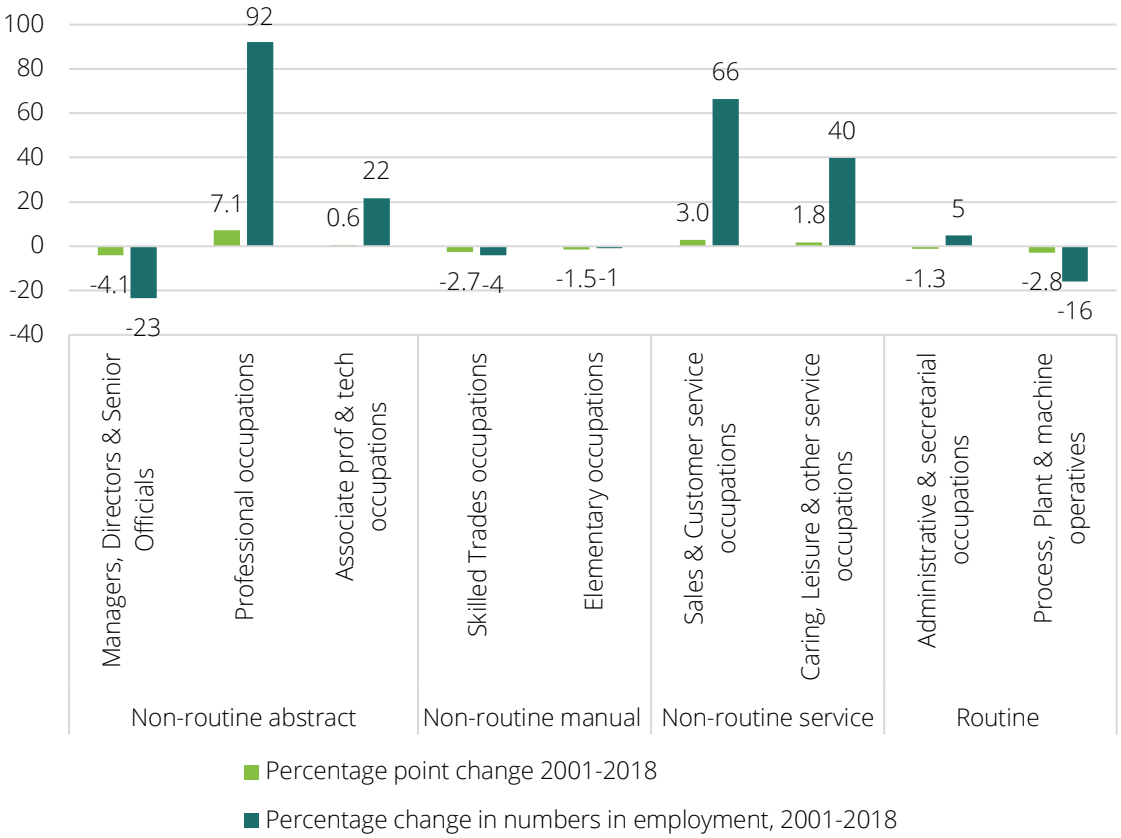
In order to further understand how technological advances are impacting upon the labour force and the nature of work Mac Flynn and Wilson (2019) examined how the labour market has been changing using the theoretical framework laid out by Autor *et al* (2003). They argue that the impact of technology for employment is not uniform across all jobs, and dependent upon the tasks involved in one's job. Specifically, Autor *et al* (2003) distinguish between occupations

which involve primarily: routine abstract/cognitive tasks, routine manual tasks; non-routine cognitive tasks; non-routine interactive tasks; and non-routine manual tasks.

Using the 2-digit SOC 2010 classification of occupations, occupations were broadly classified as being either routine or non-routine, and involving principally abstract/cognitive tasks or manual or non-routine service tasks. Those in Managerial, Director and Senior Official occupations; Professional occupations; and Associate Professional and Technical occupations are classified as involving principally non-routine abstract tasks. Those in Administrative and Secretarial occupations and those in Process, Plant and Machine operative occupations are classified as involving principally routine tasks (both abstract and manual). Those in skilled trades occupations and elementary occupations are classified as involving principally non-routine manual tasks; and personal service occupations; and sales and customer service occupations are classified as involving principally non-routine service tasks. Clearly, within these broad occupational groupings there are exceptions as to whether or not particular jobs involve routine or non-routine and abstract, manual or service tasks and so this methodological approach is by no means perfect. However, given that the approach matches broadly to the description of tasks given for broad occupational categories, it has some merit. Figure 2 charts the percentage-point change in the share of employment and the percentage change in the numbers in employment across over the period 2001 to 2018 in each of these groupings.

What is most notable from Figure 2 is the relative surge in the number of workers employed in what can broadly be classified as non-routine abstract and non-routine service occupations, albeit with the exception of a substantial decline in the numbers working in Managerial, Director or Senior Official occupations. In turn, this has reduced the share of employment accounted for in broadly routine and non-routine manual occupations. There has been a 92 per cent increase in the number of workers employed in Professional occupations, a 22 per cent increase in the numbers working in associate professional and technical occupations, a 66 per cent increase in the numbers working in Sales and Customer Service occupations, and a 40 per cent increase in the numbers working in Caring, Leisure and Other Service occupations.

Figure 2: Occupational employment Percentage-point change as a share of employment 2001-2018, Percentage change in numbers in employment 2001-2018 group



Source: Labour force Survey

The above data support the hypothesis of the routine-biased technological change model. Technological advances appear to be having a labour-saving effect in occupations whose tasks are predominantly routine and non-routine manual in nature. In contrast, there has been sharp increases in the number of jobs whose tasks are predominantly either non-routine abstract or non-routine service-orientated in nature. Thus, we ostensibly need not yet be concerned with the general decline in the numbers of jobs. Moreover, given that these jobs are estimated by Foster and Wilson (2019) to face a low risk of job loss going forward we might be tempted to conclude that the longer-term risks from automation technologies for the labour market are marginal.

However, given the occupational polarisation of the labour market one should be drawn to question the quality of the jobs being created. There is a need to question whether the overall quality of jobs is staying the same, increasing or decreasing overtime as some occupations are hollowed out and jobs are replaced in other occupations. There is also a need to give consideration to the likelihood that as the occupational structure becomes increasingly polarised, that the quality of jobs also becomes polarised into ‘good’ and ‘bad’ jobs.

Conclusion

Previous technological and other related shocks have not resulted in overall technological unemployment. They have led to a more polarised occupational structure. There has been growth in non-routine abstract and non-routine service occupations, both of which face a low risk from automation. The dilemma for policy is that, despite a lower threat of automation, these non-routine service jobs remain at the lower levels of job quality.

References

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