

Beyond tax credits and the minimum wage: the challenge of labour market inequality

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Submitted: January 2024

Funding information

Nuffield Foundation, Grant/Award Number:
WEL/43603; ESRC Centre for the Microeconomic
Analysis of Public Policy, Grant/Award Number:
ES/T014334/1

Abstract

Since the turn of the millennium, the UK has relied almost exclusively on two policies to address the adverse consequences of low pay and labour market inequality: in-work tax credits and the minimum wage. Successful as these policies have been at supporting family incomes and propping up hourly wages at the bottom, increasing numbers of less-educated workers find themselves in low-quality jobs with negligible wage growth, little training and poor career prospects. Work by itself is rarely a route to earnings progression. This paper looks at the motivation behind the expansion of in-work tax credits in the face of growing wage inequality and in-work poverty. It focuses on the impact on longer-term outcomes through human capital and skills. It argues for a balance of policies that goes beyond tax credits and the minimum wage to foster individual wage growth and improve opportunities for career progression for less-educated workers.

KEYWORDS

good jobs, inequality, minimum wages, tax credits, welfare

JEL CLASSIFICATION

D31, H31, J24, J31

1 | INTRODUCTION

It is increasingly clear that we cannot address all the concerns about labour market inequality through the tax and welfare system alone. For more than 25 years, the UK has relied on in-work tax credits to supplement low earnings combined, more recently, with an increasingly generous minimum wage.¹

¹ See Hoynes, Joyce and Waters (2023).

Despite some success in reducing in-work poverty and supporting employment, less-educated workers find themselves in jobs with negligible wage growth, little training and poor career prospects. Rates of progression up the occupational wage ladder in the early years of people's careers had tended to increase across successive generations, for both men and women – but this trend came to an end for those born in the 1980s.² This means that recent cohorts of new workers have both started lower down the occupational ladder than their predecessors and climbed it more slowly. This is against a background of high levels of earnings inequality and stagnant real wage growth.³

The UK labour market in the 21st century is characterised by high levels of earnings inequality with poor wage progression for lower-educated workers and for those in part-time work.⁴ Since the turn of the millennium, there has been growing solo self-employment, platform work and outsourcing, with low rates of on-the-job training and fewer paths to good jobs for people without university education. Employment alone has not been enough to escape poverty and low earnings for the less-educated. Moreover, for women, although increased education has reduced the gender pay gap, lower earnings have been an enduring feature of the labour market, with lower labour market attachment, more part-time work and a substantial child penalty on earnings.⁵

A well-designed policy response to these labour market inequalities will require a new take on tax credit and minimum wage policies with a refocus on human capital policies, childcare policies and labour market regulation. Drawing on some recent research from the Deaton Review⁶ and reflecting on the recommendations from the Mirrlees Review,⁷ this paper examines recent reforms to the tax and transfer system, acknowledging the changing role of families and human capital. It focuses on low earnings and less-educated workers, arguing for a new reform agenda that goes *beyond* tax credits and the minimum wage.

Looking back at some of the major welfare-to-work and in-work benefit reforms, the inspiration for policy research on tax and transfer design for low earners has its foundation in some of the most influential studies in public finance, notably the remarkable sequence of contributions by James Mirrlees, Peter Diamond, Anthony Atkinson and Emmanuel Saez.⁸ Between them, these authors produced path-breaking analysis of the key trade-offs, of the design of effective tax rates and the tax base, and of welfare benefit take-up. Although much of the focus in policy research has moved toward longer-term impacts and an integration of welfare reform with other public policies, the insights from this work remain central to policy design.

The work of James Mirrlees transformed the principles of tax design, deepening knowledge of some of the most important issues in microeconomic policy by solving questions conceived in terms of the limited information of governments about taxpayers. In so doing, he demonstrated how to characterise the analysis of redistributive objectives together with incentive effects in the design of general tax systems and, more broadly, of public policy. The Mirrleesian framework for income tax design has been enormously influential in the practical redesign of tax and welfare systems across the income distribution. Contributions such as Diamond (1998) and Saez (2001) have done much to facilitate a synthesis with the results of applied work. A direct example is the research of Brewer, Saez and Shephard (2010) for the Mirrlees Review, which, building on the work of Saez (2002), pointed to a reform of the UK tax system with high marginal tax rates on top earners and an integrated tax and transfer system for lower-earning families. It included a reformed tax credit system, based on an earned income tax credit (EITC), with negative marginal tax rates at the bottom of the income

² See Blundell, Costa Dias, Joyce and Norris Keiller (2020).

³ See Giupponi and Machin (2022).

⁴ See Cribb, Joyce and Wernham (2023).

⁵ See Andrew et al. (2023).

⁶ The IFS Deaton Review of Inequalities, <https://ifs.org.uk/inequality/>.

⁷ The IFS Mirrlees Review, <https://ifs.org.uk/mirrlees-review>.

⁸ References: Mirrlees (1971, 1976 and 1986), Diamond and Mirrlees (1971a and 1971b), Diamond (1980 and 1998), Atkinson and Stiglitz (1976), Atkinson (1997) and Saez (2001 and 2002).

distribution and a smaller guaranteed income for non-workers – a balance of redistributive aims with effort incentives in a comprehensive reform of UK personal income taxation, which became a central plank of the Mirrlees Review recommendations.⁹

The motivation behind the expansion of tax credits for working-age adults reflected an alignment between government policy to support work and the new empirical public finance arguments for tax and welfare-benefit reform, providing a coherent driving force behind the policy directions in the US, the UK and elsewhere.¹⁰ The idea of this reform agenda was to address the ‘iron triangle’ of welfare reform – i.e. the three, often conflicting, goals of raising the living standards of those on low incomes, encouraging work and economic self-sufficiency, and keeping government expenditures low.¹¹

Empirical research partially supported this view and documented positive employment impacts from tax credit expansions, especially for low-income single mothers, a key group following growing concerns about child poverty in the early 1990s.¹² The OECD, in its 2011 report, noted that 17 European economies had adopted some form of earned income tax credit by 2010. As Laun (2019) noted:

Based on the evidence from the early policy schemes, primarily in the US and the UK, in-work benefits have been regarded a successful measure to achieve both of these goals [increasing employment among low-income workers and redistributing income to the poor]. This led many European countries to introduce in-work benefits in the 2000s. These schemes were often less targeted towards families with children and low-income workers compared to the original in-work benefits schemes, and have typically stressed employment goals rather than poverty reduction.

To derive an optimal earned income subsidy for low-wage earners, of the kind that characterises most tax credit systems, required an extension of the original Mirrlees (1971) results and stemmed from the incorporation of the extensive margin decision, decisions at the employment participation margin – whether or not to take a job.¹³ Decisions at the extensive margin are clearly distinct from choices over hours of work, or work effort choices, which measure the intensity of labour supply once in a job.¹⁴ With participation effects, negative effective tax rates can be optimal and justify the wage subsidy underlying many earned income tax credit reforms. Since the long history of labour supply estimates¹⁵ suggested that, for some key groups of workers, the extensive margin is *more* responsive to incentives than the intensive margin, empirical analyses of taxation suggested an ‘optimal’ move in this direction. The key target group for the reforms was single parents with younger children, where redistributive policies targeted towards reducing child poverty had, somewhat unintentionally, created high effective tax rates for parents at the work margin.

However, women’s labour supply decisions are influenced by taxes and benefits at the intensive margin – hours of work – as well as at the extensive margin. Hours of work of parents become more sensitive as children grow older and parents are already in some form of employment.¹⁶ Consequently, earnings subsidies appear best targeted at parents with younger school-age children, where the employment decision is most sensitive. The impact of other income, from a spouse or unearned income

⁹ Mirrlees et al., 2011.

¹⁰ See Blundell and Hoynes (2004).

¹¹ See Blundell (2001).

¹² See Blundell, Duncan, McCrae and Meghir (2000), Hotz and Scholz (2003) and the overview by Hoynes (2019).

¹³ See Saez (2002) and the discussion in Choné and Laroque (2011).

¹⁴ The important empirical patterns in this distinction between the extensive and intensive margins of labour supply are documented in Blundell, Bozio and Laroque (2011).

¹⁵ See Blundell and Macurdy (1999) for an early survey.

¹⁶ See Blundell and Shephard (2012). See also Kline and Tartari (2016), who show that welfare programmes can have important impacts on labour supply but reducing labour supply at the intensive margin to ensure eligibility remains important.

sources, also appears largest for this group.¹⁷ All this implies a focus on lower effective tax rates at the extensive margin when children are young, with a shift toward lower marginal tax rates at the intensive margin as children grow older and decisions over full-time work become more salient.

Empirical work on trend increases in female labour supply, and the resulting estimated labour supply elasticities, suggest a declining role for earnings subsidies as an ‘optimal’ mechanism for promoting labour supply and reducing labour market inequality. For example, Blau and Kahn (2017) note, in their analysis of the US, ‘the dramatic reduction in women’s own wage elasticity. And, continuing past trends, women’s labor supply also became less responsive to their husbands’ wages’. Once a life-cycle view is taken, longer-run impacts on human capital and earnings progression become more important. Looking at individual earnings growth over the working life provides a new perspective on the nature of labour market inequality and on the type of policies that might best address the adverse impacts of such inequalities.

Accounting for human capital incentives and incentives for earnings progression is the main focus of this paper. The next section examines the impact of tax credit policy on incentives for work, effort and earnings progression. This is followed by a deep dive into the role of labour market experience – ‘learning by doing’ – in generating earnings progression for workers with different educational backgrounds. It explores the relative pay-off of part-time and full-time work. Part-time work is particularly relevant for women with young children in the UK and is a key determinant of the child penalty in the earnings gap for mothers. The discussion then moves on to the role of active training. As Heckman, Lochner and Cossa (2003) note, different tax credit designs have different incentives for work experience and for training and, consequently, different effects on earnings progression.

The match of skills and firms is the final step in the discussion. Work experience alone is insufficient for progression. Rather, it is the occupation and firm match with the individual skills and training that matters. As Autor, Levy and Murnane (2003) pointed out more than two decades ago, the skills content of jobs has changed enormously, with evidence of a move to lower-skilled service jobs at the bottom.¹⁸ Consequently, the skills developed in training matter. Firms play at least two potential important roles. The first is to provide an occupation match for the worker. The second is to provide the other workers in the firm, for whom the worker may find complementarities. Both can be routes to higher pay and wage progression.

The paper concludes by asking ‘Was the tax credit expansion a failed reform agenda?’. The analysis suggests not so much a failed agenda but one that has turned out to be too narrow. By increasingly focusing on the two ‘static’ policies of tax credits and minimum wages, attention pivoted toward work and low earnings and away from job quality, human capital investments, career progression and individual wage growth.¹⁹ It is a balance across all these policies that provides a better direction for policy design.

2 | TAX CREDITS, LABOUR SUPPLY AND WAGE GROWTH

The series of reforms in the 1990s and 2000s highlight the popular move toward in-work support in the tax and welfare systems, especially in the UK, the US and Canada. In the UK, the working families’ tax credit (WFTC) reform in 1999 signalled an increase in the generosity of in-work benefits in the UK, especially those directed toward working adults with children. The EITC expansion and the welfare reforms in the US in the early 1990s, following an initial expansion in the mid 1980s,

¹⁷ See also Blundell, Duncan and Meghir (1998) and Meghir and Phillips (2010).

¹⁸ See Autor and Dorn (2013).

¹⁹ There are other important impacts that are key to any evaluation of cash transfers and in-work tax credits. Perhaps for transfers directed to families with children, the most important is the impact on longer-term child outcomes. There is increasing evidence that transfers to families have a beneficial impact on children’s achievement and earnings (Dahl and Lochner, 2012; Bailey et al., 2022), although to date there is less evidence for the UK.

drew wide acknowledgement that tax credit policy could be a successful mechanism for reducing the poor work incentives in standard welfare programmes while still supporting low-earning families and enhancing employment.²⁰ In Canada, the 1990s saw the design of a random control treatment for a work-conditioned welfare supplement, the Self-Sufficiency Program (SSP).²¹ The finding of a significant positive employment impact for single mothers on welfare who were randomised into the SSP treatment was a major motivation for the expansion of work-conditioned financial incentives in the UK. It showed that single mothers with poor labour market attachment and low wages could be incentivised into work. These early tax credit reforms enjoyed broad cross-party political support in both the US and the UK.

The early optimism for these reforms, involving the introduction and/or expansion of work-conditioned tax credits, was not only based on increasing employment and hours but also on the premise that increased labour supply would lead to earnings progression, taking poor working families out of the transfer system and into self-sufficiency. The aptly named Self-Sufficiency Program in Canada was a key example.²² However, a note of caution about longer-run earnings and employment effects was already evident. In their assessment of the SSP, Card and Hyslop (2005) noted that ‘despite the extra work effort generated by SSP, the program had no lasting impact on wages and little or no long-run effect on welfare participation’. Although some studies found tax credit recipients did not end up in worse jobs,²³ research has increasingly focused on assessing dynamic impacts and found few, if any, positive longer-term labour market impacts. In the UK, for example, employment especially in part-time work for low-wage workers has been found to lead to little earnings growth, yet tax credits in the UK incentivised part-time work.²⁴

Poor wage progression across the working life for those without university-level qualifications has been recorded in many empirical studies dating back to the 1974 volume by Mincer on schooling, experience and earnings, and shown across a wide range of developed and developing economies.²⁵ For the UK, Figure 1 shows average hourly age–wage profiles split by education level and gender.

Rather than addressing the underlying causes of low wages and poor progression, policies to counter low pay in the UK have increasingly focused on short-run strategies, notably tax credits and the minimum wage. This is particularly evident in the late 1990s and early 2000s, when the UK saw a large and deliberate increase in fiscal redistribution. One key focus of those reforms was families with children, where the aim was to expand the generosity of work-conditioned benefits for families with low labour market earnings.²⁶ Over this period, benefit incomes grew strongly despite the large reductions in household worklessness. There were also rises in the minimum wage, which was introduced for the first time in the UK in 1999. A change in the direction of UK policy reform followed the Great Recession and, since 2010, the value of in-work transfers has been scaled back with an increasing reliance on the minimum wage. This was despite evidence that minimum hourly wages are a relatively poor mechanism for targeting low-income families in the UK.²⁷ Nonetheless, tax credits in the form of cash benefits for low-earning families provided through universal credit remain a key pillar of the UK welfare system.²⁸

On the face of it, these policies look to have been successful in maintaining family incomes and propping up hourly wages at the bottom. Indeed, Cribb, Joyce and Wernham (2023) show there is

²⁰ See Hotz and Scholz (2003) and Eissa and Hoynes (2006).

²¹ See Card and Robins (1998).

²² See Bitler, Gelbach and Hoynes (2008).

²³ See Dahl, DeLeire and Schwabish (2009).

²⁴ See Blundell, Costa Dias, Meghir and Shaw (2016).

²⁵ See, for example, Lagakos et al. (2018).

²⁶ See Hoynes, Joyce and Waters (2023).

²⁷ See Cribb et al. (2021).

²⁸ They saw further enhancement, albeit temporary, during the COVID-19 pandemic (Blundell, Costa Dias, Cribb, Joyce, Waters, Wernham and Xu, 2022).



FIGURE 1 Age-wage profiles by education and gender in the UK

Note: Average hourly wages, deflated using the Consumer Prices Index (CPI) and expressed in January 2016 prices. Individuals in the bottom two and top one percentiles of the gender- and year-specific hourly wage distributions are excluded. Education is measured by the highest level of qualification and the data are drawn from the Labour Force Survey (LFS), 1993Q1–2018Q4.

Source: Blundell, Costa Dias, Joyce and Norris Keiller, 2020.

little evidence of increasing inequality in family disposable incomes over the past 25 years in the UK, at least if we exclude the top percentiles of the distribution. However, looking beneath these headline figures uncovers evidence that less-educated workers find themselves in low-quality jobs with negligible wage growth, little training and poor career prospects.²⁹ Poor wage progression is a key issue for labour market inequality as differences in career earnings profiles result in large pay gaps by education and by gender by the age of 40. A static analysis of tax credit reform tends to put too much weight on short-run labour supply incentives and cross-sectional inequality. Inequality over the working life and low earnings progression also reflect low human capital investments and a paucity of matches with firms that provide training or career progression. Indeed, the strongly skewed distribution of firm productivity in the UK³⁰ points to a scarcity of workplaces that provide high-productivity jobs – something we will return to below.

Despite a positive employment effect, tax credits can result in negative incentives for wage progression and human capital investment, just as they can provide an incentive for fewer hours of work conditional on working, reducing the chance of longer-run self-sufficiency. As Heckman, Lochner and Cossa (2003) note, this will depend on the exact tax rate structure. It will also depend on the relative importance of the passive return to work experience, through ‘learning by doing’ at work, in comparison with the return to ‘active’ training investments, which require a ‘learning or doing’ trade-off. Part-time working is likely to reduce the impact of learning by doing. There is also strong evidence that workplace-based training that leads to a vocational qualification is the most effective active investment, at least for those with relatively low formal education levels.³¹

Even if tax credits are neutral to wage progression, by themselves they will simply maintain the low rates of progression we see among low-educated workers and workers in part-time work or with low attachment to the labour market. If the aim of tax credits is to incentivise work then progression is the main means by which individuals, once in work, can earn their way out of low incomes. As

²⁹ Although not the focus of discussion in this paper, a group in the labour market that requires particular attention is the self-employed, especially those who have no employees of their own (the solo self-employed). Giupponi and Machin (2022) show that this group has grown strongly in the UK over the last two decades. Solo self-employment for lower-educated workers is also strongly associated with low wages and low rates of training. The solo self-employed fall outside the minimum wage system and are ineligible for sickness benefits. Additionally, they do not pay employer or employee social security contributions. There is a clear need for reform. This is best seen as part of a reform agenda for a more coherent tax system that aligns the taxation of different sources of income and removes some of the most obvious distortions in the tax system; see the discussion by Delestre et al. (2022) in the IFS Deaton Review.

³⁰ See De Loecker, Obermeier and Van Reenen (2023).

³¹ See Blundell, Dearden and Meghir (1996) and references therein.

we will see from the analysis in the next section, estimates of the causal impact of work experience on wage growth for low-educated workers have been disappointingly small – partly because a good level of initial education seems to be a prerequisite for earnings progression once in work and partly because, as we will see, many recipients are incentivised to join the labour market but keep only a loose attachment through part-time work or infrequent work spells.

3 | THE IMPACT OF LABOUR MARKET EXPERIENCE ON WAGES

In this section, we focus on the wage returns to employment and to part-time work, and how these returns differ by gender and by education group. Drawing on work that exploits household panel data from the UK, we highlight a strong complementarity with education, with much lower returns to work experience for lower-educated workers and also for part-time work. This suggests that employment alone, certainly in part-time work, is unlikely to be a route out of low earnings. Consequently, low returns to experience for the low-educated, and the adverse impact of part-time work, limit the effectiveness of in-work benefits and tax credits and suggest little incentive for active investment in progression by workers or firms. In Sections 4 and 5, we look at whether investment in training can make a difference and whether the nature of the occupation and of the firm matter.

Understanding the ‘causal’ impact of education, work experience and part-time work on individual wage growth requires a detailed analysis of longitudinal data, following individual workers through time, together with exogenous changes in incentives for part-time and full-time work. Blundell, Costa Dias, Meghir and Shaw (2016) is one such study and is used as the key reference in the results reported on here. That study uses the BHPS panel (the British Household Panel Survey component of the UK Household Longitudinal Study), which has collected detailed longitudinal data on British households since 1991. At its core is an annual face-to-face interview that records detailed measures of education qualifications, individual training, labour supply, childcare, family demographics, incomes and assets. It is also linked to life histories for panel members that capture circumstances at age 16, with detailed family background characteristics, including measures of parental education, number of siblings, sibling order, whether lived with parents, books at home as a child, financial conditions of family, etc. The panel can be input into the IFS TAXBEN budget constraint simulation model for every family in every year.³² This allows reasonably accurate measurement of individual taxes – including personal income tax, employee social security contributions, council tax and working tax credits (in-work benefits) – and welfare benefits, including child benefit, income support, housing benefit and, more recently, universal credit.

The patterns of the age–wage profiles in Figure 1 have already suggested that wage returns to experience are *complementary* with education. People who have benefited from educational investments see a higher wage level with higher wage growth through their working life. On average, lower-educated men experience more lifetime growth in wages than lower-educated women, partly due to the prevalence of part-time work among women, but the wage profiles for lower-educated men remain poor. The growing incidence of part-time work for lower-wage men, documented in Blundell (2022), will have a role in this, although part-time work remains at a much lower level for men than for women. Using the BHPS data, Figure 2 highlights women’s lower labour market attachment during the child-rearing years. The left-hand panel shows a large fall in employment, especially for lower-educated women, while the right-hand panel indicates that this is partially offset by a rise in part-time work.

The tax credit system in Britain has, until very recently, placed a financial incentive on part-time work through a ‘16 hours per week’ work eligibility threshold for tax credit receipt.³³ Part

³² TAXBEN is a tax and benefit microsimulation model that calculates the tax liabilities and benefit entitlements for individual households, given detailed information about those households. See Waters (2017).

³³ See Blundell and Hoynes (2004).



FIGURE 2 Female employment and part-time work by age and education

Note: Plots are for all women in the BHPS.

Source: Blundell, Costa Dias, Meghir and Shaw, 2016.

of the motivation for the WFTC, the British variant of the EITC, was to preserve labour market attachment and reduce skill depreciation for women. At the time, part-time work was thought to be an effective way to achieve this.³⁴ Although the ‘minimum hours eligibility’ rules have been eliminated in universal credit (which recently replaced working tax credits), in-work support still gives a financial incentive to take a low-hours job.³⁵

The part-time incentives that have characterised the British tax credit system are clearly reflected in the actual behaviour of weekly working hours, as can be seen in Figure 3 which plots the histogram of working hours for single women aged 18–45. It uses the years 1991, 1995 and 2002 because there was no ‘16 hours per week’ incentive in 1991,³⁶ there was a small incentive at 16 hours in the 1995 tax credit system, and the incentive had become much more substantial by 2002 following the WFTC reform in 2000.³⁷ The left-hand side of Figure 3 presents the histograms for single mothers, who are the eligible group, while on the right-hand side are comparable single women who were ineligible for the in-work supplement.

Finding that the sharp incentives to work specific weekly hours in the tax and welfare system show up in actual behaviour is important – not just because it can provide exogenous variation in incentives for part-time and full-time work, but also because the take-up of welfare benefits and tax credits is always a concern in measuring the impact of policy changes on labour supply and on family incomes.³⁸ The salience of specific incentives is often argued to be low due to information frictions and an inability to change behaviour.³⁹ This appears less relevant in the UK context, where in-work tax credits are delivered at a higher frequency and are more responsive to changes in family circumstances. Nonetheless, take-up rates in the UK remain substantially less than 100 per cent.⁴⁰

³⁴ See Blundell (2001).

³⁵ See Hoynes, Joyce and Waters (2023).

³⁶ Before 1992, there was a small financial incentive threshold at 24 hours per week.

³⁷ See Blundell and Shephard (2012) for detailed references to the changes in the British tax credit system over this period.

³⁸ See Keane and Moffitt (1998) and Blundell, Duncan, McCrae and Meghir (2000).

³⁹ See the analysis of the EITC in Chetty, Friedman and Saez (2013) and Chetty and Saez (2013).

⁴⁰ See Hoynes, Joyce and Waters (2023).

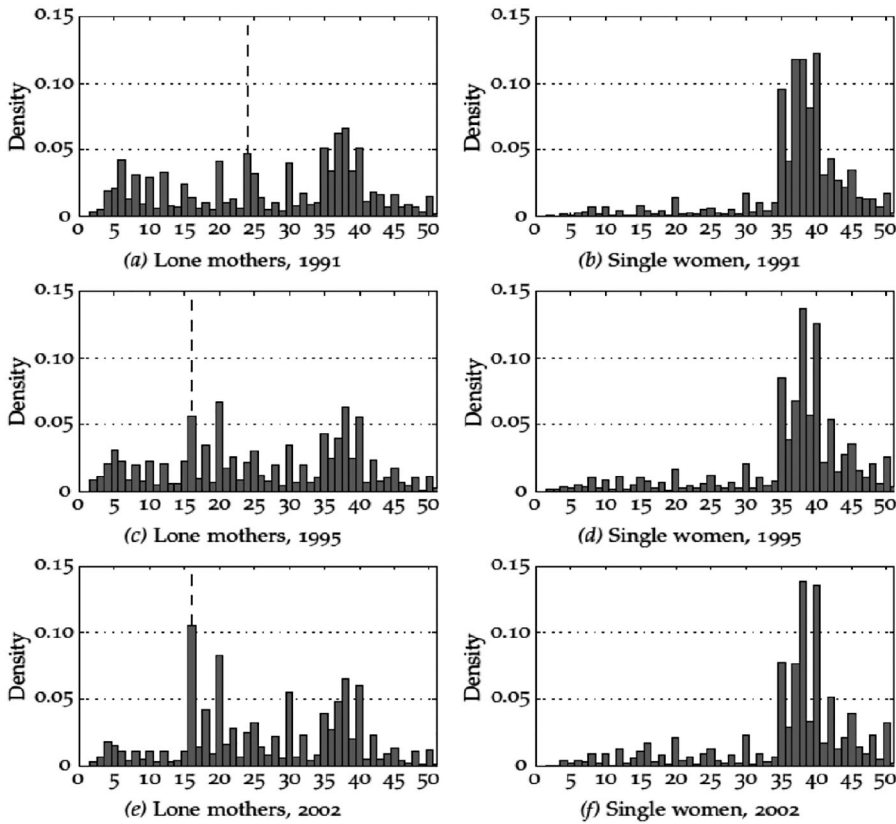


FIGURE 3 Distribution of usual hours of work for women, by year and presence of children

Note: Horizontal axes measure weekly hours of work; the vertical dashed lines in the left panel indicate the minimum hours eligibility. Sample is restricted to women aged 18–45. Calculated using UK Labour Force Survey data (for 1991) and UK Quarterly Labour Force Survey data (for 1995 and 2002).

Source: Blundell and Shephard, 2012.

To estimate the impact of education and work experience on wage progression, it is useful to form a summary measure of how past experience accumulates into a stock of ‘experience capital’. Experience capital is a form of human capital that depends on work experience. In the specification examined here, experience capital is allowed to depreciate and to differ across individuals with different levels of education. In the initial baseline model, there is no active investment in training. This is the pure learning-by-doing formulation of on-the-job human capital investment.⁴¹ We introduce training investments in the next section.

The empirical results focus on women, who (as we have already seen) exhibit large variation in employment and the amount of part-time work they do. It was single women with children who were the main target of the in-work tax credit expansions. The variation in hours per week allows us to recover more precise estimates of the impact of work experience on wage profiles. For any individual i of education s and age t , we write accumulated experience capital κ_{ist} as

$$\kappa_{ist} = \kappa_{is,t-1} (1 - \delta_s) + \alpha_{1s} FT_{i,t-1} + \alpha_{2s} PT_{i,t-1}, \quad (1)$$

⁴¹ See Becker (1964) and Ben Porath (1967).

where δ_s is the depreciation rate for a worker of education level s , and α_{1s} and α_{2s} measure the impact of full-time and part-time work on experience capital. Parameters δ_s and α_{2s} are estimated, while α_{1s} is normalised to unity.

In addition to experience capital, the log wage $\ln w_{ist}$ for any woman will depend on education, age, other observable background factors x_i (which include family financial circumstances, family social environment, etc.) and unobservable measures of skills and individual unobserved heterogeneity ω_i :

$$\ln w_{ist} = \ln W_{st} + \gamma_{0s}(x_i) + \gamma_{1s}(x_i) \ln(\kappa_{ist} + 1) + \omega_i + \nu_{ist} + \xi_{ist}, \quad (2)$$

where W_{st} is a baseline wage by education and age. The parameterisation of the experience capital term, $\ln(\kappa_{ist} + 1)$, is chosen to fit the wage profiles for women,⁴² and the coefficients $\gamma_{1s}(x_i)$ are allowed to depend on education level and family background characteristics. In addition to individual heterogeneity represented by ω_i , the log wage equation (2) includes persistent shocks $\nu_{ist} = \rho_s \nu_{is,t-1} + \mu_{ist}$ and random shocks ξ_{ist} . For estimation, Blundell, Costa Dias, Meghir and Shaw (2016) embed wage equation (2) within a dynamic discrete choice model of employment and part-time work. To address selection bias and the endogeneity of part-time work and experience, they use simulated tax instruments.

The key findings from this empirical research show a strong impact of education on the role of work experience. For the highest education group, the mean value of the coefficient on experience, γ_{1s} , was almost twice the value of the estimate for the lowest education group. Experience capital was found to depreciate relatively fast, with rates in the 6–8 per cent range across education groups. The results also point to a very small causal impact of part-time work on wage progression, with the part-time coefficient estimate, α_{2s} , closer to 0.1 than to the 0.5 it would be if part-time work was worth 50 per cent of the experience capital of full-time work.

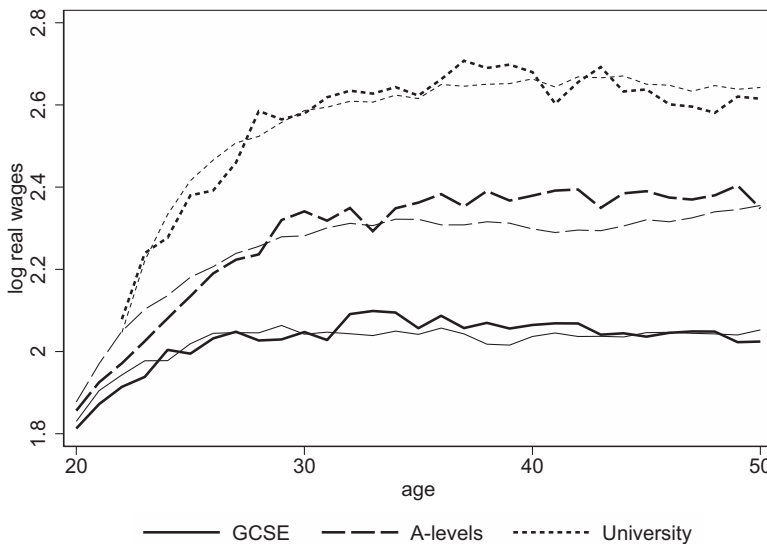


FIGURE 4 Female wage profiles by age and education: model fit

Note: Estimation is for all women in the BHPS. Interactions with background factors are included. BHPS versus simulated data, in bold and light lines respectively.

Source: Blundell, Costa Dias, Meghir and Shaw, 2016.

⁴² See Blundell, Costa Dias, Meghir and Shaw (2016).

In summary, returns to work experience show a strong complementarity with education, with much lower returns to work experience for the lower-educated and also for part-time work. The implied wage profiles for each education group are presented in Figure 4 alongside the descriptive data plot. The estimated model is also shown to replicate the employment profiles over the working life.

These results have strong implications for tax credit reform and expansion. The importance of low returns to experience for the low-educated, and the adverse impact of part-time work, limit the longer-run effectiveness of these reforms. We will draw these implications out in the final section. But first we examine the role of on-the-job training and then the importance of firms and specific skills.

4 | TRAINING AND WAGE PROGRESSION

Work-related training levels for workers with few education qualifications in the UK are low. This is clear from Figure 5, which uses the training questions in the BHPS data to plot the proportion of workers involved in substantive non-induction training – i.e. training of at least 50 hours per year – across their working life by gender and by the three education groups used in the previous discussion. The data suggest a strong complementarity of training with initial levels of education. For men, the monotonic decline with age follows a standard ‘Becker–Ben-Porath’-style pattern, with most investments occurring early in the working life. For women the story is different. A second peak in training intensity can be seen to occur at ages when they return to work as their children start full-time schooling.

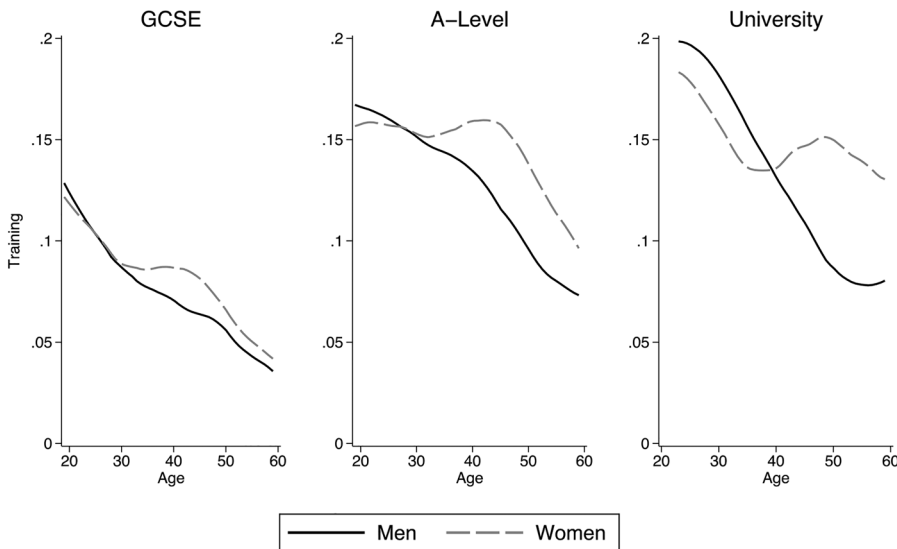


FIGURE 5 Training rates over the life cycle, by education and gender

Note: BHPS data for years 1991–2008. The training variable is an indicator for having had 50 or more hours of work-related training over the last 12 months. Lines are smoothed using an Epanechnikov kernel.

Source: Blundell, Costa Dias, Goll and Meghir, 2021.

The empirical analysis of the impact of training on labour market earnings has found mixed results.⁴³ Earlier work for Great Britain documented a significant impact for qualification-based work-related training.⁴⁴ As Figure 5 shows, training investments are already low for the less-educated. It is therefore unlikely that post-school training adds very much, on average, to overall human capital for the less-educated. Nonetheless, training may still have an impact for those who receive substantive investments, and the increase in training intensity for women in their late 30s suggests further investigation is warranted.

Blundell, Costa-Dias, Goll and Meghir (2021) exploit the pattern of training in the BHPS data shown in Figure 5, together with the implicit incentives for investments in training in the tax credit and welfare benefit system noted by Heckman, Lochner and Cossa (2003), to explore the causal impact of training investments on wages. In this analysis, the expression for the stock of human capital in panel data model (1) is extended to include a binary indicator, $D_{i,t-1}$, for training investment of at least 50 hours of training in the prior year, to become

$$\kappa_{ist} = \kappa_{is,t-1} (1 - \delta_s) + FT_{i,t-1} + \alpha_{2s} PT_{i,t-1} + \tau_s D_{i,t-1}. \quad (3)$$

The results from that BHPS study find a significant impact of training, τ_s , even *conditional* on education, experience, family background, persistent shocks and heterogeneity. Particularly strong effects are documented for the middle education group (those with some education qualifications but who did not complete a college education), where the estimated returns are found to be equivalent to those for formal education. For women in this middle education group, training is shown to partially offset human capital depreciation from lost work experience and partially reverse the gender wage gap.

This analysis suggests there is room for a closer integration between in-work welfare programmes and training policy. Moffitt (2023) makes a case for integration in his article for the IFS Deaton Review. Blundell, Costa-Dias, Goll and Meghir (2021) show that a revenue-neutral subsidy for work-related qualification training can be designed to provide an incentive for progression. We return to this in the concluding section of this paper.

5 | THE ROLE OF FIRMS AND SOCIAL SKILLS

The empirical results of the previous sections have shown that, on average, less-educated workers in the UK have lower levels of human capital not just in terms of their formal education qualifications but also in terms of work experience capital and on-the-job training. There is heterogeneity though in wage progression among lower-educated workers and, although for most the age–wage profile is weak, some have steeper profiles. In this section, we dig deeper into why some lower-educated workers experience faster wage growth over their working life. We draw on the results of Aghion et al. (2023), who use worker–firm data for the UK to examine the role of skills, measured through the task content of occupations, in determining wage progression.

The focus is on ‘social skills’, which have become of increasing interest in understanding the ingredients of success in the labour market. For example, Deming (2017) suggests that the evidence is overwhelming that these skills – a subset of what are generally called ‘non-cognitive skills’ – are important drivers of success in school and in adult life. He points to the early work of Heckman and Kautz (2012). Analytical skills remain important but there is a significant role for social skills and personal interaction.⁴⁵ Deming notes the value of teamwork and suggests social skills increase

⁴³ See McCall, Smith and Wunsch (2016).

⁴⁴ See Blundell, Dearden and Meghir (1996) and Blundell, Dearden, Meghir and Sianesi (1999).

⁴⁵ See also Weinberger (2014), Cortes, Jaimovich and Siu (2021) and Edin et al. (2022).

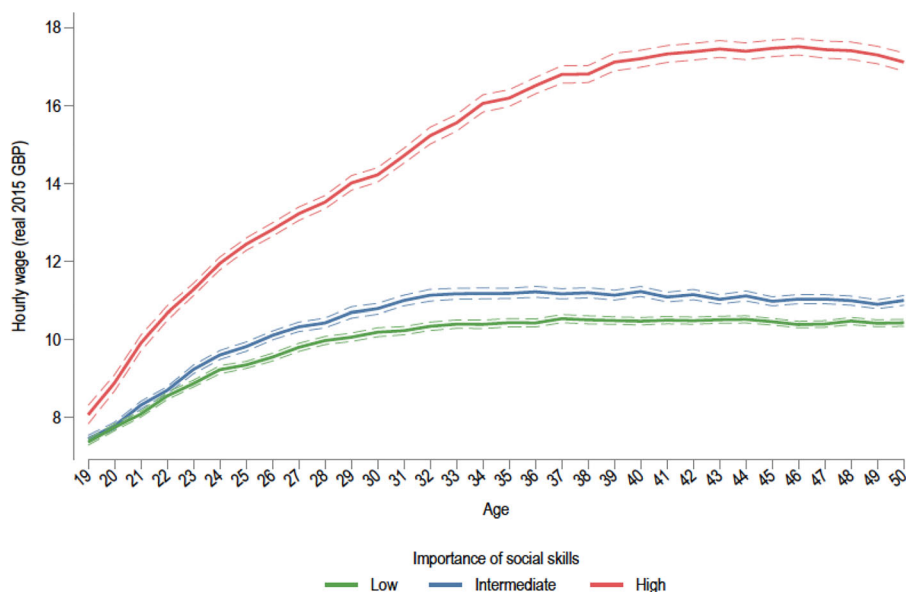


FIGURE 6 Wage profiles by age and social skill intensity for less-educated workers

Note: Data from Annual Survey of Hours and Employment (ASHE) 2004–19. Figure shows average hourly wage by age for low-educated workers in private sector firms, with education levels drawn from the linked 2011 Census data and with occupations split by the social skills index into three equal bins.

Source: Aghion et al., 2023.

productivity because they reduce the cost of trading tasks with other workers. Effective teamwork requires a complex and context-dependent understanding of team members and their likely responses to a wide range of scenarios. This is intuitive for most people, but it is very difficult to codify as a set of explicit instructions. This idea that social skills cannot easily be replaced with automation is a plus, as noted in Autor, Mindell and Reynolds (2022), but also a downside since, unlike STEM subjects, social skills are difficult to measure and verify. The fact that we see little formal training in social skills confirms the idea that they are difficult to formally measure outside direct engagement at the workplace.

Aghion et al. (2023) highlight the potential value of social skills for lower-educated workers and the way they can be used to lift wage progression. To show this, they use UK worker–firm data, collected from firms based on tax records, matched with Census data and merged at the four-digit occupation level with O*NET measurements of occupational tasks. The measure of social skills used relates to a specific set of occupational tasks including teamwork, coordination and problem sensitivity. These are used to construct a single index of the importance of ‘social skills’ across all occupations. A comparison with the European Work Conditions Survey shows this index of social skill intensity is positively correlated with a host of measurements that workers associate with good jobs. A similar analysis shows that social skill intensity is associated with higher levels of training.

Turning to the relationship between social skills and wage progression itself, Figure 6 shows a plot of wage progression by age for lower-educated workers, split by three levels of the social skill index. It shows clearly that low-educated workers in occupations that require ‘social skills’ experience higher wage progression.

Aghion et al. (2023) take the analysis further by estimating a panel data model for individual wages using the matched worker–firm data. The wage specifications extend the panel data wage equations, such as (2), by including the social skill intensity occupation index interacted with worker tenure at the firm and a set of characteristics of the firm. The empirical results show that lower-educated workers

in occupations that involve a high level of social-skill tasks experience steeper wage–tenure profiles. The results also establish that wage progression is stronger for low-educated workers when they are employed in firms with a large share of high-educated workers.

This research paints a picture of low wage progression and low labour market experience for less-educated workers. The empirical results also suggest that steeper profiles are possible through work-related training, especially if the worker is matched with a job that involves social skills in a firm that also employs high-educated workers. Of course, cognitive skills matter too, but social skills are an important dimension of productive human capital for lower-educated workers.

6 | BEYOND TAX CREDITS AND THE MINIMUM WAGE

If we take a step back and reflect on the material presented in this paper, it seems reasonable to ask whether the expansion of in-work tax credits over the past 25 years has been a failed agenda. The answer is clearly no. But was it enough to address the growing concerns over inequality in the labour market? Clearly not. By focusing on in-work cash support, it failed to tackle increasing evidence of poor job quality, low levels of human capital investment, stalling career progression and low levels of individual wage growth. The recent shift of focus toward a more generous minimum wage, although raising hourly wages, did little to address these longer-term concerns. Therefore, despite these two policies, the majority of less-educated workers in the UK find themselves in jobs with negligible wage growth, little training and poor career prospects.

By supplementing low earnings with cash transfers from the state, in-work tax credits are a successful insurance policy to short-run fluctuations in labour market earnings but are unlikely to be sufficient in the longer run to address poor career progression experienced by less-educated workers – especially in comparison with their more-educated peers, who enjoy much steeper lifetime earnings profiles and typically more satisfying jobs.⁴⁶ Flatter lifetime earnings profiles are also a characteristic of women with children, reinforcing the gender pay gap. Differences in earnings progression across different groups in society are therefore an important driver of key labour market inequalities.

How should we design a policy mix to address these longer-term concerns about labour market inequalities? We have seen that in-work tax credits are successful in encouraging employment and offsetting adverse means-testing incentives that characterise many welfare programmes. They are also well targeted to support low-earning families. However, tax credits by themselves produce little incentive for wage progression or ‘self-sufficiency’. They may also be exploited by firms which, given local labour market conditions and in the knowledge that earnings will be supplemented by the state, find they can lower offered wages and still maintain the supply of workers to the firm.

Minimum wages clearly have a role to play. Although there is little direct incentive for earnings growth and career progression, the minimum wage can mitigate monopsony wage-setting by employers and consequently help to prevent employers exploiting in-work tax credits to reduce wages. Minimum wages have been successful in boosting low hourly wages without adverse impacts on employment.⁴⁷ However, in comparison with in-work tax credits, the minimum wage in the UK is less well targeted to families with low earnings, largely due to the presence of minimum-wage workers in higher-family-income households and the increased prevalence of part-time work among low-wage male workers. As a result, the minimum wage should be thought of as a *complement* to rather than a substitute for tax credits, offsetting low wages that may reduce the effectiveness of tax credits in lifting family incomes.

⁴⁶ For example, Oreopoulos and Salvanes (2011) found that individuals with more schooling not only reported enhanced job satisfaction, autonomy, occupational prestige and feelings of self-accomplishment, but also experienced lower rates of unemployment.

⁴⁷ See Manning (2020), for example.

It is the longer-term perspective that is missing from the reform agenda to address labour market inequalities. Some systematic inequalities in earnings are inevitable, reflecting the skills distribution among workers and the demand for skills in production. Nonetheless, the analysis in this paper suggests a new take on the design of cash transfers and in-work benefits / tax credits: an agenda that sees human capital policies more closely integrated with in-work tax credits, providing a more even balance between incentives for employment and incentives for investments in skills by both employees and employers.⁴⁸

Some clear directions for the reform of in-work tax credits emerge. It is important to avoid incentives for part-time work. It is also important to integrate training incentives alongside work incentives,⁴⁹ but not just any training. The analysis presented in this paper suggests a focus on firm-based qualification training with emphasis on a match with a productive firm, much as examined in the work on sector-focused training interventions.⁵⁰ Moreover, although cognitive skills remain important even for less-educated workers, it is likely that the pay-off to social skills is also important and under-exploited. This combination of tax credits with employer-based training incentives for specific skills goes some way to putting flesh on the ‘good jobs’ agenda.⁵¹

As a final note, the research highlighted in this paper suggests skills alone are unlikely to produce high-quality jobs with reasonable wage growth, access to training and good career opportunities *unless* workers are matched to productive firms. The strongly skewed distribution of innovative firms and firm productivity in the UK, noted in De Loecker, Obermeier and Van Reenen (2023), makes the matching of workers with productive workplaces all the more challenging, especially when this is combined with the strong geographic differences in wages and education, noted in Overman and Xu (2023).

ACKNOWLEDGEMENTS

This paper is based on a presentation at the Nobel Symposium on Inequality, in Stockholm, August 2022. I would like to thank the conference participants for their comments. I am also grateful to the editors of this journal for their comments. I am especially indebted to my colleagues and co-authors at IFS and UCL for many discussions in this area and for allowing me to draw on joint work. I acknowledge financial support from the Nuffield Foundation under the IFS Deaton Review of Inequalities project (grant WEL/43603) and the ESRC Centre for the Microeconomic Analysis of Public Policy at IFS (grant ES/T014334/1).

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⁴⁸ A related concern with the in-work tax credit reform agenda is an emphasis on family income being the appropriate measure of welfare. It is likely that individual earnings themselves hold independent value in terms of individual welfare and identity. This brings a further need to emphasise outcomes such as job quality, human capital investment and career progression.

⁴⁹ Moffitt (2023) makes a similar case for the closer integration of these policies.

⁵⁰ See, for example, Katz et al. (2022).

⁵¹ See Rodrick and Stantcheva (2021a and 2021b).

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How to cite this article: Blundell, R. (2024), Beyond tax credits and the minimum wage: the challenge of labour market inequality. *Fiscal Studies*, 45, 25–42.
<https://doi.org/10.1111/1475-5890.12361>