I Z A Institute
of Labor Economics
Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 11479

Organisational Accreditation and Worker Upskilling in Britain

Getinet A. Haile

APRIL 2018

I Z A Institute
of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 11479

Organisational Accreditation and Worker Upskilling in Britain

Getinet A. Haile
University of Nottingham and IZA

APRIL 2018

IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Organisational Accreditation and Worker Upskilling in Britain[1]

Britain has lagged behind the G7 countries in labour productivity in recent years. There is also an emerging concern about a potential post-Brexit skills deficit. Upskilling the existing workforce via on-the-job training may be a vital policy tool available. Using a panel of organisations and their 'Investors in People' accreditation status, this paper empirically examines if accreditation promotes upskilling. Fixed effects estimates reveal that accreditation enhances on-the-job training but only in private sector organisations. Difference-in-differences estimates using unaccredited and di-accredited organisations as alternative matched comparators reinforce the FE findings. Policy may have to further engender accreditation schemes that boost worker upskilling to address the productivity concerns and to cope with the rapid technological changes better.

JEL Classification: J24, L5, M53, D22

Keywords: on-the-job training, organisation, accreditation, impact, panel data

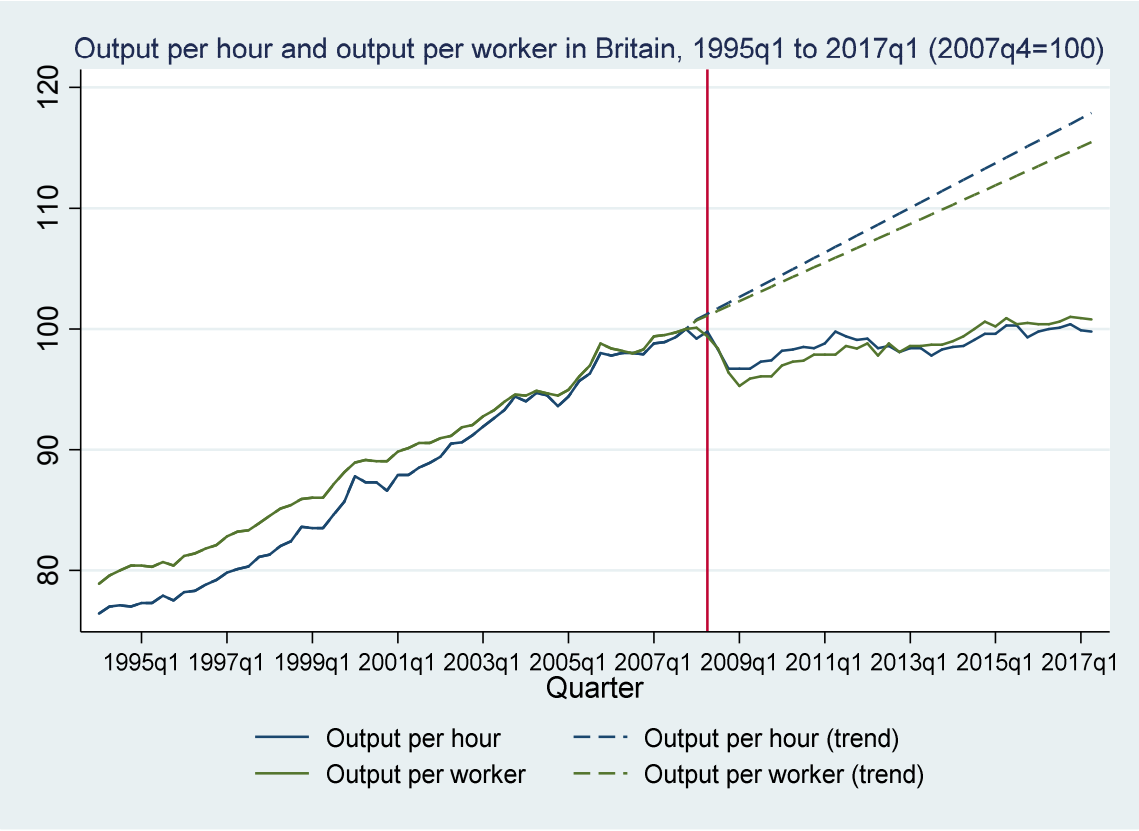
Corresponding author:
Getinet A. Haile
University of Nottingham
Wollaton Road
Nottingham, NG8 1BB
United Kingdom
E-mail: getinet.haile@nottingham.ac.uk

[1] The author acknowledges the Department of Business, Innovation and Skills; the Economic and Social Research Council; the Advisory, Conciliation and Arbitration Service, and the National Institute of Economic and Social Research as the originators of the 2011 Workplace Employee Relations Survey data; and the Data Archive at the University of Essex as the distributor of the data. Seminar participants at Leeds and Nottingham Universities provided some useful feedback on an earlier draft. The usual disclaimer applies.

1. Introduction

Britain has lagged behind the G7 countries in labour productivity since the Great Recession of 2008 (Patterson 2012; ONS 2015; Pessoa and Van Reenen 2014). That the productivity flatlining endured well beyond the downturn has become a major policy concern given that the pace of productivity growth determines the nation's material wellbeing. Figure 1 below depicts the patterns of output per hour and output per worker in Britain since the first quarter in 1995. It reveals a striking divergence between the levels of productivity observed and their pre-recession trend. The flatlining is unprecedented in the post-war era; and productivity would have been 16% higher by 2015 if the pre-crisis level of productivity had been maintained (ONS 2015). That the decline in productivity has coincided with the historically high levels of employment observed over the period has left most observers puzzled.

Figure1: Productivity Growth Pattern in Britain



Source: Authors' recreation of Figure 1 in ONS (2017)

Research needs to establish the causes and possible ways of overcoming the problem. There are various culprits behind the slack in productivity, including the fall in the number of people working full-time, the rise in the number of people working part-time, the rise of people on zero-hour contracts, the fall in real wages and the increase in the cost of capital among others (see Pessaoa and Van Reenen 2014; Pickavance 2014; Grice 2012). Addressing the problem may also require different

measures. In the long-term, institutional changes and technological innovations may help overcome the slack in productivity growth.[2] In the short-term, however, upskilling the existing workforce through on-the-job training may be the most plausible policy tool available. A number of studies have highlighted the need for skill development to enhance productivity. The 2006 Leitch Review of Skills stressed the importance of skills in boosting productivity and in the creation of wealth and social justice (Leitch 2006). The CIPD emphasises the vital role organisations play in promoting workforce upskilling to achieve improved productivity and economic prosperity (CIPD 2017). Hoque and Bacon (2008) also stressed the important role workforce training and skills play in enhancing productivity and the very survival of firms. Dowdy and Van Reenen (2014) underscore the key role organisations play in boosting productivity. In particular, they stress that although government policy plays a vital role, the realisation of the productivity potential largely hinges on the actions of managers and their organisations.

Acemoglu and Restrepo (2018) note that workforce upskilling may be of particular value given the current rapid technological change, which has led to the intensification of work automation and the emergence of Artificial Intelligence. They warn against the potential productivity loss stemming from a mismatch in the skill requirements of new technologies, especially as these new ways gather rapid pace. They point that workforce retraining can smooth the adjustment process making adaptation to the rapid rollout of automation and new technologies relatively easier. In Britain, there is also an emerging concern of a potential post-Brexit "talent exodus", which, if it happens, may compound the productivity malaise. In its recent report, the Migration Advisory Committee (MAC 2018) underscores employers' fear about possible post-Brexit restriction on the flow of EEA migrants and the likely impact of this on business. Such premonition has led all the main political parties in Britain to make calls for upskilling of the existing workforce.[3]

This paper empirically examines the upskilling impact of a UK government-backed accreditation scheme, Investors in People (IiP hereinafter), which has worker training and development at its core. IiP is broadly regarded as providing a benchmark for good organisational training practice. As a result, successive governments in Britain have encouraged the scheme to promote on-the-job training (see, de Waal 2016, Smith *et al*. 2014, Hoque and Bacon 2008, Hoque 2005, Grugulis and Bevitt 2002). The evidence on whether the scheme achieves its objective is at best mixed however. At the same time, the current productivity malaise has put the scheme on the spotlight. Notwithstanding the diverse causes behind the productivity slack allude to earlier; it does not bode well for the scheme, which is meant to increase productivity and organisational

[2] Institutional changes may include, among others, changes in the financial sector, which is the source of capital expenditure, and the education and training sector, which produces the future workforce.
[3] The calls identified areas of digital and IT skills in particular (see some discussions on this here: http://www.information-age.com/upskilling-british-workforce-top-uks-political-agenda-123466508/).

competitiveness, that there has been a notable slack in productivity in Britain. This calls for firmly established whether the scheme achieves its main objective of worker upskilling. This paper aims to do this using a panel of organisations monitored in the 2004 and 2011 WERS surveys. In addition to using panel data, which offer the scope for dealing with organisational self-selection, the paper also implements a quasi-experimental design by exploiting the unique feature of the data used, which allows like-for-like organisational comparisons. This is achieved by distinguishing among organisations that adopted the scheme in 2011 (*accredited*) from those that were unaccredited in 2004 and 2011 (*never accredited*) and those that had reported to be accredited in 2004 but lost their status in 2011 (*di-accredited organisations*). The paper offers a credible empirical account of the link between IiP accreditation and workforce upskilling, and its rigorous nature makes it distinct from much of the existing literature in the area.

The remainder of the paper is organised as follows. Section Two, provides a review of the evidence on the IiP accreditation scheme. Section Three describes the data and variables used. Section Four sets out the empirical framework employed. Section Five discusses the results obtained before the final section concludes the paper.

2. Literature Review

2.1 The IiP Accreditation Scheme

As noted in Section 1, the IiP accreditation scheme is a standard in people management that was inaugurated by the UK government in 1991 to improve industrial performance through worker upskilling and development.[4] It is a market-led voluntary scheme, which is currently adopted by some 10,000 organisations in 78 countries worldwide.[5,6] In its 27 years existence, the scheme has undergone several changes to standard it has issued; but its original aim of worker upskilling has remained the central plank. The scheme promotes worker upskilling by supporting organisations to develop their staff training and development practices, which are thought to enhance their competitiveness. The accreditation body requires organisations to identify skills gaps within, which it then encourages them to address via workforce training aimed at enhancing organisational performance. It provides a benchmark standard in training and development practices against which organisations are assessed before being crowned as IiP, if they meet the assessment criteria. Once accredited, organisations use their acquired status and the IiP logo for marketing purposes. The continued use of the IiP logo post accreditation is subject to routine reviews by the accreditation body, which requires that organisations continue to uphold the principles of the standard. If organisations are found to be in breach of the

[4] The scheme had been owned by the UK government until 2017 when it became an independent Community Interest Company (CIC) as of February 2017.

[5] See https://www.investorsinpeople.com/press/plans-announced-investors-people-engage-employees-employers-and-communities

[6] See https://www.investorsinpeople.com/what-investors-people.

standard, they risk losing their IiP accreditation status (see de Waal 2016; Smith *et al*. 2014; UKCES 2012, 2013; Hoque and Bacon 2008; Hoque *et al*. 2005, for example).[7] As Grugulis and Bevitt (2002) note, the IiP scheme "is the most wide-ranging part of the government's NETTs (National Education and Training Targets), and official rhetoric is focused on the need for a high skills economy" (p. 56). As noted in Section 1, the call for a high skills economy has become even more unrelenting since, especially given the flatlining in labour productivity and the potential for a post-Brexit skills deficit.

2.2 The impact of IiP on upskilling

Various studies have examined the effectiveness of the IiP scheme on upskilling, often with divergent findings. On the one hand, there have been studies conducted by the UKCES, the owner of the scheme between 2010 and 2017, which found the scheme to have positive outcomes both in terms of worker upskilling and organisational performance (Shury *et al*. 2012; Winterbotham *et al*. 2013). Based on telephone interview data from 716 organisations, Winterbotham *et al*. (2013) report that "IiP had most influence in leading to the introduction of training plans,…, where up to a fifth of employers with these policies in place said they were introduced as a direct result of working towards IiP" (p. 4). The accreditation body's own recent report also promotes the scheme as efficiency and performance boosting scheme stating that poor people management, which, among others, is manifested in the lack of focus on building future organisational capability through training and continuous improvement, costs the UK economy to the tune of £84bn in lost efficiency and performance (IiP 2017). Bourne and Franco-Santos (2010) found differences in managerial capabilities and performance between IiP accredited and unaccredited organisations in their mixed-methods-based study. Among others, they report that IiP accreditation enhanced managerial skills, supported the development of a culture of organisational learning, improved the effectiveness of management development practices, facilitated the creation of a high-performing environment and increased the performance of managers.

On the other hand, several recent studies reported findings that are mixed at best, calling into question the effectiveness of the IiP scheme in worker upskilling. Hoque (2003) reported mixed results using cross-sectional data from WERS1998 to study the incidence and impact of the IiP standard. Using probability models, the study found training practice to be better, on average, in IiP accredited organisations than non-accredited ones. However, a large number of small sized organisations with accreditation did not engage in good training practice. In a follow-up study, Hoque (2008) used cross-sectional data from WRS2004 to examine if the IiP standard became more effective following its revision in 2000. Using probability models to study employees' response on whether managers encouraged skills development, the study reported that the proportion of employees without formal training in accredited organisations remained the same between 1998 and 2004. Evidence of

[7] Also see https://www.investorsinpeople.com/sites/default/files/Obligations%20of%20Accreditation_0.pdf on the obligations organizations face as IiP accredited. Hoque *et al*. (2005) provide details on the institutional framework, the design and management of the IiP standard over the years.

greater inequality in training provision in IiP organisations than their non-IiP counterparts was also reported, suggesting that one of the standard's revised aim of equality in training opportunity not being met. Rayton and Georgiadis (2012) used cross-sectional data from WERS1998 to study the effect of the IiP standard on training using employee-level responses and concluded that high-training workplaces self-selected into IiP. They wondered if the IiP standard was of any value in promoting training. Grugulis and Bevitt (2002) conducted a case study in a NHS hospital trust in the north west of England to determine the effect of IiP accreditation on employee outcomes. They found that most of the "soft" HR practices they identified had existed prior to accreditation and benefits, which included staff training, owed little, if any, to being IiP accredited. Using data from the 1998 and 2004 WERS, Hoque and Bacon (2008) examined the extent of change in the proportion of small, medium and large organisations with IiP recognition and the relationship between IiP accreditation and organisational training activity. They reported a positive association between accreditation and training provision for managerial, professional and non-managerial workers in large organisations. In medium- and small-sized organisations, on the other hand, the association found is only with higher-level non-management and higher levels of management and professional training respectively. Hoque *et al*. (2005) provided a review of the evidence on recognition rates and the impact of the standard on training activity taking into account the changing features of the accreditation scheme, including its overseas adoption. They pointed out the low uptake rate of the scheme among small organisations in particular, which were offered the least encouragement to engage with the scheme. They noted selection problems, where consultants cherry picked and deliberately targeted larger organisations that already had policies and procedures the scheme sought to promote. They also highlighted sectoral variations in take-up rate where some industries such as the utilities, transport and communication and public administration sectors had a higher take-up rate. The voluntarist nature of the scheme, its institutional framework and the way the management and marketing of the standard was handled were factors identified responsible for the relatively limited and uneven uptake of the scheme across the economy as a whole. Recently, Smith *et al*. (2014) conducted a qualitative study involving 35 semi-structured interviews from six UK-based research organisations and reported that five of the six case study organisations had implemented their training and development initiatives before their involvement with IiP.

As noted earlier, the evidence pertaining to the link between IiP accreditation and worker upskilling thus far is mixed at best. Most, if not all, of the studies rely on cross-sectional data, which do not permit addressing the organisational selection issue the literature review highlighted adequately. This paper relies on organisation-level panel data, which offer significant advantage in tackling the selection issue. Uniquely, the paper also implements a quasi-experimental study design, which, as detailed in Section 4, combines matching and difference-in-differences with organisational fixed effects ensuring like-for-like organisational comparisons. Such comparisons are vital given the

suggestion in the literature reviewed that organisational size, sector and ownership-type are important determinants of accreditation. As already mentioned and as detailed in Section 4, the paper also uses alternative comparator organisations in the form of those that had never been on the scheme before and those that had once been on the scheme but lost it subsequently, which is likely to go a long way in establishing the link between accreditation and workforce upskilling. If organisations with sound training and staff development programmes already in place are likely to self-select into the scheme, their di-accredited counterparts must also have had a sound training and development culture in place to join the scheme in the first place. If so, di-accredited organisations may serve as better comparators. In addition to these, the paper also uses several organisational upskilling outcomes as detailed in Section 3.

3. Data

3.1 Overview of the Data

The data for the empirical analysis in this paper come from the 2004 and 2011 British Workplace Employment Relations Surveys (WERS). The WERS series offers the most authoritative source of information on employment relations in Britain. The surveys provide linked employer-employee data representative of all workplaces in Britain with five or more employees (Kersley *et al*. 2006, van Wanrooy *et al*. 2013). Of all the organisations surveyed in 2004 and 2011, 989 were monitored in both waves, thus yielding a panel of 989 organisations. Of these 18 organisations had to be eliminated due to missing values in the main training outcome considered, while a further 75 workplaces have missing information on their IiP accreditation status.[8] This has yielded a panel of 896 organisations as the final sample used in the empirical analysis conducted.[9]

3.2 Organisational IiP accreditation

The key variable of interest to the paper is IiP accreditation status, which is based on employers' "yes/no" response to the question "*Is* (*Name of Organisation*) *accredited as an Investor in People*?" Using such responses, which were provided in both the 2004 and 2011 surveys, it was possible to identify the following four groups of organisations: (*a*) those that were unaccredited in 2004 but became IiP accredited in 2011 (*accredited*) – 108 organisations, (*b*) those that had IiP accreditation in 2004 but became di-accredited in 2011 (*di-accredited*) – 131 organisations, (*c*) those that had IiP accreditation status in both 2004 and 2011 (*always accredited*) – 295 organisations, and (*d*) those that were unaccredited in both 2004 and 2011 (*never accredited*) – 362 organisations. Table 1 below reports transition probabilities based on organisational IiP status.

[8] 4 organizations had missing accreditation status for both 2004 and 2011 waves while 71 others had missing in either 2004 or 2011.

[9] Otherwise, the 2004 and 2011 WERS cross-sections have monitored 2295 and 2680 organizations respectively.

Table 1: IiP Accreditation Transition Probabilities (% in bracket)

	Accredited	Unaccredited	Total (row)
Accredited	295 (69.25)	131 (30.75)	426 (100)
Unaccredited	108 (22.9)	362 (77.02)	470 (100)
Total (column)	403 (44.98)	493 (55.02)	896 (100)

3.3 Outcome measures

The paper uses three different organisational upskilling outcomes, which are derived from employers' response to the following three sets of questions. *First*, employers were asked about "the proportion of experienced staff in the largest occupational group who had training in the past year". Possible responses were: "*all* (100%)", "*almost all* (80-99%)", "*most* (60-79%)", "*around half* (40-59%)", "*some* (20-39%)", "*just a few* (1-19%)" and "*none* (0%)". These responses gave rise to a binary outcome measure of "*training last year*", where organisations that responded "none" take a value 0 and all others with a positive response take a value 1, regardless of training intensity. *Secondly*, employers would also respond to a follow-up question on "whether the training [provided] cover any of…: (*i*) computing skill, (*ii*) teamworking, (*iii*) communication skills, (*iv*) leadership skills, (*v*) operation of new equipment, (*vi*) customer service, (*vii*) health and safety, (*viii*) problem-solving methods, (*ix*) equal opportunities and diversity, (*x*) reliability and working to deadlines, (*xi*) quality control procedures, (*xii*) none of these". Responses to the follow-up question are used to generate a second outcome measure ("*any skill*"), which counts the number of training types provided irrespective of the nature of the training provided.

On-the-job training can be soft or hard in nature; and recent evidence has shown the value of both types of training. Heckman and Kautz (2012) highlighted the importance of soft skills in enhancing outcomes and concluded that programmes that promote soft skills should have an important role to play in an effective portfolio of public policies. Having examined the wage returns to hard and soft skills, Balcar (2016) also concluded that soft skills are as productive as hard ones. To examine the training focus of organisations, the paper distinguishes between "hard" and "soft" skills splitting the second outcome measure above into two additional outcome measures – "*hard skills*", which counts the number of times organisations reported to have offered training on computers, new equipment, problem solving and quality control; and "*soft skills*", which counts the number of times organisations reported to have offered the remaining types of training.

Finally, the paper also uses employers' responses to four different training related questions to generate a summative measure of organisational "*training culture*". The four questions probe organisation on whether: "*training is discussed at meetings between senior management and the*

whole workforce", "*performance appraisal results in an evaluation of training needs*", "*training records are kept for the organisation*" and "*the organisation has targets for training*".

Table A1 in the Appendix reports a summary statistics on each of these outcome variables by IiP accreditation status and for the combined sample. Accordingly, organisations that were observed to be accredited in both the 2004 and 2011 surveys nearly always scored the highest in all these outcomes vis-à-vis the average organisation in the retained sample (all combined column), while organisations that were observed to be unaccredited in both waves have scored the lowest in nearly all cases. Those organisations that changed their IiP accreditation status (accredited and di-accredited organisations) scored higher averages on these outcomes compared with the average organisation nearly always. The few exceptions are "reliability" and "quality control", where organisations that were observed to be di-accredited in 2011 scored marginally higher than their counterparts who got accredited in 2011. In fact, "di-accredited" organisations do score as much as "always accredited" organisations on "customer service" and even score the highest on "computer" training.

A number of other variables relating to organisational characteristics including size, industry, ownership status, sector and geographic location have been used to perform matching among the three different types of organisations as detailed in Section 4.[10] The lower panel of Appendix Table A1 provides summary statistics on each of these organisational characteristics. The summary statistics reveals that organisations that were never accredited are largely small, private, UK owned, and single-plant organisations, which are mostly in the services and finance industries compared with the typical organisation in the sample (the "all combined" column). Organisations that were observed to be newly accredited in 2011 appear to be medium sized for the most part and they tend to come from the construction, public and health services industries. In contrast, organisations that were observed to be di-accredited in 2011 tend to be large organisations in the public and community services and education industries.

4. Analytical Approach

The analytical approach used to determine the link between IiP accreditation and upskilling exploits the panel nature of the WERS data. In observational studies of this sort, identifying the "impact" of IiP accreditation scheme requires setting up a credible quasi-experimental design capable of dealing with potential selection problem. Organisations are likely to self-select into the scheme if they anticipate to be accredited and also if they expect being accredited benefits them in their marketing drive. It is thus important that the analytical approach used attempts to deal with self-selection. To this end, the paper deploys two main empirical strategies.

[10] There are 51 organizations that changed their sectoral (private/public) status between the 2004 and 2011 waves. As a result, the sector-based sub-group analysis undertaken excludes these organizations although they are included in the combined analysis.

4.1 Fixed Effects

The first analysis conducted is based on fixed effects regression using all organisations in the retained sample, which has the following general form:

$$(1) \qquad y_{jt} = \beta \cdot IiP_{jt} + \alpha_j + u_{jt} \; ; \quad j=1,\ldots, N; \; t = 1, 2 \; (2004 \; \& \; 2011)$$

where y represents the different upskilling outcomes described in the preceding section, IiP represents organisational accreditation status, α represents organisational fixed effect, u represents the idiosyncratic error term, *j* indexes organisations and *t* indexes time.

4.2 Matching combined with Difference-in-differences

The IiP scheme is a voluntary scheme as detailed in Section 2, which means that organisations seeking to be IiP accredited self-select into the programme. As a result, the "impact" of IiP accreditation on the self-selected organisations is unlikely to be what it would have been had organisations been selected into the scheme randomly. This is because there are likely to be observed and unobserved initial differences between organisations, which potentially confound the IiP impact. For example, organisations that were observed to be IiP accredited in 2011 might have had some sound worker training and development programme in place before 2011 already while aiming to launch a successful bid for IiP. Similarly, organisations that lost their IiP status in 2011 might have already established or retained some positive culture in worker training and development as a result of being on the scheme in the past. To minimise potential biases stemming from such differences in initial conditions, the second analysis deployed combines matching and difference-in-differences techniques, which are both carried out at organisation-level. The method of matching (Rosenbaum and Rubin 1983; Rubin 2005; 1994) balances on observable organisational characteristics ensuring a "like-for-like" comparison. Matching assumes that the outcomes of interest are independent of IiP status conditional on a set of observable characteristics (Heckman *et al*. 1998). Taking this into account, the paper implements matching using a rich set of organisational and geographic characteristics from 2004 (i.e., before changes in organisations' IiP status were observed in 2011) to avoid the risk of matching on potentially endogenous variables.

As discussed in Section 3, four different types of organisations are observed in the data. The paper exploits this feature in the data to set up alternative counterfactual organisations to compare the outcomes of those organisations that were observed to be newly accredited in 2011 (*accredited*). The first comparator organisations come from those organisations that have never been IiP accredited before (*never accredited*) while the second comparator organisations come from organisations that were observed to lose their accreditation status 2011 (*di-accredited*). In each case, matching is

performed in Stata using psmatch2 (Leuven and Sianesi 2003) and its kernel matching procedure. The gaussian kernel matching with common support assigns larger weights to organisations in any of the counterfactual groups that are 'close' to the treated organisations on the basis of the estimated propensity scores allowing "like-for-like" comparison.

The paper then implements the difference-in-differences regression on the matched organisations with common support controlling for organisational fixed effects, thus combining matching with difference-in-differences (Heckman *et al*. 1997). The resulting model is given by:

$$(2) \qquad y_{jt}^{m} = \theta \cdot IiP_{j}^{m} + \gamma \cdot \mathrm{T} + \beta \cdot \mathrm{IiP}_{j}^{m}\#\mathrm{T} + \alpha_{j}^{m} + \mathrm{u}_{jt}^{m} \quad j=1,\ldots,\mathrm{N};\ \mathrm{t}=2\ \&\ \mathrm{m}=2$$

where IiP_{j}^{m} represents the accreditation status of the m^{th} matched "treatment" and "control" organisations, taking a value 1 for organisations that got accredited in 2011 and 0 for their matched comparator organisations with common support; T represents time period taking a value 1 for the post period (2011); the third term on the right is the interaction of the two terms just described, with β capturing the "impact" of being IiP accredited on upskilling, and *m* indexes the two different matched "treated" and "control" groups of organisations. Accounting for organisational fixed effects ensures that time-invariant unobserved characteristics that might potentially be correlated with IiP accreditation status are controlled for. The paper also uses cluster standard errors to address potential concerns of serial correlation (Bertrand *et al*. 2004) even though with just two time periods the panel data used are short.

5. Results and Discussion

The estimation results from the two empirical approaches described in Section 4 are reported in Tables 2 to 4 below.[11] Tables 2 reports results from fixed-effects regressions using the full sample of organisations as well as by private and public sub-groups. The results for the full sample (top panel) reveal that IiP accreditation leads to a statistically significant positive effect on whether organisations provided training over a 12 month period preceding the surveys. It is also found to have a statistically significant positive effect on the number of training types provided by organisations both in aggregation as well as by whether the training was on hard or soft skills types. On the other hand, being IiP accredited is not found to have a significant effect on the training culture of organisations, which captures whether training is discussed at meetings with the workforce, whether

[11] The results reported relate to the IiP variable in all cases, since the fixed effects specification would eliminate most of the dummy variables representing organizational and geographic characteristics, which are reported in the bottom panels of Appendix Table A1, which remain constant over time. Random Effects (RE) specifications using all these characteristics dummies yield better significance in many ways; but RE regressions are less defensible in the context here.

performance appraisal evaluates training needs, whether training records are kept and whether there are organisation-level training targets. The middle and bottom panels of Table 2 report results from the sub-group analysis conducted. They reveal that all the statistically significant positive upskilling effects found are specific to private sector organisations. In fact, the sub-group analysis has yielded a positive but weakly significant effect on one outcome (*training culture*) for private sector organisations, which was insignificant for the combined sample.

Table 2: IiP Accreditation and Worker Upskilling, Fixed Effects estimates

	Training last year	All skills	Hard skills	Soft skills	Training culture
Full sample					
IiP Accredited	0.0460**	0.5649**	0.2176**	0.3473**	0.1381
	(0.019)	(0.229)	(0.099)	(0.160)	(0.088)
Constant	0.8944***	4.0707***	1.4250***	2.6457***	2.2994***
	(0.009)	(0.106)	(0.046)	(0.074)	(0.041)
N × 2	1792	1,792	1792	1792	1,792
R-squared	0.005	0.007	0.006	0.005	0.003
N	896	896	896	896	896
Private					
IiP Accredited	0.0916***	0.9466***	0.4046***	0.5420**	0.2290*
	(0.031)	(0.307)	(0.137)	(0.212)	(0.127)
Constant	0.8518***	3.6267***	1.2633***	2.3635***	2.2005***
	(0.011)	(0.110)	(0.049)	(0.076)	(0.046)
N × 2	1223	1,223	1223	1223	1,223
R-squared	0.013	0.018	0.018	0.012	0.007
N	637	637	637	637	637
Public					
IiP Accredited	-0.0227	0.2841	0.0568	0.2273	0.0455
	(0.016)	(0.388)	(0.160)	(0.277)	(0.136)
Constant	0.9980***	4.9218***	1.7380***	3.1838***	2.5050***
	(0.011)	(0.265)	(0.109)	(0.189)	(0.093)
N × 2	569	569	569	569	569
R-squared	0.006	0.002	0.000	0.003	0.000
N	310	310	310	310	310

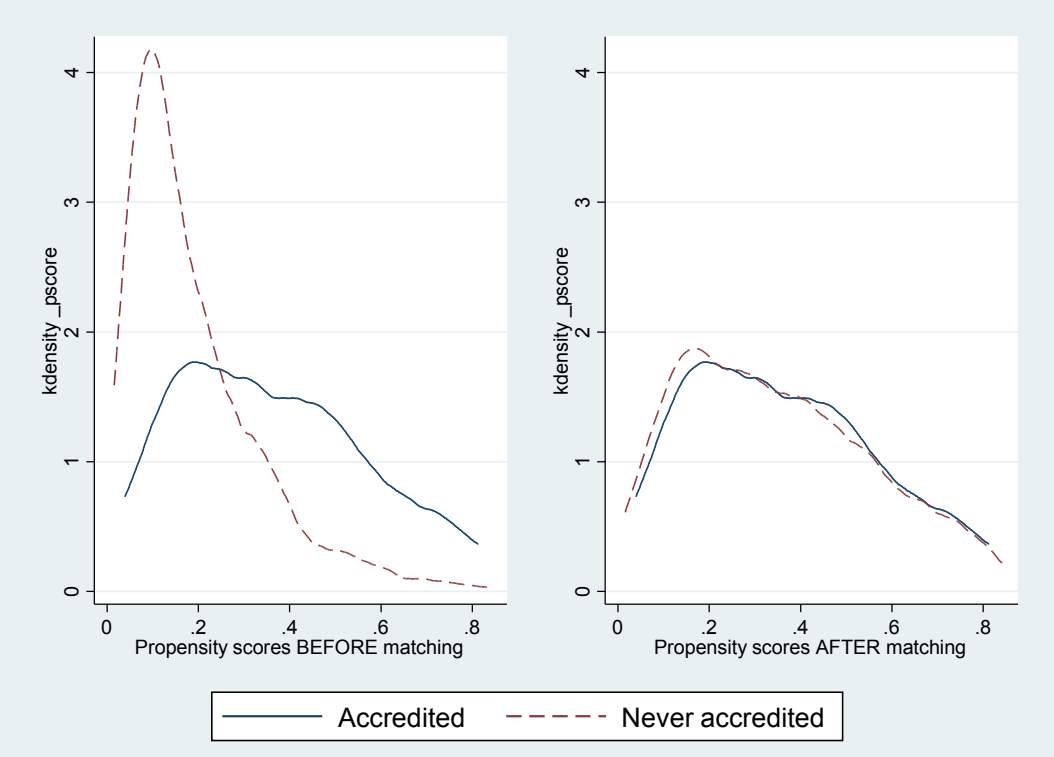
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results from fixed effects regressions on each of the training modules are reported in Appendix Table A2, which reinforce the sectoral differences in training provision noted earlier. Specifically, IiP accreditation is not found to have any significant effect on any of the eleven training modules for public sector organisations. In contrast, for private sector organisations, IiP accreditation is found to have statistically significant positive effect on six of the eleven training modules

monitored, which include: computer training, teamwork, communication, operation of new equipment, health & safety, and problem solving.

Table 3 reports results from the second empirical approach, which combines matching and difference-in-differences with organisational fixed effects. As detailed in Section 4, the paper used two different comparators based on organisations' IiP status to attain alternative like-for-like comparisons. As noted in Section 4, the matching is implemented using a rich set of observable characteristics from 2004 to ensure that the outcomes of interest are independent of IiP status conditional on these "pre-treatment" characteristics. Figures 2 and 3 depict density plots of the propensity scores before and after matching for IiP accredited organisations and their "*never accredited*" and "*di-accredited*" comparator organisations respectively.

Figure 2: Before-after density plots of propensity scores for "IiP accredited" organizations and their "never accredited" comparators

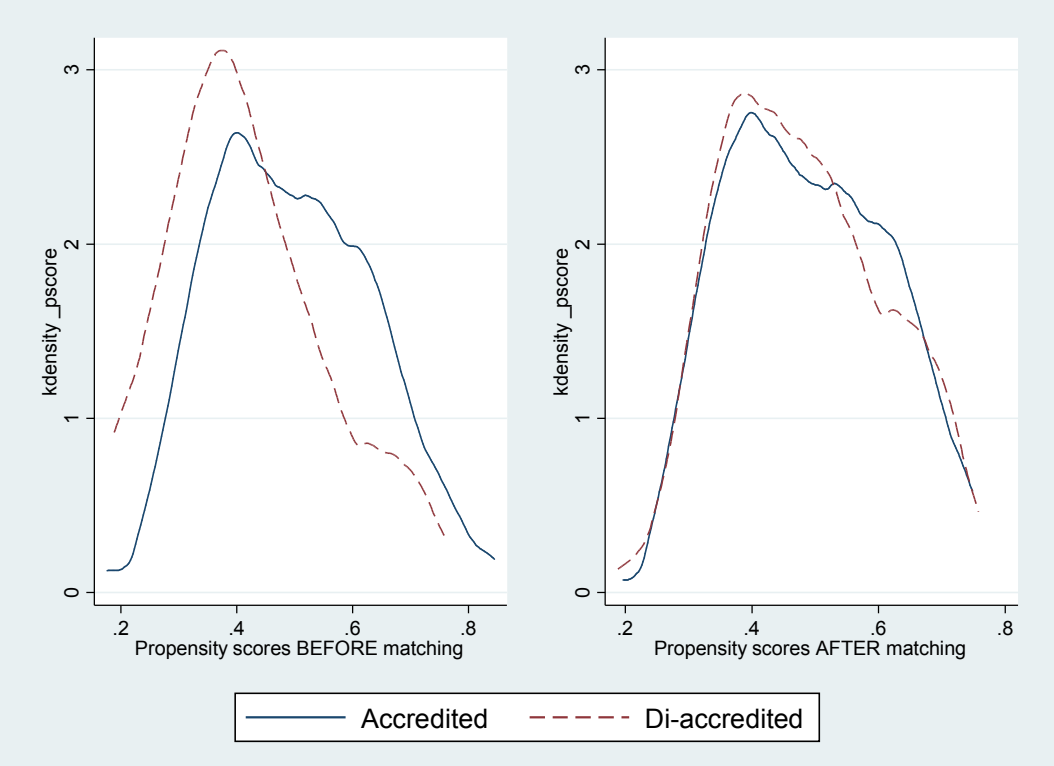


The Figures reveal sound balances between each of the two sets of matched organisations.[12] The first (*accredited* vs. *never accredited*) matching found 14 "never accredited" organisations to be

[12] Test statistics from 'pstest' are also highly favourable (see Appendix Table A5) even though t-test based balance comparisons following propensity score matching can be too sensitive to sample size, as well as relying on the normality assumption. The Probit regression results generating the propensity scores are readily available on request from the author.

off support, which are therefore excluded from the analysis conducted. Similarly, the second (*accredited* vs. *di-accredited*) matching found 4 "accredited" organisations to be off support, which are also excluded from the analysis yielding the results reported in Tables 3 and 4.

Figure 3: Before-after density plots of propensity scores for IiP accredited organizations and their "di-accredited" comparators



The top panel of Table 3 reports results based on the first type of matched comparator organisations (never accredited) while the bottom panel is based on the second type of matched comparator organisations (di-accredited). The results in the top panel reveal that compared with matched organisations that were observed to be unaccredited in both the 2004 and 2011 waves, organisations that reported to have gained IiP accreditation in 2011 experienced statistically significant positive effects on all the training outcomes considered. Given that we are contrasting observationally comparable organisations as well as controlling for organisational fixed effects to deal with the possibility of organisational self-selection, these results lend strong support for attributing these effects to IiP accreditation. On the other hand, the results in the bottom panel of Table 3, which contrasts accredited organisations with comparable di-accredited organisations (i.e., organisations that had IiP status in 2004 but lost their status in 2011) reveal that with the exception of only one of the training outcomes (*training last year*), which is significant only marginally, the positive upskilling effects found earlier no longer hold. There may be a case for regarding di-accredited organisations as

better comparators, if one believes the argument that only those organisations that expect to be accredited join the scheme. This is because di-accredited organisations must have once been more similar to organisations that attained accreditation in 2011 in this respect. If so, the lack of significant effects in the bottom panel may suggest a misfortune for the IiP accreditation scheme. However, there may be a strong counterargument that di-accredited organisations were likely to have retained some best training and staff development practices even after losing their accreditation status. If the latter, then this may be due to IiP accreditation having promoted best upskilling practices in both group of organisations similarly, a favourable perspective for the IiP accreditation scheme.

Table 3: IiP Accreditation & Worker Upskilling, Fixed-Effects DID Estimates from Kernel Matched Organizations (Full sample)

	Training last year	All skills	Hard skills	Soft skills	Training culture
IiP Accredited vs Never Accredited					
2011	0.0152	-0.2769	-0.3263**	0.0494	-0.2961***
	(0.020)	(0.291)	(0.141)	(0.181)	(0.090)
Accredited#2011	0.1273**	1.6891***	0.8027***	0.8864***	0.4067*
	(0.057)	(0.495)	(0.219)	(0.341)	(0.210)
Constant	0.8569***	4.0315***	1.4435***	2.5880***	2.3486***
	(0.021)	(0.157)	(0.066)	(0.112)	(0.073)
N×2	912	912	912	912	912
R-squared	0.098	0.128	0.097	0.110	0.017
N	456	456	456	456	456
IiP Accredited vs Di-accredited					
2011	-0.0233	-0.2299	-0.0677	-0.1622	-0.3817***
	(0.020)	(0.390)	(0.163)	(0.268)	(0.141)
Accredited#2011	0.0565*	0.2304	0.1397	0.0908	0.1864
	(0.032)	(0.618)	(0.247)	(0.428)	(0.185)
Constant	0.9549***	4.8533***	1.6564***	3.1969***	2.5905***
	(0.008)	(0.159)	(0.063)	(0.110)	(0.046)
N×2	470	470	470	470	470
R-squared	0.012	0.002	0.002	0.002	0.050
N	235	235	235	235	235

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A3 in the Appendix reports results from the analysis combining matching and difference-in-differences for each of the eleven training modules separately. The results reveal that compared with "never accredited" organisations, those organisations that gained IiP accreditation in 2011 are found to have a positive and statistically significant accreditation effect in six of the eleven training modules considered, which include: computer training, teamwork, communication, new equipment, customer service and reliability training, which is only marginally significant. On the

other hand, no statistically significant training module specific effect is found when comparison is made vis-à-vis the "di-accredited" organisations.

Table 4 reports results from sub-group analysis for private and public sectors, which are based on matching and difference-in-differences regression with organisational fixed effects. The top two panels report results for private sector organisations comparing IiP accredited private organisations with their matched "never accredited" (first panel) and "di-accredited" (second panel) comparator private organisations. The bottom two panels report results from similar comparisons for public sector organisations. The results reveal that compared with matched organisations that were never accredited, being IiP accredited leads to statistically significant positive effects across all the upskilling outcomes considered. Evidently, the results from the sub-group analysis reveal that comparing accredited private organisations even with their matched di-accredited private counterparts yields statistically significant positive effects on three of the five upskilling outcomes considered, which include: "training last year", "all skills" and "hard skills". It seems, therefore, that even the most stringent of comparisons yields some favourable results for the performance of the scheme in the private sector. On the other hand, similar comparisons yield no statistically significant upskilling effect whatsoever for the public sector (bottom two panels).

Table 4: IiP Accreditation & Worker Upskilling, Fixed-Effects DID Estimates from Kernel Matched Organizations (Sector-based sub-groups)

	Training last year	All skills	Hard skills	Soft skills	Training culture
IiP Accredited vs Never Accredited (Private)					
2011	0.0092	-0.0334	-0.1386	0.1052	-0.3170***
	(0.029)	(0.225)	(0.097)	(0.171)	(0.075)
Accredited#2011	0.1621**	1.7226***	0.7130***	1.0096***	0.5233**
	(0.068)	(0.502)	(0.214)	(0.365)	(0.229)
Constant	0.8267***	3.7296***	1.3402***	2.3894***	2.3009***
	(0.025)	(0.184)	(0.078)	(0.132)	(0.088)
N×2	738	738	738	738	738
R-squared	0.126	0.199	0.137	0.170	0.028
N	379	379	379	379	379
IiP Accredited vs Di-accredited (Private)					
2011	-0.0271	-0.1288	-0.0237	-0.1050	-0.3020
	(0.033)	(0.533)	(0.227)	(0.358)	(0.209)
Accredited#2011	0.1236**	1.2639*	0.6107**	0.6531	0.3268

	(0.052)	(0.714)	(0.308)	(0.503)	(0.263)
Constant	0.9206***	4.5506***	1.5222***	3.0284***	2.5287***
	(0.013)	(0.180)	(0.078)	(0.127)	(0.066)
N×2	276	276	276	276	276
R-squared	0.052	0.052	0.071	0.026	0.022
N	148	148	148	148	148
IiP Accredited vs Never Accredited (Public)					
2011	0.0288	-0.7557	-0.7027**	-0.0530	-0.3200
	(0.029)	(0.705)	(0.345)	(0.409)	(0.217)
Accredited#2011	-0.0742*	0.2988	0.6157	-0.3169	0.0736
	(0.044)	(1.003)	(0.429)	(0.652)	(0.298)
Constant	0.9882***	5.3835***	1.8879***	3.4957***	2.4962***
	(0.011)	(0.252)	(0.106)	(0.166)	(0.075)
N×2	174	174	174	174	174
R-squared	0.039	0.029	0.105	0.011	0.076
N	97	97	97	97	97
IiP Accredited vs Di-accredited (Public)					
2011	-0.0000	-0.9918	-0.3364	-0.6554	-0.4746**
	(0.000)	(0.656)	(0.281)	(0.468)	(0.237)
Accredited#2011	-0.0423	-0.2796	-0.1203	-0.1593	0.1900
	(0.030)	(1.081)	(0.410)	(0.761)	(0.300)
Constant	1.0015***	5.3706***	1.8583***	3.5123***	2.6147***
	(0.009)	(0.293)	(0.106)	(0.206)	(0.072)
N×2	194	194	194	194	194
R-squared	0.042	0.083	0.067	0.070	0.090
N	107	107	107	107	107

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A4 in the Appendix reports results from sub-group analyses on each of the eleven training modules separately, which are once again based on matching combined with difference-in-differences regresssions. As before, the top (bottom) two panels relate to private (public) sector organisations. Comparing accredited private organisations with their matched "never accredited" private counterparts (top panel) yields significant positive results in six of the eleven training modules for the private sector, more or less similar results as those reported in Table A2 from fixed effects regression although two of the training modules (customer service and reliability) are different here. Similarly, comparing accredited private organisations with their matched "di-accredited" private counterparts (second panel from top) reveals positive but marginally significant effects in three of the eleven training modules. On the other hand, no statistically significant training-module specific effect is found for public sector organisations once again.

Overall, the results from both types of analytical approaches lend support for the hypothesis that the IiP accreditation has a positive upskilling impact for private sector organisations. The matching based analysis revealed that the positive effects found are fewer and weaker when

comparison is made vis-à-vis di-accredited private organisations, where no significant effect is found for two of the five outcomes ("soft skills" and "training culture"). As argued earlier, if organisations with sound training and staff development programmes in place were to self-select into the scheme, then their di-accredited counterparts may form better comparators. This is because di-accredited organisations must also have had self-selected into the scheme in the past before losing the status. If so, the support for the hypothesis that accreditation yields positive upskilling effects may have to be somehow tempered. On the other hand, being accredited in the past might have led di-accredited organisations to preserve some best upskilling practices, particularly as regards to good organisational "training culture" that is unlikely to be dissipated easily. If so, the reduced significant effects found for private sector organisations vis-à-vis their di-accredited counterparts may not entirely spell doom for the accreditation scheme, especially given that "training culture" is one of the two insignificant outcomes found.

6. Summary and conclusion

The paper attempted to establish empirically if Investors-in-People (IiP), a UK government-backed organisational accreditation scheme with employee training and development at its core, has promoted worker upskilling. Worker upskilling is widely thought to be vital in promoting labour productivity, which has been markedly sluggish in Britain since the Great Recession of 2008 (ONS 2015; 2017). Worker upskilling also plays a crucial role in making the adjustment process to the current rapid technological change smoother as Acemoglu and Restrepo (2018) emphasised. There is also an emerging apprehension in Britain concerning a potential post-Brexit "talent exodus", which the recent Migration Advisory Committee report underscores (MAC 2018) among others. As noted earlier, this has also led all the main political parties in Britain to make calls for upskilling the existing workforce. As emphasised in Dowdy and Van Reenen (2014) and MAC (2018), success in worker upskilling and achieving the productivity potential depend on the actions of both the government and organisations.

As noted earlier, the IiP scheme has been the main worker upskilling scheme supported by the UK government. However, the evidence linking IiP and worker upskilling to date is mixed at best; and the data and analytical approaches used are wanting for the most part. This paper attempted to contribute to the literature on organisational accreditation and skill formation. To this end, it used a panel of 989 organisations monitored in the 2004 and 2011 WERS surveys. It also deployed rigorous empirical approaches capable of providing a credible empirical account of the link between IiP accreditation and workforce upskilling. The use of panel data is vital given the potential role organisational self-selection and/or unobserved heterogeneity play in accreditation, an empirical challenge hardly addressed by much of the existing research. The paper also implemented fixed effects regression and a quasi-experimental design. The later combines matching and difference-in-differences regression by exploiting the unique feature of the panel data, which allowed identifying

organisations that were observed to be accredited in 2011 from those that were observed to be unaccredited throughout and those that were observed to have lost their accreditation status in 2011. The matching performed used the latter two groups of organisations as alternative comparator organisations. If organisational self-selection is important, organisations that were observed to have gained accreditation in 2011 and those that were observed to have lost it then might be similar in some unobserved way(s), given that the latter must have also self-selected into the scheme in the past to gain accreditation in the first place before losing it eventually. In this case, using alternative comparators may yield better like-for-like comparisons than combining the two groups of comparators together. The matching quality attained is sound, as can be gathered from plots of the propensity scores and the accompanying test statistics. In all cases, the difference-in-differences regressions have also been made to account for organisational fixed effects, thus, the combined approach controls for both observed and unobserved organisational differences.

The results from both analytical approaches reveal that IiP accreditation has a significant positive impact on worker upskilling in private sector organisations. This is based on the results from the sub-group analyses conducted using both approaches and each of the upskilling outcomes considered, which include: *whether organisations provided any training to experienced staff in the(ir) largest occupational group over a 12 month period*, *whether the training involved any of the eleven training modules monitored*, which have also been grouped into hard and soft skills types, and *whether organisations maintained a sound training and staff development culture*. Some of the specific training modules with a statistically significant positive effect for private sector organisations include: computer training, teamworking, communication, operation of new equipment, health & safety, and problem solving. On the other hand, no significant IiP upskilling effect is found for organisations in the public sector. This is unsurprising in some sense, given that some of the evidence in the literature that rejects IiP's upskilling effect are based on studies that rely on public sector organisations exclusively (e.g., Grugulis and Bevitt 2002) or nearly exclusively (e.g., Smith et al. 2014).

The findings in this paper do have important implications for policy. If accreditation has a positive upskilling effect as this study finds for private sector organisations, government and organisational policies may have to uphold such accreditation schemes further to address skill shortages and to equip the general workforce with vital skills. As noted above, upskilling is likely to serve several purposes including enhancing labour productivity and organisational competitiveness. In this regard, it may be worth reconsidering the voluntarist nature of the IiP scheme. As Hoque *et al*. (2005) noted, more directed and/or consensus-led upskilling schemes of the type pursued in France and Germany may be more effective at least as far as the private sector is concerned. On the other hand, public sector organisations may perhaps require a more fitting scheme to promote upskilling and, through it, enhanced productivity. As noted earlier, the IiP scheme is a voluntary scheme, which

successful organisations use for marketing purposes. It may be that the marketing benefit accreditation affords is mostly relevant to private sector organisations. If this is the case, encouraging the design of upskilling scheme more attractive/suited to public sector organisations may be worthwhile. After all, as Heckman and Kautz (2012) noted, the promotion of skills should take centre stage in an effective portfolio of public policies.

The paper is rigorous in its use of rich data in the form of organisation-level panel data, in its use of alternative empirical approaches in the form of fixed effects regression and difference-in-differences regression with organisational fixed effects as well as its use of alternative matched comparator organisations. On the other hand, the organisational accreditation scheme studied is a voluntary scheme and unlikely to signify exogenous intervention. In addition, accreditation could have happened at different time points for different organisations in our sample although the changes in accreditation status are observed only in 2011. Also, as noted in Section 2, the scheme has gone through some changes over the years even though worker upskilling has remained its main intent. These caveats may have to be taken into account when considering the results obtained from the second analytical approach, since establishing precise impact using the quasi-experimental design as implemented here are challenging in the presence of such caveats. However, that the results obtained from the second analytical approach broadly concur with those obtained from the fixed-effects regressions is reassuring in this regard. Also, the matching of different comparator organisations based on their distinct accreditation status; and combining this with fixed effects difference-in-differences is likely to minimise any potential/remaining organisational self-selection.

References

Acemoglu, D. and Restrepo, P. (2018), Artificial Intelligence, Automation and Work, Working Paper 24196, NBER Working Paper Series, National Bureau of Economic Research.

Balcar, J. (2016), Is it better to invest in hard or soft skills? *The Economic and Labour Relations Review*, 27 (4), 453-470.

Bell, E., Taylor, S. and Hoque, K. (2004), Workplace Training and High Skills Vision: Where does Investors in People fit? SKOPE Research Paper No. 45, Centre for Skills, Knowledge and Organizational Performance (SKOPE).

Bertrand, M., Duflo, E. and Mullainathan, S. (2004), How Much Should We Trust Difference-in-Differences Estimates? *The Quarterly Journal of Economics*, 119 (1), 249-275.

Bloom, N., Dorgan, S., Dowdy, J. and Van Reenen, J. (2007), Management Practices and Productivity: Why They Matter, McKinsey & Company Operations Extranet, September 2007.

Bourne, M. and Franco-Santos, M. (2010), Investors in People, Managerial Capabilities and Performacne, Cranfield School of Management, Cranfield University.

CIPD (2017), Skills development in the UK workplace, Chartered Institute of Personnel and Development, London.

De Waal, A. (2016), Does Investors in People affect organisational performance a relevant question? Employee Relations, 38 (5), 665-681.

Dowdy, J. and Van Reenen, J. (2014), Why management matters for productivity, McKinsey Quarterly, September 2014.

Grice, J. (2012), The Productivity Conundrum, Interpreting the Recent Behaviour of the Economy, Office for National Statistics, London

Grugulis, I. and Bevitt, S. (2002), The impact of Investors in People: a case study of a hospital trust, *Human Resource Management Journal*, 12 (3), 44-60.

Heckman, J. and Kautz, T. (2012), Hard evidence on soft skills, *Labour Economics*, 19, 451-464.

Heckman, J., Ichimura, H. and Todd, P. (1997), Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme, *The Review of Economic Studies*, 64 (4), 605-654.

Heckman, J., Ichimura, H. and Todd, P. (1998) Matching as an Econometric Evaluation Estimator, *Review of Economic Studies*, 65, 261-294.

Hoque, K. (2003), All in All, it's Just Another Plaque on the Wall: The Incidence and Impact of the Investors in People Standard, *Journal of Management Studies*, 40 (2), 543-571.

Hoque, K. (2008), The impact of Investors in People on employer-provided training, the equality of training provision and the 'training apartheid' phenomenon, *Industrial Relations Journal*, 39 (1), 43-62.

Hoque, K. and Bacon, N. (2008), Investors in People and training in the British SME sector, *Human Relations*, 61 (4), 451-482.

Hoque, K., Taylor, S., and Bell, E. (2005), Investors in People: Market-led Voluntarism in Vocational Education and Training, *British Journal of Industrial Relations*, 43 (1), 135-153.

Investors in People (2017), People Management Benchmark: The Impact of Investing in People, London.

Kersley, B., Alpin, C., Forth, J., Bryson, A., Bewley, H., Dix, G. and Oxenbridge, S. (2006). *Inside the Workplace: Findings from the 2004 Workplace Employment Relations Survey*, Routledge, London.

Leitch Report (2006), Prosperity for all in the Global Economy – world class skills, HM Treasury, London.

Leuven, E. and Sianesi, B (2003) PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing, Statistical software components, Boston College Department of Economics.

MAC (2018), *EEA-workers in the UK labour market: Interim Update*, Migration Advisory Committee Report, March 2018, London.

ONS (2017), Labour Productivity: April to June 2017, Office for National Statistics Statistical Bulletin, 6 October 2017 release.

ONS Digital (2015), What is the productivity puzzle? 7 July 2015, Office for National Statistics (https://visual.ons.gov.uk/productivity-puzzle/).

Patterson, P. (2012), The Productivity Conundrum, Explanations and Preliminary Analysis, Office for National Statistics, London.

Pessoa, J. and Van Reenen, J. (2014), The UK Productivity and Jobs Puzzle: Does the answer lie in wage flexibility? *The Economic Journal*, 124, 433-452.

Pickavance, N. (2014), *Zeroed Out: The place of zero-hours contracts in a fair and productive economy*, An Independent Report, London

Rayton, B. and Georgiadis, K. (2012), Workplace self-selection into Investors in People, *Applied Economics Letters*, 19, 1455-1458.

Rayton, B. and Georgiadis, K. (2012), Workplace self-selection into Investors in People, *Applied Economics Letters*, 19, 1455-1458.

Rosenbaum, P. and Rubin, D.B. (1983) The Central Role of the Propensity Score in Observational Studies for Causal Effects, *Biometrika*, 70, 41-55.

Rubin, D. (1974), Estimating Causal Effects of Treatments in Randomized and Nonrandomized Studies, *Journal of Educational Psychology*, 66 (5), 688-701.

Rubin, D. (2005), Causal Inference Using Potential Outcomes, *Journal of the American Statistical Association*, 100 (469), 322-331.

Shury, J., Vivian, D., Gore, K., Huckle, C. and Belt, V. (2012), *UK Commission's Employer Perspectives Survey 2012*, UK Commission for Employment and Skills, London

Smith, S., Stokes, P. and Wilson, J. (2014), Exploring the impact of Investors in People: A focus on training and development, job satisfaction and awareness of the standard, *Employee Relations*, 36 (3), 266-279.

Tamkin, P., Cowling, M. and Hunt, W. (2008), *People and the Bottom Line*, Report No. 448, Institute for Employment Studies, Brighton.

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

Winterbotham, M., Huckle, C. and James, A. (2013), *Research to Support the Evaluation of Investors in People: Employer survey (Year 2)*, UK Commission for Employment and Skills, London

Appendix

Table A1: Summary Statistics

	Accredited		Di-accredited		Always accredited		Never accredited		All combined			
	Mean	StDev	Mean	StDev	Mean	StDev	Mean	StDev	Mean	StDev	Min	Max
Training outcomes												
Training last year	0.944	0.230	0.950	0.218	0.986	0.116	0.837	0.370	0.916	0.278	0	1
All skills	4.690	2.970	4.840	2.921	5.212	2.789	3.325	2.838	4.332	2.972	0	11
Hard skills	1.639	1.227	1.679	1.218	1.817	1.180	1.199	1.165	1.526	1.216	0	4
Soft skills	3.051	2.085	3.160	2.062	3.395	1.976	2.126	2.001	2.806	2.090	0	7
Computer	0.472	0.500	0.504	0.501	0.502	0.500	0.334	0.472	0.431	0.495	0	1
Teamwork	0.421	0.495	0.447	0.498	0.534	0.499	0.280	0.449	0.405	0.491	0	1
Communication	0.463	0.500	0.469	0.500	0.520	0.500	0.351	0.478	0.438	0.496	0	1
Leadership	0.417	0.494	0.435	0.497	0.468	0.499	0.249	0.433	0.368	0.482	0	1
New equipment	0.495	0.501	0.515	0.501	0.590	0.492	0.413	0.493	0.496	0.500	0	1
Customer service	0.417	0.494	0.439	0.497	0.439	0.497	0.297	0.457	0.379	0.485	0	1
Health & safety	0.745	0.437	0.767	0.423	0.790	0.408	0.616	0.487	0.711	0.453	0	1
Problem solving	0.241	0.429	0.252	0.435	0.276	0.448	0.144	0.351	0.215	0.411	0	1
Equal opportunities	0.398	0.491	0.443	0.498	0.441	0.497	0.211	0.409	0.343	0.475	0	1
Reliability	0.190	0.393	0.160	0.368	0.203	0.403	0.122	0.327	0.162	0.369	0	1
Quality control	0.431	0.496	0.408	0.492	0.449	0.498	0.308	0.462	0.384	0.486	0	1
Training culture	2.519	0.997	2.378	1.028	2.664	0.876	2.066	1.096	2.363	1.039	0	4
Training discussed	0.338	0.474	0.324	0.469	0.342	0.475	0.290	0.454	0.318	0.466	0	1
Training in appraisal	0.843	0.365	0.866	0.341	0.905	0.293	0.691	0.463	0.805	0.396	0	1
Training records	0.852	0.356	0.821	0.384	0.920	0.271	0.797	0.403	0.848	0.359	0	1
Training target	0.486	0.501	0.366	0.483	0.497	0.500	0.289	0.453	0.392	0.488	0	1
Organizational characteristics												
Single establishment	0.162	0.369	0.179	0.384	0.139	0.346	0.471	0.500	0.282	0.450	0	1
Private	0.593	0.492	0.588	0.493	0.515	0.500	0.880	0.325	0.682	0.466	0	1
UK owned	0.435	0.497	0.427	0.496	0.351	0.478	0.700	0.458	0.513	0.500	0	1
Size(base: 5-9)												

10-24 employees	0.148	0.356	0.137	0.345	0.086	0.281	0.265	0.442	0.174	0.379	0	1
25-49 employees	0.185	0.389	0.145	0.353	0.115	0.320	0.131	0.338	0.134	0.341	0	1
50-99 employees	0.116	0.321	0.153	0.360	0.146	0.353	0.116	0.320	0.131	0.338	0	1
100-199 employees	0.157	0.365	0.088	0.284	0.168	0.374	0.109	0.312	0.131	0.338	0	1
200-499 employees	0.125	0.331	0.153	0.360	0.192	0.394	0.094	0.292	0.138	0.345	0	1
500-999 employees	0.088	0.284	0.095	0.294	0.100	0.300	0.068	0.251	0.085	0.279	0	1
1000-1999 employees	0.032	0.177	0.061	0.240	0.061	0.240	0.030	0.172	0.045	0.208	0	1
2000+ employees	0.079	0.270	0.099	0.300	0.092	0.289	0.059	0.237	0.078	0.268	0	1
Industry (base: manufacturing)												
Construction	0.046	0.211	0.023	0.150	0.039	0.194	0.055	0.229	0.044	0.205	0	1
Whole sale & retail trade	0.042	0.200	0.057	0.233	0.098	0.298	0.134	0.341	0.100	0.300	0	1
Hotel restaurant & transport	0.102	0.303	0.107	0.310	0.098	0.298	0.128	0.335	0.112	0.316	0	1
Finance & business services	0.153	0.361	0.115	0.319	0.080	0.271	0.191	0.393	0.138	0.345	0	1
Public and community	0.213	0.410	0.271	0.445	0.186	0.390	0.109	0.312	0.171	0.376	0	1
Education	0.125	0.331	0.126	0.332	0.190	0.393	0.033	0.179	0.109	0.312	0	1
Health	0.213	0.410	0.191	0.394	0.217	0.413	0.178	0.383	0.197	0.398	0	1
Region (base: North East)												
North West	0.139	0.347	0.137	0.345	0.164	0.371	0.095	0.294	0.129	0.336	0	1
Yorkshire and Humber	0.083	0.277	0.046	0.209	0.061	0.240	0.088	0.284	0.073	0.259	0	1
East Midlands	0.056	0.230	0.065	0.247	0.066	0.249	0.064	0.244	0.064	0.244	0	1
West Midlands	0.065	0.247	0.069	0.253	0.098	0.298	0.091	0.288	0.087	0.282	0	1
East of England	0.074	0.263	0.046	0.209	0.063	0.243	0.117	0.322	0.084	0.277	0	1
London	0.157	0.365	0.137	0.345	0.108	0.311	0.134	0.341	0.129	0.335	0	1
South East	0.139	0.347	0.164	0.371	0.132	0.339	0.152	0.359	0.146	0.353	0	1
South West	0.074	0.263	0.115	0.319	0.054	0.227	0.069	0.254	0.071	0.258	0	1
Scotland	0.148	0.356	0.107	0.310	0.120	0.326	0.105	0.307	0.116	0.320	0	1
Wales	0.028	0.165	0.076	0.266	0.081	0.274	0.048	0.215	0.061	0.239	0	1
No. of Organizations	108		131		295		362		896			

Table A2: IiP Accreditation and Worker Upskilling, Fixed Effects Estimates for Each Domains of Training

	Computer	Teamwork	Commun-ication	Leadership	New equipment	Customer service	Health & safety	Problem solving	Equal Opps.	Reliability	Quality control
	Full sample										
IiP Accredited	0.0837**	0.1088***	0.0879**	0.0502	0.1004**	0.0460	0.0669*	0.0335	-0.0251	0.0126	0.0000
	(0.041)	(0.041)	(0.043)	(0.042)	(0.043)	(0.039)	(0.035)	(0.036)	(0.039)	(0.033)	(0.039)
Constant	0.3921***	0.3548***	0.3969***	0.3451***	0.4496***	0.3576***	0.6800***	0.1994***	0.3548***	0.1566***	0.3839***
	(0.019)	(0.019)	(0.020)	(0.020)	(0.020)	(0.018)	(0.016)	(0.017)	(0.018)	(0.015)	(0.018)
N × 2	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792
R-squared	0.005	0.009	0.005	0.002	0.006	0.002	0.004	0.001	0.001	0.000	
N	896	896	896	896	896	896	896	896	896	896	896
	Private										
IiP Accredited	0.1221**	0.1298**	0.1221**	0.0382	0.1374**	0.0458	0.1221**	0.1145**	0.0458	0.0382	0.0305
	(0.054)	(0.054)	(0.054)	(0.056)	(0.060)	(0.052)	(0.050)	(0.047)	(0.051)	(0.048)	(0.054)
Constant	0.3142***	0.3253***	0.3690***	0.2953***	0.4158***	0.3507***	0.6339***	0.1501***	0.2411***	0.1482***	0.3831***
	(0.019)	(0.020)	(0.019)	(0.020)	(0.022)	(0.019)	(0.018)	(0.017)	(0.018)	(0.017)	(0.019)
N × 2	1223	1223	1223	1223	1223	1223	1223	1223	1223	1223	1223
R-squared	0.010	0.011	0.009	0.001	0.010	0.001	0.010	0.011	0.002	0.001	0.001
N	637	637	637	637	637	637	637	637	637	637	637
	Public										
IiP Accredited	0.0909	0.0795	0.0909	0.0682	0.0682	0.0795	-0.0227	-0.0568	-0.0795	0.0114	-0.0455
	(0.066)	(0.069)	(0.077)	(0.073)	(0.073)	(0.067)	(0.058)	(0.063)	(0.063)	(0.047)	(0.066)
Constant	0.5248***	0.4219***	0.4282***	0.4490***	0.5158***	0.3498***	0.7976***	0.3042***	0.5816***	0.1557***	0.3931***
	(0.045)	(0.047)	(0.052)	(0.050)	(0.050)	(0.046)	(0.040)	(0.043)	(0.043)	(0.032)	(0.045)
N × 2	569	569	569	569	569	569	569	569	569	569	569
R-squared	0.007	0.005	0.006	0.004	0.004	0.006	0.001	0.003	0.006	0.000	0.002
N	310	310	310	310	310	310	310	310	310	310	310

Table A3: IiP Accreditation & Worker Upskilling, Fixed-Effects Difference-in-differences Estimates Using Kernel Matched Organizations with Common Support, Each Domains of Training

	Computer	Teamwork	Commun-ication	Leadership	New equipment	Customer service	Health & safety	Problem solving	Equal opps.	Reliability	Quality control
IiP Accredited vs Never Accredited											
2011	-0.1916***	-0.0651	-0.0348	0.0348	-0.0524	-0.0543	0.0762*	-0.0726	0.0923**	0.0003	-0.0097
	(0.062)	(0.053)	(0.045)	(0.040)	(0.055)	(0.054)	(0.044)	(0.055)	(0.044)	(0.030)	(0.043)
Accredited#2011	0.3160***	0.2072**	0.2595***	0.0012	0.2684***	0.2803***	0.0123	0.1260	-0.0099	0.1358*	0.0924
	(0.084)	(0.086)	(0.094)	(0.085)	(0.097)	(0.088)	(0.096)	(0.086)	(0.082)	(0.070)	(0.091)
Constant	0.3896***	0.3741***	0.3704***	0.3576***	0.4218***	0.3230***	0.6756***	0.2327***	0.3228***	0.1645***	0.3994***
	(0.023)	(0.027)	(0.032)	(0.029)	(0.031)	(0.027)	(0.033)	(0.026)	(0.027)	(0.025)	(0.031)
N×2	912	912	912	912	912	912	912	912	912	912	912
R-squared	0.070	0.049	0.089	0.004	0.082	0.110	0.021	0.012	0.023	0.058	0.015
N	456	456	456	456	456	456	456	456	456	456	456
IiP Accredited vs Di-accredited											
2011	-0.0255	-0.1287**	-0.0400	-0.0871	-0.0321	0.0401	-0.1094*	-0.0322	0.1228**	0.0402	0.0221
	(0.067)	(0.060)	(0.066)	(0.060)	(0.068)	(0.066)	(0.056)	(0.054)	(0.058)	(0.059)	(0.061)
Accredited#2011	0.0419	0.0644	0.0430	-0.0245	0.0310	0.0037	0.1105	0.0519	-0.1045	-0.0018	0.0148
	(0.101)	(0.100)	(0.110)	(0.100)	(0.107)	(0.090)	(0.079)	(0.079)	(0.097)	(0.080)	(0.089)
Constant	0.4885***	0.4819***	0.4739***	0.5091***	0.5158***	0.3929***	0.7908***	0.2326***	0.3934***	0.1549***	0.4195***
	(0.026)	(0.026)	(0.028)	(0.026)	(0.028)	(0.022)	(0.020)	(0.020)	(0.025)	(0.020)	(0.022)
N×2	470	470	470	470	470	470	470	470	470	470	470
R-squared	0.001	0.024	0.002	0.024	0.001	0.005	0.018	0.002	0.018	0.006	0.003
N	235	235	235	235	235	235	235	235	235	235	235

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A4: IiP Accreditation & Worker Upskilling, Fixed-Effects Difference-in-differences Estimates Using Kernel Matched Organizations with Common Support, Each Domain of Training and by Sector

	Computer	Teamwork	Commun-ication	Leadership	New equipment	Customer service	Health & safety	Problem solving	Equal opps.	Reliability	Quality control
IiP Accredited vs Never Accredited (Private)											
2011	-0.1321***	-0.0135	-0.0116	0.0137	-0.0314	0.0294	0.0200	-0.0158	0.0750**	-0.0078	0.0408
	(0.042)	(0.044)	(0.050)	(0.046)	(0.051)	(0.037)	(0.041)	(0.038)	(0.035)	(0.034)	(0.043)
Accredited#2011	0.2927***	0.1864**	0.2713**	0.0495	0.2883***	0.2434***	0.0834	0.0871	0.0142	0.1615**	0.0448
	(0.075)	(0.088)	(0.106)	(0.096)	(0.105)	(0.084)	(0.107)	(0.085)	(0.084)	(0.079)	(0.101)
Constant	0.3339***	0.3529***	0.3410***	0.3172***	0.3804***	0.2906***	0.6483***	0.2242***	0.2675***	0.1720***	0.4017***
	(0.026)	(0.031)	(0.038)	(0.035)	(0.038)	(0.031)	(0.040)	(0.031)	(0.031)	(0.029)	(0.037)
N×2	738	738	738	738	738	738	738	738	738	738	738
R-squared	0.094	0.078	0.125	0.009	0.116	0.182	0.023	0.016	0.027	0.078	0.017
N	379	379	379	379	379	379	379	379	379	379	379
IiP Accredited vs Di-accredited (Private)											
2011	-0.0157	-0.0977	-0.0301	-0.0320	-0.0084	0.0531	-0.1501*	-0.0490	0.0830	0.0688	0.0493
	(0.090)	(0.080)	(0.078)	(0.077)	(0.089)	(0.090)	(0.084)	(0.066)	(0.079)	(0.080)	(0.081)
Accredited#2011	0.2036*	0.1512	0.1599	-0.0032	0.1472	0.1057	0.1907*	0.1978*	0.0234	0.0255	0.0622
	(0.114)	(0.121)	(0.120)	(0.115)	(0.133)	(0.120)	(0.114)	(0.105)	(0.115)	(0.114)	(0.120)
Constant	0.3949***	0.4732***	0.4613***	0.4650***	0.4506***	0.3541***	0.7721***	0.2297***	0.3292***	0.1734***	0.4469***
	(0.029)	(0.030)	(0.030)	(0.029)	(0.034)	(0.030)	(0.029)	(0.027)	(0.029)	(0.029)	(0.030)
N×2	276	276	276	276	276	276	276	276	276	276	276
R-squared	0.050	0.016	0.025	0.003	0.023	0.041	0.034	0.044	0.026	0.022	0.021
N	148	148	148	148	148	148	148	148	148	148	148
IiP Accredited vs Never Accredited (Public)											
2011	-0.3309**	-0.1470	-0.0039	0.0467	-0.1337	-0.1951	0.1483	-0.1982	0.1022	-0.0043	-0.0400
	(0.157)	(0.117)	(0.092)	(0.083)	(0.130)	(0.128)	(0.101)	(0.138)	(0.112)	(0.063)	(0.089)
Accredited#2011	0.2506	-0.0144	-0.0334	-0.2146	0.1128	0.2381	-0.1515	0.1271	-0.1263	-0.0149	0.1251
	(0.190)	(0.163)	(0.145)	(0.149)	(0.170)	(0.181)	(0.138)	(0.168)	(0.181)	(0.107)	(0.154)
Constant	0.6352***	0.4914***	0.4903***	0.5481***	0.6054***	0.4301***	0.8011***	0.2775***	0.5898***	0.1448***	0.3697***
	(0.047)	(0.041)	(0.037)	(0.038)	(0.042)	(0.045)	(0.035)	(0.041)	(0.046)	(0.027)	(0.039)
N×2	174	174	174	174	174	174	174	174	174	174	174
R-squared	0.128	0.064	0.002	0.043	0.023	0.044	0.040	0.068	0.013	0.001	0.013
N	97	97	97	97	97	97	97	97	97	97	97
IiP Accredited vs Di-accredited (Public)											
2011	-0.2252**	-0.1876*	-0.1813	-0.1957*	-0.0864	-0.0505	-0.0251	-0.0305	0.0883	-0.1036	0.0057

	(0.093)	(0.103)	(0.130)	(0.109)	(0.130)	(0.106)	(0.086)	(0.118)	(0.090)	(0.097)	(0.120)
Accredited#2011	0.0632	-0.0324	0.0670	-0.0003	-0.0470	-0.0044	-0.0243	-0.0788	-0.2180	0.0532	-0.0578
	(0.168)	(0.167)	(0.204)	(0.185)	(0.193)	(0.146)	(0.127)	(0.142)	(0.167)	(0.120)	(0.163)
Constant	0.6482***	0.4993***	0.5041***	0.5705***	0.6006***	0.4489***	0.8182***	0.2354***	0.5200***	0.1512***	0.3740***
	(0.047)	(0.045)	(0.054)	(0.051)	(0.050)	(0.037)	(0.033)	(0.032)	(0.047)	(0.028)	(0.041)
N×2	194	194	194	194	194	194	194	194	194	194	194
R-squared	0.081	0.100	0.036	0.072	0.028	0.008	0.006	0.026	0.034	0.029	0.004
N	107	107	107	107	107	107	107	107	107	107	107

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A5: 'Pstest' Statistics from Matching Accredited-Never Accredited & Accredited-Di-accredited Organisations

	Accredited vs. Never Accredited					Accredited vs. Di-accredited				
	Mean Treated	Mean Control	%bias	t	p>|t|	Mean Treated	Mean Control	%bias	t	p>|t|
Single establishment	0.204	0.226	-5.0	-0.40	0.686	0.183	0.171	3.3	0.23	0.821
UK owned	0.426	0.459	-7.1	-0.49	0.622	0.423	0.420	0.5	0.04	0.969
Private	0.593	0.613	-4.8	-0.30	0.764	0.587	0.593	-1.4	-0.10	0.920
10-24 employees	0.157	0.135	5.6	0.46	0.643	0.163	0.166	-0.7	-0.05	0.960
25-49 employees	0.185	0.149	10.0	0.72	0.473	0.192	0.189	0.7	0.05	0.959
50-99 employees	0.111	0.117	-1.8	-0.13	0.897	0.115	0.116	-0.1	-0.01	0.992
100-199 employees	0.148	0.146	0.7	0.05	0.962	0.135	0.117	5.8	0.39	0.695
200-499 employees	0.111	0.128	-5.5	-0.37	0.709	0.115	0.123	-2.4	-0.18	0.858
500-999 employees	0.111	0.120	-3.0	-0.20	0.845	0.106	0.114	-2.6	-0.19	0.846
1000-1999 employees	0.028	0.022	3.5	0.27	0.784	0.029	0.028	0.4	0.03	0.977
2000+ employees	0.074	0.092	-6.9	-0.46	0.644	0.077	0.075	0.8	0.06	0.949
Construction	0.037	0.029	3.8	0.33	0.745	0.038	0.031	4.2	0.28	0.779
Whole sale & retail trade	0.046	0.050	-1.3	-0.13	0.898	0.048	0.048	0.1	0.01	0.992
Hotel rest. & transport	0.093	0.089	1.0	0.08	0.936	0.096	0.106	-3.4	-0.24	0.807
Finance & bus. services	0.148	0.150	-0.4	-0.03	0.974	0.135	0.131	1.0	0.07	0.943
Public and community	0.222	0.208	3.7	0.25	0.805	0.221	0.203	4.2	0.32	0.752
Education	0.130	0.117	4.8	0.29	0.775	0.135	0.133	0.5	0.03	0.973
Health	0.213	0.244	-7.9	-0.55	0.584	0.221	0.229	-1.9	-0.13	0.897
North West	0.139	0.159	-6.2	-0.41	0.683	0.125	0.137	-3.4	-0.25	0.800
Yorkshire and Humber	0.083	0.084	-0.2	-0.02	0.988	0.077	0.065	5.0	0.34	0.733
East Midlands	0.056	0.047	3.8	0.30	0.766	0.058	0.064	-2.5	-0.18	0.857
West Midlands	0.065	0.043	8.3	0.72	0.472	0.067	0.073	-2.1	-0.15	0.881
East of England	0.074	0.068	2.2	0.18	0.857	0.077	0.078	-0.3	-0.02	0.984
London	0.157	0.189	-8.9	-0.61	0.541	0.163	0.158	1.5	0.11	0.916
South East	0.139	0.171	-9.1	-0.65	0.516	0.144	0.154	-2.8	-0.20	0.840
South West	0.074	0.072	0.8	0.06	0.954	0.077	0.069	2.6	0.21	0.837
Scotland	0.148	0.121	8.1	0.58	0.562	0.154	0.148	1.9	0.12	0.901
Wales	0.028	0.016	6.3	0.60	0.548	0.019	0.013	2.8	0.35	0.728

Base categories: 5-9 employees, manufacturing, north east. The Probit regression results, which are generated using 'psmatch2' and organisations' 2004 characteristics are available on request from the author.