Working paper:

Back To Work Enterprise Allowance – a counterfactual impact evaluation

Prepared by Hugh Cronin, Saidhbhín Hardiman and Ciaran Judge

February 2017

An Roinn
Gnóthaí Fostaíochta agus Coimirce Sóisialaí
Department of
Employment Affairs and Social Protection

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This paper has been prepared by an IGEES economist and statisticians working in the Statistics and Business Intelligence Unit of the Department of Employment Affairs and Social Protection. The views presented in this paper are those of the authors alone and do not represent the official views of the Department of Employment Affairs and Social Protection or the Minister for Employment Affairs and Social Protection. Analytical papers are prepared on an ongoing basis and reflect the data available at a given point in time.

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Summary

This working paper estimates the impact of participation in the Back to Work Enterprise Allowance, a self-employment subsidy provided by the Department of Social Protection to long-term unemployed people. The analysis uses propensity score matching (PSM) to create comparable treatment and control groups for each month between May 2009 and December 2011, with further testing on a subset of those who expressed an interest in pursuing self-employment but did not participate in the programme. The results show the programme has a positive impact on employment at six and 18 months, albeit one moderated by the disposition towards self-employment. The employment rate of participants is at least 27 percentage points higher than that of the matched control group.

Introduction

This working paper presents initial estimates of the impact of participation on the Back to Work Enterprise Allowance (hereafter, BTWEA) on employment outcomes. The programme is a self-employment incentive open to the long-term unemployed, where participants can retain a portion of their unemployment assistance payment for two years while setting up new businesses, with a view to remaining in work after the subsidy period has ended. This paper examines whether those who participated on the programme were more likely to be in employment (either self-employment or as an employee) at points after the completion of the programme, compared to similar people who did not participate in it.

A propensity score matching approach is used to generate matches on a range of covariates to ensure the most reasonable comparison of outcomes for programme participants and non-participants and to closely estimate the effect of the programme while eliminating, to the greatest extent possible, the self-selection effects of participation.

A review of the BTWEA was undertaken as part of the Government's labour market strategy, Pathways to Work 2015 and comprises two parts: a qualitative review informed by a survey of participants, and a quantitative study of the scheme impact. This paper is the quantitative study that measures labour market outcomes to estimate the impact of participation on employment, focussing on those who commenced between May 2009 and the end of 2011.

These results show a significant impact of participation in BTWEA on employment outcomes where participants are matched to similar potential participants – an effect that remains relatively stable six months and 18 months after the end of the programme.

Background

The objective of the BTWEA is to encourage the unemployed to take up self-employed opportunities by allowing them to retain social welfare benefits over the first two years. Since 2009, the portion of a jobseeker payment (most likely Jobseekers Allowance) retained by the programme participant is 100% rate for the first year and 75% for the second.

The programme is similar to the much smaller Short-Term Enterprise Allowance (STEA) but targets long-term unemployed people rather than short-term. The STEA applies to those who are entitled to Jobseeker's Benefit, typically those who have been employed and built up an entitlement to a PRSI-related benefit.

Eligibility on BTWEA is restricted to those under the age of 66, with the allowance payable up to 66th birthday. The applicant must have a business plan for self-employment approved, in writing, by a partnership company, local development company, local enterprise office or Department of Social Protection case officer. Note that for evaluation purposes, this application process allows for some degree of administrative selection. Applicants can also access support, advice and mentoring from partnership companies, local development companies or local enterprise offices.

Finally, the applicant must be in receipt of Jobseeker's Benefit or Jobseeker's Allowance for 12 months (currently, there is no longer an entitlement to Jobseeker's Benefit for this duration). In the case of the former, the person on Jobseekers Benefit must have an underlying entitlement to Jobseekers Allowance.[1] If there is no Jobseekers Allowance entitlement, the qualifying period is two out of the last three years on a qualifying payment. According to scheme rules, a recommencement is possible under certain limited circumstances.

The same duration also leads to an entitlement to BTWEA for recipients of the following payments:

- One-Parent Family Payment
- Disability Allowance
- Blind Person's Pensions
- Carer's Allowance
- Farm Assist
- Invalidity Pension
- Incapacity Supplement
- Pre-Retirement Allowance
- Widows/Widowers Non Contributory Pension
- Deserted Wife's Benefit/Allowance
- Prisoners Wife's Allowance.

Additional requirements apply to Illness Benefit recipients, recipients of Farm Assist, and casual workers.

Labour Market Context

This evaluation covers all entrants to the BTWEA programme during a period of considerable turbulence in the labour market, with a sustained period of unemployment followed by a rapid improvement.

[1] This requirement may apply based on means, residency or a claimant's employment/self-employment status.

The most striking feature of the labour market in the period under review is the collapse in employment in 2008-2011 as measured by ILO economic status (or by the self-reported principal economic status) in the Central Statistics Office's Quarterly National Household Survey. The total number in employment, seasonally adjusted, fell from a high of 2.07 million in Q4 2007 to below 1.8 million in Q3 2012 (Figure 1). The recovery in employment began in earnest in Q1 2013 and has continued steadily to date. The consequence of this was, predictably, a sharp increase in the unemployment rate (Figure 2), from a low of 4.3% in November 2006 to a peak of 15.2% in January 2012.

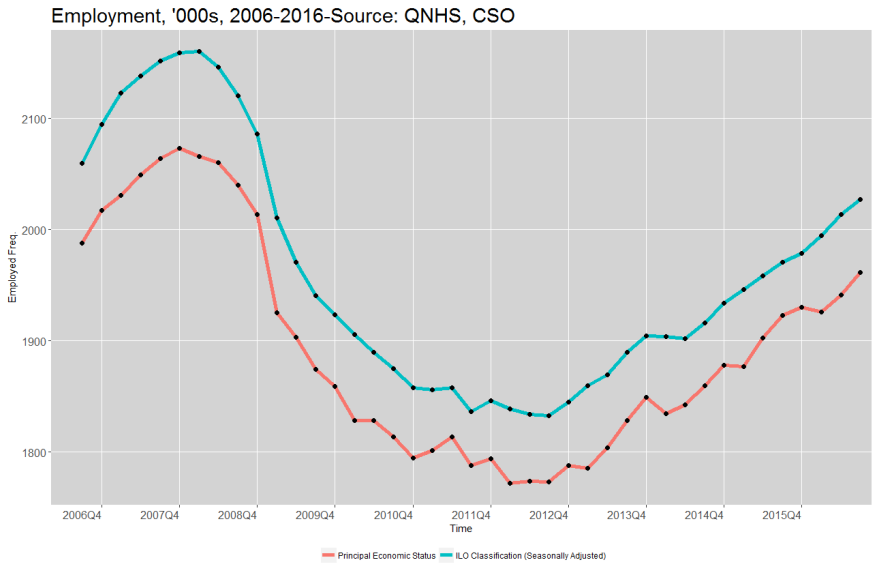


Figure 1 - Employment in Ireland 2006-2016 (note truncated y axis)

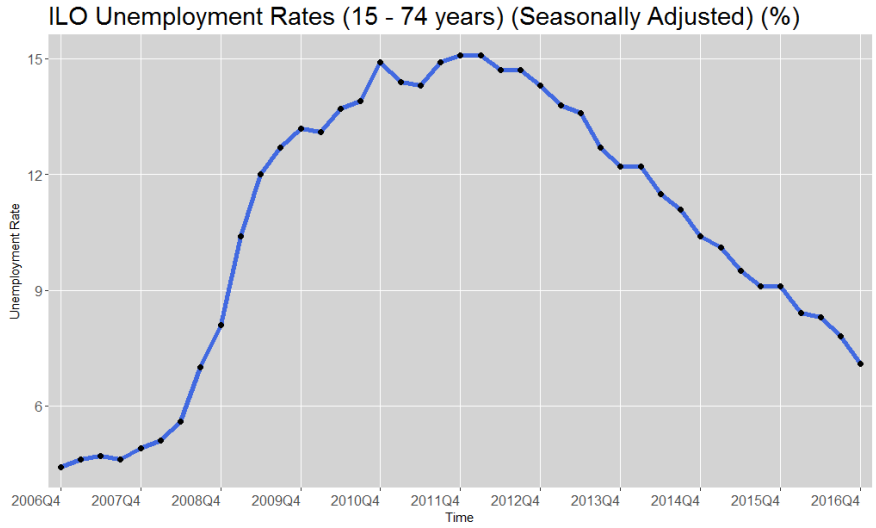


Figure 2 - Unemployment rate in Ireland 2006-2016

The absence of an immediate recovery meant a large proportion of the first wave of unemployed people became long-term unemployed. Long-term unemployment (periods of continuous unemployment greater than 12 months) rose sharply in the recession, with the share of the unemployed made up by the long-term unemployed increasing from just under 25% to over 60%. Figure 3 outlines the total number of people unemployed, and the number of long-term unemployed people.

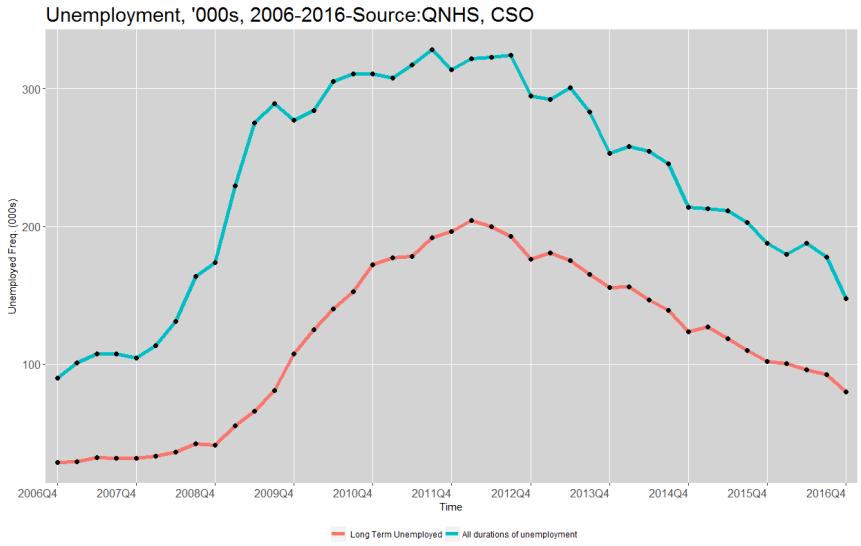


Figure 3 - Unemployment and long-term unemployment in Ireland 2006-2016

This evaluation covers entrants to the programme from May 2009 up to end-2011, just before that unemployment rate peak, but measures labour market outcomes at points six, 12 and 18 months after completion of the two-year programme, at a time when the labour market was more buoyant. Thus, in assessing the cohort of potential participants and their likelihood of later

employment, it is important to consider the labour market context at both the intake and outcome periods.

A further consequence of the decrease in employment was an increasing number of people undertaking labour market activation and training programmes, including the BTWEA. Table 1 sets out the expenditure and number of participants on the programme from 2006 to 2015. Note that this includes participants under the 4-year version that ceased taking new entrants in May 2009. This evaluation includes only those who entered after May 2009, and therefore only includes those who participated in the two-year version of BTWEA.

Table 1 Table of recipients and expenditure
Source: Statistical Information on Social Welfare Services, Department of Social Protection
***Note: Expenditure includes the Short-Term Enterprise Allowance**

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 (est)
Expenditure (€,million)*	56.5	71.1	73.2	76.4	88.0	114.6	127.2	119.5	118.8	129.0
Year 1 BTWEA recipients	1,683	1,811	1,470	1,966	5,011	5,617	5,656	5,216	6,580	6,214
Years 2-4 BTWEA recipients	2,690	3,017	3,134	2,625	2,947	5,134	5,154	4,882	4,586	5,667

As well as a change in the proportion of short-term and long-term unemployment, the sharp increase in the number of people who became unemployed in 2008-2011 most likely led to changed cohort of unemployed people. For example, where people with a long history of continuous employment become unemployed or long-term unemployed, this affects the labour market potential of the entire cohort of long-term unemployed people. It possibly also has an impact on the extent to which they can benefit from activation programmes.

As a simple indicator of the changing cohort of long-term unemployed over 2006-2013, Table 2 shows mean earnings of long-term unemployed. This compares mean earnings values from the preceding year of a random sample of 150,000 people who were, or were about to become, long-term unemployed (a duration of at least 11 months) on 31 December for years between 2006 and 2013. Those with zero values in the preceding years are dropped. The values in

2008 and 2009 are considerably higher than the preceding years, suggesting a possible change in the cohort of long-term unemployed at this time.

Table 2 - Prior earnings as LTU status approaches

Year of reaching at least 11 months	Number of observations	Mean values of earnings in previous year (€, nominal)
2006	68,574	12,811
2007	71,720	14,867
2008	82,485	17,218
2009	82,088	17,871
2010	61,767	14,606
2011	55,144	13,236
2012	55,493	12,823
2013	56,854	16,257

Literature Review

Labour market outcomes from self-employment incentives

Caliendo (2016) provides a comprehensive overview of the literature on start-up subsidies for the unemployed, finding them to be an effective policy to help participants move out of unemployment. The overview covers 14 countries across three continents, and splits studies into those providing descriptive overview and those with evidence of causal effects. The outcome of interest is either survival in self-employment, the broader definition of employment (self-employment or employee), or job creation. Depending on approach, this is measured at time ranges of 1-4 years after the end of the subsidy or 1.5-5 years after the commencement of the subsidy.

The descriptive analyses find participants' employment rates range from 60% to 92% at the various points in time. The causal effects estimates increases of 8 to

22 percentage points in the employment rate, with several measuring the decrease in the probability of being unemployed instead (10 to 31 percentage points). Several of these studies are examined more closely below.

Enterprise turnover and survival

While the employment effects of these kinds of subsidies are generally very positive, the effects on job creation and growth seem limited. Caliendo et al (2015) finds enterprises created from unemployment fare worse than other businesses on the metrics of income, business growth and innovation. Quentier (2012) notes that start-ups from unemployment have fewer employees than other start-ups, are in sectors with low barriers to entry, and have a lower propensity to invest and recruit. Similarly, Niefert (2010) finds such enterprises to be in less capital-intensive sectors with a high level of competition.

Methodology and detailed results

Moving onto specific approaches and results, Baumgartner and Caliendo (2008) use logistic regression and PSM to evaluate two German start-up programmes using administrative data and a follow-up survey. The programmes, SUS and BA, share some features with the BTWEA, with SUS paying a monthly sum that reduces each year over three years, and BA paying unemployment benefits for six months. By comparing labour market outcomes for a group of participants with eligible unemployed non-participants, it finds the unemployment rate for participants 17 to 29 percentage points lower than for a matched control group.

Behrenz (2012) measures employment outcomes at four to five years after commencement of a start-up subsidy and finds participants to be 17 percentage points less likely to be unemployed or to return to unemployment. The paper also estimates direct displacement effects and concludes the start-up subsidy is less likely to cause displacement than other Swedish active labour market programmes.

Villsaar (2014) examines the effect on business survival, employment and income levels of an Estonian start-up subsidy by using probit models and propensity score matching. A novel feature of the analysis is its limitation of the control group to only those with experience of running a business or a qualification in business management. The analysis finds a difference of 30-35

percentage points in employment outcomes four years after the commencement of the subsidy.

Sianesi (2007) uses dynamic matching to compare six Swedish active labour market programs (employment services, labour market training, two work experience programmes, public relief work, trainee replacement and job subsidies) in respect of short-term and long-term employment probability and unemployment benefit dependency. The finding is that the more a labour market programme approximates a job in the competitive labour market, the more effective it is for participants, with job subsidies proving most effective.

Similarly, in determining what kind of State intervention assists the transition from unemployment to employment, Kelly et al (2011) emphasise the requirement for strong labour market links in supply side measures such as employment subsidies.

Caliendo and Krititikos (2010) use both qualitative survey data and administrative data in their examination of two self-employment subsidy programmes, BA and SUS. They measure survival rates for such firms and employment status after 2.5 years and estimate the deadweight effect by a follow-up question on whether the person would have started the business without a subsidy (31-47% of recipients indicate they would have done so). The study finds survival rates of 70% and that self-employed are doing no worse financially when compared to a previously employed status.

Duhautois and Redor (2015) use PSM to estimate the effect of public support on the likelihood of start-ups developing and surviving and find the ACCRE ('Aide au chomeurs créant ou reprenant une enterprise') programme – a start-up or return to self-employment subsidy for unemployed people) – is effective in increasing firm survival, irrespective of initial capital or funding sources.

The characteristics of the self-employed are also significant for the purposes of dealing with selection. Storey (1998) considers that policies to assist the start-up of new enterprises are likely to be targeted at the unemployed and cites studies in the UK and US showing that unemployed people in receipt of such incentives are likely to enter trades with low barriers to entry. With low barriers to entry often coinciding with enterprises of low growth and low export potential or with limited scope for geographic spread, displacement must be considered as a factor. Substitution effects, where business react to an increase in demand by subcontracting to recipients of a start-up incentive rather than taking on new employees, is also a consideration in this regard. Storey and Strange (1992) outline how this can be manifest in a decrease in average firm size without any

increase in employment. This will occur if subsidised enterprises survive at the expense of similar but unsubsidised firms, leading to more small firms or self-employed people generated from unemployment but fewer unsubsidised firms growing employment. Studies of whether the experience of unemployment makes people more likely to become self-employed are mixed and, in some cases, seem to vary by country.

Vejsiu (2011) find that having self-employed parents is a strong predictor of movement into self-employment and that people in white collar occupations are more likely to become self-employed, particularly in opportunity-based entrepreneurship. Alba-Ramirez (1994) finds that an origin in unemployment means the self-employed are more likely to be part-time rather than full-time and earning significantly less than comparable employees of firms.

Quentier (2012) uses a probit model with survey data and finds the probability of unemployed people becoming self-employed increases with household income and that such start-ups are more likely in sectors with low barriers to entry. There is, consequently, a high fluctuation in the stock of companies, and his conclusion is that start-up incentives are unlikely to lead to a sustainable reduction in overall unemployment.

Millán et al (2012) use hazard models to focus specifically on survival in self-employment (as opposed to in employment) and find entering self-employment from unemployment has a strong negative effect on survival but that start-up subsidies reduce this risk.

Selection

Block and Sandner (2009) use a probit model to estimate the characteristics of necessity (self-employment arising from unemployment) and opportunity entrepreneurs (self-employment from employment or inactivity) and hazard rate models to estimate the determinants of duration in self-employment. The notable finding is that opportunity entrepreneurs survive for significantly longer than necessity entrepreneurs when controlling for sex, age and nationality but this difference is eroded once an educational background in that business area is controlled for. The paper concludes that the difference between the two groups is down to selection.

Considering how an evaluation deals with selection must address whether self-selection, administrative selection or both are an issue. Storey (1998) outlines how the performance of the selected group will be better both in terms of self-

selection and administrative selection. Self-selection is the extent to which recipients of start-up incentives are distinguished from non-recipients of start-up incentive support by the very act of making an application. Administrative selection occurs when firms or individuals do not automatically receive the support, or access to the programme, but must be chosen from a range of applicants by the scheme administrators.

As outlined by that paper, two factors mitigate the effects of administrative selection. The first is the availability of funds or places on the programme. Where competition is weaker, and where few people have applications rejected, the administrative selection effect is weaker. Second, where those approving projects have no particular expertise in assessing the probability of business success, the administrative selection effect will be mitigated. Nevertheless, it is entirely possible that some criterion other than the most suitable applicant is being used.

Storey (1998) points out that, ideally, firms should be matched immediately before the implementation of the policy so that the performance of treatment and control groups can be monitored, with a random sample of applicants allowed to participate without passing through the administrative selection process.

In summary, the international literature finds start-up subsidies are among the more effective active labour market programmes but that subsidy recipients tend to be engaged in activities with lower returns to investment and lower barriers to entry, and earn less than comparable employees. The literature also outlines the need for careful consideration in evaluation design in order to overcome selection bias.

Evaluations of Irish programmes

Turning finally to Irish evaluations using counterfactual methodology, McGuinness et al (2014) use propensity score matching (PSM) to match participants and non-participants to investigate which State training initiatives prove successful in facilitating the transition from unemployment to employment. The paper finds strong positive effects for job search skills and high-level specific skills training, and shorter training programmes, but more modest effects for general vocational skills programmes and training programmes of longer duration.

The earliest evaluation using the Jobseekers Longitudinal Dataset (JLD) – described below – is McGuinness et al (2015), again using PSM, where the impact of the Back to Education Allowance is estimated at making second level participants 38 and 30 percentage points less likely to be in employment at points in time four and six years after enrolment and third level participants 23 and 14 percentage points less likely to be in employment after the same periods had elapsed.

The most recent evaluation using the JLD is the Indecon (2016) evaluation of an internship programme (JobBridge), which estimates inverse-probability weighted regression adjustment (IPWRA) and PSM models to gauge the impact on employment outcomes. It finds participants were 12 percentage points more likely to be in employment one and two years after the internship, a finding that holds across both methods.

Data, sample selection and descriptive statistics

The Jobseekers Longitudinal Dataset (JLD) is an administrative dataset that tracks social welfare claims, activation and training, and employment histories over time, covering individuals with jobseeker or one parent family claims since 2004. It draws together payment and administrative data from the Department of Social Protection and data from SOLAS and the Revenue Commissioners.[2] It has its origins in efforts to make best use of the sizeable volume of data collected or generated by the Department and to structure the recording of episodes of unemployment and training in a meaningful way. [3]

The dataset takes operational data from a range of sources and rearranges them into a view of each individual's periods of unemployment, employment, and training. The data are structured in a way that bears some relation to a panel dataset but with important distinctions. To reflect the individual experience of employment and unemployment, the data are re-arranged as a series of episodes, with one episode beginning when the person begins a spell of unemployment and ending when the person moves to employment or another activation or training programme. The next episode begins when the person's employment or training status changes again. In this way, it differs from panel

[2] The principal creators of the JLD were Paul Morrin, Terry Corcoran, Mick Holohan and Brian King; subsequent development has been led by Saidhbhín Hardiman. A complete list of data sources is at Appendix III.

[3] An analysis by UCD of the Department of Social Protection's data systems in 2011, before the development of the JLD, is entitled 'Issues on the Evaluation of Revised Employment Action Plan/NEES' by Professor Colm Harmon (UCD School of Economics) Paul Morrin (DSP) and Dr Sean Murphy (UCD School of Computer Science)https://www.welfare.ie/en/downloads/Issues-on-the-Evaluation-of-Revised-Employment-Action-Plan_N.pdf

data in that observations are not recorded at a fixed point but at points of transition from one status to another.

One of the advantages of restructuring the administrative data of the Department in this way is that it retains some element of the individual's experience of unemployment. When a client of the Department of Social Protection moves from Jobseekers Benefit to Jobseekers Allowance, it is treated as an exit from the former and an entry to the latter on the Live Register. In the JLD, contiguous periods on Jobseekers Benefit and Jobseekers Allowance can be linked and represented as one episode of unemployment, which is arguably a better representation of the experience of the absence of work, regardless of whether it is on a social insurance or social assistance programme of income support.

The dataset used in this evaluation includes the base JLD and a number of additional derived variables. Where their origin is not immediately obvious, a brief discussion of some variables may be useful at this point.

Education is one of the weaker parts of the JLD in its current state of development, a point noted in previous evaluations using the JLD. Due to the low level of coverage and the apparent non-random missing data, an educational variable was not used in the main model. However, evaluations where the analysis period is situated later than 2013 look likely to have satisfactory education data on the basis of a merging of the historical Client Services System (CSS) and data measuring a claimant's probability of exit (PEX).[4]

The geographic location of participants on BTWEA is broadly similar to non-participation, as seen in Appendix III.

Derived variables include counts of episodes of training or employment before and after the episode in question. Where, for example, a BTWEA participant starting in July 2009 had been in employment three times before July 2009 and has been employed twice after July 2009, the following values are given:

- EMPL_count_pre=3
- EMPL_count_post=2.

Durations for each variable are treated similarly so, in the case of previous and subsequent employment, each individual has values for:

[4] PEX (Probability of Exit) is a score calculated by the Department of Social Protection from responses of individual jobseekers to questions on location, mobility, transport availability, health, literacy, employment experience and training when making an application for a jobseeker payment.

- EMPL_count_pre
- EMPL_count_post
- EMPL_duration_post
- EMPL_duration_pre

Durations for previous employment and previous duration of unemployment are subsequently banded into less than one year, one to three years and more than three years. Durations of less than one year should be relatively rare in the treatment group, so this is designated the reference group for comparing those with longer durations.

Previous occupation is available for some, but not all, people with episodes of unemployment. We create a separate grouping of those who have never worked from the 'Unknown, not stated occ, or never worked'. This separates those who may have a strong connection to the labour market, but in a variety of different occupations ('Unknown, not stated'), from those with no history of employment ('never worked').

The other categories are outlined in the table below. While there are a variety of ways in which we can group occupations, it may be useful to expand beyond a breakdown of 'Professional' and 'Non-professional' to capture those who were attracted to the BTWEA because of the prominence of self-employment within those kinds of occupations.

Values for previous occupation were grouped into the four categories in Table 3:

Managerial and Professional (1)	Non-professional (2)	Industrial and elementary (3)	No history of employment (0)
Managers, Directors and Senior Officials	Administrative And Secretarial Occupations	Process, Plant And Machine Operatives	Never worked
Professional Occupations	Caring, Leisure And Other Service Occupations	Elementary Occupations	
Associate Professional And Technical Occupations	Sales And Customer Service Occupations	Unknown, or no stated occupation	

The previous sector in which a person was employed is coded as the 14 NACE Rev.2 economic sector categories, with one category for unknown sector. Where there was more than one sectoral value for previous employment (where a person had worked in several sectors over previous years), sector was denoted as the most frequently occurring sector over the four years prior to period of

unemployment commencing. Where two sectors recurred in equal frequency, the most recent sector was preferred.

As well as the demographic and labour market variables above, for this exercise the JLD was enhanced with data on previous earnings – this was calculated as the average of the four calendar years preceding the point at which people are candidates for either treatment or control groups. These data are collected on behalf of the Department of Social Protection by the Revenue Commissioners. This variable conveys some measure of the amount of human capital acquired through education and training and over previous periods of employment as well as some measure of more intangible qualities people have that are valued in the workplace. This mean includes any zero values if the person was not earning in any of the four preceding years. The denominator is the four year period even if the person was in employment for only part of any given year.

For the purpose of additional analysis, participants and potential comparison individuals' four-year average of previous earnings within each occupational and age grouping were ranked in quartiles.

Two variables were added to reflect the person's background in, or interest in pursuing, self-employment. A dummy variable was added to capture social insurance contributions under Class S – the pay-related social insurance class relating to self-employment contributions – in the years since 2005 until the year before the episode of unemployment that identifies them as potential candidates for BTWEA (or actual participants).

For sensitivity testing, another dummy variable was added to capture an interest in self-employment expressed during interviews with Department of Social Protection case officers. These interviews are arranged to discuss options that will assist in progressing from unemployment to employment. Clients select from a number of options when identifying what they aim to do, as part of the personal progression plan agreed with the Department, to move from unemployment to employment.[5] Where clients had selected the option of 'Explore option of Self Employment', they are designated as having an interest in self-employment. As this variable applies only to a subset of candidates who had interviews during the period in question and indicated an interest in self-employment, it is not included in the main model and used only for sensitivity testing of results.

Finally, a range of outcome variables were added identifying the labour market status of the person who had taken part in BTWEA at three points after the two-

[5] The full list of options is available at Appendix I.

year subsidy ended: 6 months, 12 months and 18 months and at the same point in time for non-participants in the comparison group.

Sample selection

The episodes of unemployment under review were restricted to the period from 01 May 2009 to 31 December 2011. Prior to May 2009 the subsidy, at varying proportions of the full benefit rate, ran for a four-year period. By restricting the sample to new BTWEA claims opened between these two dates, we can ensure all episodes were subject to the same subsidy period and to the same proportion of the full benefit rate, namely, 100% for the first year and 75% for the second year. It also allowed enough time after the subsidy cut-off – the latest possible time someone could be in receipt of the subsidy was 31 December 2013 – to allow for a reasonable review of labour market outcomes, particularly outcomes where there is a considerable time lag (i.e earnings data).

The next step was to exclude those who qualified for BTWEA from non-jobseeker schemes, thereby excluding those from Disability Allowance, One-Parent Family Payment and Blind Pension schemes and whose first appearance on the JLD is the BTWEA episode, as the JLD contains demographic and labour market information on jobseeker payments only. This ensures the participants and matched comparison group are comparable.

With casual workers, the decision on whether to exclude is more difficult. It can be argued that casual employment is somewhat similar to BTWEA in its retention of a social welfare payment, its absence of any formal training or education component, and its direct connection to the labour market. Accordingly, it may be appropriate to have casuals who do not participate as potential matches. On the other hand, it is possible that casual employment has a particular effect on later labour market outcomes and, in order to disentangle the effects of casual employment and the BTWEA, casuals are excluded from the initial analysis.

In the case of BTWEA participants, we wanted to measure specifically the effect on employment outcomes of the programme, and not any other training programme taken subsequently. In the case of the comparison group, we also want to measure their outcomes in contrast to the treatment group and not pick up any confounding effects of other training programmes. Where the treatment group receives additional interventions, the effect will be exaggerated and mistakenly attributed entirely to the programme; where the control group receives additional interventions, it will serve to underestimate the effect of the intervention. Therefore, those who had subsequent training episodes after

participating in BTWEA were excluded. The same approach was applied to the control group where they had had subsequent training episodes after the month in which they were considered as comparisons.

The methodology for identifying treatment and comparison groups began by identifying people on full jobseeker claims (either Jobseekers Benefit or Jobseekers Allowance) who met the qualifying criteria. An initial examination of participants showed that, for a portion of the participants, duration on qualifying claims seemed to be inconsistent with the eligibility criteria observed on the JLD. This may be due to at least some period of the qualification period occurring during a non-jobseeker programme not observed on the JLD. To ensure we did not restrict the possibility for good matches between treatment and comparison groups, the duration criterion is not rigorously applied in the initial phase.

This total stock at the end of one month is deemed to be the eligible pool of candidates for the following month, and this is subsequently broken down into people who progress to BTWEA (the treatment group) and all others, who become potential matches in the comparison group.

The defining attribute of this evaluation is its grouping of treatment and comparison groups into monthly cohorts. An individual regression, PSM estimation process and outcome analysis is run for each month and the results are aggregated. In other words, those who are unemployed at the beginning of each month are considered to be a separate population on which we can run a separate analysis. This gives us not just one monthly cohort followed over time but a separate sample for every month, with a large pool of potential participants splitting into actual participants and candidates for matched comparators. This ensures that, even where the extent to which participation propensity shifts over time, the process of matching participants and non-participants is specific to that month.

Table 4 outlines the sample selection process. The lower ratio of episodes to individuals in the BTWEA participants reflects the two-year duration of one episode (the BTWEA programme). During the same period, the comparison group may have any number of episodes of employment, training and unemployment.

	BTWEA participants	Comparison group
Number of episodes	316,515	9,866,838
Number of individuals	39,839	1,765,487
Number of episodes 30Apr2009-31Dec2011	10,844	1,349,133

Number of individuals 30Apr2009-31Dec2011	10,623	821,896
Number of individuals (excluding casuals)	9,630	727,793
Number of individuals (excluding further training)	9,197	564,302

Overall, some 47,160 individuals were included in the modelling – representing the treatment cohort and five control cases per treatment case, with minimal use of comparison cases in more than one month.

Descriptive Statistics

The use of a monthly regression and outcomes measurement generates a considerable amount of output and, for presentation purposes, the descriptive statistics are presented in respect of four sample months: July 2009, April 2010, December 2010 and August 2011. These are chosen as four evenly spaced months between the beginning and end of the evaluation period. Employment outcomes for all months are presented at the end of this paper.

The labels identifying durations and counts, both pre- and post-, follow the conventions outlined at the beginning of the 'Data, sample selection and descriptive statistics' section.

Table 5 shows the variance between BTWEA participants and comparison group (unmatched) – the process is repeated after the matching process in respect of the four sample months:

		Comparison group		BTWEA participants	
Variable ↓	Measure→	Mean	Std Dev	Mean	Std Dev
Average earnings over 4 years preceding 2009		17,151.70	21,214.73	20,375.59	20,017.75
Average earnings over 4 years preceding 2010		16,763.15	19,709.62	17,742.72	17,479.86
Average earnings over 4 years preceding 2011		15,203.02	16,706.32	13,349.52	13,823.84
CE_duration_pre		18.68	143.49	12.30	100.78
CE_duration_post		37.53	192.35	11.34	85.22
Claim paid days		594.74	818.62	550.27	147.41

Duration (calendar days)	525.12	824.70	632.66	184.13
Duration Months	16.74	27.03	20.06	5.94
EMPL_count_post	1.34	1.81	0.68	1.22
EMPL_duration_post	482.53	679.23	227.07	433.73
EMPL_duration_pre	1,992.59	1,892.60	1,645.47	1,528.38
Rate paid at the end of the episode	207.75	69.53	253.08	88.25
FAS_duration_post	19.46	78.13	5.76	40.13
FAS_duration_pre	30.34	99.64	30.32	84.21
CE_count_post	0.06	0.27	0.03	0.17
INTN_duration_post	7.17	43.65	3.68	31.51
INTN_duration_pre	0.01	1.30	0.01	0.56
LR_duration_post	469.55	566.28	247.25	450.37
LR_duration_pre	282.60	449.40	755.55	488.53
SLO_duration_post	11.14	64.07	2.51	29.93
SLO_duration_pre	7.19	52.08	8.32	58.43
TLO_duration_post	27.92	142.52	7.29	73.73
TLO_duration_pre	9.27	77.80	13.59	104.30
Rate paid at the beginning of the episode	201.38	65.91	261.00	92.83

Table 6 outlines the employment outcomes of all of the participants and potential comparison candidates (N=268,925). This table compares the employment outcomes for those who participated in BTWEA and those who did not. However, it does not necessarily compare the most similar individuals within the two groups (a matter addressed in the next section). Second, it measures employment status at three points in time – 30 June 2014, 31 December 2014 and 30 June 2015. This is 6, 12 and 18 months after the latest period that the last entrants receive the subsidy. This means that those who commenced in 2009 will be at a later stage in the post-subsidy period compared to those who applied for the subsidy in late 2011. The next phase of the analysis examines aligning participants and non-participants and measuring their employment outcomes at points that make for more meaningful comparisons.

Table 3 Employment outcomes by participation/non-participation at fixed points

	Non-participants		**BTWEA participants**	
Status at 30 JUN 2014	Frequency	Percent	Frequency	Percent
In Employment	98,939	36.79	7,069	73.63
Not in Employment	169,986	63.21	2,532	26.37
Status at 31 DEC 2014	Frequency	Percent	Frequency	Percent
In Employment	102,305	38.04	7,066	73.60
Not in Employment	166,620	61.96	2,535	26.40
Status at 30 JUN 2015[6]	Frequency	Percent	Frequency	Percent
In Employment	106,980	39.78	7,105	74.00
Not in Employment	161,944	60.22	2,496	26.00

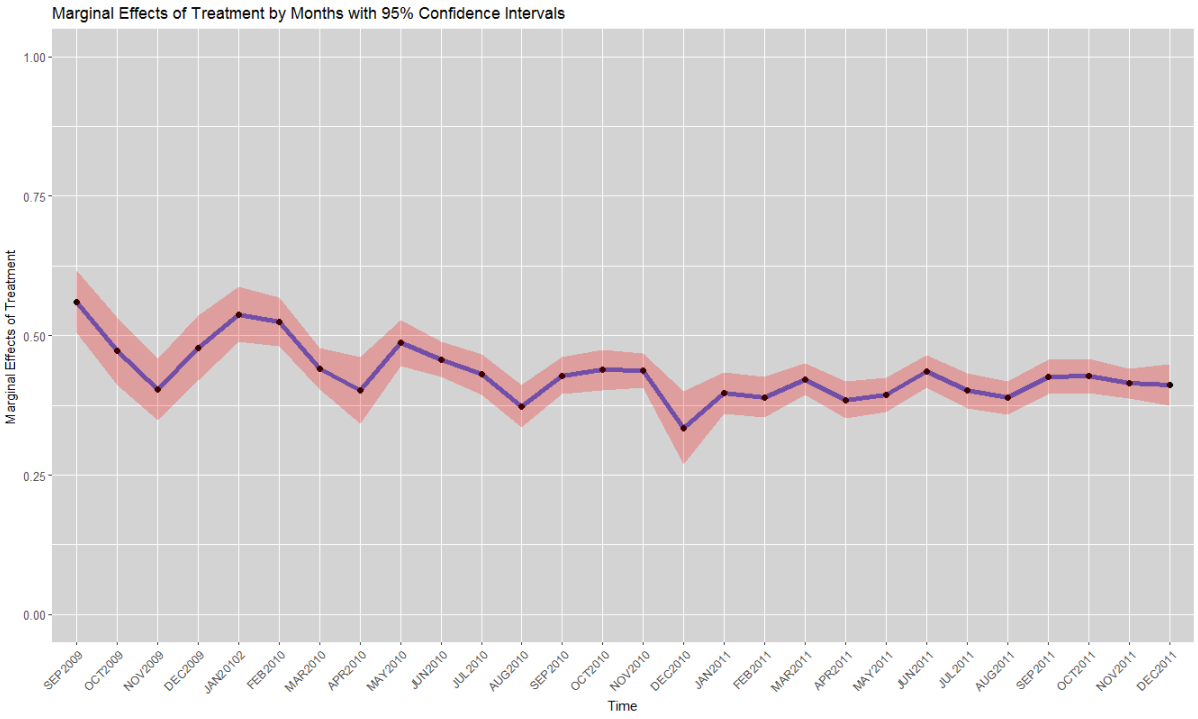
Finally, logistic regression for the four sample months models the probability of employment at a post-18 month point without, at this stage, considering the question of selection. This takes the future participants on BTWEA in that month and a random sample of 5,000 non-participants, with 'employment' at the post-18 month as the dependent variable. As a broad outline of the likely characteristics of transitioning to employment, the sample month below (July 2009) suggests people were more likely to be in employment where they had an occupation in the 'Managerial and Professional', had longer durations of previous employment, shorter durations of unemployment, and had no adult or child dependents. Notably, participation in BTWEA (the 'Treatment' variable) is positively correlated with an outcome of 'employment' at the post-18 month point.

	dF/dx	Std. Err.	z	P> | z|
Treatment	0.465	0.047	9.915	0
Age_this_Month	-0.006	0.004	-1.473	0.141

[6] This sums to 268,924 as the outcome for one individual cannot be determined.

month_agesq	0.00001	0.0001	0.218	0.827
Sex (ref=male)	-0.017	0.016	-1.063	0.288
Class S flag	-0.018	0.037	-0.490	0.624
mar_status	0.106	0.017	6.132	0
Preempgroup	0.034	0.029	1.178	0.239
Preempgroup (3+ years v <1 year)	0.062	0.027	2.261	0.024
prelrgroup1	-0.067	0.017	-3.991	0.0001
prelrgroup2 (3+ years v <1 year)	-0.062	0.034	-1.799	0.072
Duration this month	-0.007	0.001	-7.405	0
NACE	0.004	0.002	2.211	0.027
prof_ind (Managerial and Professional v No empl history)	0.188	0.044	4.285	0.00002
prof_ind2	0.025	0.033	0.771	0.441
prof_ind3	0.026	0.035	0.731	0.465
Irish	-0.062	0.020	-3.122	0.002
Yearavg_earn	0.00000	0.00000	4.583	0.00000
fam_flag1	-0.116	0.019	-6.252	0
fam_flag2 (ADA only v No ADA, no CDAs)	-0.108	0.024	-4.580	0.00000
fam_flag3	-0.096	0.022	-4.384	0.00001

Figure 4 shows the marginal effect of treatment over the months in question, with 95% confidence intervals reflecting the 5,000 random sample of non-participants as an initial comparison.



Identification strategy

From the descriptive statistics and initial estimation above, the outcomes for BTWEA participants seem to diverge considerably from non-participants. However, taking this as an indication of the effect or impact of the programme is premature. It may be that the tendency to self-select into BTWEA distinguishes participants from non-participants in a way that is systematically correlated with labour market outcomes. If this is true, any attempt to infer a programme effect from the raw comparison of the two groups' outcomes will contain bias.

To study the employment impact of a self-employment subsidy, we need to examine the outcomes of participants and compare them to a similar group that did not take up the self-employment subsidy. This paper attempts to match participants with non-participants who closely resemble them and compares the variance in their labour market outcomes.

First, we need to define treatment and outcome. After the sample selection process, a single version of BTWEA is available as the treatment process. In other words, the programme of retention of welfare payments for a maximum of two years is the same for all participants.

As a labour market activation programme, the objective of the BTWEA has the medium-term objective of helping people to remain in employment rather than, specifically, new enterprise creation. It does this by allowing people to move into self-employment, thereby minimising distance from the labour market, in circumstances where paid employment may not be available. Accordingly, rather than focussing on self-employment as a desirable end in itself, any form of employment – whether self-employment or paid employment – is the objective against which we measure success. This will be the initial basis of the estimation of the average treatment effect on the treated.

However, after initial results of either 'employed' or 'unemployed', additional analysis will include some estimate of the extent of self-employment. The only available indicator of self-employment is whether the person made Class S contributions in the year in which the status check occurs (6 months, 12 months, or 18 months after participation). It is not possible to determine whether the self-employment undertaking at this stage is the same as supported under the BTWEA.

For those who have the status of 'employed' rather than 'unemployed', we can examine the level of earnings and whether their employment status is subsidised by the Department of Social Protection.[7]

By measuring the average difference in employment outcomes (the categorical binary outcome variable) between participants and non-participants for each month, we estimate the average treatment effect on the treated (ATET) as the impact the treatment has on employment outcomes for those who participated.

The method by which we generate a valid comparison sample is Propensity Score Matching (PSM), which allows for the comparison of treatment and comparison groups on the basis that matching on likelihood of treatment is equivalent to matching on a range of covariates. This means each candidate does not have to match on every individual characteristic but must be matched on the overall likelihood of participation (the propensity score).

Three conditions must be met to return a valid estimate of causal effect when using PSM:

- unobserved characteristics must not be the underlying reason for receipt of treatment

[7] This includes cases of employment where additional payment is made under the Family Income Supplement and to casual workers who work fewer than three days per week.

- the overlap in distributions of propensities for treatment in both groups must permit the pairing of individuals (also referred to as common support)
- the treatment group must not benefit from treatment in a different way to how comparison cases would have, conditional on the likelihood of treatment

Two of the conditions above relate to unobserved characteristics – that some unobserved characteristic is the underlying reason behind applying to participate in BTWEA or that those who participate are in some way primed to take greater advantage of it. Unobserved characteristics such as innate ability or motivation are frequently of concern in analysis of the effects of labour market interventions.

In this case, the number of instances of employment and previous duration in employment are indications of a person's attachment to the labour market. Furthermore, previous earnings data are an indication of the level of acquisition of human capital. In addition to the comprehensive data on previous duration and number of episodes of unemployment or employment, these data typically indicate likely labour market success. While educational data is highly desirable as a further proxy for unobserved characteristics that will likely be related to labour market outcomes, its absence seems less detrimental when assessing the impact of a self-employment subsidy than, for example, a training programme.

The overlap between treatment and control groups is illustrated below for the four sample months, indicating a reasonable overlap between the two groups to satisfy the common support condition. The first set of graphs show the overlap between propensity to participate for the treatment (blue) and control (red); the second set of graphs illustrate how the propensity scores of treatment (blue) and control (red) in our sample are virtually indistinguishable. While there is an initial difference in the likelihood of participation, we can select a comparison group in which each case has a similar propensity to participate:

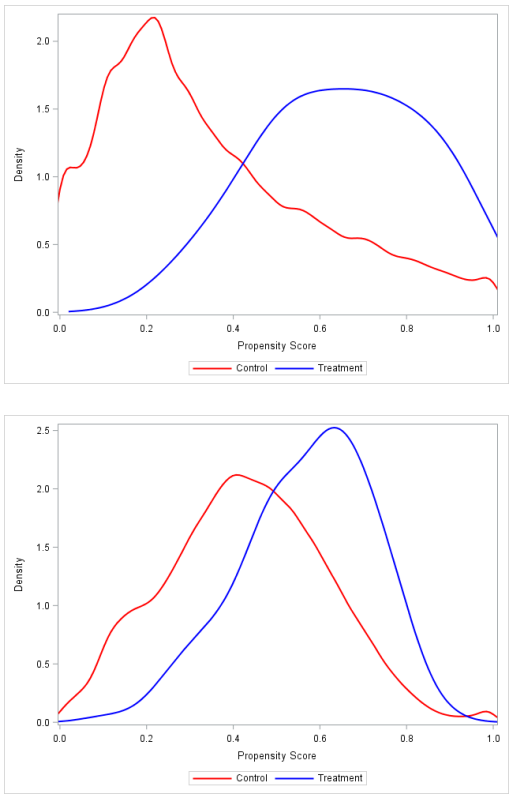


Figure 4 July 2009: overlap of propensity densities
Figure 2April 2010 - overlap of propensity densities

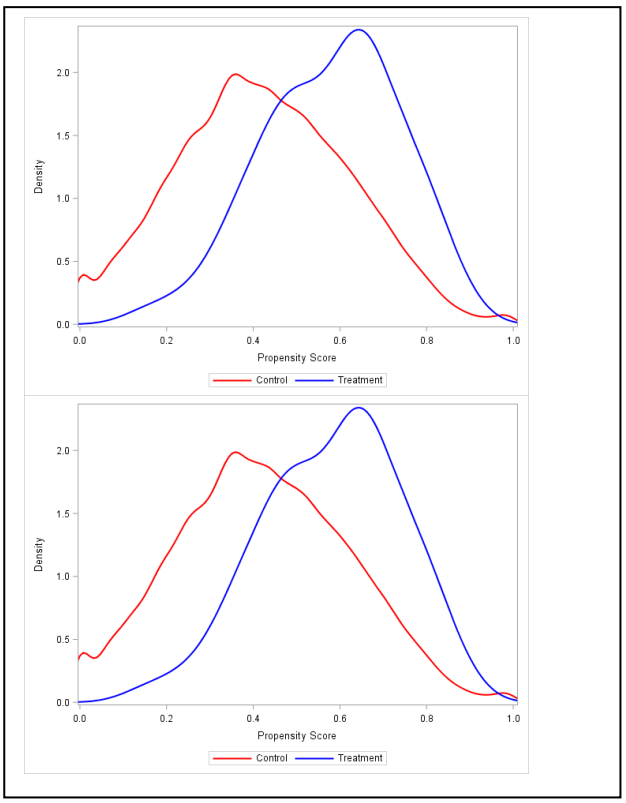
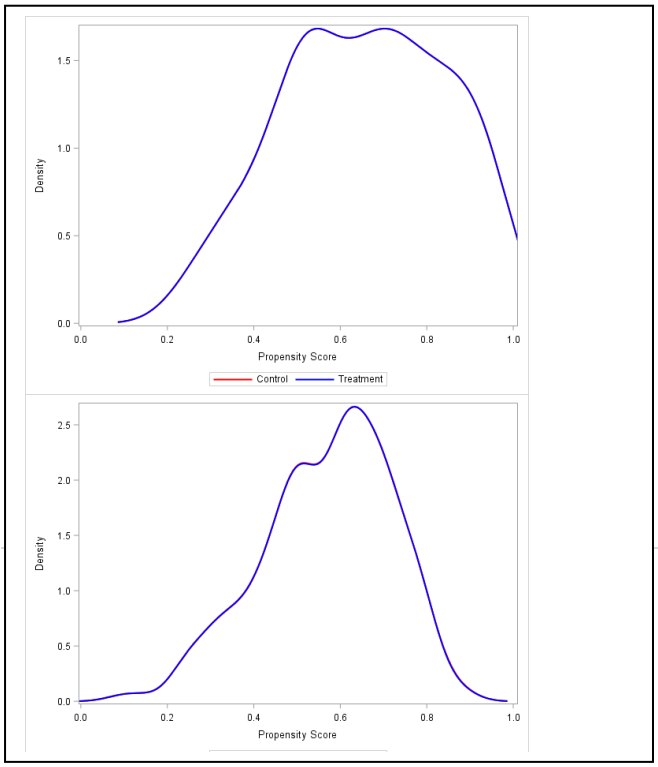
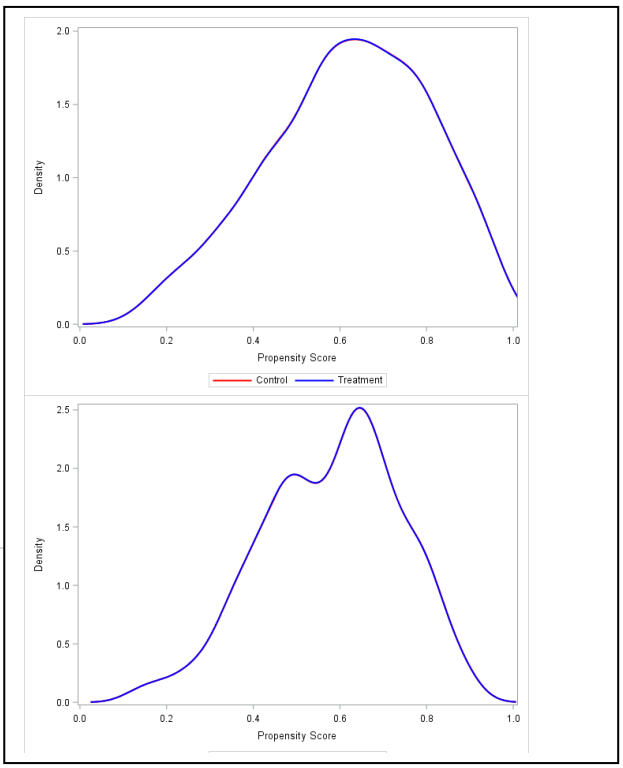


Figure 5 December 2010 - overlap of propensity densities
Figure 5 August 2011 - density of propensity scores





Propensity score matching offers a variety of matching options, with reuse of the same controls for several treatment cases, or one-to-one matching, or one-to-many matching. Given the large pool of potential matches, nearest neighbour without replacement is the version of PSM used here, with pairs formed between participants and non-participants that have the minimum difference in propensity score. Once used for one match, a control case is not reused within that monthly regression. To ensure the matching algorithm does not stray too far from the propensity of score of a given treatment case, a caliper value of 0.1 is used – this ensures a pair is not formed where the scores differ by more than 0.1.

Using greater than a one to one ratio of treatment to comparison cases aims to increase the precision of the estimated effect. Bearing in mind that some cases may have many potential matches and others very few, a large dataset is a prerequisite of this approach – the ratio of control cases to treatment is sufficient in this case to allow the most precise matching with a ratio of five to one control to treatment cases. As a result, the average of five control outcomes is matched with one treatment outcome to minimise any remaining bias. While nearest neighbour without replacement ensures the same control case is not reused in the same monthly regression, it is not certain that the same control is being used over and over in subsequent months. While there is nothing wrong with the same case being used as the control case in several months, on the basis that it is most appropriate match, examining the total number of unique cases used indicates this has not happened.

Treatment cases	Control cases (5xTreatment)	Total number of cases (treatment and 5 control)	Number of IDs used
8,582	42,910	51,492	47,160

After the matching process, the covariates on which treatment and control candidates were matched should reflect the bias reduction. The following tables show distribution of various characteristics among the treatment and control groups after matching, first for numeric and then categorical variables. The matching process has generated two groups with similar distributions of values for key variables. The exception is the variable reflecting a history of Class S contributions, which is heavily skewed towards BTWEA participants. This suggests a need for some sensitivity testing at a later stage.

Sample month: August 2011

	Non participants			BTWEA participants		
	N	Mean	Std	N	Mean	Std
Duration of unemployment	2037	12.63	14.21	2035	13.64	12.05
Age this Month	2037	36.67	10.5	2035	36.64	8.83
Average earnings over 4 preceding years, €	2037	15,306.61	17,483.56	2035	14,908.95	14,464.66
Count of LR episodes to date	2037	2.22	3.06	2035	2.36	1.64

Sample month: August 2011

Variables	Values	Participation	
		Non participants	BTWEA participants
		%	%
Family structure	No ADA, no CDAs	49.5	50.5
	ADA and CDAs	49.7	50.3
	ADA only	52.8	47.2
	CDAs only	50.8	49.2
Irish	non-Irish	50.4	49.6
	Irish	49.9	50.1
Previous duration of employment	<1y	46.5	53.5
	1-3y	50	50
	>3y	50.9	49.1
Previous duration of unemployment	<1y	80.6	19.4
	1-3y	42.9	57.1
	>3y	36.7	63.3
Sector - NACE categories	Unknown sector	46.1	53.9
	B Mining and Quarrying	50	50
	C Manufacturing	50.2	49.8
	D Electricity, gas, steam and air	50.1	49.9

	conditioning supply		
	E Water supply, Sewerage, waste management and remediation activities	51.6	48.4
	F Construction	51.1	48.9
	G Wholesale and Retail Trade, Repair of Motor Vehicles and motorcycles	51.8	48.2
	H Transportation and storage	51.1	48.9
	I Accommodation and food service activities	51.4	48.6
	J Information and communication activities	51.4	48.6
	K Financial and insurance activities	58.3	41.7
	L Real Estate activities	54.5	45.5
	M Professional, Scientific and Technical activities	55.6	44.4
	N Administrative and support service activities	46.1	53.9
	No history of employment	48.9	51.1
Previous occupational category	Managerial and Professional	46.2	53.8
	Non-professional	52.3	47.7
	Industrial and elementary	48.5	51.5
History of Class S contributions	No experience of Class S	52.6	47.4
	Experience of Class S	20.7	79.3

A further test is to verify that the model predictive power of the model identifying participants and non-participants has decreased significantly after the matching process. In other words, after a balanced matching process, the model used to predict participation in the programme (correctly distinguishing those who will participate from those who will not) should be less successful. Appendix II displays the contrast before and after matching using the ROC (receiver operating characteristic) graph.

In summary, having identified the entire sample of treatment and potential control individuals, we began monthly cohort-building. This involves examining the total number of full jobseeker claims open as the month begins, running

logistic regression to identify the likelihood of participation in that month, generating propensity scores from this process, matching 5 control cases to each treatment case on the basis of similar propensity scores, and finally comparing employment status at 6 and 18 months. The entire process is repeated for each month between May 2009 and December 2011. In theory, the changing labour market during that period means the following attributes may vary over time:

(i) the cohort that made the decision to participate in the programme
(ii) the likelihood of the employment status at 6 and 18 months being 'in employment'

If these factors vary over time, running monthly regression analysis will estimate the likelihood of participation in that month only. Furthermore, it will compare the labour market outcomes of individuals who faced the same opportunity to participate and emerged, a fixed amount of time later, into the same labour market. Finally, the process can be repeated into the future when the pool of potential participants has, perhaps, changed again in profile.

Results

Employment outcomes after 6 months:

The following tables compare the employment outcomes of BTWEA participants and suitable matches after the PSM process for the four sample months. The employment status is captured at 6 and 18 months after the completion of the two-year programme (e.g. the programme runs from July 2009 to July 2011 for all those who were potential matches in July 2009, so the 18-month status check takes place in January 2013). The tables below show the percentage of the BTWEA participants and matched non-participants whose status was 'in employment' or 'not in employment' at that point.

Employment outcomes by participation, July 2009 cohort

	Outcome at 6 months		Outcome at 18 months	
	In Employment	Not in Employment	In Employment	Not in Employment
Matched non-participants	27.47	72.53	34.22	65.78
BTWEA participants	81.93	18.07	77.11	22.89

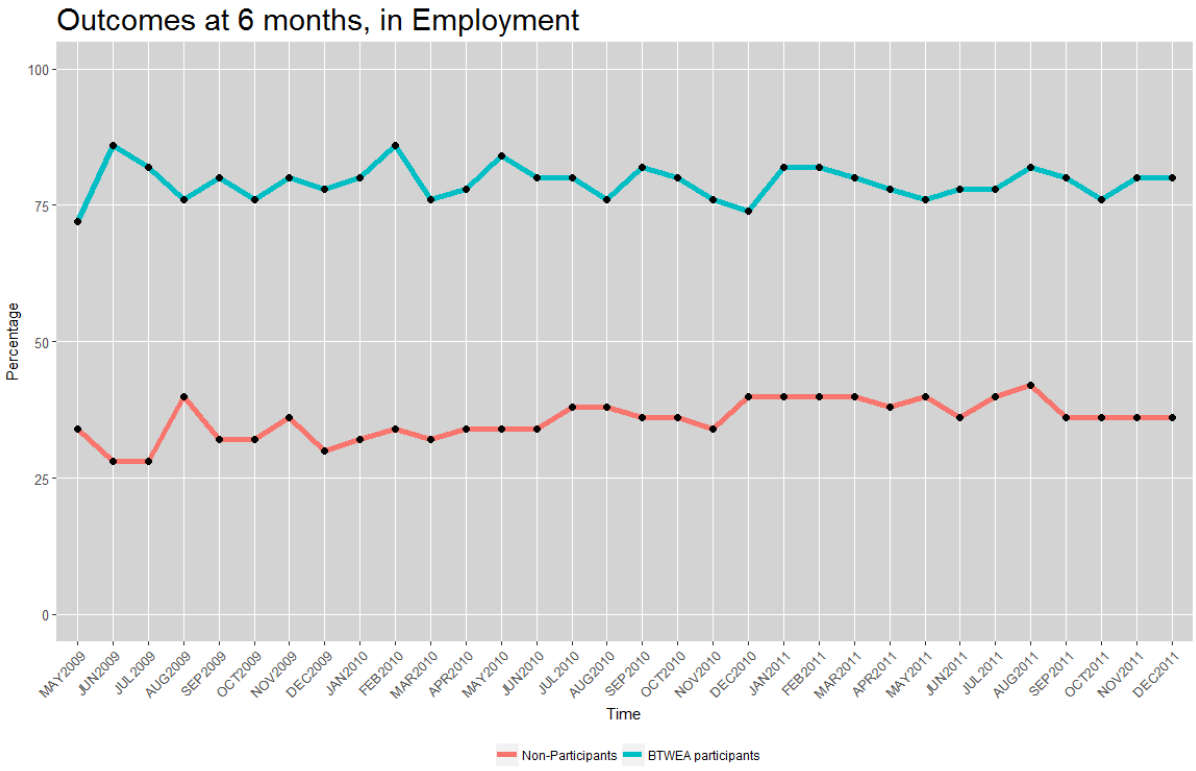
Employment outcomes by participation, April 2010 cohort	Outcome at 6 months		Outcome at 18 months	
	In Employment	Not in Employment	In Employment	Not in Employment
Matched non-participants	34.53	65.47	41.06	58.94
BTWEA participants	78.60	21.40	75.88	24.12

Employment outcomes by participation, December 2010 cohort

	Outcome at 6 months		Outcome at 18 months	
	In Employment	Not in Employment	In Employment	Not in Employment
Matched non-participants	39.40	60.60	45.45	54.55
BTWEA participants	73.79	26.21	73.79	26.21

Employment outcomes by participation, August 2011 cohort

	Outcome at 6 months		Outcome at 18 months	
	In Employment	Not in Employment	In Employment	Not in Employment
Matched non-participants	41.02	58.98	46.46	53.54
BTWEA participants	81.22	18.78	81.22	18.78


Outcomes at 6 months, in Employment
Percentage
100
75
50
25
0
MAY2009
JUN2009
JUL2009
AUG2009
SEP2009
OCT2009
NOV2009
DEC2009
JAN2010
FEB2010
MAR2010
APR2010
MAY2010
JUN2010
JUL2010
AUG2010
SEP2010
OCT2010
NOV2010
DEC2010
JAN2011
FEB2011
MAR2011
APR2011
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OCT2011
NOV2011
DEC2011
Time
Non-Participants
BTWEA participants

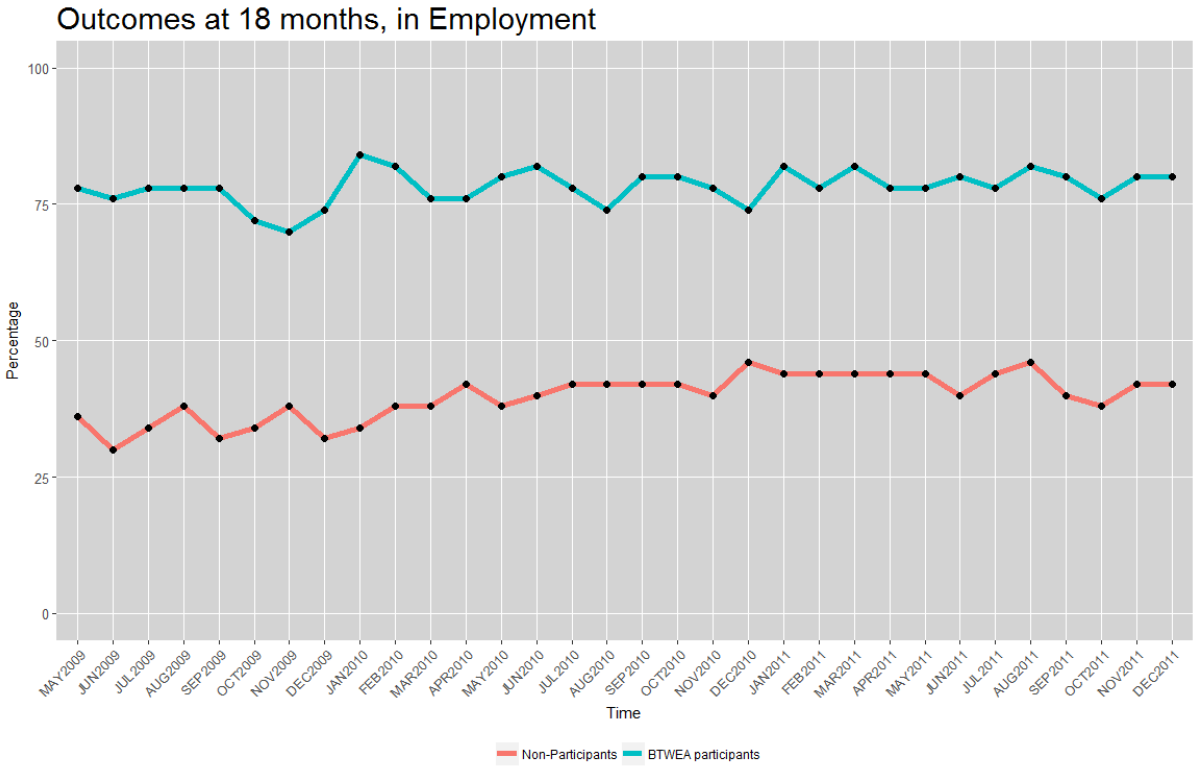
Outcomes at 18 months, in Employment
Percentage
100
75
50
25
0
MAY2009
JUN2009
JUL2009
AUG2009
SEP2009
OCT2009
NOV2009
DEC2009
JAN2010
FEB2010
MAR2010
APR2010
MAY2010
JUN2010
JUL2010
AUG2010
SEP2010
OCT2010
NOV2010
DEC2010
JAN2011
FEB2011
MAR2011
APR2011
MAY2011
JUN2011
JUL2011
AUG2011
SEP2011
OCT2011
NOV2011
DEC2011
Time
Non-Participants
BTWEA participants

Figure 8 Employment outcomes at 6 months and 18 months after BTWEA participation has ended.

In comparing matched participants and comparable control cases, we can see that a notable difference exists between those who participated in the programme and those who did not, with participants more likely to be in employment at both six months after completion and 18 months after completion.

As the number of participants increased considerably over the intake period, this should be reflected in coming to some summary of the effect of the programme. By weighting each month by the proportion of participants in that month (out of all participants between May 2009 and Dec 2011), we can estimate the average treatment effect, or difference in outcomes, as the following values:

Weighted average percentage point difference	
6 months	18 months
41.5	36.68

Income

While employment is the primary measure of the impact of the programme, the income level of participants is also a matter of concern for the participants and the Department of Social Protection.

The presentation of income as a secondary indicator of the success of the programme is not as straightforward as employment status. While the construction of monthly cohorts of individuals into separate treatment and control groups is facilitated by the structure of the JLD, income data are available only in annual terms. These data are derived from data collected by the Revenue Commissioners on behalf of the Department of Social Protection. In so far as is possible, the same approach is taken to facilitate the comparison over time.

In the tables below, the reporting of taxable income for BTWEA participants matches the employment status check by selecting the point at 12-18 months after the completion of the programme. All those who reached this point in 2013

are reported in the 2013 table; all those who reached that point in 2014 are included in the 2014 table.[8]

The mean earnings calculation reflects the entire cohort of BTWEA participants and matched non-participants, with the zero return of those not in employment lowering the mean. The 75th percentile value indicates the top 25% of earners. Outliers, earnings above €150,000, were removed.

These earnings data include the taxable income for participants and non-participants but do not indicate the financial success (ie turnover) of the enterprise being supported. Also, a greater proportion of former BTWEA participants are Class S contributors, making it difficult to compare directly their incomes with those of Class A contributors.

Table 4 and 5 shows the sectoral breakdown. By necessity, this includes only those whose status was 'in employment' at the point of the 18-month status check.

Taxable income in 2013	Mean	75th percentile
Matched non-participants	8,666.20	13,653.00
BTWEA participants	10,662.15	16,486.50

Taxable income in 2014	Mean	75th percentile
Matched non-participants	9,761.03	16,448.00
BTWEA participants	10,113.64	17,742.00

Sector in 2013, for those in employment		Matched non-participants	BTWEA participants
.		30.47	43.49
A Agriculture, Forestry and Fishing		1.23	0.74
B Mining and Quarrying		0.47	0.20
C Manufacturing		9.06	6.27
D Electricity, gas, steam and air conditioning supply		0.08	0.07
E Water supply; Sewerage, waste management and remediation activities		0.63	0.20
F Construction		6.98	10.72
G Wholesale and Retail Trade; Repair of Motor Vehicles and motorcycles		10.13	7.22

[8] As far as possible, each monthly cohort is included in the year in which participants have the 18-month employment status check; however, 2013 includes the May 09 and June 09 cohorts at 19 and 20 months rather than 18 months; 2014 includes all after the June 2010 cohorts.

Sector in 2013, for those in employment		Matched non-participants	BTWEA participants
H Transportation and storage		3.07	2.02
I Accommodation and food service activities		4.13	2.83
J Information and communication activities		3.39	2.56
K Financial and insurance activities		3.75	1.89
L Real Estate activities		0.77	0.74
M Professional, Scientific and Technical activities		5.15	4.92
N Administrative and support servce activities		6.49	5.73
O Public Administration And Defence; Compulsory Social Security		2.82	1.69
P Education		3.59	2.49
Q Human Health And Social Work activities		3.86	1.62
R Arts, entertainment and recreation		1.01	0.81
S Other Service activities		2.55	2.83
T Activities of Households as employers		0.38	0.94

Table 4: Sector in 2013, by participant and matched non-participant

Sector in 2014, for those in employment		Matched non-participants	BTWEA participants
.		31.54	39.95
A Agriculture, Forestry and Fishing		1.32	0.99
B Mining and Quarrying		0.18	0.08
C Manufacturing		8.85	5.00
D Electricity, gas, steam and air conditioning supply		0.07	0.08
E Water supply; Sewerage, waste management and remediation activities		0.35	0.50
F Construction		9.72	14.02
G Wholesale and Retail Trade; Repair of Motor Vehicles and motorcycles		10.05	9.24
H Transportation and storage		2.76	2.29
I Accommodation and food service activities		3.51	2.52
J Information and communication activities		2.72	3.51
K Financial and insurance activities		2.94	1.76
L Real Estate activities		0.57	0.46
M Professional, Scientific and Technical activities		4.32	4.93
N Administrative and support servce activities		7.22	5.27
O Public Administration And Defence; Compulsory Social Security		2.31	1.30
P Education		3.39	2.29
Q Human Health And Social Work activities		4.29	1.57
R Arts, entertainment and recreation		0.94	1.15

Sector in 2014, for those in employment		Matched non-participants	BTWEA participants
S Other Service activities		2.64	2.52
T Activities of Households as employers		0.29	0.57

Table 5 Sector in 2014, by participant and matched non-participant

Sensitivity testing - Interest in, or experience of, self-employment

The question of self-selection, whether participation is an indicator of people whose outcomes are always going to differ, is discussed earlier and addressed by using a PSM estimation that draws on many of the desirable labour market variables. A more specific concern about whether it is appropriate to compare BTWEA participants with unemployed non-participants is that those inclined towards self-employment differ beyond some general motivational aspect (already addressed in the self-selection point) and that it is specifically their interest in self-employment that is correlated with labour market outcomes. Perhaps it is the case that a willingness to take risks or the determination to pursue a business idea that is correlated with a greater probability of employment.

To address this, we analyse a small subset of participants who had expressed an interest in self-employment and compared their outcomes to those of the treatment group. Note that this sensitivity analysis does not follow the same design as the main model, where monthly inflows of treatment and control candidates subject to separate regression and PSM and candidates face an identical labour market at intake and outcome; it is, in other respects, a similar comparison.

As should be expected, the employment outcomes of BTWEA participants do not differ to any great extent from the previous measurement of their outcomes before the monthly cohort building and matching process. However, the difference in the outcomes between those who participated and those who did not (but who showed a disposition towards self-employment) has narrowed.

While it would require further probing before concluding that an interest in self-employment is in some way indicative of future labour market outcomes, this analysis provides further support to the conclusion that participation on BTWEA seems to have a positive impact (albeit smaller than the initial estimate) even when compared to people with a similar disposition towards self-employment.

The outcomes of the two groups are measured at a single point in time, 6 months after participation on BTWEA or 6 months after the episode in which they expressed interest in self-employment closed:

	Non-participants who expressed interest in self-employment		BTWEA participants	
Status	Frequency	Percent	Frequency	Percent
In Employment	4,276	45.35	8,349	72.13
Not in Employment	5,152	54.65	3,226	27.87

The results of the regression on the same sample are presented below. This suggests a significant treatment effect for BTWEA participants compared to non-participants who expressed interest in self-employment:

	dF/dx	Std. Err.	z	P>|z|
Treatment	0.2766	0.0075	37.0016	0.0000
age	0.0035	0.0030	1.1583	0.2467
agesq	-0.0001	0.0000	-3.3942	0.0007
Sex	0.0529	0.0092	5.7396	0.0000
Class S Prior_flag	0.0361	0.0132	2.7452	0.0060
Marital status	0.0260	0.0083	3.1422	0.0017
relevel(preempgroup, "0")1	0.0461	0.0154	2.9978	0.0027
relevel(preempgroup, "0")2	0.0789	0.0150	5.2695	0.0000
relevel(prelrgroup, "0")1	-0.0693	0.0090	-7.6995	0.0000
relevel(prelrgroup, "0")2	-0.2022	0.0165	-12.2222	0.0000

DurMon	-0.0052	0.0002	-21.4329	0.0000
NACE	-0.0013	0.0010	-1.3812	0.1672
relevel(prof_ind, "0")1	0.0270	0.0176	1.5342	0.1250
relevel(prof_ind, "0")2	-0.0335	0.0163	-2.0529	0.0401
relevel(prof_ind, "0")3	-0.0350	0.0177	-1.9804	0.0477
Irish	-0.0165	0.0092	-1.8055	0.0710
pre_4_av	0.0000	0.0000	5.7514	0.0000
relevel(fam_flag, "0")1	-0.0094	0.0105	-0.8959	0.3703
relevel(fam_flag, "0")2	0.0016	0.0158	0.0985	0.9215
relevel(fam_flag, "0")3	-0.0355	0.0128	-2.7747	0.0055

A second sensitivity test is to see whether those who have a background in self-employment are driving positive labour market outcomes. To investigate this, a subset of the control group that had made Class S social insurance contributions in the four years preceding 2009 was selected. Class S is the social insurance contribution class for those who are self-employed or company directors. As it was not possible to take the same monthly approach as with the main model, a single point in time, 18 months after the last possible point of subsidy, is selected as the status check point. Again, the results for participants are broadly similar and the gap between outcomes for participants and non-participants narrows.

	Non-participants who have made Class S contributions		BTWEA participants	
Status	Frequency	Percent	Frequency	Percent
In Employment	6,687	44.91	6,698	78.05
Not in	8,202	55.09	1,884	21.95

Employment				

Conclusions and analysis

The results show a significant difference in employment outcomes between those who participated and those who did not, even when a comprehensive effort is made to match the two groups, both in terms of their likely labour market outcomes (based on observed characteristics) and on their interest in self-employment or previous experience of being self-employed. In this respect, the results are in line with the international literature examined earlier, which shows almost universally positive employment effects of self-employment subsidies.

However, in considering the difference that appears to be engendered by participation in the programme in Ireland, the context must also be borne in mind. The mid-2009 to end-2011 period saw an exceptional growth in the long-term unemployed. Given the scale of job destruction, many of those who became unemployed, and thereafter long-term unemployed, had considerable work experience and skills. It may be that they were an unusual cohort in respect of their ability to take advantage of an opportunity to move from long-term unemployment into employment. Nonetheless, given the depressed market for products and services, that the early entrants remained in employment after completing the BTWEA is a considerable achievement given that the recovery in employment was delayed until Q1 2013. Figure 9 shows the entire intake period – each month between May 2009 and end-2011 – and the period in which the 18 month status check is conducted for each of those monthly cohorts.

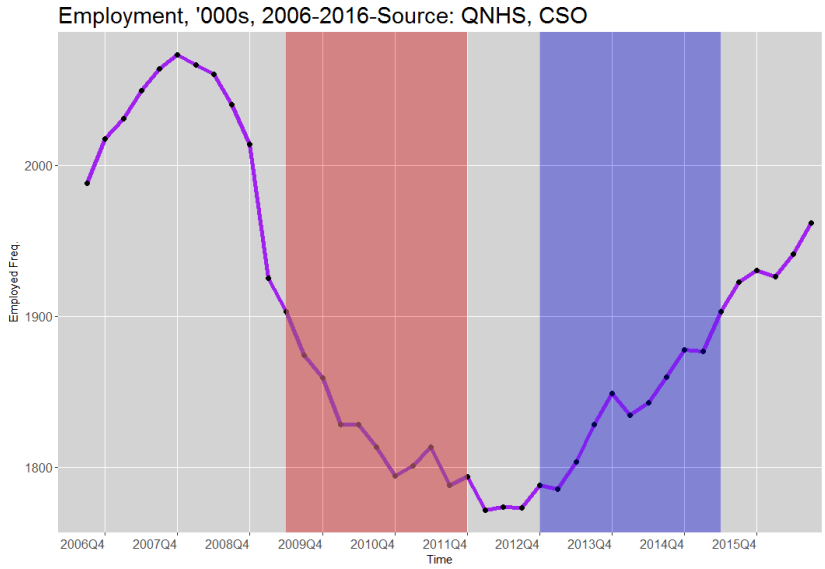

Figure 9 - Employment in Ireland 2006-2016 (note truncated y axis).
Note: highlighted areas show the range of the rolling intake period (red) and rolling status check period (blue)

The results show the programme has a positive impact, albeit one moderated by the disposition towards self-employment. However, this analysis does not identify the drivers of successful intervention within participation on the BTWEA. In the absence of

comprehensive data on the application process and the business plans being put into practice under the BTWEA, such analysis requires qualitative research on participants. While the analysis up to this stage is an attempt to quantify the impact of the programme using administrative datasets and statistical methods, any qualitative research will rely on subjective responses from participants. An initial step in this direction is the survey reported in the BTWEA policy review.

The results are also worth considering in light of the oft-repeated policy recommendation to ensure activation measures retain close ties to the labour market. In subsidising the creation of an employment opportunity where none previously existing (assuming displacement is not a major factor), the BTWEA is an example of a measure that ensures participants remain close to the labour market. Underpinning that policy advice is the assumption that employment skills are difficult to acquire outside of the workplace. Consequently, prospective employers pay attention to previous experience in employment as an indicator of employment skills where candidates have identical educational or training qualifications. A self-employment subsidy such as the BTWEA means people are acquiring a range of workplace skills, building contacts, and increasing knowledge of markets and sectors. We can assume that the process of engaging with a local development company, drawing up a business plan, and engaging in the variety of tasks associated with self-employment (particularly a new enterprise) instils valuable employment skills that make people more likely to remain in self-employment or paid employment. In this respect, the results align with research on job retention in Ireland, using QNHS data, showing the high proportion of people who remain in employment, from one quarter to the next, once they are in employment.[9]

The results remain positive, although the margin is narrower, when comparing BTWEA participants with non-participants who have also expressed interest in self-employment and those who have experience of self-employment. This analysis concludes the BTWEA has a significant positive impact on employment outcomes.

Further work

[9] Conefrey et al report the retention rate of a given employment status by tracking those who remain in the QNHS sample from one quarter to the next. The retention of the status of 'employed' in consecutive quarters between 1998 and 2013 is over 96%. Conefrey et al (2014) Journal of the Statistical and Social Inquiry Society of Ireland; Vol. XLIV; Developments in the Irish Labour Market during the Crisis: What Lessons for Policy?

The breakdown of employment outcomes by income strata does not necessarily reflect the success or otherwise of the enterprise; this merely classifies the ranges of income on which the BTWEA participants and a comparison group pay social insurance contributions. An examination of how well the enterprises are doing requires a matching exercise between the tax returns made by entities supported by BTWEA and those not supported by BTWEA. This will allow for a comparison of firms that are alike in sector, size, and age and turnover before the application of various tax reliefs and deduction. This could usefully be pursued in future research and would usefully provide information on the level of activity in BTWEA-supported enterprises.

A serious limitation of the dataset is the absence of any information on the kind of enterprise being supported. As this information is a requirement for approval, recording and collecting it centrally is a minor step that could yield a significant increase in the quality of the dataset (as well as, presumably, essential information for administrative purposes).

The extent to which BTWEA-supported enterprises are displacing similar unsupported enterprises is not investigated in this paper. This phenomenon will be evident from a decrease in average firm size without any increase in employment or from a clustering of supported enterprises within certain sectors. Again, the absence of sectoral data means displacement cannot be considered here.

Nor does this paper investigate deadweight, either the question of whether unemployed people would have started in self-employment or whether they would continue in employment with a subsidy period shorter than two years.

What this analysis contributes is a month-based series of outcomes that makes reasonable comparisons between programme participants and unemployed people who share many observed characteristics. While this paper analyses outcomes over a particular period, the code underpinning the analysis is designed to be extended over time, with minor modification to ensure modelling and assumptions remain valid.

Where the State encourages and facilitates participation in a range of activation measures and labour market programmes, some indication of the effectiveness of each is an important component into the decisions of case officers and clients. Following the evaluations of BTEA in 2015 and JobBridge in 2016, this evaluation of BTWEA suggests a positive impact from participation on the programme in helping the transition from unemployment to employment.

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Appendix I

Descriptive statistics of the BTWEA participants and non-participants

	BTWEA participants	Non-participants		BTWEA participants	Non-participants
county	Percent	Percent	county	Percent	Percent
Carlow	2.35	1.54	Louth	4.44	3.79
Cavan	1.87	1.53	Mayo	2.86	3.04
Clare	1.3	2.41	Meath	2.21	2.58
Cork	9.55	10.4	Monaghan	0.55	1.47
Donegal	3.61	4.32	Offaly	1.41	1.92
Dublin	24.33	25.3	Roscommon	0.93	0.93
Galway	6.35	5.46	SWA	1.74	0
Kerry	4.16	3.74	Sligo	1.2	1.25
Kildare	3.64	4.29	Tipperary	3.47	3.9
Kilkenny	2.07	1.58	Waterford	4.34	3.11
Laois	1.85	1.84	Westmeath	2.89	2.32
Leitrim	0.92	0.83	Wexford	2.24	3.62
Limerick	4.67	4.88	Wicklow	3.5	2.86
Longford	1.55	1.05			

Full list of potential goals available to case officers during initial stages of client engagement:

Code	**Description**	**Code**	**Description**
010-1	Contact Job Club	016-1	Participate in Career Guidance

030-1 Participate in Literacy/Numeracy Training Supports	064-1 Explore Other DSFA Payments
094-1 Participate in LES Mediation	143-1 Job seeking using a job coach
182-1 Career Directions	301-1 Complete Course
309-1 Source Work Experience	317-1 Complete Momentum Project
500-1 Explore Employment Programmes	602-1 Explore Therapeutic Interventions
604-1 Referral back to Linkage	702-1 Explore Work Options
704-1 Explore option of Self Employment	710-1 Job Searching
711-1 Contact Free Phone Service	800-1 Explore Training/Education Options
802-1 Night Training Non FAS	805-1 Participate in English Language Training
806-1 Explore Training/Education Options	914-1 Refer to MABS

Appendix II

ROC curves before and after matching

Figure 10 displays the predictive ability of the model on the raw and matched datasets. This contrasts the ability of the model to place participants into the treatment or non-treatment categories on the basis of the covariates specified at two points: before and after the matching has taken place. The graph plots sensitivity - the proportion of treatment cases that were correctly predicted – and specificity – the proportion of non-treatment cases correctly categorised as such. The 45 degree horizontal line represents the likelihood of this being correct by chance.

At the unmatched stage, when matching has yet to take place, the line generates an area under the curve of 0.7562. Where the treatment and control groups are matched on their treatment propensity, the area under the curve reduces to 0.5925. Almost all of the coefficients show p-values above 0.05.

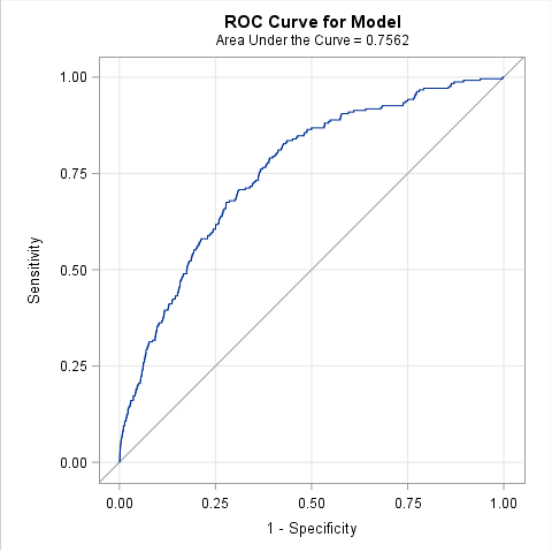

Figure 10 ROC curve for pre-match sample – Dec 2010

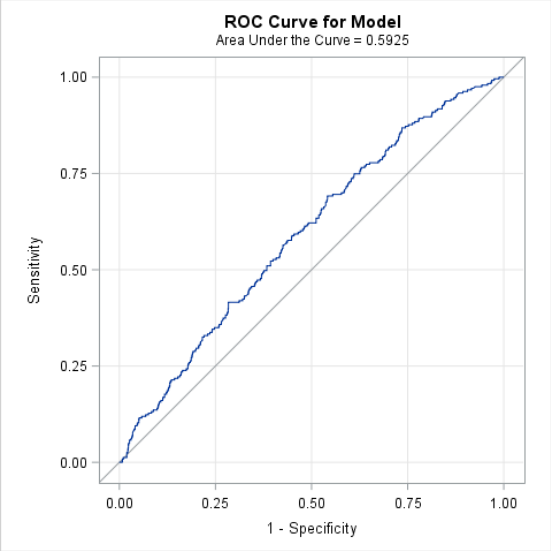

Figure 11 ROC curve for post-match sample – Dec 2010

Initial Logistic Regression

Results from initial logistic regression on participants on BTWEA in that month and a random sample of 5,000 non-participants, with the dependent variable being the dummy variable whose values are 'in employment' or 'not in employment'. The status check is at two years (to allow participants to complete the programme) and an additional 18 months after the reference month and probability modelled is 'in employment':

April 2010

	dF/dx	Std. Err.	z	P> | z|
Treatment	0.388	0.032	12.210	0
Age_this_Month	0.004	0.004	0.913	0.361
month_agesq	-0.0001	0.0001	-2.471	0.013
sex_num	0.016	0.016	0.998	0.318
classsPrior_flag	0.056	0.036	1.559	0.119
mar_status	0.100	0.017	5.742	0
preempgroup1	0.037	0.031	1.199	0.230
preempgroup2	0.076	0.028	2.693	0.007
prelrgroup1	-0.070	0.016	-4.328	0.00002
prelrgroup2	-0.084	0.033	-2.535	0.011
Dur_this_month	-0.004	0.001	-5.743	0
NACE	0.002	0.002	1.275	0.202
prof_ind1	0.146	0.044	3.351	0.001
prof_ind2	0.054	0.033	1.617	0.106
prof_ind3	0.037	0.036	1.044	0.296
Irish	-0.050	0.020	-2.553	0.011
Yearavg_earn	0.00000	0.00000	4.666	0.00000
fam_flag1	-0.099	0.019	-5.185	0.00000
fam_flag2	-0.071	0.026	-2.717	0.007
fam_flag3	-0.097	0.021	-4.716	0.00000

August 2011

	dF/dx	Std. Err.	z	P> | z|
Treatment	0.421	0.025	17.060	0
Age_this_Month	0.007	0.005	1.519	0.129
month_agesq	-0.0002	0.0001	-3.044	0.002
sex_num	0.004	0.016	0.222	0.824
classsPrior_flag	0.064	0.040	1.611	0.107
mar_status	0.097	0.019	5.180	0.00000
preempgroup1	0.039	0.031	1.252	0.211
preempgroup2	0.083	0.028	2.955	0.003
prelrgroup1	-0.063	0.017	-3.623	0.0003
prelrgroup2	-0.100	0.027	-3.770	0.0002
Dur_this_month	-0.003	0.001	-5.809	0
NACE	-0.001	0.002	-0.629	0.529
prof_ind1	0.154	0.042	3.630	0.0003
prof_ind2	0.045	0.033	1.384	0.166
prof_ind3	-0.0005	0.034	-0.015	0.988

Irish	-0.052	0.020	-2.603	0.009
Yearavg_earn	0.00000	0.00000	4.606	0.00000
fam_flag1	-0.109	0.020	-5.405	0.00000
fam_flag2	-0.111	0.026	-4.213	0.00003
fam_flag3	-0.103	0.022	-4.759	0.00000

Odds Ratio Estimates

Effect	**Point Estimate**	**95% Wald Confidence Limits**	
BTWEA 1 vs 0	8.291	5.185	13.258
Age_this_Month	0.982	0.977	0.987
month_agesq	1.000	1.000	1.000
sex M vs F	0.954	0.935	0.974
classsPrior_flag 1 vs 0	0.904	0.862	0.948
mar_status 1 vs 0	1.581	1.549	1.614
preempgroup 1 vs 0	1.156	1.114	1.199
[1-3 years v <1 year]			
preempgroup 2 vs 0	1.370	1.322	1.420
[3+ years v <1 year]			
prelrgroup 1 vs 0	0.645	0.631	0.659
[1-3 years v <1 year]			
prelrgroup 2 vs 0	0.593	0.564	0.624
[3+ years v <1 year]			
Dur_this_month	0.977	0.976	0.978
NACE Agriculture, forestry and fishing[10]	1.717	1.568	1.879
NACE *Other production industries*	1.541	1.466	1.621

[10] Ref category for all NACE is 'unknown'

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
NACE *Construction*	1.433	1.366	1.503
NACE *Wholesale and retail trade*	1.635	1.559	1.715
NACE *Accommodation and food service activities*	1.962	1.839	2.094
NACE *Transport, storage and communication*	1.710	1.621	1.804
NACE *Information and communication activities*	2.179	2.028	2.341
NACE *Financial, insurance, Real Estate*	2.089	1.960	2.226
NACE *Professional, Scientific and Technical*	1.888	1.781	2.002
NACE *Admin and support*	1.625	1.542	1.712
NACE *Public Administration*	2.273	2.121	2.436
NACE *Education*	4.431	4.157	4.724
NACE *Human Health And Social Work*	1.596	1.492	1.708
NACE *Arts, entertainment and other*	1.409	1.333	1.489
prof_ind 1 vs 0	1.389	1.316	1.467
[Managerial and Professional v No history of employment]			
prof_ind 2 vs 0	0.803	0.764	0.844
[Non-professional v No history of employment]			
prof_ind 3 vs 0	0.713	0.677	0.751
[Industrial and elementary v No history of employment]			
Irish 1 vs 0	0.743	0.726	0.760
Yearavg_earn	1.000	1.000	1.000
fam_flag 1 vs 0	0.542	0.526	0.559
[ADA and CDAs v No ADA, no CDAs]			
fam_flag 2 vs 0	0.670	0.645	0.696
[ADA only v No ADA, no CDAs]			
fam_flag 3 vs 0	0.559	0.540	0.578
[CDAs only v No ADA, no CDAs]			

Table 6 Outcomes April 2010

Appendix III

Variables

A full list of variables is set out below, including those on the current version of the JLD and those created for this analysis:

Variable name	Variable name	Variable name	Variable name
ada_code[11]	EMPL_count_post		occupation
ADA_flag	EMPL_count_pre	Irish	OverlapNext
Age	EMPL_duration_post	LastClaim	OverlapPrev
age_end	EMPL_duration_pre	LastLLS	PenaltyFlag
age_start	Employer_No	LastLR	ppsn
Av_4y_for_2009	EmplStartDateFlag	LastPrevHist	preEMpband
Av_4y_for_2010	EmpStartDerived	LastStatus	preLRband
Av_4y_for_2011	end_rra_amt	life_event_date	PrevEvent
broad_closure	End_weekly_rate	location	PrevEvent30
BTW_count_post	EndDate	LR_count_post	PrevHist
BTW_count_pre	endmth	LR_count_pre	PrevLR
BTW_duration_post	family_flag	LR_duration_post	prof
BTW_duration_pre	FAS_CE_count	LR_duration_pre	ProgRollUp
btw_startdate	FAS_count_post	lr_flag	rank_Av_4y_for_2009
CasualFlag	FAS_count_pre	mar_status	rank_Av_4y_for_2010
CDA_flag	FAS_duration_post		rank_Av_4y_for_2011
cda_number	FAS_duration_pre	marital_status	sector
CE_count_post	FASEndDateFlag	miss_ed	sex

[11] Family category (showing whether there are child or adult dependants)

CE_count_pre	FirstLLS	miss_mar	SLO_count_post
CE_duration_post	FirstLR	MOM_count_post	SLO_count_pre
CE_duration_pre	FirstNextHist	MOM_count_pre	SLO_duration_post
claim_status_reason	hist_lls	MOM_duration_post	SLO_duration_pre
classsPrior_flag	hist_lr	MOM_duration_pre	Start_rra
clm_nxt_certn_date	ICTP_count_post	nat_code	Start_weekly_rate
clm_paid_days	ICTP_count_pre	NACE rev 2	StartDate
ClosedOrNextLR	ICTP_duration_post	NextEvent	startmth
county	ICTP_duration_pre	NextEvent30	status_reason
Date of birth	Ind_Code	NextHist	SuspensionReason
Duration	INTN_count_post	NextLR	TLO_count_post
Duration	INTN_count_pre	Number of days a claim has been paid	TLO_count_pre
DurMon	INTN_duration_post	occu_group	TLO_duration_post
educationlevel	INTN_duration_pre		TLO_duration_pre

JLD data sources

The JLD at present integrates data from the sources shown in the table below. Raw data feeds are provided weekly for most of these sources, and these are integrated and transformed to produce an updated version of the dataset every week.

Information system	**Origin**	**Information supplied**	**Volume**[12]
Integrated Short-Term Schemes (ISTS)	DSP	Customer details; Jobseeker (JA/JB), One-Parent Family Payment (OFP), Family Income Supplement (FIS), Supplementary Welfare Allowance (SWA), and associated schemes	~8 m
Commencement/cessation of Employment (CCoE)	Revenue	Commencement/cessation of Employment	~ 7 m
SOLAS Management Information System	SOLAS[13]	SOLAS Education & Training programmes, Community Employment episodes	~ 1 m
Client Services System (CSS) & Activation Case Management (ACM)	DSP	Activation details. appointments, education history; JobPath contracted	~ 1 m

[12] Approximate number of individual records (millions)

[13] SOLAS is the State organisation with responsibility for funding, planning and co-ordinating Further Education and Training (FET) in Ireland. It was established in 2013 under the Further Education and Training Act as an agency of the Department of Education and Skills, taking over the education and training functions of the dissolved State employment and training authority FÁS (Foras Áiseanna Saothair).
The employment functions of FÁS were transferred to DSP. The FÁS Management Information System continued to operate following the dissolution of FÁS and the transfer of its functions to SOLAS and DSP. Under a Memorandum of Understanding (MoU) between DSP and SOLAS, some data from this system are made available to DSP.

		employment services information	
Central Records System	DSP/ Revenue[14]	Earnings & Weeks of Social Insurance	~ 26 m

[14] The Office of the Revenue Commissioners ('Revenue') is the principal body responsible for the assessment and collection of taxes in Ireland. Alongside Income Tax and the Universal Social Charge, which are directly attributable to the Exchequer, Revenue collects Pay-Related Social Insurance (PRSI) on behalf of the Department of Social Protection.
In the discharge of this function, Revenue provides detailed information about earnings and weeks of insurable employment for every category of worker to DSP, along with the PRSI receipts themselves. This arrangement is established in the Social Welfare (Consolidation) Act 2005, and actualised in a Memorandum of Understanding (MoU) between Revenue and DSP.
The primary legislation and MoU also establish the basis for the transmission by Revenue to DSP of information on commencement and cessation of employments.