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Endowment Effect and Reservation Wage: A behavioural evaluation of the impact of 2010 Jobseekers Allowance rate changes on labour market outcomes for young unemployed

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Abstract: This paper evaluates the impact of the 2010 jobseekers allowance rate changes on the labour market decisions of new jobseekers to investigate the predictive power of orthodox versus behavioural economic theories. The paper tests the degree to which the endowment effect and loss aversion acts to subvert optimising behaviour as specified by the orthodox economic job-search model. The study found that jobseekers demonstrated optimising behaviour when faced with a reduction in their welfare support through increased employment exits. The results provide ambiguous evidence to support the predictions concerning previous earnings and endowment effect or loss aversion. The results provide no evidence for the policy rationale regarding incentivising greater take up of activation or education amongst young jobseekers.

Keywords: youth unemployment, labour markets, welfare
JELs: D60, E20, I38

1. INTRODUCTION

In the fallout from the economic crisis of 2007/08, unemployment increased dramatically in Ireland. By 2012 unemployment had reached its highest level since the 1980s at 15.1%, amongst the highest in the EU (CSO, 2016). In response to the crisis social welfare budgets were dramatically reduced from 2009 onwards, including the main weekly rate of the means-tested unemployment assistance payment, Jobseekers Allowance (JA) for younger jobseekers. These changes were part of the retrenchment of public finances at the time, but they were also advanced as labour activation policies.

Mainstream economics classifies the labour market as much like any other market as far as it is composed of buyers; i.e. employers seeking to hire workers to enable the design, production or delivery of a good or service in order to make a profit; and sellers (i.e. jobseekers seeking to sell their labour to prospective employers in return for income). In an idealised world, jobseekers would quickly match themselves to an available job vacancy. Since such matches involve some risk and take some time, there would be some frictional unemployment before the market clears. However, this model of the labour market rests upon the assumption of economic rationality. Since the 1970s, a growing body of empirical research has highlighted limitations to these behavioural assumptions when applied to real world situations. This body of research has become known as behavioural economics and it draws on psychological insights to supplement how economic behaviour is understood.

The objective of this study is to evaluate the behavioural impact of the changes in the JA rates and in doing so assess the predictive power of the behavioural assumptions underpinning orthodox and behavioural economics. It draws upon the orthodox economic model of job-search and reservation wage to test how people respond to financial incentives. In doing so, it will also evaluate the use of passive policy approaches, such as altering unemployment assistance rates, in respect of addressing unemployment.

The next section investigates the policy context and rationale that led to the introduction of age-differentiated JA rates in Ireland. Section Three explores the theoretical debate concerning behaviour and economic decision making in the context of the labour market. Section Four presents the model and the methods that the study used to test the two theories. Section Five presents the results and the final section contextualises and interprets the results.

2. CONTEXT

Unemployment Assistance and Benefits in Ireland

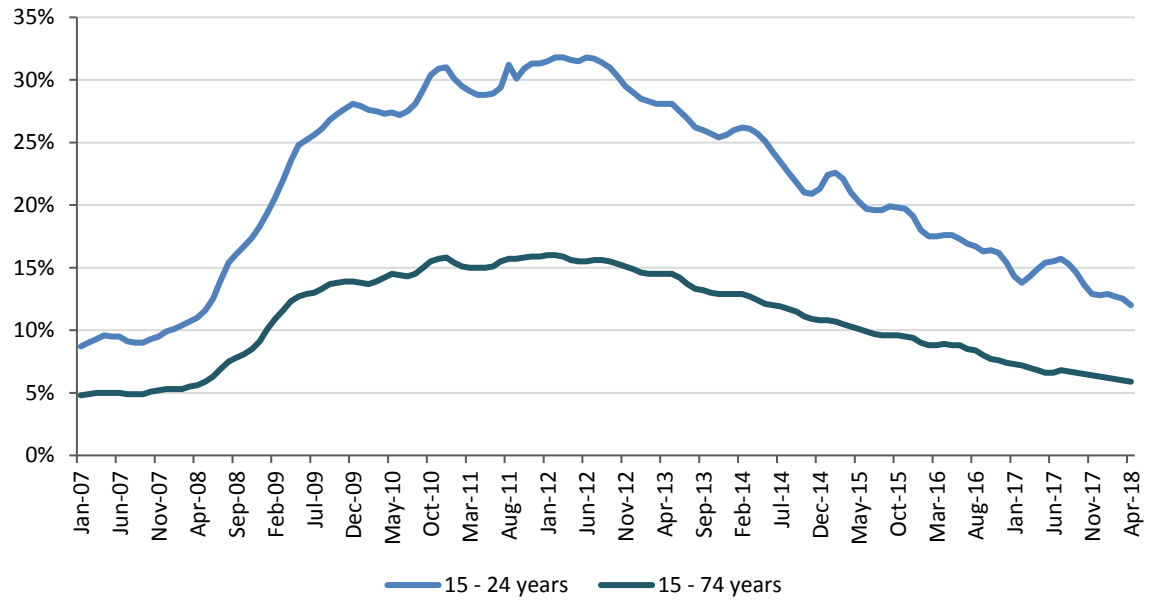
Many OECD countries use insurance-based systems, i.e. where eligibility is based upon making a minimum number of employee and employer social security contributions into an unemployment insurance fund (OECD, 2006). Ireland's unemployment support system is one of few developed economies, along with Australia and New Zealand, where an indefinite unemployment assistance payment is the primary unemployment support payment (OECD, 2007). While Ireland also has an insurance-based payment, known as Jobseekers Benefit (JB), most jobseekers are in receipt of JA. Furthermore, there is no direct link between the weekly rate of JA or JB to the jobseeker's previous income, and both payments have historically been set at the same weekly rate. To access JA, a jobseeker must satisfy a habitual residence condition and a means test. In addition to the primary payment, recipients can also access top-up payments for dependent children and adults and several subsidiary benefits.

Recent Developments

The 2008 banking crisis led to a sharp contraction of credit in the Irish economy and the bursting of a major real estate and construction bubble. Exchequer revenues collapsed, just as the Government bailed out the Irish banking sector, thus knocking the country into recession and ultimately entry into the EU/IMF Financial Assistance Programme.

As shown in Figure 1 below, after a period of virtually full employment, the collapse of the construction industry and the sharp contraction in economic activity saw the unemployment rate climb from 4.8% in January 2007 to 16% by January 2012. Moreover, the rate of long-term unemployment, unemployed for over one year, and the rate of youth unemployment also increased over the same period. By the first quarter of 2012, the long-term unemployment rate peaked at 62.5% of total unemployed. Meanwhile youth unemployment grew from 8.7% in January 2007 to a peak of 31.8% in February 2012. The rapid deterioration in the labour market caught the State off-guard and unemployment became a national priority.

Figure 1: Monthly Unemployment and Youth Unemployment, 2007 to 2018

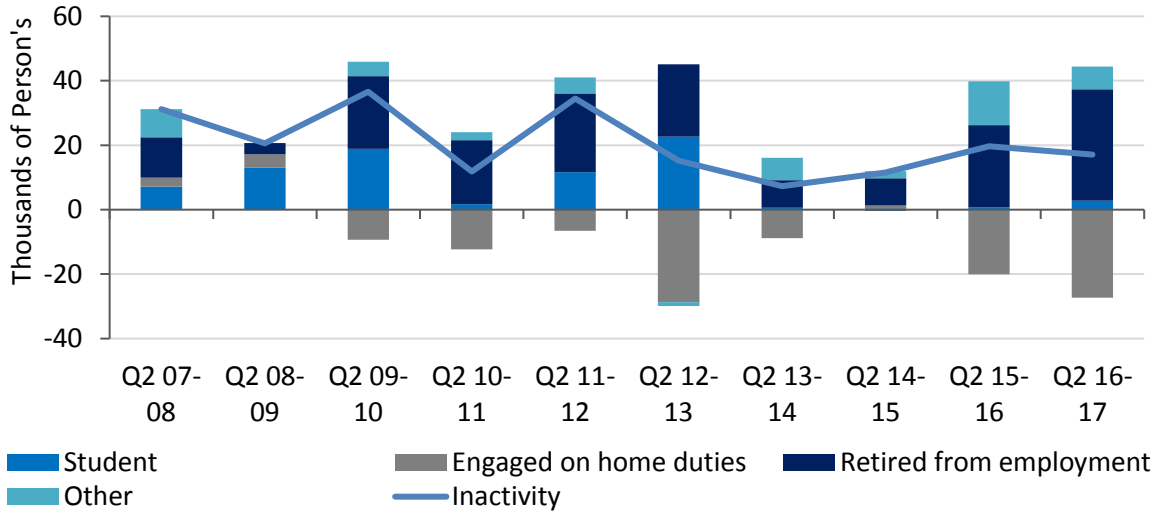


Source: CSO, LFS data

The impact of the economic crisis on the labour market also played out in other ways. The level of labour market inactivity, as defined as neither being "employed" nor "unemployed" (European Commission, 1997), was impacted by the fallout of the downturn. Over the period, 2007 to 2017, the proportion of people classified as inactive increased from 36.3% in Q2 2017 to 39.9% in Q1 2013. People are defined as being inactive economically if they occupy one of the following four types of economic status: retirement; engaged in family duties; in full-time education illness or other economically inactive (Hussmann, 2007). Inactivity has since declined marginally but remains elevated at 39.4% as of Q2 2017. Figure 2 breaks down the year-on-year change in inactivity categories over the period Q2 2007 and Q2 2017. In absolute terms the number of inactive people has increased by +17.2% to 1,524,800. However, within that, there were varied trends by ILO inactive category.

Increasing number of retirements from employment as well as a declining number of people engaged in home duties accounted for much of the year-on-year changes over the last ten years. However, there were also notable annual increases in the numbers of people classified as students during the recession years, 2007 to 2013. Indeed, in the years 2007 to 2010, the number of working age people classified as a student increased year-on-year. After a dip between 2010 and 2011, the numbers classified as students increased annually again to 2013. Indeed, as a share of the inactive cohort, the student category would grow by 2.9 percentage points over the period 2007 to 2013. Similarly, the numbers classified as other, i.e. inactive excluding the other three categories also experienced increases albeit more modestly. In the periods 2007 to 2008 and 2009 to 2012, the numbers in this category experienced increases year-on-year. By 2012, the other category as a share of inactivity had increased by 0.6 percentage points. More worryingly, the increases in this category have continued into the post-recession period despite an improved labour market.

Figure 2: Year-on-Year Change in ILO Inactivity Status, Q2 2007 to Q2 2017



Source; CSO, LFS data

A further impact was on migration trends. According to the CSO, in 2007, there were 104,000 net immigrants into Ireland. By 2010, the trend reversed with net migration of -27,500 people. Net immigration would not return until 2015. Amongst the under 25-year-old cohort, in 2007, 43,100 immigrants joined the Irish labour force. In 2010, migration patterns reversed amongst under 25s, with a net figure of -9,400. Net emigration for this cohort peaked in 2011 at -19,900, representing almost three quarters of net emigration in that year. Net immigration amongst this cohort returned in 2015.

The onset of the recession translated into increases in unemployment and in declines in the numbers in the labour force. While in many cases, disengagement from the labour force was a temporary measure as many people of working age opted to engage in full-time education while awaiting recovery. However, there is also some evidence that the recession years corresponded with increases in the numbers of people disengaging from the labour market as well as the return of emigration.

Policy Responses

Since the mid-1990s, Irish public employment services (PES) have undergone several waves of reform, known as the National Employment Action Plans (NEAPs), driven by the broader recognition that the welfare state needed to become more activist (Dept. Social Protection, 2011). In Ireland as elsewhere, changing labour market dynamics, demographic trends and societal change have challenged the traditional role of the welfare state and its ability to respond to social risks (O'Connell, 2002). In doing so Ireland adopted a more complex view of the individual regarding labour market policy. The reforms have focused on ensuring that the PES enables individuals to maximise their economic and social participation. This was informed by a growing body of evidence at the time which demonstrated the positive impact of developing training and employment incentive schemes to improve employment prospects, especially amongst the young unemployed cohorts (Breen and Halpin, 1989; Breen, 1991; O'Connell and McGinnity, 1997; and O'Connell, 2017).

By the late 2000's Ireland had moved some way towards a more activist model, however, an evaluation published at the time highlighted there remained significant shortcomings in the Irish PES (McGuinness *et al.,* 2011). It advocated major overhaul of monitoring and sanction mechanisms; better integration of services and more intensive job-search assistance. However, notwithstanding the push for a more activist approach to labour market policy, passive measures were still a major part of the State's policy arsenal in their response to the unemployment during the crisis years. In 2009, the Department of Social Protection (DSP) reformed the JA payments regime, differentiated payment rates by age reflecting the continuing reliance on passive interventions. This reliance was also in part driven by the demands of prevailing the austerity regime related to the fiscal crisis of the State from 2009 (Roche *et al.*, 2017; and Hick, 2017). According to the then Minister for Social Protection Mary Hanafin, when announcing the cuts in Jobseeker Allowance rates for young people:

"…the focus of the social welfare measures announced today is to help people get access to education, training and work experience…putting in place a new incentive to encourage 18 and 19-year-old jobseekers to avail of the education and training opportunities and improve their skills, in order to try to avoid them becoming long-term welfare dependent from a young age." (Press Release, Department of Social Protection: April 7, 2009)

The 2009 reduction in the payment rates was the first such cut in over a decade, albeit confined to 18 and 19 year olds at the time and with the proviso that those wishing to participate in an activation, training or education scheme would retain the full rate. In the Supplementary Budget of 2009, after peaking at €204.30 per week in the 2009 Budget, the core payment rate was reduced to €100 for unemployed people aged under 20 years old entering the Live Register of unemployed. In the following year, further differentiation of payments was introduced. The €100 rate was applied to all new Live Register entrants aged up to and including 21 years old. A further rate reduction to €150 was introduced for new entrants aged 22 to 24 years old, while those new entrants aged 25 and older received €196. At the same time the weekly rate for all existing jobseekers on the Live Register was also reduced to €196 (see Appendix D for timeline of JA rate changes).

Despite the link to activation, the use of such passive measures reflected the influence of the behavioural assumptions associated with orthodox economic theory. It was predicated on the assumption, that all things being equal, the change in the financial incentives would encourage individual jobseekers to exit from benefit support to either a job or participation in an activation scheme. To understand the rationale for this, the next section will explore the theoretical basis of this assumption drawing on the orthodox economic model of the labour market and also discuss the alternative views that have emerged from the field of behavioural economics.

3. THEORY

In economics, there is a tendency to emphasise that "incentives matter" when modelling the behaviour of economic agents. Individuals are assumed to be rational utility maximisers, hence they will always choose the option that maximises their utility, as formalised by Von Neumann and Morgenstern in their expected utility theory (1944). This has been a traditional assumption of mainstream public policy regarding designing interventions. In terms of the labour market, the use of rate changes exemplifies how the State draws on this approach as it tries to optimise job-search behaviour. However, this model can be at odds with the reality of human behaviour, due to its reliance on extrinsic incentives. A growing literature emerging from cognitive and social psychology has revealed a more complex model of economic behaviour beyond the narrow model espoused by orthodox economics.

The following section explores the current theoretical debate concerning human behaviour in terms of the implications for how job-search behaviour has been modelled in public policy. Starting with an outline of the orthodox behavioural model, the reservation wage theory, the discussion then offers an alternative approach based on the findings of the behavioural school of economics, namely heuristic decision making and bounded rationality.

Rational Choice Theory: Optimisation and the Reservation Wage

As a start to exploring the orthodox job-search model, consider an unemployed person who is seeking job opportunities. There may be many job opportunities available to that jobseeker; however, at any given time she has incomplete information regarding the whole distribution of jobs available. This means she will have to commit time and resources to searching and rely on a certain degree of luck to find the most satisfactory opportunity she can. Note that the jobseeker must also consider the cost of searching for jobs which increase with time spent searching (Mortensen, 1976).

Under these circumstances when a job offer arrives she will face a decision to either accept the offer and its corresponding wage, which shall be referred to as *W*, or forgo the offer and continue searching in the hope she will find another job opportunity with a better offer in the immediate future. The jobseeker is assumed to be seeking to maximise the expected present value of her lifetime wage income. In other words, she will want to maximise the net present value of what she expects to earn over her career. This can be written formally as:

$$(1)\quad \mathrm{E}\sum_{t=0}^{\infty}\beta^{t}y_{t\prime}$$

where β is the discount factor between 0 and 1 and $y_{t\prime}$ denotes the job seekers' income in the time period *t*. Where the job seeker is unemployed, $y_{t\prime}= W^{U}$ and where the job seeker is employed at wage *W*, $y_{t\prime}=W$. The discount factor determines the rate at which the job seeker will discount her future earnings against her current income.

In a given week, the job seeker will evaluate the offer in front of her in the context of how the current offer compares to other offers she may receive in future weeks. If she judges the probability of a better offer the following week as higher, she will reject the current week's offer and forego the income of wage *W* less the value of the unemployment benefit W^{U}. Such a loss in income would have to be compared against the potential gain from the potentially higher wage offer she may receive the following week.

The level at which the wage offer must be set at for the job seeker to accept is known as the reservation wage, W^{R} (Trehan, 2001). The exact value of the reservation wage is dependent on a wide range of factors including the distribution of possible wage offers, the probability of being fired, the discount rate, the level of unemployment compensation and the previous earnings of the jobseeker amongst others (Prasad, 2003). Furthermore, these factors can vary according to broader macro-economic conditions, regional differences, the quality of labour market information available to jobseekers as well as jobseekers' expectations (Walker, 2003). For a detailed discussion of the parameters of the job-search model, a good introduction is Fitzgerald (1998) or Mortensen and Pissarides (1994). However, the objective of this study is to explore the underlying behavioural assumptions of the agent, in this case the jobseeker, therefore, it is sufficient to limit the discussion to the basic choice architecture faced by a typical jobseeker. Furthermore, the study specifically assumes the jobseeker is a price-taker, i.e. the jobseeker has no influence on the wage offers they receive, the behaviour of firms and the processes by which the wage distribution is determined.

In making her decision, the jobseeker must compare the expected lifetime income of accepting or rejecting an offer. Using some basic notation, it is possible to walk through the intuition behind the job-search model. Let $V^{wait}(W)$ denote the expected present value of lifetime income if she rejects a wage offer and chooses to wait for a better offer and let $V^{accept}(W)$ be the expected present value of lifetime income if she accepts *W*; and let $V^{offer}(W)$ represent the expected present value of lifetime income upon drawing wage offer *W*. Assuming the jobseeker will behave optimally to maximise the present value of her expected lifetime income, equation (1) can be used to model each option by plugging the three functions into it. The following equation considers the value of rejecting an offer and waiting for a better offer as follows:

$$(2)\ V^{wait}(W)= W^{U} + \beta E V^{offer}(W)\text{-}C$$

where $E\,V^{offer}$ is the expected value of $V^{offer}(W)$ and *C* is the cost of job-search. The value to the job seeker of this choice includes the value of the unemployment compensation for the week and the discounted expected value of drawing a new wage offer the following week. W^{U} is a constant in this function reflecting the fact that the following week's wage offer is independent of the current week's offer and therefore the value of rejecting an offer and waiting is the same regardless of the current week's offer.

The next scenario has the job seeker accept the job offer, it can be written as:

$$(3)\ V^{accept}(W) = W + \beta\alpha E V^{offer} + \beta\,(1-\alpha)V^{accept}(W)$$

In this scenario, because the jobseeker has accepted the wage offer *W*, she will receive *W* as income. As noted earlier a key determining factor on the choice to accept a wage offer is the probability of being fired. In the model the probability of being fired at the end of the week is captured by α which discounts the expected value of receiving a new offer the next week, denoted as $\beta\alpha E V^{offer}$ in the case of being fired[1]. However, in the case of being

[1] Note, being fired may also come with a severance package. In such cases any additional income associated with a severance package may affect a jobseekers expected present value of W^{U}. However, for the purposes of the example above, it is assumed there is no severance payment.

kept on she faces a probability of $(1 - \alpha)$ and receives the discounted value of accepting the same wage offer the following week, denoted as $\alpha V^{accept}(W)$. This function can be rewritten as:

$$(4)\ V^{accept}(W) = \frac{W + \beta\alpha EVoffer}{1 - \beta(1 - \alpha)}$$

When the job seeker has a wage offer in hand, she must decide between accepting the offer which is valued as $V^{accept}(W)$, the expected present value of accepting W, or rejecting the offer which would equate to $V^{wait}(W)$, the expected present value of choosing to wait for next week's offer. This can be denoted as:

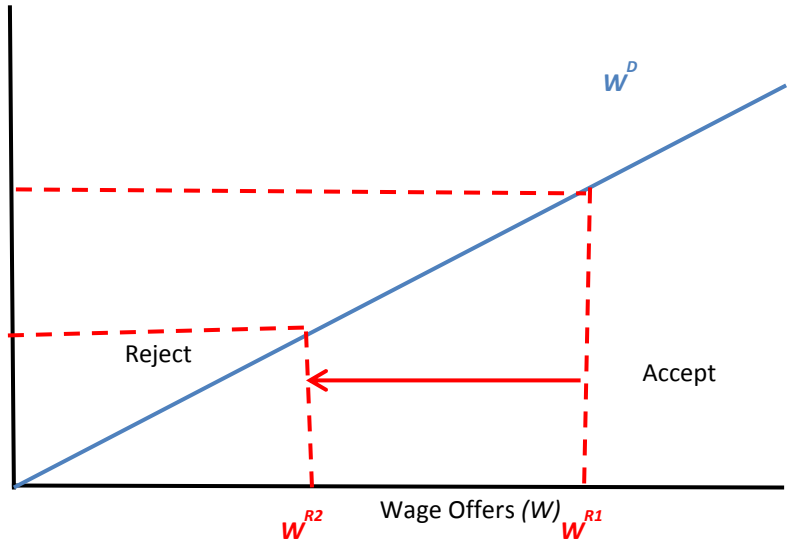
$$(5)\ V^{offer}(W) = max\{\ V^{accept}(W),\ V^{wait}(W)\}$$

which reflects that the acceptance of an offer is conditional upon the relative benefit of accepting over waiting. In this way $V^{accept}(W)$ can be understood to increase linearly with W. At this point it is worth recalling that there is also a cost associated with prolonged job-search. For the purposes of the paper, this model is limited to a single period. However, looked at over a longer period, orthodox theory would expect the reservation wage to decline over time as the duration of unemployment increases as jobseekers adapt their preferences.

But in this case the resolution to the job seekers decision must be able to satisfy equations (2), (4) and (5). A helpful way of capturing this is to graph $V^{wait}(W)$ against a wage offer distribution W^D. Figure 3 below details a simplified model of how the decision to reject or accept each wage offer operates. The decision depends on whether the wage offer is greater or lesser than $V^{wait}(W)$. For values of W^D less than W^{R1}, the value of $V^{accept}(W)$ is less than $V^{wait}(W)$, therefore the jobseeker is better off rejecting the offer. Where W^D is greater than W^{R1}, $V^{wait}(W)$ is less than $V^{accept}(W)$ and therefore the jobseeker is better off accepting the offer.

Ceteris paribus, the jobseeker will reduce her reservation wage downwards from W^{R1} to W^{R2} in response to the reduced value of the unemployment compensation. In this case, W^D is greater than W^{R1} over a greater range of lower value wage offers, reducing the range of values where $V^{wait}(W)$ is greater than $V^{accept}(W)$. The result is that the jobseeker is incentivised to accept lower wage offers.

Figure 3: Assessing Wage Offers



To summarise, the orthodox model implies that a high reservation wage will require higher financial incentives to exit the Live Register of unemployed. Conversely, a reduction in the reservation wage, *ceteris paribus*, would dis-incentivise remaining on the Live Register and increase in willingness of the jobseeker to accept other labour market options and therefore increase in the likelihood of exiting the Live Register. In terms of the JA rates, the reductions should increase the expected present value of accepting $V^{accept}(W)$, in terms of the expected value of the next wage offer $V^{wait}(W)$. Therefore, all things being equal, the reduced rates will incentivise a jobseeker to accept lower wage offers and make other labour market options such as participating in education and or activation schemes relatively more attractive.

Prospect Theory: Endowment Effect and Loss Aversion

Since the 1970s, there has been a growing body of empirical evidence that has found that the basic rationality assumptions underpinning the orthodox economic model of human behaviour and decision-making do not always hold in practice (Rabin, 1998; Thaler and Sunstein, 2008; Congdon, Kling and Mullainthan, 2011). In respect of job-search theory, the orthodox model assumes that the jobseeker as an economic agent is predictable, time-consistent, and self-interested. In contrast, extensive research in labour market behaviour has shown that this model of behaviour does not account for phenomena that distort behaviour and produce sub-optimal outcomes. For example, evidence has shown that over time the reservation rate will decrease as the duration of unemployment increases (Anderson, 1998). If the jobseeker withholds her supply of labour until wage offers to adjust to her wage expectations she can become involuntarily unemployed (Romer, 2011). In cases where the jobseeker experiences a prolonged period of unemployment, her skill-set may grow less relevant, the marginal cost of job-search begins to increase, and her employability diminishes to the point where she may cease receiving wage offers altogether regardless of her preferences (Ball, 2009).

Behavioural economics offers an alternative approach. When considering how jobseekers respond to reductions in their JA rates, the behavioural insight applies to how individuals evaluate relative gains and losses. This can be understood in terms of the endowment effect and loss aversion. Specifically, when presented with a choice between outcomes, an individual will select those outcomes they consider equivalent to their current situation, choose a reference point, and then consider outcomes below this point as losses and outcomes that are above this point as gains. This is known as the endowment effect, i.e. when people place a higher value on a good they own than on an identical good that they do not own.

The endowment effect was first characterised as an example of a heuristic in decision making by Thaler (1980). It captures the under-weighting of opportunity costs by consumers. It also explains that people suffer a greater sense of loss from losing goods they already own (Hoffman and Spitzer, 1993). The endowment effect is closely related to loss aversion, that is, where losses are felt more intensely that gains of the same value.

The way the endowment effect operates can be explained through decision-making as modelled by prospect theory. It outlines decision-making as a two-stage process involving an editing stage and an evaluating stage (Kahneman and Tversky, 1979). The editing stage involves the ordering of possible outcomes of a given decision according to a certain criterion. In the case of labour market decisions, the jobseeker will decide which outcomes they consider equivalent, specifically either to accept a wage offer or remain on the Live Register, set a reference point, which for those jobseekers with previous earnings experience is likely to be the level of those earnings; and then consider the outcomes with lower wage offers as losses and greater ones as gains. In the evaluation stage, the jobseeker will ascribe a utility to each outcome, give each one a probability weighting and then choose the option with the highest expected utility. Kahneman and Tversky have modelled this process using the following formula:

$$(6)\quad U = \sum_{i=1}^{n} Pr(P_i)V(X_i)$$

U represents the expected utility from the outcomes over which the individual is making her decision, X_i represents the potential outcome(s) and P_i represents the prospective probability attached to each outcome X_i. *V* is the function for assigning a value to the outcome and *Pr* is a probability weighting. According to prospect theory, as charted in Figure 3 below, the value function that passes through the reference point is s-shaped and asymmetrical because the function *Pr* is a probability weighting function for each individual probability because people tend to over-react to small probability events and under-react to large probabilities.

$$(7)\quad U = (Pr_1)v(X_1) + (Pr_2)v(X_2) + \cdots + (Pr_n)v(X_n)$$

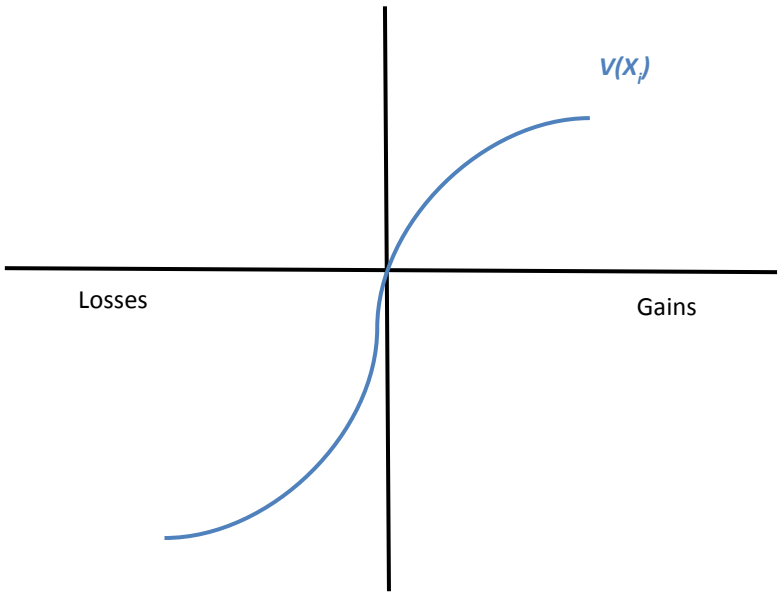
Equation 7 decomposes the function. For simplicity, the reference point can be X_0=0, and gains (positive values of X_i) and losses (negative values of X_i) can be defined with respect to that reference point. Under prospect theory, the reference point is typically the individual's status quo, which in the case of jobseekers with previous earnings, would be the level of those previous earnings. Unlike orthodox expected utility theory, the decision-weighted function, *Pr*, incorporates a probability distortion of every individual probability by either over-weighting P_i, or under-weighting it. It is important to note the distinction, as while the probabilities themselves should add to 1, the probability weighting function typically doesn't. However, as individuals will not distort impossibility and certainty, therefore, $Pr(0)=0$ and $Pr(1)=1$.

As the value of the reference point should be neutral, it is assigned $V(0)=0$. In addition, $V(X_i)$, is assumed to be a continuous, strictly increasing function. The prospects are thus evaluated based on their values. The preferences are determined by a utility function that evaluates the subjective value of an outcome in terms of the reference point and by the decision weights that capture the individual's attitude towards risk.

The reference point need not be an individual's current wealth position; the reference point can be affected by the composition of the prospects being offered, and by the expectations of the individual making the decision. The value function is defined in terms of diminishing marginal value as the financial value of the outcomes moves farther away from the reference point. This is referred to as diminishing sensitivity, demonstrating how a person's decision-making can be anchored to their previous experiences. This is known as the endowment effect.

Furthermore, in the gains domain this implies concavity, $V(X_i) \geq 0$, and regarding losses it also implies convexity, $V(X_i) < 0$. Therefore, the utility function takes on a s-shape as shown in Figure 4. This also demonstrates the loss aversion property, as far as losses loom larger than gains. Put formally, this can be written as $|V(-X_i)| > - V(X_i)$ for $X_i > 0$.

Figure 4: Loss Aversion



4. METHODS

This section details the parameters of the research model used to assess the theoretical approaches as detailed previously. It will outline first, the main data source for the analysis, second the rational and specifics of the model used undertake the analysis and finally detail the specifications of the econometric techniques used to run the model.

Research Design

To test the different theoretical models, the study evaluates the impact of the reduced rates on the labour market outcomes of jobseekers at specified intervals of 6 and 12 months from the date the jobseeker was first registered on the Live Register. The data were derived from the Department of Social Protection's Jobseekers Longitudinal Database (JLD)[2] and collated into four categories[3]. The categories included on the Live Register, in employment, in an activation or education scheme or in the other category. These were formulated as follows:

- The category 'on the Live Register' included being in receipt of one of the main jobseeker payments and not in employment or an activation or education scheme.
- The 'employment' category was where the jobseeker had left the Live Register and was in an employment situation, this included self-employment and part-time employment where the jobseeker also was claiming a casual JA or JB payment.
- The category designated 'in activation or education scheme' concerned jobseekers that were referred to a DSP operated or subsidised programme to support jobseekers back into the employment or to improve their skills and qualifications.

[2] The Jobseekers Longitudinal Database is an administrative dataset, which contains an episodic record of each jobseekers interaction with unemployment services and their jobseeker claim details. It contains a history of all jobseekers since 2004.
[3] For a detailed breakdown of how these outcome categories were derived from the JLD please see Appendix C

- Finally, the 'other' category covered all outcomes that did not fall into any of the other three. This included where jobseekers transferred to other non-working age DSP schemes such as disability and illness supports or the state pension[4], where jobseekers have ended their claim but not notified the DSP the reason, where jobseekers have lost entitlement.

An important caveat to note in respect of the other category is that the DSP is of the view that many of the people in this category most likely end up in full-time education. It is also possible however, that these people have emigrated, have left the labour market due to illness or disability, to care for relatives or children or have chosen to disengage completely or have become disengaged from the labour market through bad experience. These are all viable behavioural responses to a rate reduction and worthy of further investigation. However, at the time of the analysis the DSPs administrative system did not capture these outcomes in its data. The lack of further data on these outcomes limits the analysis to outcomes related to continued participation in the labour force.

Another set of outcomes considered, concerned the impact of the rate reductions on the decision to enter the Live Register. However, this was not feasible for this study, due to lack of available data. However, an examination of inactivity and labour force statistics from the Quarterly National Household Survey data for the period in question showed that the introduction of the reduced rates had no significant impact on inactivity rates overall.

The study uses a control group and treatment group to model the introduction of the two new JA rates in respect of each test. The treatment group was composed of new entrants aged 23 year olds in receipt of JA. New entrant jobseekers aged 23 year olds, upon making their claim from the 1st January 2010 onwards, received €54.30 less than the 2009 rate, approximately 27% less. New entrant jobseekers aged 24 years old were also considered but were excluded as they would have turned 25 years old within 12 months of signing on. Upon turning 25 they would have been eligible for the full rate of JA. It would not have been possible to ensure a full 12 months of data for each jobseeker aged 24 years old. Furthermore, the knowledge that they would receive an increase in their JA rate when they turned 25 would have introduced expectation effects and distorted their labour market behaviour.

The control group was composed of 25 year old new entrants who continued to receive the standard rate of JA. Note, the standard rate was reduced from €204 to €196 for everyone excluding those under the age of 25 years old already on the Live Register. However, as this was universally applied to all those aged 25 or older, it is reasonable to assume that, *ceteris paribus*, the impact on behaviour would be uniform. As the 25-year-old cohort continued to receive the standard rate in both periods and are close to 23 year olds in age, it can be argued that they provided an adequate counterfactual for the tests. However, an important caveat needs to be acknowledged as far as entry into the labour market at a time of recession is likely to have had scarring effects on newly graduated young people. This effect would probably have been greater for 23 year olds compared of 25 year olds who may have had the benefit of more labour market experience.

Research Questions

The following section details the main theoretical approaches in terms of the analytical model.

Rational Choice Theory

Proposition 1: Optimisation

As explained previously, the stated aim of the rate reductions was to encourage younger jobseekers to engage in activation, education, or training rather than remain on the Live Register. This is in fitting with the orthodox model of behavioural responses to financial incentives. Therefore, to assess the power of the orthodox model the first test can be modelled into the following prediction:

The treatment effect of the rate change on exits to both employment and education will be positive.

Prospect Theory

Proposition 2: Endowment Effect

The second test focuses on the endowment effect and assumes the reference point used by jobseekers with experience of previous earnings is anchored to the level of the previous earnings. Therefore, the reduction in the rates should have a negligible effect on the labour market behaviour of jobseekers with previous earnings.

[4] Note other non-working age payments, such as Disability Allowance, were not subject to change at this time and would have been equivalent to the full rate of JA rate for jobseekers aged 25 and older, i.e. €196.

Referring to Section 3, this means the threshold for accepting wage offers, V^{wait}, will not shift down the wage offer distribution, W^{D}. This diverges from orthodox expected utility theory, as far as it incorporates the anchoring effects of recent experiences into how people respond to gains and losses as well as the contemporary context. Furthermore, it follows that those jobseekers who did not have previous earnings should be relatively more sensitive to the rate reductions. For these jobseekers, the JA rate should be the main reference point. A reduction in the rate will therefore reduce the threshold for accepting wage offers V^{wait}, relative to the expected present value of accepting a given wage offer $V^{accept}(W)$. This was modelled in respect of the analysis by the following prediction:

The treatment effect of the rate change on exits to both employment and education will be more positive for those without previous earnings than for those with positive previous earnings.

Proposition 3: Loss Aversion

It may also be the case that the experience of previous earnings may have established expectations of a standard of living associated with a specific wage level. The experience of the deterioration of the standard of living may increase sensitivity to loss. In this instance, loss aversion may operate in opposition to the endowment effect as modelled above in the case of higher earners and result in greater sensitivity to current income changes not less. Therefore, the reduction in the rate will reduce the threshold for accepting wage offers V^{wait} for jobseekers with high previous earnings relative to those with low previous earnings. This was tested by the following prediction:

The treatment effect of the rate change on exits to both employment and education will be more positive for those with high previous earnings than for those with low previous earnings.

Methodology and Data

To test the theories, the study examines the observed effects of the rate reductions on labour market outcomes and then applies an inferential analysis of the effects on the probability of exiting the Live Register into employment or into an activation or education scheme provided by the Department of Social Protection. This section will outline the data and the parameters of the models used to run the tests.

Data Specification

The study draws on an anonymised dataset from the Jobseekers Longitudinal Database (JLD). It holds an account of each episode of unemployment for every individual entering the Live Register since 2004. This includes a basic socio-economic profile for each jobseeker, including information on previous employment and earnings and their history of interaction with the Live Register amongst other information.

Data Sources and Sample Parameters

The data extract for the study is composed of all new entrants onto JA aged 23, 25 and 26 years old in 2009 and 2010, 35,009 individuals. After removing jobseekers who also received additional increases for dependent adults and children, the sample was reduced by approximately 14%. The next step was to isolate only those jobseekers who were only subject to the age-related reduction[5]. In the DSP's administrative data this is defined as an RRA (Reduced Rate Allowance). After cleaning for RRA's, the final sample size was 21,206 jobseekers, as shown in Table 1.

Table 1 Sample Exclusions

	23 yr olds	25 yr olds	26 yr olds	Total
Live Register	13,100	11,982	9,927	35,009
minus Dependents	11,571	10,335	8,181	30,087
minus RRA	6,879	8,125	6,201	21,205

[5] Note, that a jobseeker can be subject to differential rates for a variety of reasons including sanctions, over-payment and means conditionality. A further issue concerns situations where a jobseeker can retain the full-rate regardless of age where they have had a previous full JA claim in the preceding 52 weeks. This is known as claim linking or 'repeat claims'. Please see the following link for more details:
http://www.welfare.ie/en/Pages/Jobseekers-Allowance.aspx#Claims

The removal of jobseekers with dependents is biasing the sample in respect of non-parents. Parents, and especially female jobseekers with children, are likely to face a different set of incentives in terms of their labour market behaviour compared to single people, or couples without children. This in turn would influence how they responded to the rate reduction. To identify the pure financial effect, the analysis is limited to non-parents.

The DD estimators also include additional variables as independent co-variates to control for potential bias associated with other factors. These have also been sourced from the JLD. The study was able to draw on a rich set of panel data for each new entrant[6].

(i) Socio-demographic Variables

The gender variable controls for potential recruitment-related biases. For example, regarding gender, certain employers will almost exclusively prefer to hire men for jobs such as agriculture and construction, whereas, employers in education and healthcare occupations tend to prefer women. Furthermore, the gender breakdown of the Live Register also tends to reflect the greater male participation in the labour market.

The relationship variable controls for behavioural effects associated with the relationship status of jobseekers. For example, being in a relationship may allow jobseekers to pool their resources with their partners, which in turn may affect their response to changes in their income streams. Equally, the presence of a partner who is also earning may affect the financial incentive to engage with the labour market. However, the process of data cleaning introduced the risk of omitted variable bias. To account for this Table 2 below presents the breakdown of the socio-demographic profile of the sample before and after cleaning. As can be seen in most cases the data cleaning had a negligible effect on the main socio-demographic characteristics.

Table 2: Socio-demographic Profile

Variable	**Category**	***Sample***	**2009**	**2010**	**Total**
Gender	**Male**	*Raw*	65.8%	63.2%	64.7%
		Cleaned	64.8%	63.9%	64.4%
Relationship	**Single**	*Raw*	81.4%	84.9%	83.2%
		Cleaned	81.2%	83.4%	82.1%

(ii) Labour Market Variables

The nationality variable controls for potential recruitment biases. According to CSO occupations data, as certain sectors, such as administration and support services and wholesale and retail, have a higher proportion of immigrants than other sectors[7].

Occupation captures the most recent, self-reported, previous occupation of the jobseeker. It is derived from the DSP's administrative system. For the purposes of this study, the occupations have been summarised into professional and non-professional.

Previous LR history and count of previous jobs variables are proxies for employability as far as they provide a measure of the distance the jobseekers are from the labour market. There is evidence from the literature that prolonged periods of unemployment are related to longer periods of subsequent unemployment and shorter periods of employment. This is particularly relevant given that the period of analysis occurs during a period of prolonged high unemployment nationally. Essentially, in an environment of high unemployment, people may become used to unemployment and while they remain in receipt of welfare payments, they may not actually be looking for employment.

[6] Appendix D includes a detailed description of how these various explanatory variables have been constructed.
[7] See CSO Quarterly National Household Survey releases at: http://www.cso.ie/en/qnhs/

Table 3: Sample Description

		2009	2010	Total
Nationality	**Non-Irish**	9.3%	6.9%	8.4%
Previous Occupation	**None**	3.4%	3.9%	3.6%
	Administrative	10.3%	8.9%	9.7%
	Personal/Protective	8.7%	9.4%	9.0%
	Professional/Management	24.3%	25.9%	25.0%
	Routine Process, Transport and Machinery Workers	10.6%	10.3%	10.5%
	Sales Occupations	11.3%	11.5%	11.4%
	Trades	23.0%	20.4%	21.9%
	Other Occupations	8.4%	9.8%	9.0%
Count of Previous Jobs	**None**	26.1%	29.9%	27.7%
	1	11.4%	11.4%	11.4%
	1 to 5	34.6%	34.3%	34.5%
	More than 5	31.8%	31.8%	26.5%
Previous LR History	**None**	95.5%	95.2%	95.4%
	< 12 months	2.8%	1.3%	2.2%
	1 year or more	1.7%	3.5%	2.5%
Earnings in Previous Year	**No Earnings**	24.4%	28.7%	26.2%
	Low	47.7%	50.4%	48.8%
	High	27.8%	21.0%	25.0%

Modelling Earnings

The dynamics of the reservation wage are not directly observed and are often inferred through proxies or through self-reporting (for examples, see Shimer and Werning, 2006; and Krueger and Muller, 2011). As this study was able to exploit a rich set of panel data in respect of the jobseeker's characteristics, it was possible to create a proxy indicator for the reservation wage using average weekly earnings in the previous year. Table 4 below shows the distribution of total earnings in the previous year for 2009 and 2010. As is evident, there was a greater prevalence of low earnings amongst younger jobseekers. However, it is notable that average earnings improve in 2010.

Table 4: Previous Earnings Distribution

	Minimum	Lower Quartile	Mean	Median	Upper Quartile	Maximum	Std Dev
Total	€0.00	€0.00	€270.20	€259.00	€418.00	€6,363.00	€246.55
2009	€0.00	€0.00	€288.00	€292.00	€385.00	€3,445.00	€248.95
2010	€0.00	€0.00	€245.10	€219.00	€436.00	€6,363.00	€240.93

Source: Revenue Commissioners, 2017

To model relationship between the level of previous earnings and behaviour the distribution of previous earnings variable was divided into three levels; High, Low and No earnings. To reflect the distribution of earnings for the total sample, the model uses the 75th percentile threshold as the cut-off of the High earnings category.

Analytical Specification

The study utilised ex-post quasi-experimental methods based on administrative data collected by the Department of Social Protection. To achieve this, the study utilised a difference-in-difference (DD) design. The use of DD estimators in policy evaluations is very widespread (Imbens, 2007). The following will account for the rationale behind the use of a DD estimator in evaluating the impact of the JA rate reductions as well as outline the model used in this evaluation.

DD estimation is a quasi-experimental technique used to understand the effect of a sharp change in policy and is used in conjunction with a natural experiment in which randomisation is ensured. DD estimation relies on the exogeneity and the sharpness of the event/treatment, as well as the comparability of the treatment and control groups (the common trends assumption) (Roberts, 2012).

The advantage of a DD design in this context is that it ameliorates the risk of omitted variables associated with macro-economic change and other extraneous variables. DD mitigates this risk by explicitly incorporating a time variable into a before and after test. In doing so it controls for omitted variables even though they are unobserved. This was predicated on the 'common trends' assumption, i.e. that the outcome of control and treatment group would follow the same trend, in the absence of the treatment. Assuming that the 23 and 25 year olds have parallel differences over time, any change in the outcomes for 25 year olds can be interpreted as the change the 23 year olds would have experienced had there not been a change in the rates, and vice versa.

To conduct a DD estimation, it is necessary to identify two populations that can be further partitioned into two time periods: a control group with a segment before the event and after the event, and a treatment group with a segment before the event and after the event. As the rate reduction in question was targeted at a relatively small and distinct cohort of the wider Live Register, it provided convenient 'natural experimental' conditions.

The introduction of the reduced weekly JA rates from the first week of January 2010 onwards, facilitated the randomisation required for identifying the causal relationship and minimise the risk of bias. The clean discontinuity facilitated by the manner of the reduction in the JA rate, i.e. age was the only discriminating factor, which cannot be biased or manipulated, means it is acceptable to assume the selection into the control and treatment groups was random and unbiased, and therefore provides a reasonable proxy for experimental conditions. In addition, these changes were introduced within one month of their announcement in the Government's National Budget 2010 in December 2009, leaving little time to expect that the affected jobseekers would have time to adjust their behaviour before the benefit reduction came into force[8].

Regression Model

The tests took the form of a multinomial logistic regression. This is an extension of binary logistic regression that allows for more than two categories of the dependent or outcome variable. Like binary logistic regression, multinomial logistic regression uses maximum likelihood estimation to evaluate the probability of categorical membership. The Live Register outcomes were assessed on an interval basis at 6 and 12 months from the start of each jobseeker's entry onto the Live Register. The central equation for the model has been specified in the naïve estimator below:

$$Y(LR) = \beta_0 + \beta_1(Year_i) + \beta_2(Age_t) + \beta_3(Year*Age)_{it} + \varepsilon_i$$

Where dependent variable Y(LR) is the proportional change in the difference in the probability of 23 year olds being in a given outcome category relative to 25 year olds, the interaction term $\beta_3(Year*Age)_{it}$ captures the effect of being treated, i.e. the rate reduction for 23 year olds compared to 25 year olds, where Year is the post treatment dummy and Age represents whether the observation is in the treatment group.

Separate DD regressions are run for the overall treatment effect and each of the Earnings Bands. The basic DD model in each case isolates the effect, Y(LR), by subtracting the difference between the pre-treatment outcome, Y_{it1}, and post-treatment outcome, Y_{it2}, in the control group, $D_i = 1$, from the difference between the pre-treatment outcome, Y_{it1}, and post-treatment outcome, $Y_{it2,}$ in the treatment group, $D_i = 0$.

$$Y(LR) = E(Y_{it2}|D_i=1) - E(Y_{it1}|D_i=1) - \{ E(Y_{it2}|D_i=0) - E(Y_{it1}|D_i=0)\}$$

[8] Note that in 2010, the maximum rate was reduced from €204 to €196 for everyone excluding those under the age of 25 years old. However, as the changes were universally applied to all those aged 25 or older, it is reasonable to assume that, *ceteris paribus*, the impact on behaviour would be uniform.

To improve the efficiency of the model, each test incorporated a stepwise selection procedure to identify the relevant co-variates for inclusion (see Appendix A for a detailed breakdown of selection process).

Sensitivity Testing
To test the results for robustness the study also runs a second treatment effect test, by substituting the 25 year olds in the control group with 26 year olds. Given their relative closeness in age, they provide an adequate alternative control group in terms of their labour market behaviour. The same difference-in-difference design was used to analyse the change in the difference in relative exit behaviours associated with the introduction of the reduced rate in 2010.

To validate the 26 year olds as an alternative, the study also tested the main control group against the alternative control group. To ensure that the 26 year olds truly do provide an adequate alternative control group, the estimated treatment effect, the DD estimator, in this case should be zero to show that there was no difference between the two populations as these populations were not subject to the treatment.

Common Trends Assumption
In order to conduct a DD analysis, the common parallel trend assumption between the treatment group and the control group in the pre-treatment period must hold. The assumption requires that the trends between the treatment and control groups are parallel in the pre-treatment period. In this case, the pre-treatment period is 2009 before the reduced rate of JA was introduced for 23 year olds.

The following in Figures 5 and 6 illustrates the test of the common parallel trend assumption for the model. Figure 5 shows that in the pre-treatment period for both 23 year olds and 25 year olds there exists a broadly parallel trend thus confirming the assumption. Similarly, Figure 6 shows that the common trend assumption holds for 23 year olds and the alternative control group, 26 year olds.

Figure 5: Common Trends, 23yr olds vs 25yr olds, 2009

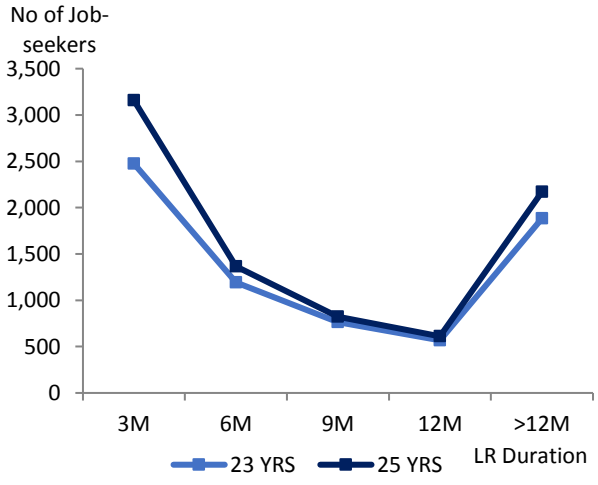
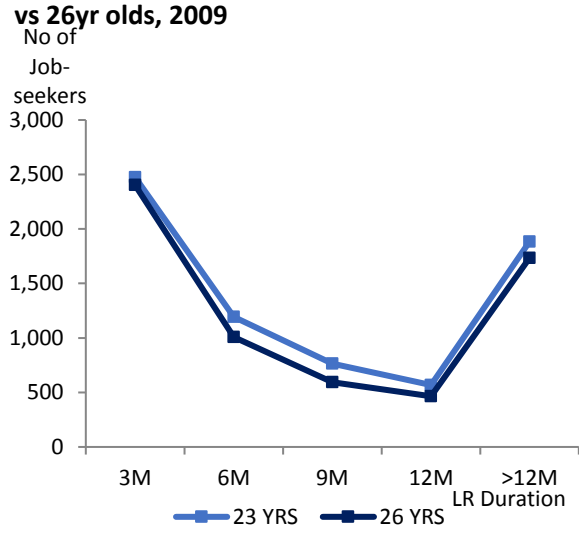


Figure 6: Common Trends, 23yr olds vs 26yr olds, 2009



5. RESULTS

The following section presents the summarised results for the econometric tests. The full results of the tests can be found in Appendix A.

Descriptive Analysis

Before exploring the results, it is useful to outline the broader labour market context at the time. The following set of graphs presents the observed Live Register outcomes for the control and treatment group at 6 and 12 months in 2009 and 2010.

Figures 7 and 8 present the status of 23 year old and 25 year old jobseekers that entered in 2009 at 6 and 12 months from the date of their entry. In terms of the inter-age group dynamics, the pattern is consistent at both 6 and 12

months. The 25 year olds have a higher rate of employment and participation in activation, training or education at both 6 and 12 months, while 23 year olds are highest in the other exit category. However, while the proportion of 23 year olds on the Live Register is highest at 6 months, the proportion of 25 year olds on the Live Register is marginally higher at 12 months.

A further notable difference between 6 and 12 months is the reduced proportion of both 23 and 25 year olds still on the Live Register. By 12 months both age groups have redistributed themselves into employment, activation, and the other exit category. Interestingly, the largest increase between 6 and 12 months for both 23 and 25 year olds was into the other exit category of approximately ten and nine percentage points for 23 and 25 year olds respectively, followed by an increase of around seven percentage points for both groups into employment.

Figure 7: 6 Month LR Outcomes, New Entrants in 2009

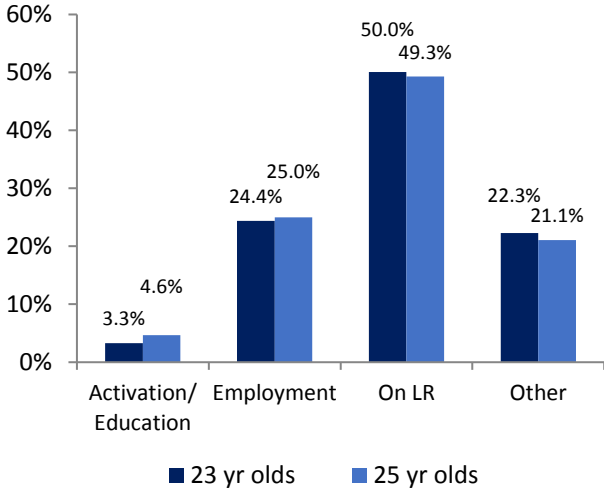


Figure 8: 12 Month LR Outcomes, New Entrants in 2009

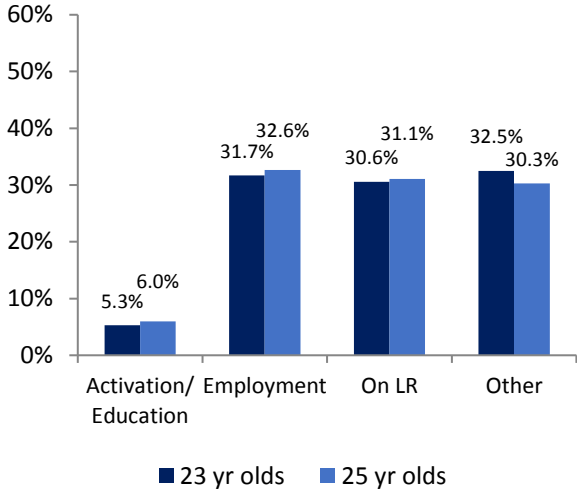


Figure 9 and 10 show the proportion of new entrant jobseekers in each Live Register outcome category at 6 and 12 months from entry for the 2010 cohort. Similar to the patterns identified for the 2009 cohort, a higher proportion of 25 year olds were in employment and activation, training or education relative to 23 year olds, while 23 year olds had the higher proportion in the other outcome category at both time intervals. A notable difference is that the 25 year old cohort has the highest proportion on the Live Register in both periods.

It is also evident that there is a shift off the Live Register between 6 and 12 months. Similar to 2009, this equates to a reduction in the proportion on the Live Register of approximately 19 and 17 percentage points respectively for 23 and 25 year olds. The majority move into the other exit category or into employment for both age groups.

Figure 9: 6 month LR Outcomes, New Entrants in 2010

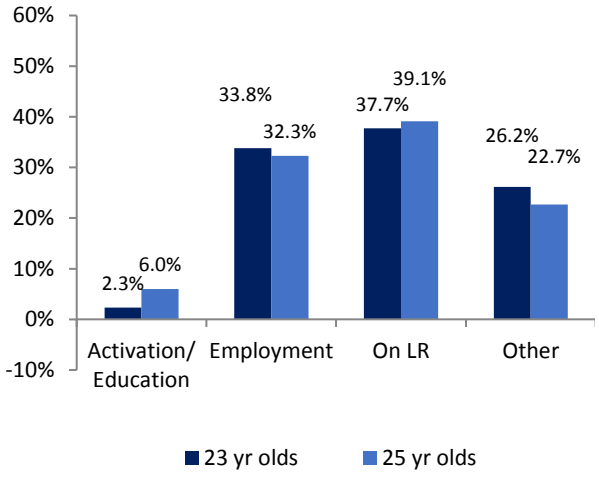
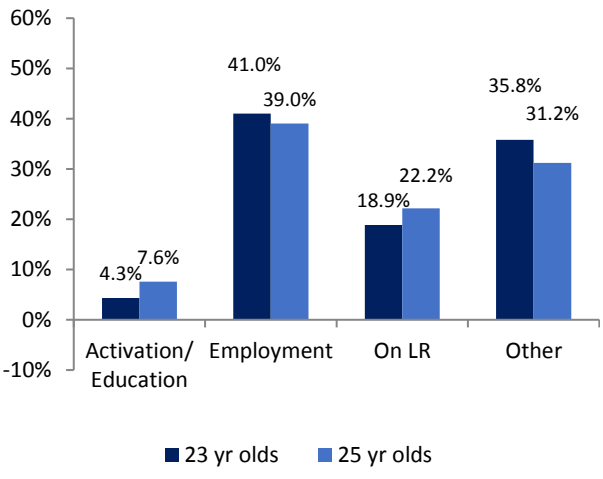


Figure 10: 12 Month LR Outcomes, New Entrants 2010



Figures 11 and 12 show the year-on-year change in Live Register outcomes at 6 and 12 months for both age groups. As shown, 23 year olds experience a decline in the proportion entering into an activation or education programme, whereas 25 year olds experience an increase. Both age groups experience increases in the proportion exiting into employment and into the other exit category, although 23 year olds have the higher proportional increase in both cases. Conversely, both age groups experience a reduction in the proportion still on the Live Register.

Figure 11: 6 Month LR Outcomes, Yr-on-Yr Change

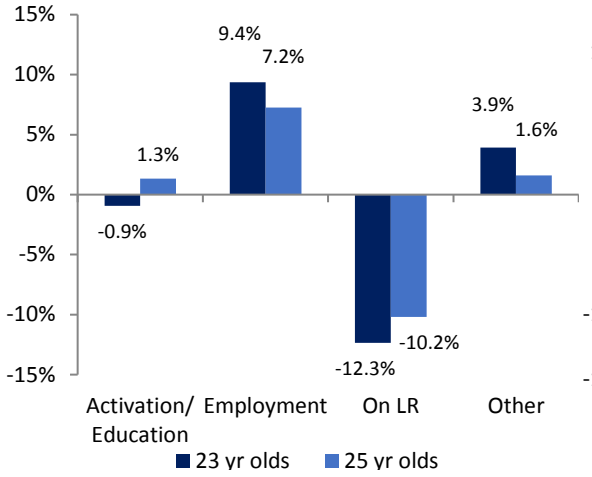
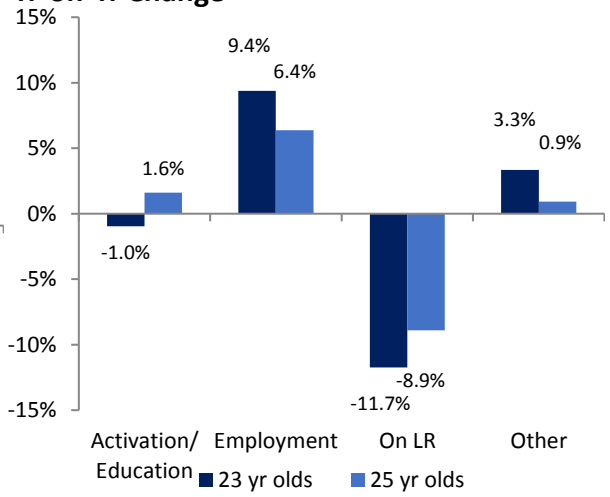
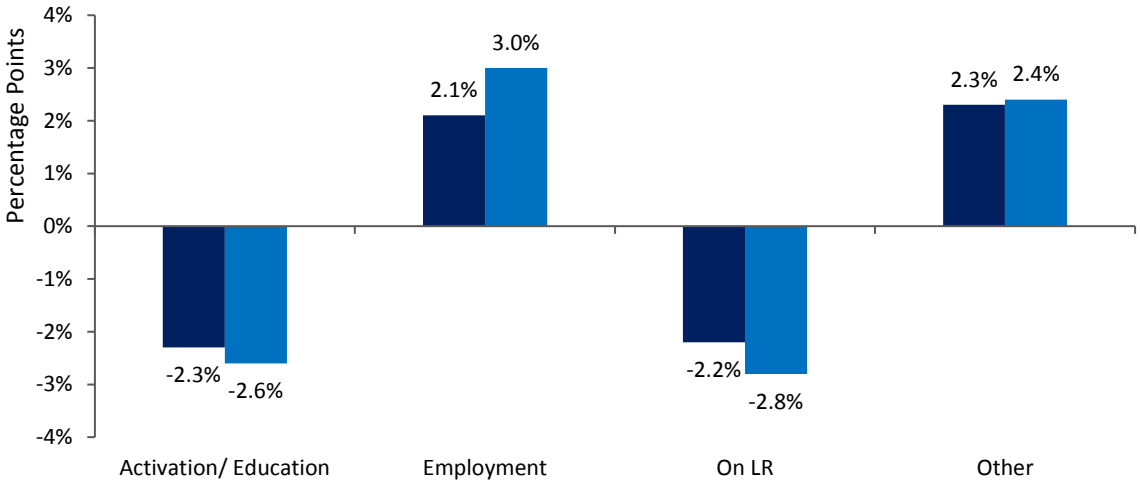


Figure 12: 12 Month LR Outcomes, Yr-on-Yr Change



However, to examine the impact of the rate reductions more directly it is useful to explore the change in the difference between each age group. Figure 13 details the change in the differences between each age group at 6 and 12 months between 2009 and 2010. For each outcome category, the differences between 23 year olds and 25 year olds increased over the year and over the 6 to 12 months from entry.

Figure 13: Change in LR Outcomes, 23yr olds vs. 25yr olds



In summary, the descriptive analysis demonstrates that there was a general shift in the distribution of outcomes between the 6 and 12 month intervals. There is a reallocation away from being on the Live Register in favour of the other outcomes, namely other and employment. This effect is found to be consistent for both age groups in both years.

However, there are differences in the outcome between the two age groups between 2009 and 2010. The 25 year old group experienced the largest percentage point increase in terms of activation or education, while 23 year old group experienced the largest percentage point increases in terms of employment and other exits from the Live Register. This indicates a mixed picture in terms of the relative effects. While 23 year olds improved relatively regarding employment and exits, there was also a dis-improvement regarding activation or education and being on the Live Register relative to 25 year olds.

Overall, these results would indicate that 23 year olds responded to the reduced rate by moving into employment or the other exit category and actually were less likely to enter activation or education when compared to 25 year olds who did not receive the reduced rate.

Inferential Analysis

The tables below present the summarised results of the difference-in-difference multinomial estimators regarding the effect of the change in rates in 2010 on the change in the probability of being in each of the outcome categories in terms of the treatment (23 year olds) and control groups (25 year olds). Five separate models are used, including a naive and multivariate estimator for the overall treatment effect and multivariate estimators for each Earnings Band. The coefficients represent maximum likelihood estimates for each Outcome category relative to being on the Live Register for each category of Age and Earnings Band incorporating socio-economic and labour market characteristics. In this way, it isolates the proportion of the change in the difference in outcome probabilities between 23 year olds and 25 year olds that can be accounted for by the introduction of a reduced rate for 23 year olds.

Table 5 presents the results of the full model in terms of employment (for the full results please refer to Appendix A, Tables A1.1 and A2.1). Specifically, the results concern the change in the probability of being in employment at 6 and 12 months post entry on the Live Register relative to being still on the Live Register between 23 year olds and 25 year olds. The table includes the results with and without co-variates. It also includes the results for each earnings group.

The first row of coefficients shows the results without co-variates for 23 year olds versus 25 year olds. At six months there is no statistically significant effects, while at 12 months it shows that the difference in the probability of being in employment compared to being on the Live Register between 23 and 25 year olds increased by 23 percentage points. In other words, 23 year olds were more likely than 25 year olds to increase their exit rates to employment between 2009 and 2010. These results are replicated when the co-variate model was run. At 12 months the difference in the probability of being in employment rather than on Live Register increased by 27 percentage points.

The rest of the rows show the co-efficients for each of the three earnings groups. Here again there is an increase in the difference in probabilities between 23 and 25 year olds. However, the increase is only statistically significant for the high earnings group. At 6 months the difference between 23 and 25 year olds increased by 50 percentage points. At 12 months the difference was found to have increased by 96 percentage points. Note the result for 12 months has quite wide confidence intervals around them, indicating that the sample size may need to be increased to validate this result.

In general, there is some evidence to indicate that the reduction in the weekly rate for jobseekers increased was associated with an increased probability of being in employment where the jobseekers had a high level of earnings in the previous year.

Table 5: Estimated Treatment Results for Employment vs On LR, 23yr olds vs. 25yr olds

		Estimate	SE	95% Confidence Intervals	
23 Yr Olds (without covariates)	**6 Months**	0.122	(0.085)	-0.044	0.288
	12 Months	0.226**	(0.094)	0.042	0.410
23 Yr Olds (with covariates)	**6 Months**	0.172*	(0.091)	-0.006	0.350
	12 Months	0.273***	(0.100)	0.076	0.470
High Earnings	**6 Months**	0.496***	(0.003)	0.490	0.502
	12 Months	0.957***	(0.282)	0.405	1.509
Low Earnings	**6 Months**	0.039	(0.120)	-0.196	0.273
	12 Months	0.044	(0.137)	-0.224	0.313
No Earnings	**6 Months**	0.286	(0.249)	-0.201	0.774
	12 Months	0.351	(0.219)	-0.079	0.781

Note:*p<0.1; **p<0.05; ***p<0.01

Table 6 presents the results of full model in terms of the probability of exiting into Activation, Training or Education at 6 and 12 months post entry on the Live Register relative to being still on the Live Register between 23 year olds and 25 year olds.

The first row of coefficients shows the results without co-variates for 23 year olds versus 25 year olds. There is a decrease in the probability of 23 year olds being in activation, training or education compared to remaining on the Live Register relative to 25 year olds, at both six and twelve months, 54 and 29 percentage points respectively. In other words, the probability of 23 year olds being in activation or training declined relative to 25 year olds. This trend is also found for the model with co-variates.

Regarding the results for the earnings groups, there are statistically significant effects found for the high earnings and no earnings groups. In the high earnings group, the probability of 23 year olds entering an activation/ education scheme compared to staying on the Live Register declined relative to 25 year olds by 65 percentage points. Although at 12 months no statistically significant effect was found. Amongst the no earnings group, the relative decline between 23 and 25 year olds was higher; at 6 months it was 131 percentage points and at 12 months it was 60 percentage points. However, the results for the no earnings group must be interpreted in the context of very wide confidence intervals.

In general, the results by earnings group are consistent with the overall impact; however, the impact was greater for jobseekers without any previous earnings than it was for the high earnings group, although the results for the low earnings group were associated with much wider confidence intervals. No effects were found for the low earnings group.

Table 6: Estimated Treatment Results for Activation vs On LR, 23yr olds vs. 25yr olds

		Estimate	SE	95% Confidence Intervals	
23 Yr Olds (without covariates)	**6 Months**	-0.536***	(0.204)	-0.936	-0.135
	12 Months	-0.294*	(0.171)	-0.629	0.041
23 Yr Olds (with covariates)	**6 Months**	-0.589***	(0.209)	-0.999	-0.179
	12 Months	-0.349**	(0.174)	-0.689	-0.008
High Earnings	**6 Months**	-0.654***	(0.015)	-0.683	-0.62
	12 Months	-0.103	(0.592)	-1.264	1.059
Low Earnings	**6 Months**	-0.161	(0.281)	-0.711	0.388
	12 Months	-0.204	(0.242)	-0.679	0.271
No Earnings	**6 Months**	-1.31***	(0.405)	-2.105	-0.517
	12 Months	-0.599**	(0.295)	-1.177	-0.021

Note:*p<0.1; **p<0.05; ***p<0.01

Sensitivity Tests

To validate these results, the study also tested the 23 year olds against 26 year olds. Jobseekers aged 26 years old were subject to the same rate regime as 25 year olds. Given their relative closeness in age, they provide an adequate alternative control group in terms of their labour market behaviour. The same DD design was used to analyse the change in the difference in relative exit behaviours associated with the introduction of the reduced rate in 2010.

The results were consistent with the results detailed above (See Appendix B for a detailed breakdown of the sensitivity testing results). Under the two primary regression models, with and without co-variates, 23 year olds were found to experience a reduced probability of being in activation or education relative to 26 year olds. Similarly, 23 year olds were found to increase their probability of being in employment exit category relative to 26 year olds.

When analysed by earnings group, 23 year olds with high earnings were found to have the largest improvements in the probability of being in employment exit category compared to the other earnings groups. One notable difference concerned the probability of being activation or education. While the pattern of results was consistent with the primary model, only the results for no earnings group were found to be statistically significant.

Summary of Results

Regarding the theoretical propositions the test results can be summarised as follows:

- ***The treatment effect of the rate change on exits to both employment and education will be positive*.**

The test explored the relationship between labour market behaviour and financial incentives in terms of the outcome types. The policy rationale sought to encourage the young unemployed to engage in education, training, or work experience to further up-skill and wait out the recession until employment opportunities increased once again. This rationale assumed that when faced with a financial dis-incentive, jobseekers will seek to optimise their welfare and chose either to exit into employment or invest in up-skilling rather than remain unemployed in receipt of reduced financial support.

The findings of the descriptive analysis indicate that there was a reduction in the proportion of 23 year olds in activation, training or education relative to 25 year olds. This is confirmed by the results of inferential analysis which showed a relative decline in the probability of 23 year olds compared to 25 year olds being an activation, training or education scheme. However, the evidence also shows a marked improvement in employment exits of

23 year olds over 25 year olds. Therefore, while the rate reduction does not seem to have conformed to the stated policy rationale, the results are consistent with the expectations derived from the orthodox rational choice model.

- ***The treatment effect of the rate change on exits to both employment and activation will be more positive for those without previous earnings than for those with positive previous earnings*.**

To address this proposition, the inferential tests also examined the change in the difference in outcome probabilities between 23 and 25 year olds across three earnings categories. For the endowment effect to hold, those with any previous earnings should not respond to the reduction in the current income, i.e. the JA rate, because their previous earnings would anchor their reservation wage. Whereas those without previous earnings should be more responsive as far as their current income should be the reference point for the reservation wage. This should translate into a higher probability of exit for the no earnings group compared to the high earnings group.

Regarding exits into activation or education, the results indicate that both the high earnings and no earnings group responded to the rate reduction. However, the effect was negative rather than positive which was consistent with the overall effect described in the first proposition. Regarding the relative responses of each group, the 23 year olds in the no earnings group experienced the greatest reduction in probability of being in activation or education relative to the 25 year olds albeit this result was associated with wide confidence intervals. The question of the relative performance of each earnings group regarding exiting into activation or education programmes is therefore ambiguous. However, the negative results for both would nevertheless indicate that second proposition fails in the case of activation and education. No statistically significant effects were found for the no earnings group regarding employment exits.

These results indicate that the presence of earnings in and of themselves was not sufficient for there to be an endowment effect due to the responses found for the high earnings group. The results also provide some evidence to suggest that those with previous earnings are more responsive to negative financial incentives such as a rate reduction.

- ***The treatment effect of the rate change on exits to both employment and education will be more positive for those with high previous earnings than for those with low previous earnings.***

This test sought to explore the role of loss aversion. The existence of loss aversion implies that those with previous earnings would be more sensitive to the rate reductions because people respond more to losses than gains. Furthermore, the more people must lose, the more responsive they are likely to be. To test this, the study divided those with earnings into a high and low group. The test compared the relative responses between the low and high earnings groups across each of the outcome categories. For the proposition to hold the higher earnings group should have a higher probability of exiting the Live Register compared to the low earnings group.

There were no statistically significant results found for the low earners group for any of the outcome categories regarding activation or education. There was a negative effect found for the high earnings group in respect of exits to activation or education. This was consistent with the overall results insofar as 23 year olds were in general less likely than 25 year olds to enter activation or education. On the other hand, the 23 year olds in the high earnings group experienced improved probabilities regarding employment compared to their 25 year old counterparts. Therefore, the results support the third proposition as far as the high earnings group responded but the low earnings group didn't, indicating higher previous earnings are associated with greater sensitivity to loss.

6. CONCLUSIONS

Interpretation and Caveats

Before going into a detailed discussion of the findings, it is important to note some caveats in respect of the results. Firstly, regarding the results for activation or education schemes, it is important to acknowledge the relative under-development of the PES in the period in question. As discussed earlier Ireland had been slow to adopt activist labour policies prior to the crisis. This was further compounded by a general diminishment of the attractiveness of training and education through the elimination or reduction of financial supports and allowances as part of the ongoing fiscal retrenchment underway at the time[9] (Dept. Finance, 2010).

[9] In the 2010 Budget, there were reductions in the rates of student support grants and the allowances for Youthreach and VTOS. Furthermore, recipients of BTEA and certain VTOS were no longer eligible for student support grants. For details see: http://www.budget.gov.ie/Budgets/2010/Summary.aspx

Second, the timing of these changes is also relevant to the interpretation. The period 2008 to 2013 was a particularly difficult time in the labour market, especially for new entrants into the workforce. Limited employment options, a PES unprepared for the scale of the unemployment problem and severely constrained public finances would have negatively affected the likelihood of exiting unemployment. Indeed, related to the timing was the location of social welfare offices. In the case of activation, there would also have been variation in the quantity and type of programme available at local level at the time. While the study controls for this variation at a county level, the number, capacity and geographic coverage of social welfare offices within counties can also vary. In some offices, such as Finglas for example, the catchment area would have included both urban and rural areas and a mix of affluent and disadvantaged communities. However, due to data confidentiality and reliability, controlling for individual office level characteristics was not possible for this study.

Third, as shown in the descriptive analysis, the 25 year old group tended to have better outcomes in terms of activation and education in general compared to the 23 year old group. One way to interpret this is that, all things being equal, 25 year olds are likely to have had more experience of the labour market than 23 year olds as a function of their age and therefore should make more effective labour market choices than 23 year olds. It is important to recognise the association between earnings, occupations and employability when interpreting these results. While the model does control for the skills and employment background of the jobseekers, one would expect those with more technically demanding occupations to invest more in education and training to maintain their employability.

A related point concerns education levels. The absence of viable education data presents an omitted variable bias. However, high earnings can be used as a proxy for skill levels, insofar as graduates are more likely to have higher paying jobs than non-graduates. In the context of a recessionary labour market, high earners can take lower paid jobs but low earners cannot take high paid jobs. This is interesting, as the results suggest high earners were the most likely to enter employment and least likely to enter activation or training. If earnings can be a proxy for skills/education level, then higher skilled jobseekers found it easier to get employment, while lower skilled jobseekers were relatively more likely to choose activation to training, notwithstanding the overall decline in probability of entry into activation or training.

Fourth, while the employment outcomes and entry into activation or education schemes are relatively easy to understand, the other exit category requires further explanation. As discussed earlier, the other category accounts for people who left the Live Register but were not recorded in the DSP's administrative systems as being in employment or participating in one of the DSP's activation or education programmes. It can include several outcomes, such as entry to full-time education, emigration, inactivity, transferred to another non-Live Register welfare support payment as well as administrative adjustments and lags in reporting. Analysis of CSO education and emigration data indicates that young people were either choosing to delay entry into the labour market altogether; remain on in full-time education; or emigrate.

Findings

In respect of the first proposition, the results of the tests indicate that, while the rate reduction did not improve the probability of entering into an activation or education scheme, it did motivate 23 year olds to exit the Live Register and to enter employment. These results do give credence to the orthodox behavioural assumptions underpinning the policy rationale even if the response was not as predicted. As discussed earlier, the supply of activation or education services as well as relative inexperience regarding the labour market may have been contributing factors also.

In the case of the second proposition, the only statistically significant effects were for the high earnings and the no earnings groups regarding activation or education exits. However, the direction of the effect did not correspond with the predicted effect. Furthermore, the high earnings group was also the most responsive in the case of employment. These results contradict the predicted effects, indicated that the presence of earnings alone is not sufficient for there to be an effect and that the presence of previous earnings may in fact increase responsiveness to negative financial incentives. This indicates that loss aversion is most influential in combination with endowment effect, i.e. the experience of having income.

In the case of the third proposition, the results support the behavioural proposition. The high earnings group responded but the low earnings group did not, indicating higher previous earnings are associated with greater sensitivity to loss. However, in the case of activation or education, the effect was negative.

There are several ways of interpreting the failure of the rate reduction to motivate 23 year olds with low earnings to exit the Live Register. A starting point is to examine it regarding the earnings levels. First, those with higher

previous earnings were on average better off in income terms and therefore were probably more capable of insulating themselves from the reduction in the JA rate. However, given that the JA payment is means-tested, this is unlikely.

An alternative explanation may be that the experience of limited financial means may have conditioned jobseekers with modest wealth to be more risk averse relative to jobseekers with experience of greater material wealth. Those with less material resources available to them may have found it more difficult to exploit the range of activation or education opportunities available.

The most straightforward explanation in the case of high earners may be that comparatively, high earners were more employable and therefore did not need to participate in activation. Indeed, if high earnings are a proxy for higher skills, then exiting into employment was more likely. The issue of labour market experience may also have been a factor to consider regarding the no earnings group. These jobseekers are likely to have relatively less experience of the labour market. The relative employability of this group compared to the other two is likely to have been lower and contributed to a greater level of inertia.

Furthermore, the marginal cost of exiting the Live Register may also be relevant to the results. All things being equal a reduction in income will result in an increase in relative costs. In the case of the low earnings and no earnings groups, the reduction in the JA rate, in the absence of any anchoring effects associated with previous earnings, would dis-incentivise efforts to leave the Live Register as the marginal cost of those efforts increased. This may also point to a link between lower socio-economic status and persistent unemployment, which would resonate with the wider literature.

Table 7: Summary of Test Results

Theory	Proposition	Effect Y/N
Rational Choice	**1. Optimisation:** The probability of exit of the treated will increase relative to the control	Y
Prospect Theory	**2. Endowment Effect:** The probability of exit of the treated without earnings will increase relative to the treated with earnings	N
	3. Loss Aversion: The probability of exit of the treated with higher earnings will increase relative to the treated with low or no earnings	Y

Conclusions: Rationality, Heuristics and Policy

In summary, the results of the study reveal a more nuanced picture regarding how we think about financial incentives. In the first instance, the results showed that the change in their JA rate did not have a very significant impact on jobseeker's choices overall. As shown in the descriptive analysis, the change in outcomes was broadly consistent across both age groups. This raises doubts about how appropriate the use of age-based rate reductions was as a policy lever, at least in respect of 23 year olds. Secondly, the inferential analysis found a nuanced picture in terms of how previous earnings influenced behaviour. While it was evident that previous earnings did act as a reference point for jobseekers, the magnitude and direction of the effect did not correspond to the predictions provided by endowment theory or loss aversion.

The association between low or no income and labour market behaviour may go some way to validating Gigerenzer's 'bounded rationality' model (Gigerenzer and Goldstein, 1996). Rather than subscribing to the highly rational version of humanity, as suggested by the orthodox model, or to the model of the individual as a prisoner of their experience and cognitive limitations, a more nuanced version of economic behaviour is required that recognises that the individual can be rational but that context and experience matter (Simon, 1982).

Moreover, these results do show the dangers of over-reliance on deductive reasoning in policymaking. Generalising from a set of assumptions, such as the 'axioms of rationality', encourages a 'one-size-fits' all approach to policy making. This increases the risk of unintended consequences as different contextual situations distort how policy is interpreted and implemented.

In addition to what the results suggest in terms of how policymakers think about human behaviour, this analysis has also raised some implications for the use of financial incentives in the context of assistance type payments. As discussed earlier, Ireland is somewhat of an outlier insofar as the primary unemployment support programme is JA, an unemployment assistance scheme, instead of a social insurance-based scheme that is more common in developed countries. Under such arrangements, the indefinite nature of its eligibility may encourage inertia and counteract the incentive effects of the rate reduction. Furthermore, given there was some association between the level of previous earnings and labour market behaviour identified in this study, it may be more productive to consider shifting to a more social insurance-based system.

The final point concerns the context of the policy change itself. Occurring during a period of major financial retrenchment in the public services, the choice of age as the vector of the rate reduction was a reactive decision. The broader literature, even at the time, had shown that the use of financial incentives is most effective when coupled with monitoring and appropriate ALMPs and applied in a targeted way, focused on those most at risk of long-term unemployment and welfare dependency (OECD, 1994). In this case, the rate reduction was introduced at the same time as employment opportunities were limited, education funding was also being reduced and in the absence of a targeted and more intensive job-search assistance service. Under these circumstances, justifying the rate reduction of the basis of encouraging investment into up-skilling and improving employability through activation or education programmes was questionable at best.

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APPENDIX A: MODEL RESULTS

Table A.1.1: Primary 6 Months Model Without Co-variates

		Activation/Education			Employment			Other		
Parameter		**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**
Intercept		-2.3609	0.0749	<.0001	-0.6783	0.0379	<.0001	-0.8505	0.0402	<.0001
age_start	23	-0.3619	0.1097	0.001	-0.0401	0.0514	0.4351	0.0404	0.0539	0.4534
Yr	2010	0.4829	0.1026	<.0001	0.4859	0.0536	<.0001	0.3053	0.0582	<.0001
age_start*Yr	23*2010	-0.5355	0.2041	0.0087	0.1223	0.0846	0.148	0.1399	0.0906	0.1227

Table A.1.2: Primary 6 Months Model Fit Statistics

Criterion	**Intercept**	**Intercept + Covariates**
AIC	35543.012	35308.978
SC	35565.860	35400.371
-2 Log L	35537.012	35284.978
R-Square		0.017
Max-rescaled R-Square		0.018

Table A.1.3: Primary 6 Months Model With Co-variates

		Activation/Education			Employment			Other		
Parameter		Co-ef	SE	P-value	Co-ef	SE	P-value	Co-ef	SE	P-value
Intercept		-1.8567	0.3876	<.0001	-0.9737	0.1894	<.0001	-1.1135	0.1992	<.0001
age_start	23	-0.4099	0.1141	0.0003	-0.0955	0.0553	0.0843	0.00467	0.0553	0.9327
Yr	2010	0.398	0.1076	0.0002	0.5835	0.0581	<.0001	0.3395	0.0597	<.0001
age_start*Yr	23*2010	-0.5891	0.2092	0.0049	0.1721	0.0908	0.0581	0.1421	0.0926	0.1249
Gender	M	-0.3219	0.0934	0.0006	-0.6676	0.0448	<.0001	-0.2575	0.0471	<.0001
Relat_stat	Couple	0.0377	0.1212	0.7556	0.381	0.0558	<.0001	0.0696	0.0609	0.253
National	Irish	-0.1875	0.1786	0.2938	-0.1922	0.0957	0.0446	0.0941	0.102	0.3562
county	Carlow	0.3292	0.4301	0.444	-0.0718	0.2128	0.7359	-0.0085	0.2245	0.9697
county	Cavan	-1.327	0.7753	0.087	-0.224	0.2166	0.3011	-0.2298	0.2344	0.3269
county	Clare	-0.2267	0.471	0.6302	-0.0761	0.1903	0.6892	0.3204	0.192	0.0952
county	Cork	0.526	0.3178	0.0979	0.3398	0.1429	0.0174	0.2871	0.1532	0.061
county	Donegal	1.0112	0.3286	0.0021	0.365	0.1585	0.0213	0.4755	0.1667	0.0043
county	Dublin	0.0696	0.307	0.8207	-0.2398	0.1359	0.0777	0.1378	0.1445	0.3403
county	Galway	0.3938	0.3325	0.2363	-0.011	0.1521	0.9425	0.1683	0.1614	0.2971
county	Kerry	0.5768	0.3526	0.1018	0.3171	0.1656	0.0555	0.3723	0.1753	0.0337
county	Kildare	0.2305	0.3694	0.5326	-0.0275	0.1721	0.873	0.1183	0.1807	0.5128
county	Kilkenny	-0.0349	0.4756	0.9415	0.1286	0.2093	0.5389	0.2193	0.2167	0.3115
county	Laois	0.1346	0.4817	0.7799	-0.5836	0.2528	0.021	-0.3061	0.2564	0.2326
county	Leitrim	-0.9279	0.7816	0.2352	-0.0166	0.2546	0.9481	0.0834	0.2639	0.7521
county	Limerick	0.1413	0.3597	0.6944	-0.0401	0.1632	0.806	0.2609	0.1684	0.1213
county	Longford	0.3729	0.4881	0.4448	-0.0012	0.2406	0.9961	-0.0423	0.2587	0.8701
county	Louth	0.1309	0.3713	0.7244	-0.1111	0.1761	0.5281	0.1417	0.1804	0.4322
county	Mayo	0.6705	0.3579	0.061	0.3209	0.1673	0.0551	0.2307	0.1808	0.2019
county	Meath	-0.2957	0.4758	0.5342	-0.1079	0.2002	0.5898	-0.3624	0.2244	0.1064
county	Monaghan	-0.59	0.5482	0.2818	0.1063	0.1999	0.595	-0.0032	0.2166	0.9882
county	Offaly	0.5828	0.4232	0.1685	0.0934	0.2178	0.6682	0.1543	0.2255	0.4937
county	Roscommon	-0.0383	0.6016	0.9492	0.3062	0.2532	0.2266	0.2046	0.2687	0.4463
county	Sligo	-1.5409	0.7778	0.0476	-0.0562	0.2094	0.7883	0.1848	0.2149	0.3899
county	Tipperary	0.5983	0.3706	0.1064	0.3502	0.1706	0.0401	0.4437	0.1798	0.0136
county	Waterford	0.6582	0.3583	0.0662	-0.0647	0.1817	0.7218	-0.1163	0.1949	0.5507
county	Westmeath	-0.4713	0.4914	0.3375	-0.2311	0.2025	0.2538	-0.0318	0.2098	0.8797
county	Wexford	0.1738	0.4043	0.6673	0.1411	0.1839	0.4427	0.0675	0.1992	0.7346
occup_type	Non-Prof.	0.1331	0.1028	0.1955	-0.6738	0.0463	<.0001	-0.4575	0.048	<.0001
occup_type	None	0.0605	0.209	0.7723	-0.9677	0.1365	<.0001	-0.3193	0.1108	0.0039
Empl_Hist	1	-0.3759	0.1479	0.011	0.9336	0.0822	<.0001	-0.0407	0.0787	0.6049
Empl_Hist	1 to 5	-0.4014	0.1038	0.0001	1.2679	0.0639	<.0001	0.234	0.0553	<.0001
Empl_Hist	5 to 10	-0.4751	0.1382	0.0006	1.4806	0.0707	<.0001	0.4562	0.0641	<.0001
Empl_Hist	> 10	-0.661	0.2774	0.0172	2.2333	0.0954	<.0001	1.0386	0.0954	<.0001
LR_Dur	1-2 yrs	0.7729	0.3444	0.0248	-0.4944	0.2534	0.051	-0.515	0.2784	0.0643
LR_Dur	2-5 yrs	0.8901	0.2826	0.0016	-0.4899	0.2521	0.052	-0.6919	0.2891	0.0167
LR_Dur	< 12 mths	-0.4887	0.4211	0.2458	0.0731	0.1642	0.6563	0.2389	0.1678	0.1546
LR_Dur	> 5 yrs	0.7667	0.4377	0.0798	-0.7722	0.383	0.0438	-0.6328	0.4086	0.1215

Month	Apr	-0.44	0.2293	0.055	0.1385	0.1132	0.2211	0.3702	0.114	0.0012
Month	Aug	-0.5015	0.2177	0.0213	0.1387	0.1054	0.188	0.3439	0.1079	0.0014
Month	Dec	-1.6144	0.363	<.0001	0.36	0.1109	0.0012	0.4089	0.1158	0.0004
Month	Feb	-1.1169	0.2645	<.0001	-0.1327	0.1115	0.2337	-0.0186	0.1155	0.8718
Month	Jan	-3.0233	0.5187	<.0001	-0.1208	0.1023	0.2374	-0.1428	0.1099	0.194
Month	Jul	-0.55	0.2175	0.0114	0.2347	0.1013	0.0205	0.4993	0.1034	<.0001
Month	Jun	0.4774	0.159	0.0027	0.3162	0.0915	0.0005	0.48	0.0952	<.0001
Month	Mar	-0.4414	0.2222	0.047	0.1309	0.1079	0.2249	0.17	0.1137	0.1348
Month	May	0.9767	0.1533	<.0001	0.1727	0.0974	0.0761	0.415	0.0999	<.0001
Month	Nov	-1.5086	0.3216	<.0001	0.1751	0.1087	0.1073	0.2416	0.1135	0.0333
Month	Oct	-1.4629	0.2935	<.0001	0.1345	0.1034	0.1932	0.1097	0.1102	0.3195

Table A.1.4: Primary 6 Months Model With Co-variates
Model Fit Statistics

Criterion	Intercept	Intercept + Covariates
AIC	35543.01	32710.15
SC	35565.86	33921.11
-2 Log L	35537.012	32392.15
R-Square		0.1891
Max-rescaled R-Square		0.2086

Table A.1.5: Primary 6 Months Model With Co-variates
Summary of Stepwise Selection

Step	Effect	DF	Number In	Score Chi-sq	P-value
1	Empl_Hist	12	4	1235.469	<.0001
2	Month	33	5	603.5406	<.0001
3	Gender	3	6	370.9017	<.0001
4	occup_type	6	7	266.6129	<.0001
5	county	75	8	223.6682	<.0001
6	Relat_stat	3	9	51.3537	<.0001
7	LR_Dur	12	10	67.534	<.0001
8	National	3	11	7.8449	0.0493

Table A.1.6: High Earnings Group 6 Months Model

		Activation/Education			Employment			Other		
Parameter		**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**
Intercept		-3.9529	0.00311	<.0001	0.4845	0.0009	<.0001	-0.4572	0.000976	<.0001
age_start	23	-0.2534	0.0058	<.0001	-0.2004	0.00147	<.0001	0.135	0.00153	<.0001
Yr	2010	0.8738	0.00471	<.0001	0.4351	0.00153	<.0001	0.4367	0.00169	<.0001
age_start*Yr	23*2010	-0.6537	0.0149	<.0001	0.4962	0.00317	<.0001	0.1255	0.0035	<.0001
Gender	M	-0.2056	0.00365	<.0001	-0.6144	0.00111	<.0001	-0.2168	0.00118	<.0001
Relat_stat	Couple	0.0336	0.00747	<.0001	0.3774	0.00192	<.0001	0.0849	0.00223	<.0001
National	Irish	-0.7264	0.00321	<.0001	-0.575	0.00093	<.0001	-0.3564	0.00101	<.0001
county	Carlow	0.4669	0.024	<.0001	-0.2495	0.00712	<.0001	-0.1818	0.00823	<.0001
county	Cavan	1.0141	0.017	<.0001	-0.1874	0.00664	<.0001	-1.0074	0.0104	<.0001
county	Clare	0.2723	0.0239	<.0001	-0.0293	0.0057	<.0001	0.3531	0.00599	<.0001
county	Cork	0.4072	0.0102	<.0001	0.1865	0.00248	<.0001	0.1628	0.00286	<.0001
county	Donegal	1.1112	0.0141	<.0001	0.0653	0.00459	<.0001	0.2883	0.00501	<.0001
county	Dublin	0.5785	0.00565	<.0001	-0.3326	0.00174	<.0001	0.249	0.00174	<.0001
county	Galway	0.7587	0.0118	<.0001	-0.0857	0.00362	<.0001	0.0548	0.00406	<.0001
county	Kerry	0.4784	0.0187	<.0001	0.3699	0.00457	<.0001	0.3743	0.00519	<.0001
county	Kildare	0.6761	0.0149	<.0001	-0.1995	0.00481	<.0001	0.000843	0.00526	0.8727
county	Kilkenny	-0.6804	0.0618	<.0001	0.2601	0.00788	<.0001	0.9601	0.00753	<.0001
county	Laois	0.4293	0.0239	<.0001	-0.838	0.00897	<.0001	-0.6191	0.0102	<.0001
county	Leitrim	-1.3254	0.0807	<.0001	-0.5726	0.01	<.0001	0.2455	0.0094	<.0001
county	Limerick	0.7807	0.0125	<.0001	-0.1961	0.00433	<.0001	-0.1346	0.00494	<.0001
county	Longford	-1.0869	0.0774	<.0001	0.0794	0.00875	<.0001	-0.0439	0.0104	<.0001
county	Louth	0.5309	0.017	<.0001	-0.1939	0.00507	<.0001	0.2318	0.00524	<.0001
county	Mayo	0.992	0.014	<.0001	0.3988	0.00428	<.0001	0.2386	0.00504	<.0001
county	Meath	0.0717	0.0238	0.0026	-0.5719	0.00679	<.0001	-0.1986	0.00714	<.0001
county	Monaghan	0.4036	0.024	<.0001	-0.1432	0.00621	<.0001	-0.2171	0.00755	<.0001
county	Offaly	-1.2981	0.0557	<.0001	-0.0434	0.0064	<.0001	-0.1133	0.00761	<.0001
county	Roscommon	1.2746	0.0244	<.0001	0.1956	0.00906	<.0001	-0.5263	0.0131	<.0001
county	Sligo	-1.13	0.0689	<.0001	0.0081	0.00826	0.3269	0.3945	0.00875	<.0001
county	Tipperary	1.0072	0.0149	<.0001	0.3786	0.0043	<.0001	0.5164	0.00463	<.0001
county	Waterford	0.8184	0.0173	<.0001	-0.2539	0.00604	<.0001	-0.4645	0.00767	<.0001
county	Westmeath	0.3583	0.0241	<.0001	-0.5874	0.00708	<.0001	-0.3703	0.00799	<.0001
county	Wexford	0.3794	0.0239	<.0001	0.2423	0.00558	<.0001	0.527	0.00596	<.0001
occup_type	Non-Prof.	-0.3017	0.00404	<.0001	-0.9141	0.00126	<.0001	-0.8166	0.00137	<.0001
occup_type	None	-0.6344	0.024	<.0001	-1.0684	0.00795	<.0001	-0.5855	0.00768	<.0001
Empl_Hist	1	1.763	0.00838	<.0001	0.2156	0.00269	<.0001	-0.1749	0.00288	<.0001
Empl_Hist	1 to 5	1.8981	0.00437	<.0001	0.5842	0.00129	<.0001	0.1248	0.0014	<.0001
Empl_Hist	5 to 10	2.1157	0.00549	<.0001	0.6976	0.0017	<.0001	0.1698	0.00188	<.0001
Empl_Hist	> 10	1.5184	0.0161	<.0001	1.7818	0.00255	<.0001	1.0173	0.00283	<.0001
Month	Apr	-1.6639	0.0181	<.0001	0.1056	0.00345	<.0001	0.5996	0.00351	<.0001
Month	Aug	-0.7781	0.0111	<.0001	0.1902	0.00324	<.0001	0.5102	0.00346	<.0001
Month	Dec	-1.38	0.0167	<.0001	0.4391	0.00331	<.0001	0.9147	0.00338	<.0001
Month	Feb	-0.7499	0.0114	<.0001	-0.0207	0.00341	<.0001	0.0939	0.00389	<.0001

Month	Jan	-1.5112	0.0139	<.0001	0.0605	0.00292	<.0001	0.2923	0.00322	<.0001
Month	Jul	-0.9104	0.0123	<.0001	0.3886	0.00283	<.0001	0.7407	0.00297	<.0001
Month	Jun	-0.4685	0.00805	<.0001	0.2972	0.0024	<.0001	0.4994	0.00266	<.0001
Month	Mar	-0.6075	0.0108	<.0001	0.2836	0.00323	<.0001	0.4055	0.00363	<.0001
Month	May	-0.0892	0.00779	<.0001	0.1938	0.00298	<.0001	0.4731	0.00328	<.0001
Month	Nov	-1.2483	0.0148	<.0001	0.1301	0.00348	<.0001	0.2337	0.00395	<.0001
Month	Oct	-0.8026	0.0119	<.0001	0.2521	0.00324	<.0001	0.5043	0.00348	<.0001
LR_Dur	1-2 yrs	-1.5656	0.0744	<.0001	-1.224	0.0169	<.0001	-0.3521	0.0141	<.0001
LR_Dur	2-5 yrs	-2.413	0.1013	<.0001	0.468	0.0123	<.0001	0.217	0.0141	<.0001
LR_Dur	< 12 mths	-2.0663	0.0506	<.0001	-0.2539	0.00615	<.0001	0.00269	0.00659	0.6828
LR_Dur	> 5 yrs	-11.2823	6.6432	0.0894	-3.4668	0.0423	<.0001	-18.6868	104.6	0.8582

Table A.1.7: High Earnings Group 6 Months Model Fit Statistics

Criterion	Intercept	Intercept + Covariates
AIC	8174.397	7883.445
SC	8192.929	8865.67
-2 Log L	8168.397	7565.445
R-Square		0.1558
Max-rescaled R-Square		0.1733

Table A.1.8: High Earnings Group 6 Months Model Summary of Stepwise Selection

Step	Effect	DF	Number In	Score Chi-sq	P-value
1	occup_type	6	4	205.7374	<.0001
2	Empl_Hist	12	5	116.4005	<.0001
3	Gender	3	6	45.6622	<.0001
4	Relat_stat	3	7	16.3788	0.0009
5	LR_Dur	12	8	24.8601	0.0155
6	National	3	9	591152.6	<.0001
7	Month	33	10	576510.2	<.0001
8	county	75	11	70737.11	<.0001

Table A.1.9: Low Earnings Group 6 Months Model

		Activation/Education			Employment			Other		
Parameter		**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**
Intercept		-1.7248	0.5737	0.0026	-1.202	0.3162	0.0001	-0.7403	0.2894	0.0105
age_start	23	-0.4446	0.1746	0.0109	0.0246	0.0744	0.741	0.0608	0.0812	0.4539
Yr	2010	0.4699	0.1676	0.0051	0.5484	0.0805	<.0001	0.3949	0.0891	<.0001
age_start*Yr	23*2010	-0.1614	0.2805	0.5651	0.0387	0.1197	0.7464	0.13	0.1306	0.3197
Gender	M	-0.3406	0.1322	0.01	-0.7166	0.0577	<.0001	-0.2866	0.0639	<.0001
Relat_stat	Couple	-0.1809	0.1863	0.3316	0.36	0.0744	<.0001	0.1033	0.0856	0.2277
county	Carlow	0.3275	0.6816	0.6309	0.2591	0.2868	0.3662	0.2557	0.3178	0.4211
county	Cavan	-11.679	174.3	0.9466	-0.2972	0.3033	0.3272	-0.0187	0.3228	0.9537
county	Clare	-0.3049	0.6725	0.6503	-0.1138	0.2553	0.6558	0.2516	0.2701	0.3516
county	Cork	0.3444	0.4712	0.4648	0.4151	0.1926	0.0312	0.2247	0.218	0.3028
county	Donegal	1.186	0.4731	0.0122	0.3537	0.2115	0.0944	0.2725	0.2385	0.2533
county	Dublin	0.00724	0.4488	0.9871	-0.1762	0.1832	0.3361	0.0404	0.2053	0.8439
county	Galway	0.3134	0.4814	0.515	-0.047	0.2023	0.8164	0.0724	0.2259	0.7487
county	Kerry	0.7446	0.5018	0.1379	0.327	0.2208	0.1387	0.2467	0.2478	0.3195
county	Kildare	0.1878	0.5546	0.735	0.1012	0.2307	0.6608	0.1661	0.2558	0.5162
county	Kilkenny	0.3227	0.6405	0.6144	0.1842	0.2734	0.5004	-0.1105	0.3206	0.7304
county	Laois	-0.0781	0.7519	0.9172	-0.5198	0.3416	0.1281	-0.5109	0.3867	0.1865
county	Leitrim	0.0492	0.8574	0.9542	0.1822	0.3422	0.5944	0.0213	0.3952	0.957
county	Limerick	-0.7126	0.6015	0.2361	0.00574	0.2166	0.9789	0.2257	0.2368	0.3404
county	Longford	0.8389	0.6305	0.1834	-0.0516	0.321	0.8723	-0.2828	0.3824	0.4595
county	Louth	0.1195	0.5594	0.8308	-0.0741	0.2406	0.7582	0.1287	0.2605	0.6213
county	Mayo	0.3084	0.5442	0.5708	0.2229	0.2249	0.3216	0.0614	0.2568	0.8109
county	Meath	-0.2447	0.7384	0.7403	0.1359	0.2728	0.6184	-0.3831	0.3366	0.2551
county	Monaghan	-0.6205	0.8411	0.4607	-0.0817	0.2819	0.7719	-0.0725	0.3127	0.8166
county	Offaly	1.1481	0.5735	0.0453	-0.1991	0.3229	0.5376	-0.2279	0.3547	0.5205
county	Roscommon	-0.5147	1.1138	0.644	0.2394	0.3613	0.5076	0.2977	0.3971	0.4535
county	Sligo	-1.4893	1.1044	0.1775	0.0344	0.2722	0.8994	0.1832	0.299	0.5401
county	Tipperary	0.6748	0.5249	0.1985	0.3327	0.2309	0.1497	0.296	0.2578	0.2509
county	Waterford	0.4649	0.5472	0.3955	0.0868	0.2386	0.7158	-0.1428	0.2753	0.6041
county	Westmeath	-1.7133	1.1003	0.1194	-0.194	0.2663	0.4662	-0.1175	0.2956	0.6911
county	Wexford	0.2838	0.5711	0.6192	0.1472	0.2423	0.5435	-0.1484	0.284	0.6014
occup_type	Non-Prof.	0.1236	0.1474	0.4017	-0.4908	0.0607	<.0001	-0.237	0.0674	0.0004
occup_type	None	0.4588	0.3099	0.1387	-0.7103	0.1827	0.0001	-0.3245	0.184	0.0778
Empl_Hist	1	-0.1675	0.3305	0.6124	0.8086	0.2463	0.001	-0.3271	0.1844	0.0761
Empl_Hist	1 to 5	-0.1591	0.3091	0.6066	1.0974	0.2387	<.0001	-0.084	0.1719	0.625
Empl_Hist	5 to 10	-0.3236	0.3286	0.3248	1.3452	0.2415	<.0001	0.2333	0.1761	0.1854
Empl_Hist	> 10	-0.3417	0.4097	0.4042	1.9257	0.2536	<.0001	0.718	0.1954	0.0002
Month	Apr	-0.3875	0.2889	0.1798	0.1868	0.1519	0.2186	0.1222	0.1645	0.4576
Month	Aug	-0.8371	0.2931	0.0043	-0.0141	0.1402	0.9198	0.167	0.1492	0.2632
Month	Dec	-1.6858	0.4453	0.0002	0.2527	0.1461	0.0837	0.104	0.1615	0.5195
Month	Feb	-1.5485	0.3776	<.0001	-0.2412	0.1487	0.1048	-0.2351	0.1614	0.1451
Month	Jan	-3.4223	0.7276	<.0001	-0.1868	0.1332	0.1608	-0.4845	0.154	0.0017

Month	Jul	-0.5247	0.2711	0.053	0.2583	0.1336	0.0531	0.3116	0.1441	0.0306
Month	Jun	-0.1237	0.2147	0.5644	0.3689	0.1193	0.002	0.464	0.1285	0.0003
Month	Mar	-0.6726	0.2891	0.02	0.0491	0.1421	0.7297	-0.0176	0.1565	0.9103
Month	May	0.2055	0.2084	0.3239	0.208	0.1262	0.0993	0.3303	0.1352	0.0146
Month	Nov	-1.6638	0.4174	<.0001	0.1391	0.142	0.3272	0.00195	0.1584	0.9902
Month	Oct	-1.6937	0.3934	<.0001	0.1481	0.1346	0.2712	-0.0876	0.1526	0.5662
LR_Dur	1-2 yrs	0.4231	0.4926	0.3904	-0.5394	0.285	0.0584	-0.9482	0.37	0.0104
LR_Dur	2-5 yrs	1.0732	0.3688	0.0036	-0.5476	0.3167	0.0838	-1.3625	0.484	0.0049
LR_Dur	< 12 mths	-0.1088	0.5277	0.8366	0.1641	0.1867	0.3792	0.0838	0.2068	0.6853
LR_Dur	> 5 yrs	1.0253	0.6127	0.0942	-0.7123	0.476	0.1345	-1.0772	0.6362	0.0904

Table A.1.10: Low Earnings Group 6 Months Model Fit Statistics

Criterion	Intercept	Intercept + Covariates
AIC	8174.397	7825.183
SC	8192.929	8121.704
-2 Log L	8168.397	7729.183
R-Square		0.1161
Max-rescaled R-Square		0.1291

Table A.1.11: Low Earnings Group 6 Months Model Summary of Stepwise Selection

Step	Effect	DF	Number In	Score Chi-sq	P-value
1	Gender	3	4	254.3055	<.0001
2	Empl_Hist	12	5	203.5486	<.0001
3	Month	33	6	217.1509	<.0001
4	occup_type	6	7	81.8598	<.0001
5	county	75	8	145.9428	<.0001
6	LR_Dur	12	9	47.2421	<.0001
7	Relat_stat	3	10	28.0896	<.0001

Table A.1.12: No Earnings Group 6 Months Model

		Activation/Education			Employment			Other		
Parameter		**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**
Intercept		-2.6657	0.6544	<.0001	-1.1211	0.482	0.02	-1.3462	0.3775	0.0004
age_start	23	-0.4089	0.1761	0.0203	-0.2481	0.1965	0.2068	-0.1679	0.1093	0.1245
Yr	2010	0.2745	0.1666	0.0995	1.3438	0.1624	<.0001	0.2202	0.1109	0.0472
age_start*Yr	23*2010	-1.3113	0.405	0.0012	0.2864	0.2488	0.2496	0.2592	0.1743	0.1371
Gender	M	-0.1898	0.1551	0.2212	-0.8283	0.1218	<.0001	-0.2553	0.0959	0.0078
National	Irish	-0.7243	0.2197	0.001	-0.0965	0.231	0.676	0.1149	0.1716	0.5032
county	Carlow	0.2744	0.6397	0.668	-1.4982	0.8194	0.0675	-0.3584	0.4645	0.4404
county	Cavan	-13.157	469.3	0.9776	-0.3087	0.6552	0.6375	-0.0683	0.4693	0.8843
county	Clare	-0.2622	0.7761	0.7354	0.009	0.5288	0.9864	0.3898	0.3867	0.3135
county	Cork	0.7849	0.4891	0.1085	0.3318	0.4042	0.4118	0.493	0.3074	0.1087
county	Donegal	0.8546	0.5159	0.0976	0.7636	0.4124	0.0641	0.8799	0.3183	0.0057
county	Dublin	0.1046	0.4757	0.826	-0.2375	0.3832	0.5354	0.1482	0.2924	0.6124
county	Galway	0.3156	0.5237	0.5467	0.3203	0.4206	0.4464	0.4691	0.3256	0.1496
county	Kerry	0.2934	0.5633	0.6024	0.208	0.4531	0.6462	0.6087	0.3416	0.0748
county	Kildare	0.1633	0.569	0.7741	-0.0853	0.4848	0.8604	0.0908	0.3659	0.804
county	Kilkenny	-0.3761	0.7704	0.6254	-0.0021	0.5462	0.9969	0.2016	0.4066	0.62
county	Laois	0.2633	0.7298	0.7182	-0.4959	0.724	0.4934	0.1908	0.4667	0.6827
county	Leitrim	-13.428	482.1	0.9778	0.4117	0.6023	0.4942	-0.0226	0.5157	0.965
county	Limerick	0.742	0.5401	0.1695	-0.0581	0.4749	0.9027	0.589	0.3331	0.077
county	Longford	-0.0888	0.902	0.9216	-0.0976	0.6699	0.8841	0.3536	0.4587	0.4409
county	Louth	0.139	0.5601	0.804	-0.059	0.4565	0.8972	0.0364	0.3521	0.9176
county	Mayo	0.9538	0.551	0.0834	0.4449	0.4655	0.3392	0.5028	0.3599	0.1624
county	Meath	-0.2848	0.7153	0.6905	0.0409	0.5163	0.9369	-0.4997	0.4584	0.2757
county	Monaghan	-0.6463	0.8712	0.4582	0.9108	0.4758	0.0556	0.1999	0.4128	0.6282
county	Offaly	0.1782	0.728	0.8067	0.6842	0.5305	0.1971	0.8629	0.4076	0.0343
county	Roscommon	-0.0049	0.893	0.9957	0.4313	0.598	0.4708	0.505	0.4617	0.2741
county	Sligo	-1.5849	1.1192	0.1567	-0.0562	0.5477	0.9182	0.1685	0.4133	0.6835
county	Tipperary	0.4182	0.6233	0.5023	0.3461	0.4727	0.4641	0.6049	0.3596	0.0926
county	Waterford	0.6894	0.5424	0.2037	-0.4992	0.5466	0.3611	0.1466	0.3699	0.6919
county	Westmeath	0.1747	0.6764	0.7962	0.1248	0.5372	0.8163	0.3532	0.4013	0.3788
county	Wexford	-0.0277	0.6471	0.9658	0.199	0.5258	0.7051	0.0755	0.4078	0.8531
occup_type	Non-Prof.	0.165	0.1737	0.342	-0.7915	0.1262	<.0001	-0.5319	0.0982	<.0001
occup_type	None	-0.2816	0.3157	0.3725	-1.2877	0.2853	<.0001	-0.2467	0.1617	0.1271
Month	Apr	0.6062	0.5105	0.2351	-0.2739	0.3066	0.3716	0.5963	0.2269	0.0086
Month	Aug	0.6167	0.4918	0.2098	0.3918	0.2519	0.1198	0.6334	0.2179	0.0036
Month	Dec	-0.7687	0.8148	0.3455	0.4665	0.2882	0.1055	0.4881	0.2516	0.0524
Month	Feb	-0.1494	0.5711	0.7936	-0.1882	0.2974	0.5269	0.328	0.2324	0.1581
Month	Jan	-13.096	239.8	0.9564	-0.5384	0.3044	0.0769	0.1168	0.2322	0.6148
Month	Jul	0.1093	0.5187	0.833	-0.3132	0.273	0.2512	0.7194	0.2076	0.0005
Month	Jun	1.9985	0.4087	<.0001	-0.0459	0.2354	0.8455	0.597	0.1969	0.0024
Month	Mar	0.4587	0.5106	0.369	-0.0744	0.2897	0.7974	0.4016	0.2358	0.0885
Month	May	2.6131	0.4035	<.0001	-0.3024	0.2534	0.2327	0.5858	0.2018	0.0037
Month	Nov	-1.0536	0.8133	0.1952	0.1427	0.2838	0.615	0.7775	0.225	0.0005
Month	Oct	-0.9277	0.7012	0.1859	-0.2801	0.2733	0.3055	0.1842	0.2269	0.4167

Table A.1.13: No Earnings Group 6 Months Model Fit Statistics

Criterion	Intercept	Intercept + Covariates
AIC	8136.338	7455.914
SC	8155.004	8277.22
-2 Log L	8130.338	7191.914
R-Square		0.2229
Max-rescaled R-Square		0.2511

Table A.1.14: No Earnings Group 6 Months Model Summary of Stepwise Selection

Step	Effect	DF	Number In	Score Chi-sq	P-value
1	Month	33	4	461.3913	<.0001
2	occup_type	6	5	104.2605	<.0001
3	Gender	3	6	50.178	<.0001
4	county	75	7	116.2961	0.0016
5	National	3	8	13.2646	0.0041

Table A.2.1: Primary 12 Month Model Without Co-variates

		Activation/Education			Employment			Other		
Parameter		Co-ef	SE	P-value	Co-ef	SE	P-value	Co-ef	SE	P-value
Intercept		-1.647	0.0689	<.0001	0.0494	0.0387	0.2018	-0.0249	0.0394	0.528
age_start	23	-0.1079	0.0956	0.2591	-0.0144	0.0526	0.7844	-0.0846	0.0536	0.1107
Yr	2010	0.5746	0.0962	<.0001	0.5166	0.0574	<.0001	0.3684	0.0593	<.0001
age_start* Yr	23*2010	-0.2942	0.1709	0.0851	0.2257	0.0938	0.0161	0.2124	0.0959	0.0268

Table A.2.2: Primary 12 Month Model Fit Statistics

Criterion	Intercept	Intercept + Covariates
AIC	35543.012	35308.978
SC	35565.860	35400.371
-2 Log L	35537.012	35284.978
R-Square		0.017
Max-rescaled R-Square		0.018

Table A.2.3: Primary 12 Month Model With Co-variates

		Activation/Education			Employment			Other		
Parameter		**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**
Intercept		-0.9732	0.3412	0.0043	-0.0714	0.1989	0.7194	-0.1254	0.1972	0.5247
age_start	23	-0.1498	0.0979	0.126	-0.0747	0.0569	0.1893	0.0519	0.0546	0.3423
Yr	2010	0.5237	0.0988	<.0001	0.6262	0.0622	<.0001	0.4194	0.061	<.0001
age_start*Yr	23*2010	-0.3489	0.1737	0.0446	0.2729	0.1004	0.0066	0.2137	0.0981	0.0293
Gender	M	-0.4171	0.0827	<.0001	-0.6768	0.0496	<.0001	-0.2582	0.0499	<.0001
Relat_stat	Couple	0.0644	0.1101	0.5584	0.469	0.0624	<.0001	0.202	0.0635	0.0015
National	Irish	-0.1171	0.1611	0.4672	-0.206	0.0996	0.0386	0.0991	0.1	0.3219
county	Carlow	0.4189	0.3771	0.2666	0.0135	0.2227	0.9518	0.0377	0.2209	0.8644
county	Cavan	-0.9778	0.5768	0.0901	-0.1745	0.224	0.4362	-0.1701	0.2242	0.4481
county	Clare	0.2604	0.3709	0.4826	0.1283	0.2009	0.5229	0.3333	0.1961	0.0892
county	Cork	0.5599	0.2792	0.045	0.3529	0.1517	0.02	0.2882	0.1517	0.0574
county	Donegal	0.7808	0.294	0.0079	0.3414	0.1678	0.0419	0.3225	0.1669	0.0533
county	Dublin	0.2327	0.2675	0.3844	-0.1459	0.143	0.3075	0.2203	0.1419	0.1204
county	Galway	0.5846	0.2917	0.0451	0.2163	0.162	0.1818	0.3162	0.1613	0.0499
county	Kerry	0.5347	0.3147	0.0893	0.3535	0.1766	0.0453	0.3122	0.1765	0.0769
county	Kildare	0.348	0.3226	0.2808	0.1048	0.1807	0.5621	0.1431	0.1795	0.4254
county	Kilkenny	0.2886	0.3795	0.4471	-0.00282	0.2198	0.9898	0.0162	0.2164	0.9403
county	Laois	0.1859	0.4116	0.6516	-0.4722	0.2518	0.0607	-0.2245	0.2413	0.3521
county	Leitrim	-0.6974	0.656	0.2877	0.1643	0.2707	0.544	0.294	0.2625	0.2626
county	Limerick	0.1544	0.3137	0.6226	-0.0804	0.1714	0.639	0.1842	0.167	0.27
county	Longford	0.5472	0.4223	0.1951	0.0276	0.2603	0.9157	0.1779	0.2531	0.4823
county	Louth	-0.0276	0.3327	0.9339	-0.0857	0.1816	0.637	0.0312	0.1777	0.8606
county	Mayo	0.578	0.3198	0.0707	0.3901	0.1789	0.0292	0.2009	0.1815	0.2682
county	Meath	-0.2	0.4138	0.6289	0.1231	0.2073	0.5527	-0.0456	0.2093	0.8276
county	Monaghan	-0.0708	0.4149	0.8645	0.1494	0.2119	0.4806	0.0201	0.2138	0.9251
county	Offaly	0.4771	0.3771	0.2059	0.1019	0.2261	0.6521	-0.0167	0.2255	0.9411
county	Roscommon	-0.0289	0.5469	0.9579	0.4844	0.2712	0.0741	0.2827	0.2718	0.2982
county	Sligo	-1.0497	0.5787	0.0697	0.0552	0.2231	0.8045	0.2534	0.2169	0.2427
county	Tipperary	0.8115	0.321	0.0115	0.434	0.185	0.0189	0.4925	0.1836	0.0073
county	Waterford	0.4792	0.3193	0.1335	-0.1047	0.189	0.5795	-0.0706	0.1865	0.7051
county	Westmeath	-0.0775	0.3964	0.845	-0.0152	0.2111	0.9425	0.0117	0.2093	0.9553
county	Wexford	0.134	0.3562	0.7069	0.056	0.1942	0.7729	-0.0106	0.1955	0.9567
occup_type	Non-Professional	-0.1246	0.0903	0.1678	-0.7895	0.0518	<.0001	-0.5692	0.0516	<.0001
occup_type	None	-0.1543	0.1894	0.4152	-0.9904	0.1348	<.0001	-0.2927	0.1104	0.008
Empl_Hist	1	-0.1143	0.1273	0.3692	1.0148	0.0812	<.0001	0.1239	0.0761	0.1034
Empl_Hist	1 to 5	-0.1503	0.0917	0.1011	1.34	0.0618	<.0001	0.3455	0.0545	<.0001
Empl_Hist	5 to 10	-0.0424	0.1168	0.7169	1.5937	0.0721	<.0001	0.6234	0.0664	<.0001
Empl_Hist	> 10	-0.1882	0.2423	0.4374	2.42	0.1151	<.0001	1.2461	0.1144	<.0001
LR_Dur	1-2 yrs	0.4555	0.3265	0.163	-0.4384	0.2475	0.0765	-0.5005	0.2557	0.0503
LR_Dur	2-5 yrs	0.5838	0.2704	0.0309	-0.7107	0.251	0.0046	-0.7642	0.2549	0.0027
LR_Dur	< 12 mths	-0.2818	0.3648	0.4399	0.2453	0.1789	0.1703	0.4372	0.1739	0.0119
LR_Dur	> 5 yrs	0.5687	0.4107	0.1662	-0.8735	0.3738	0.0195	-0.7895	0.3756	0.0356

Month	Apr	-1.0579	0.216	<.0001	-0.1659	0.1186	0.1619	-0.00286	0.1139	0.98
Month	Aug	-0.5543	0.1827	0.0024	0.0781	0.1132	0.4901	0.1716	0.1103	0.1195
Month	Dec	-0.587	0.2027	0.0038	0.2099	0.12	0.0802	0.1509	0.119	0.2048
Month	Feb	-1.1632	0.2109	<.0001	-0.3064	0.1159	0.0082	-0.1954	0.1123	0.082
Month	Jan	-1.1844	0.1964	<.0001	-0.2446	0.1078	0.0233	-0.1922	0.1063	0.0706
Month	Jul	-0.9656	0.1959	<.0001	0.0743	0.1086	0.4939	0.1741	0.106	0.1004
Month	Jun	-0.0497	0.1439	0.7301	0.1261	0.099	0.2027	0.2075	0.0971	0.0327
Month	Mar	-0.9591	0.2045	<.0001	-0.1153	0.1144	0.3138	-0.0785	0.1126	0.4858
Month	May	0.3873	0.1386	0.0052	-0.0387	0.1036	0.709	0.063	0.1013	0.5337
Month	Nov	-0.8441	0.2112	<.0001	0.1722	0.1174	0.1426	0.2375	0.1147	0.0384
Month	Oct	-0.4666	0.1854	0.0118	0.3322	0.1132	0.0033	0.2812	0.1121	0.0121

Table A.2.4: Primary 12 Month Model With Co-variates Model Fit Statistics

Criterion	Intercept	Intercept + Covariates
AIC	37633.616	35003.139
SC	37656.464	36214.094
-2 Log L	37627.616	34685.139
R-Square		0.178
Max-rescaled R-Square		0.194

Table A.2.5: Primary 12 Month Model With Co-variates Summary of Stepwise Selection

Step	Effect	DF	Number In	Score Chi-sq	P-value
1	Empl_Hist	12	4	1316.592	<.0001
2	occup_type	6	5	403.5906	<.0001
3	Month	33	6	338.528	<.0001
4	Gender	3	7	234.7574	<.0001
5	Relat_stat	3	8	65.8289	<.0001
6	county	75	9	184.0679	<.0001
7	LR_Dur	12	10	73.0584	<.0001
8	National	3	11	10.6454	0.0138

Table A.2.6: High Earnings 12 Month Model

		Activation/Education			Employment			Other		
Parameter		**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**
Intercept		-13.146	248.4	0.9578	0.7182	0.4824	0.1366	0.9797	0.3915	0.0123
age_start	23	0.0799	0.2554	0.7545	-0.1458	0.1117	0.1918	0.0954	0.1137	0.4014
Yr	2010	0.6197	0.2645	0.0191	0.4143	0.1247	0.0009	0.3651	0.1295	0.0048
age_start*Yr	23*2010	-0.1027	0.5923	0.8624	0.957	0.2816	0.0007	0.6167	0.2892	0.033
Gender	M	-0.4339	0.2592	0.0942	-0.755	0.1239	<.0001	-0.3445	0.1297	0.0079
Relat_stat	Couple	-0.063	0.3	0.8338	0.553	0.1256	<.0001	0.2228	0.1326	0.093
occup_type	Non-Prof.	-0.4884	0.2361	0.0386	-0.9287	0.1095	<.0001	-0.8741	0.1127	<.0001
occup_type	None	0.2855	0.6885	0.6783	-0.8615	0.427	0.0437	-0.112	0.3899	0.774
Empl_Hist	1	11.6601	248.4	0.9626	0.5052	0.4756	0.2881	-0.2189	0.3808	0.5655
Empl_Hist	1 to 5	11.6154	248.4	0.9627	0.8115	0.4635	0.08	0.0126	0.3654	0.9724
Empl_Hist	5 to 10	12.0118	248.4	0.9614	1.0422	0.4681	0.026	0.2196	0.3716	0.5545
Empl_Hist	> 10	10.8681	248.4	0.9651	2.175	0.4998	<.0001	0.949	0.4152	0.0223

Table A.2.7: High Earnings 12 Month Model Fit Statistics

Criterion	**Intercept**	**Intercept + Covariates**
AIC	8256.652	7896.399
SC	8275.185	8118.790
-2 Log L	8250.652	7824.399
R-Square		0.113
Max-rescaled R-Square		0.125

Table A.2.8: High Earnings 12 Month Model Summary of Stepwise Selection

Step	**Effect**	**DF**	**Number In**	**Score Chi-sq**	**P-value**
1	occup_type	6	4	169.124	<.0001
2	Empl_Hist	12	5	97.6645	<.0001
3	Gender	3	6	50.6068	<.0001
4	Relat_stat	3	7	25.8738	<.0001
5	LR_Dur	12	8	26.3384	0.0096

Table A.2.9: Low Earnings Group 12 Month Model

		Activation/Education			Employment			Other		
Parameter		**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**
Intercept		-1.6095	0.5765	0.0052	-0.4733	0.341	0.1652	-0.4271	0.3268	0.1913
age_start	23	-0.1371	0.1466	0.3496	0.0777	0.079	0.325	0.1816	0.0818	0.0263
Yr	2010	0.5741	0.1511	0.0001	0.6234	0.0888	<.0001	0.5277	0.0928	<.0001
age_start*Yr	23*2010	-0.2041	0.2424	0.3997	0.0443	0.137	0.7467	0.0428	0.1415	0.7622
Gender	M	-0.4447	0.1154	0.0001	-0.7243	0.0654	<.0001	-0.3366	0.0684	<.0001
Relat_stat	Couple	-0.0219	0.1621	0.8925	0.457	0.0863	<.0001	0.2264	0.0917	0.0135
National	Irish	0.4718	0.264	0.0739	0.0506	0.1342	0.7062	0.3931	0.1486	0.0082
county	Carlow	0.6731	0.6027	0.2641	0.4136	0.3271	0.2061	0.484	0.3364	0.1502
county	Cavan	-1.4814	1.089	0.1737	-0.2309	0.3236	0.4756	0.0696	0.3269	0.8315
county	Clare	0.6812	0.5157	0.1865	0.2491	0.2799	0.3735	0.424	0.2863	0.1386
county	Cork	0.5159	0.4213	0.2207	0.4827	0.2103	0.0217	0.2729	0.2216	0.2181
county	Donegal	1.1086	0.431	0.0101	0.3681	0.232	0.1126	0.2883	0.2435	0.2364
county	Dublin	0.298	0.3985	0.4546	-0.1083	0.1972	0.583	0.1325	0.206	0.5202
county	Galway	0.8058	0.4254	0.0582	0.2121	0.2209	0.3369	0.2689	0.2308	0.244
county	Kerry	0.7922	0.4536	0.0807	0.3633	0.2398	0.1297	0.1287	0.2544	0.6129
county	Kildare	0.63	0.4771	0.1867	0.2448	0.2526	0.3324	0.2672	0.263	0.3098
county	Kilkenny	0.3266	0.5674	0.5648	0.0608	0.2954	0.8368	-0.2295	0.3201	0.4734
county	Laois	-0.1171	0.6644	0.8601	-0.5722	0.3479	0.1	-0.5054	0.3625	0.1632
county	Leitrim	-0.3475	0.8389	0.6787	-0.1669	0.3685	0.6506	-0.0604	0.3798	0.8737
county	Limerick	-0.1527	0.4859	0.7533	-0.0145	0.2328	0.9504	0.1118	0.2412	0.6429
county	Longford	1.1174	0.5624	0.0469	0.0992	0.3549	0.7798	-0.0264	0.3782	0.9444
county	Louth	0.2358	0.492	0.6318	-0.0535	0.2547	0.8335	-0.00953	0.2642	0.9712
county	Mayo	0.4173	0.4913	0.3956	0.4226	0.2467	0.0867	0.1977	0.2621	0.4506
county	Meath	0.2591	0.6211	0.6766	0.4386	0.3018	0.1462	0.0501	0.3277	0.8784
county	Monaghan	0.2119	0.6182	0.7317	0.1674	0.3033	0.581	0.101	0.3182	0.7509
county	Offaly	0.7551	0.542	0.1635	-0.3214	0.3312	0.3318	-0.291	0.339	0.3906
county	Roscommon	-0.9515	1.1003	0.3872	-0.1491	0.3839	0.6976	-0.0582	0.3966	0.8834
county	Sligo	-0.8916	0.8289	0.2821	0.1742	0.3017	0.5637	0.2694	0.3137	0.3905
county	Tipperary	0.8053	0.4776	0.0918	0.4497	0.2584	0.0817	0.4622	0.2685	0.0852
county	Waterford	0.3611	0.4996	0.4698	0.068	0.2583	0.7923	-0.00452	0.2713	0.9867
county	Westmeath	0.1133	0.589	0.8474	0.1848	0.2909	0.5253	0.078	0.3073	0.7997
county	Wexford	0.4449	0.5019	0.3754	0.0868	0.2635	0.7417	-0.1254	0.2822	0.6568
occup_type	Non-Prof.	-0.0584	0.129	0.6506	-0.6174	0.0705	<.0001	-0.3621	0.0736	<.0001
occup_type	None	0.209	0.293	0.4756	-0.7033	0.1917	0.0002	-0.3529	0.1903	0.0637
Empl_Hist	1	0.0482	0.2843	0.8654	0.9625	0.2251	<.0001	0.0343	0.1782	0.8471
Empl_Hist	1 to 5	0.0552	0.2665	0.8359	1.2645	0.2165	<.0001	0.232	0.1667	0.1641
Empl_Hist	5 to 10	0.0531	0.2812	0.8501	1.5215	0.221	<.0001	0.5442	0.1727	0.0016
Empl_Hist	> 10	0.1014	0.3584	0.7771	2.2087	0.245	<.0001	1.1508	0.2043	<.0001
Month	Apr	-1.0259	0.2854	0.0003	-0.2368	0.1625	0.1451	-0.294	0.1678	0.0798
Month	Aug	-0.6158	0.2536	0.0152	0.0462	0.157	0.7688	0.1598	0.1601	0.3183
Month	Dec	-0.684	0.2744	0.0127	0.1222	0.1628	0.4529	-0.0127	0.1695	0.9403
Month	Feb	-1.1933	0.2827	<.0001	-0.3895	0.1581	0.0138	-0.3517	0.1623	0.0302

Month	Jan	-1.1748	0.2577	<.0001	-0.246	0.1454	0.0907	-0.2972	0.1514	0.0496
Month	Jul	-0.8131	0.2549	0.0014	0.0745	0.149	0.6171	0.0637	0.1537	0.6784
Month	Jun	-0.3697	0.2083	0.0759	0.2932	0.1359	0.0309	0.3633	0.1394	0.0091
Month	Mar	-0.9953	0.2706	0.0002	-0.1829	0.1542	0.2356	-0.2364	0.1604	0.1407
Month	May	-0.2801	0.2008	0.163	-0.1123	0.1386	0.4177	-0.1077	0.1431	0.4518
Month	Nov	-1.0183	0.3012	0.0007	0.1661	0.1607	0.3013	0.1536	0.1659	0.3543
Month	Oct	-0.6467	0.2573	0.012	0.2601	0.1535	0.0902	0.1122	0.1604	0.4843
LR_Dur	1-2 yrs	0.5814	0.4771	0.223	-0.4332	0.3045	0.1549	-0.3282	0.3315	0.3222
LR_Dur	2-5 yrs	0.9795	0.3972	0.0137	-0.6713	0.3227	0.0375	-1.513	0.4725	0.0014
LR_Dur	< 12 mths	0.0522	0.5282	0.9212	0.2898	0.2373	0.2219	0.5599	0.2485	0.0243
LR_Dur	> 5 yrs	1.0865	0.6014	0.0708	-0.5921	0.4901	0.227	-0.4925	0.5397	0.3615

Table A.2.10: Low Earnings Group 12 Month Model Fit Statistics

Criterion	Intercept	Intercept + Covariates
AIC	18980.188	18301.196
SC	19001.044	19406.536
-2 Log L	18974.188	17983.196
R-Square		0.120
Max-rescaled R-Square		0.132

Table A.2.11: Low Earnings Group 12 Month Model Summary of Stepwise Selection

Step	Effect	DF	Number In	Score Chi-sq	P-value
1	Gender	3	4	226.3934	<.0001
2	Empl_Hist	12	5	196.1656	<.0001
3	occup_type	6	6	100.7502	<.0001
4	Month	33	7	118.899	<.0001
5	Relat_stat	3	8	34.4284	<.0001
6	LR_Dur	12	9	52.1586	<.0001
7	county	75	10	127.0744	0.0002
8	National	3	11	10.5716	0.0143

Table A.2.12: No Earnings Group 12 Month Model

		Activation/Education			Employment			Other		
Parameter		**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**	**Co-ef**	**SE**	**P-value**
Intercept		-0.8432	0.5337	0.1141	-0.0045	0.4386	0.9918	-0.0628	0.343	0.8547
age_start	23	-0.2254	0.1606	0.1604	-0.2454	0.1566	0.1171	-0.1267	0.0997	0.2037
Yr	2010	0.5056	0.1563	0.0012	1.1456	0.1401	<.0001	0.3095	0.1054	0.0033
age_start*Yr	23*2010	-0.5992	0.2947	0.042	0.3508	0.2194	0.1098	0.3403	0.1679	0.0427
Gender	M	-0.2755	0.1408	0.0504	-0.7824	0.1137	<.0001	-0.1229	0.0941	0.1912
National	Irish	-0.7427	0.2069	0.0003	-0.2084	0.205	0.3094	0.0519	0.1618	0.7484
county	Carlow	0.1833	0.575	0.7499	-0.2738	0.5182	0.5972	-0.5407	0.418	0.1958
county	Cavan	-11.665	171.3	0.9457	0.2779	0.5149	0.5894	-0.2203	0.4201	0.6
county	Clare	-0.0334	0.647	0.9588	0.4231	0.4693	0.3673	0.3631	0.3617	0.3154
county	Cork	0.5295	0.4388	0.2276	0.1906	0.3698	0.6063	0.1906	0.2776	0.4924
county	Donegal	0.437	0.4685	0.3509	0.6669	0.3793	0.0787	0.4649	0.2932	0.1129
county	Dublin	0.0814	0.4235	0.8477	-0.1638	0.3488	0.6386	0.1682	0.2608	0.519
county	Galway	0.1477	0.475	0.7559	0.4203	0.3853	0.2753	0.3355	0.2976	0.2597
county	Kerry	0.253	0.5107	0.6204	0.1719	0.4262	0.6867	0.6217	0.3174	0.0501
county	Kildare	-0.0402	0.5163	0.938	0.0221	0.4286	0.9588	-0.1246	0.3297	0.7056
county	Kilkenny	0.1074	0.5773	0.8524	-0.4078	0.5169	0.4301	-0.2519	0.376	0.503
county	Laois	0.444	0.6376	0.4863	-0.0502	0.5938	0.9326	0.1093	0.4349	0.8016
county	Leitrim	-0.8128	1.1345	0.4737	1.3359	0.558	0.0167	0.7666	0.4824	0.112
county	Limerick	0.4601	0.4841	0.3419	-0.3257	0.4384	0.4576	0.2401	0.3045	0.4305
county	Longford	-0.1732	0.7651	0.8209	-0.3619	0.6255	0.5629	0.1706	0.4215	0.6856
county	Louth	-0.3087	0.5184	0.5515	-0.076	0.4116	0.8534	-0.198	0.3151	0.5298
county	Mayo	0.7215	0.4994	0.1485	0.2316	0.4341	0.5937	0.2408	0.333	0.4696
county	Meath	-0.4051	0.6406	0.5271	0.1918	0.4655	0.6803	-0.0978	0.3687	0.7908
county	Monaghan	-0.3731	0.68	0.5832	0.6804	0.4477	0.1286	-0.0705	0.3798	0.8528
county	Offaly	0.3814	0.6134	0.534	0.6757	0.4941	0.1714	0.3861	0.3974	0.3313
county	Roscommon	0.3779	0.7802	0.6282	1.2268	0.5429	0.0238	0.7489	0.4563	0.1008
county	Sligo	-1.8517	1.1015	0.0927	0.132	0.4951	0.7897	0.3043	0.371	0.412
county	Tipperary	0.4419	0.5388	0.4121	0.3475	0.4361	0.4255	0.2762	0.3367	0.4121
county	Waterford	0.2588	0.4937	0.6001	-0.3473	0.4592	0.4495	-0.2082	0.3334	0.5325
county	Westmeath	-0.3675	0.6385	0.5649	-0.0241	0.4892	0.9606	0.1278	0.3625	0.7243
county	Wexford	-0.37	0.5876	0.5289	-0.0308	0.4776	0.9486	-0.2838	0.3656	0.4375
occup_type	Non-Prof.	-0.1191	0.1569	0.4477	-0.8966	0.1194	<.0001	-0.5928	0.0979	<.0001
occup_type	None	-0.5065	0.282	0.0725	-1.3828	0.2584	<.0001	-0.178	0.1556	0.2529
Month	Apr	-0.4573	0.3917	0.2429	-0.3416	0.2767	0.217	0.12	0.2062	0.5607
Month	Aug	-0.3353	0.3614	0.3535	0.082	0.2426	0.7353	0.1578	0.1971	0.4233
Month	Dec	-0.0396	0.3991	0.921	0.4384	0.2748	0.1106	0.1013	0.2341	0.6652
Month	Feb	-1.0935	0.4393	0.0128	-0.5059	0.2772	0.068	-0.1088	0.2037	0.5931
Month	Jan	-1.0942	0.4232	0.0097	-0.7037	0.2779	0.0113	-0.1654	0.2011	0.4109
Month	Jul	-1.0235	0.4085	0.0122	-0.2541	0.2445	0.2986	0.2024	0.1882	0.2822
Month	Jun	0.767	0.2739	0.0051	-0.1541	0.2195	0.4826	0.0484	0.1762	0.7835
Month	Mar	-0.7826	0.4125	0.0578	-0.522	0.282	0.0642	0.0058	0.2075	0.9779
Month	May	1.4798	0.2682	<.0001	-0.1865	0.2309	0.4192	0.2089	0.1817	0.2505
Month	Nov	-0.4248	0.4037	0.2926	0.1636	0.2644	0.536	0.4118	0.2082	0.048
Month	Oct	0.0952	0.3516	0.7866	0.3928	0.2484	0.1138	0.3771	0.2047	0.0655

Table A.2.13: No Earnings Group 12 Month Model Fit Statistics

Criterion	Intercept	Intercept + Covariates
AIC	9338.314	8788.942
SC	9356.980	9610.248
-2 Log L	9332.314	8524.942
R-Square		0.195
Max-rescaled R-Square		0.212

Table A.2.14: No Earnings Group 12 Month Model Summary of Stepwise Selection

Step	Effect	DF	Number In	Score Chi-sq	P-value
1	Month	33	4	329.2388	<.0001
2	occup_type	6	5	124.3247	<.0001
3	Gender	3	6	53.807	<.0001
4	National	3	7	17.9481	0.0005
5	county	75	8	113.6255	0.0027

APPENDIX B: SENSITIVITY ANALYSIS

The following are the results of the sensitivity tests of the primary analysis. As a robustness check on the primary model results, the study also ran the DD estimator using an alternative control group by replacing 25 year olds with 26 year olds. As the 26 year olds received the same treatment as 25 year olds, i.e. they retained the maximum rate of JA, they provide an alternative control group against which to test the treatment.

Tables B.1, B.2 and B.3 detail the results from the alternative model. The results were consistent with the results of the primary analysis. Under the two primary regression models, with and without co-variates, 23 year olds were found to experience a reduced probability of being in activation or education relative to 26 year olds. Similarly, 23 year olds were found to increase their probability of being in employment or in the other exit category relative to 26 year olds.

When disaggregated by earnings group, 23 year olds with high earnings were found to have the largest improvements in the probability of being in employment or in the other exit category compared to the other earnings groups. One notable difference concerned the probability of being activation or education. While the pattern of behaviour was consistent with the primary model, only the results for no earnings group were found to be statistically significant.

Table B.1: DD Results for Employment vs On LR, 23yr olds vs. 26yr olds

	6 Months	12 Months
23 Yr Olds (without co-variates)	0.166*	0.205**
	(0.090)	(0.099)
23 Yr Olds (with co-variates	0.175*	0.202*
	(0.097)	(0.106)
High Earnings	0.438**	0.743**
	(0.217)	0(.291)
Low Earnings	-0.010	-0.104
	(0.133)	(0.150)
No Earnings	0.447*	0.482**
	(0.253)	(0.222)

Note:*p<0.1; **p<0.05; ***p<0.01

Table B.2 DD Results for Activation vs On LR, 23yr olds vs. 26yr olds

	6 Months	12 Months
23 Yr Olds (without co-variates)	-0.675***	-0.442**
	(0.206)	(0.174)
23 Yr Olds (with co-variates	-0.673***	-0.454**
	(0.212)	(0.177)
High Earnings	-0.668	-0.720
	(0.732)	(0.606)
Low Earnings	-0.423	-0.371
	(0.290)	(0.253)
No Earnings	-1.253***	-0.513*
	(0.405)	(0.291)

Note:*p<0.1; **p<0.05; ***p<0.01

Table B.3: DD Results for Other vs On LR, 23yr olds vs. 26yr olds

	6 Months	12 Months
23 Yr Olds (without co-variates)	0.129	0.217**
	(0.097)	(0.101)
23 Yr Olds (with co-variates	0.111	0.195*
	(0.099)	(0.104)
High Earnings	0.261	0.583*
	(0.239)	(0.299)
Low Earnings	0.001	-0.038
	(0.145)	(0.153)
No Earnings	0.169	0.340**
	(0.182)	(0.173)

Note:*p<0.1; **p<0.05; ***p<0.01

As a further validation of the sensitivity tests, the study also tested the main control group against the alternative control group. To ensure that the 26 year olds truly do provide an adequate alternative control group, the estimated treatment effect, the DD estimator, in this case should be zero to show that there was no difference between the two populations as these populations were not subject to the treatment. Tables B.4, B.5 and B.6 detail the results of the tests.

The results show that there were no statistically significant differences found between 25 year olds and 26 year olds, with one exception. As shown in Table B.5, the results for the high earnings group, showed that the difference in the probability of 25 year olds entering activation or education relative to 26 year olds increased by 69 percentage points. However, this effect was only found to be statistically significant at the 90% confidence level. Given the limited differences found, it is reasonable to conclude that that in general 26 year olds are an appropriate alternative comparison group to test the impact of the rate reduction.

Table B.4 DD Results for Employment vs On LR, 25yr olds vs. 26yr olds

	6 Months	**12 Months**
23 Yr Olds (without co-variates)	0.166	0.021
	(-0.09)	(-0.087)
23 Yr Olds (with co-variates	-0.015	0.059
	(-0.088)	(-0.094)
High Earnings	0.034	0.232
	(-0.162)	(0.192)
Low Earnings	0.031	0.135
	(-0.127)	(0.138)
No Earnings	-0.152	-0.138
	(-0.237)	(0.206)

Note:*p<0.1; **p<0.05; ***p<0.01

Table B.5: DD Results for Activation vs On LR, 25yr olds vs. 26yr olds

	6 Months	**12 Months**
23 Yr Olds (without co-variates)	-0.675	0.15
	(-0.206)	(-0.140)
23 Yr Olds (with co-variates	0.057	0.086
	(-0.155)	(-0.144)
High Earnings	0.294	0.678*
	(-0.447)	(0.399)
Low Earnings	0.21	0.145
	(-0.245)	(0.224)
No Earnings	-0.139	-0.166
	(-0.238)	(0.224)

Note:*p<0.1; **p<0.05; ***p<0.01

Table B.6: DD Results for Other vs On LR, 25yr olds vs. 26yr olds

	6 Months	12 Months
23 Yr Olds (without co-variates)	0.129	-0.004
	(-0.097)	(-0.090)
23 Yr Olds (with co-variates	0.019	0.006
	(-0.091)	(-0.092)
High Earnings	-0.153	0.053
	(-0.182)	(0.200)
Low Earnings	0.138	0.097
	(-0.14)	(0.143)
No Earnings	0.08	-0.037
	(-0.166)	(0.157)

Note:*p<0.1; **p<0.05; ***p<0.01

APPENDIX C: DATA EXCLUSIONS

The data extract for the study is composed of all new entrants onto JA aged 23, 25 and 26 years old in 2009 and 2010. This constituted 35,009 individual jobseekers before data cleaning. After cleaning, the sample was reduced to 21,205, as shown in Table C.1.

Table C.1: Sample Exclusions

	23	25	26	Total
Live Register	13,100	11,982	9,927	35,009
Family	11,571	10,335	8,181	30,087
Dups + error	6,879	8,125	6,201	21,205

Exclusions

Casual Jobseekers Allowance and Jobseekers Benefit

Along with Jobseekers Allowance (JA) there are two other main unemployment welfare payments that a jobseeker can access. Jobseekers Benefit (JB) is an insurance-based payment that is unconditional beyond having the appropriate number of insurance contributions accumulate in the two years prior to the application for support. It is usually paid at the same rate a JA, however the age differentiated rate reductions did not apply to JB.

The other payment type is Casual Jobseeker Allowance (Casuals). This is a payment that can be drawn in cases where a jobseeker also maintains part-time unemployment. Casuals can work up to three days and receive a partial JA payment. This was excluded due to the distortionary effect of receiving income from employment and because like JB the rate reductions did not apply.

Adult and Child Qualified Increases

Jobseekers can claim a top-up payment when they have adult or child dependents. However, these top-ups were not subject to the rate reductions. Furthermore, in cases of adult or child dependents there an individual jobseeker may have caring responsibilities not participate that limit the amount of time that can be given to job-search. For these reasons, jobseekers claiming adult or child increases were excluded.

Duplicates and Error

Due to administrative error, time lags updating individual case files or poor coverage, the administrative datasets can be incomplete. Where there was missing data in the key variables used for the analysis, these cases were excluded from the sample.

Duplicates are cases where a jobseeker may have multiple episodes on the Live Register in a given period. To minimise the risk of distortion in the response, in cases where a jobseeker has multiple claims in a given year, only the first claim is kept. Similarly, where jobseekers were found to initiate a claim in both years these were also dropped from the sample.

Age

As outlined in section 4.1, to control for the influence on labour market behaviour of expectations of an increase in the rate of JA as jobseeker's approached age thresholds, 22 and 24 year olds were excluded from the sample.

20 and 21 year olds were excluded due to their limited labour market experience. While 18 and 19 year olds were excluded because they received a rate reduction in April 2009.

RRAs

The next step was to isolate only those jobseekers who were subject to the age-related reduction. In the JLD, this is defined as an RRA (Reduced Rate Allowance). Note, that a jobseeker can be subject to differential rates for a variety of reasons including sanctions, over-payment and means conditionality. A further issue concerns situations where a jobseeker can retain the full-rate regardless of age where they have had a previous full JA claim in the preceding 52 weeks. This is known as claim linking or 'repeat claims'. (Please see the following link for more details: http://www.welfare.ie/en/Pages/Jobseekers-Allowance.aspx#Claims).

APPENDIX D: DATA SPECIFICATIONS

All the variables presented in the analysis were derived from administrative data from the Jobseekers Longitudinal Database which is owned and managed by the Department of Social Protection.

Age Group

These were derived from the age at the start of the claim in each period:

- Treatment Group– 23 year olds
- Control Group 1 – 25 year olds
- Control Group 2 – 26 year olds

Outcome

The Exit Type variable is a function of the labour market status of the claim at 6 and 12 months from the start of the claim as recorded by the JLD. The JLD categorises the status in terms of the type of scheme or program the jobseeker is on as follows:

Activation or in full-time education/training course Education, includes:

- Community Employment;
- FÁS Employment Schemes;
- Labour Market Activation Fund;
- Work Placement Graduate Program;
- JobBridge;
- Back To Education - 2nd level;
- Back To Education - 3rd level;
- Back To Education – ICTP;
- Back To Education – Momentum;
- Jobpath.

Employment – In paid employment/self-employed

On LR – Still on the Live Register and not employed

- Jobseekers Allowance;
- Jobseekers Benefit;
- Farm Assist;
- Jobseekers Benefit Credits;
- OFP.

Other – Not in employment, activation, education or on the Live Register

- No Longer Entitled to Unemployment;
- No Reason Stated;
- Other;
- Questionable Status;
- Transferred to Other non-working age DSP Schemes.

County

The county was identified through matching the individual jobseeker to their local office.

Month

The Month was based on the month when each individual claim was started.

Gender, Relationship Status and Nationality

These variables are reformulations of data sourced from the JLD for each jobseeker. Note relationship status is a binary variable for being in any relationship including, civil partnership, co-habiting or married.

Occupation type

Occupation type captures the most recent, self-reported, previous occupation of the jobseeker. These were based on the occupational codes available from the JLD. These are based on the International Standard Classification of Occupations (for European Union purposes) used by the Central Statistics Office. These include:

- Trades;
- Professional/Management;
- Plant and Machinery Workers;
- Other Occupations;
- Sales Occupations;
- Personal/Protective;
- Administrative;
- No Previous Occupation.

For the purposes of this study, the occupations have been summarised into professional and non-professional.

Previous Earnings

The previous earnings level was derived from the aggregate total earnings from all jobs in the year prior to entering the Live Register for each jobseeker divided by the total number of PRSI contributions in that year to arrive at an average earnings figure for each jobseeker. This was calculated using earnings data from the Revenue Commissioners administrative data. Table D.1 below shows the distribution of total earnings in the previous year for 2009 and 2010. As is evident, there was a greater prevalence of low earnings amongst younger jobseekers. However, it is notable that average earnings improve in 2010.

Table D.1: Earnings Distribution

	Minimum	Lower Quartile	Mean	Median	Upper Quartile	Maximum	Std Dev
Total	€0.00	€0.00	€270.20	€259.00	€418.00	€6,363.00	€246.55
2009	€0.00	€0.00	€288.00	€292.00	€385.00	€3,445.00	€248.95
2010	€0.00	€0.00	€245.10	€219.00	€436.00	€6,363.00	€240.93

Source: Revenue Commissioners, 2017

To model relationship between the level of previous earnings and behaviour the distribution of previous earnings variable was divided into three levels; High, Low and No earnings. If sensitivity to the rate reductions are related to the level of previous earnings, then the greater the level of previous earnings the stronger the effect would be. To reflect the distribution of earnings for the total sample, the model uses the 75 percentile threshold, €418, as the cut-off of the Low and High earnings category.

Employment History

Employment History was calculated from the total count of employment episodes prior to the initiation of the claim in question as recorded by the Revenue Commissioners. The distribution was divided into bands as follows:

- None – no previous employment experience;
- 1 employment episode
- 1-5 employment episodes
- 5-10 employment episodes
- > 10 employment episodes

LR Duration

LR Duration categorises history on the Live Register (LR) into bands. Duration was derived from total number of days the jobseeker was in receipt of a Jobseekers Allowance claim prior to making the claim in question. The bands are as follows:

- None – no previous experience on LR;
- < 12 Months
- 1-2 Years
- 2-5 Years
- > 5 Years

APPENDIX E: JOBSEEKER ALLOWANCE RATE CHANGES

		2007	2008	2009	2009S	2010	2011	2012	2013	2014	2015	2016	2017
18 Year Olds	**Maximum Rate**	185.80	197.80	204.30	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	102.70
	Child Increase	22.00	24.00	26.00	26.00	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
	Adult Increase	123.30	131.30	135.60	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	102.70
19 Year Olds	**Maximum Rate**	185.80	197.80	204.30	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	102.70
	Child Increase	22.00	24.00	26.00	26.00	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
	Adult Increase	123.30	131.30	135.60	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	102.70
20 Year Olds	**Maximum Rate**	185.80	197.80	204.30	204.30	100.00	100.00	100.00	100.00	100.00	100.00	100.00	102.70
	Child Increase	22.00	24.00	26.00	26.00	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
	Adult Increase	123.30	131.30	135.60	135.60	100.00	100.00	100.00	100.00	100.00	100.00	100.00	102.70
21 Year Olds	**Maximum Rate**	185.80	197.80	204.30	204.30	100.00	100.00	100.00	100.00	100.00	100.00	100.00	102.70
	Child Increase	22.00	24.00	26.00	26.00	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
	Adult Increase	123.30	131.30	135.60	135.60	100.00	100.00	100.00	100.00	100.00	100.00	100.00	102.70
22 Year Olds	**Maximum Rate**	185.80	197.80	204.30	204.30	150.00	144.00	144.00	144.00	100.00	100.00	100.00	102.70
	Child Increase	22.00	24.00	26.00	26.00	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
	Adult Increase	123.30	131.30	135.60	135.60	130.10	124.80	124.80	124.80	100.00	100.00	100.00	102.70
23 Year Olds	**Maximum Rate**	185.80	197.80	204.30	204.30	150.00	144.00	144.00	144.00	100.00	100.00	100.00	102.70
	Child Increase	22.00	24.00	26.00	26.00	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
	Adult Increase	123.30	131.30	135.60	135.60	130.10	124.80	124.80	124.80	100.00	100.00	100.00	102.70
24 Year Olds	**Maximum Rate**	185.80	197.80	204.30	204.30	150.00	144.00	144.00	144.00	100.00	100.00	100.00	102.70
	Child Increase	22.00	24.00	26.00	26.00	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
	Adult Increase	123.30	131.30	135.60	135.60	130.10	124.80	124.80	124.80	100.00	100.00	100.00	102.70
25 Year Olds	**Maximum Rate**	185.80	197.80	204.30	204.30	196.00	188.00	188.00	188.00	144.00	144.00	144.00	147.80
	Child Increase	22.00	24.00	26.00	26.00	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
	Adult Increase	123.30	131.30	135.60	135.60	130.10	124.80	124.80	124.80	124.80	124.80	124.80	128.10
26 Year Olds	**Maximum Rate**	185.80	197.80	204.30	204.30	196.00	188.00	188.00	188.00	188.00	188.00	188.00	193.00
	Child Increase	22.00	24.00	26.00	26.00	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
	Adult Increase	123.30	131.30	135.60	135.60	130.10	124.80	124.80	124.80	124.80	124.80	124.80	128.10

VOTE OF THANKS PROPOSED BY MICHEÁL COLLINS

I am very pleased to propose a vote of thanks to Dr Eric Doyle. This is a very interesting and welcome piece of research and serves as an important contribution to Irish public policy and Irish labour market policy. I have a number of brief comments to make as a response to Dr Doyle's paper; ranging from some general points to some that are more specific.

Ireland as an interesting place to Research
Ireland is a very interesting place to ask research questions like the one asked in this paper. The combined experience of major societal changes, in all sorts of ways and in all directions, coupled with the availability of good statistical data allows those who choose to study Ireland and Irish society the chance to examine things that can only be considered at the conceptual and theoretical level in many other states.

What happens when you increase people's income by 20% over a few years; and then take most of that away again over a year or two? How do they respond, what do they do and what don't they do?

What happens when you cut minimum wages? What happens when unemployment triples in the space of a few months? What happens when you stop building houses and offices?

Ireland offers a unique case study to answer these and so many more questions. I admit it was not so nice to live through some of those years, certainly not 2008-2012, but it is a period and experience that opens up so many interesting questions of particular relevance to a research society such as this. In that context, using evidence to examine what happens when you reduce the value of the social welfare payment available to young unemployed workers is a most interesting question whose answer has national and international relevance.

Context for these Policy Changes
The context for these policy changes is worth recalling; indeed, it is well summarised in the paper. Based on the new CSO Labour Force Survey data, unemployment went from 4.4% of the labour force at the end of 2006 to more than three times that level in early 2010 as this policy change was being implemented. Unemployment continued to climb for the following two and a half years before peaking, in mid-2012, at 15.9% of the labour force. Over the same period, labour force participation was falling, employment continued to decrease, and net-migration data recorded a constant stream of people, many of them young people, leaving the country.

The precise policy objective for the welfare payment changes examined in Dr Doyle's paper is also less than clear. As he points out it was presented as a measure intended to boost participation in training courses and other activation measures and never explicitly presented as a way of decreasing the welfare budget. I note the then Minister for Finance, Brian Lenihan, in his speech to outline the Supplementary Budget in April 2009, noted that cuts to jobseekers allowance for those under 20 years was intended "to incentivise the young unemployed to participate in training programmes". Sentiments he reflected in subsequent cuts in the Budget outlined in December of that year.

Around that time there were many other changes to welfare payments which were similarly presented; many of these were latent changes such as to pension entitlements and the reduction in the duration of social insurance entitlements from twelve months to nine months. However, one wonders what was the 'real' policy objective at that time.

Administrative Data
This paper uses an important and interesting administrative data source, the Department of Employment Affairs and Social Protection's Jobseekers Longitudinal Database. The ideal for evidence based policy is that policy analysis and policy formation are built on solid foundations, and datasets such as this are prime examples of the potential and richness of administrative data. As much as the author should be congratulated for using it, we should also note the commitment of the statistical staff in the DEASP who gathered and assembled that data.

Seeing such a detailed administrative dataset being used to assess important policy questions, highlights two important issues. First, for organisations like DEASP, the Revenue Commissioners, the HSE, An Garda Siochana and other public service providers, it is important that they appreciate the merits and potential of collecting this type of administrative data. Viewed narrowly, the remit of these providers might be interpreted as just running systems and implementing policy; but I think papers like this demonstrate that the collection of this data has a key role in informing and improving public policy over the medium term. Second, as much as it is important to collect

this data, it is also important to make it available to researchers so that it may be used to contribute to discussions and debates around policy analysis and formation; material which has been the bedrock of this society for the last 170 years.

Methods
Working with a large and complex data set such as this cannot have been easy, but Dr Doyle's paper does so in a clear and careful manner. The papers approach to isolating the effects, if any, of welfare reductions though the use of a difference-in-difference estimator is very appropriate. As the paper points out, a great advantage of this approach is the ability to control for omitted variables and more comprehensively isolate the treatments effects being examined. The approach to sensitivity testing, by substituting 26 year olds for 25 year olds and re-running the analysis, is also a well though through approach which adds robustness to the papers findings.

Policy Lessons and Implications
The paper reports and implies a number of theoretical and policy lessons and implications; and I will focus on the latter. The paper's conclusion puts it well:

> *"…these results do show the dangers of over-reliance on deductive reasoning in policy making. Generalising from a set of assumptions, such as the 'axioms of rationality', encourages a 'one-size-fits' all approach to policy making. This increases the risk of unintended consequences as different contextual situations distort how policy is interpreted and implemented".*

It is also important that research like this feeds into the infrastructure of policy making; so that when future choices arise they are framed in the context of the evidence from past policy initiatives. That is particularly important in the area of labour market policy, whereas the scale of unemployment reduces the focus can shift on to other more pressing priorities and leave untouched some of the remaining challenges of long-term unemployment, youth unemployment and participation, female participation and precarious work experiences. Given Ireland's exposure to the international economy, and our long and continuing history of less than stable macroeconomic management, there is a high probability that unemployment will return again as a high priority and when it does we should not forget the issues and lessons of the era examined in this paper.

Finally, let me conclude by thanking Dr Doyle for his work on this important issue and I look forward to his future contributions in this area.

DISCUSSION

Seán Lyons: Thanks for the interesting paper. Given that you couldn't control for educational attainment when estimating the model for higher income people, did you consider changing the control group for that model include only 25/26 year olds with top quartile incomes to match the treatment group better? Also, did you consider whether some of the relative increases in employment probability for 23 year olds could have been due to a demand side response rather than labour supply alone? For example, maybe employers who normally employ people in their mid 20s took the benefit changes as a signal that they could more cheaply recruit 23 year olds and thus targeted this group instead of their slightly older counterparts.