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**Working Paper**

## Economic Outcomes of Youth not in Education, Employment or Training (NEET)

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# Economic Outcomes of Youth not in Education, Employment or Training (NEET)

Anton Samoilenko and Kristie Carter

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New Zealand Treasury Working Paper 15/01

March 2015



THE TREASURY

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New Zealand Government

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PAPER 15/01**

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Economic Outcomes of Youth not in Education, Employment or Training (NEET)

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March 2015

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The results in this paper are not official statistics; they have been created for research purposes from the Integrated Data Infrastructure (IDI) managed by Statistics New Zealand.

The opinions, findings, recommendations and conclusions expressed in this paper are those of the authors, not Statistics NZ.

Access to the anonymised data used in this study was provided by Statistics NZ in accordance with security and confidentiality provisions of the Statistics Act 1975. Only people authorised by the Statistics Act 1975 are allowed to see data about a particular person, household, business or organisation and the results in this paper have been confidentialised to protect these groups from identification.

Careful consideration has been given to the privacy, security and confidentiality issues associated with using administrative and survey data in the IDI. Further detail can be found in the Privacy impact assessment for the Integrated Data Infrastructure available from [www.stats.govt.nz](http://www.stats.govt.nz).

The results are based in part on tax data supplied by Inland Revenue to Statistics NZ under the Tax Administration Act 1994. This tax data must be used only for statistical purposes, and no individual information may be published or disclosed in any other form, or provided to Inland Revenue for administrative or regulatory purposes.

Any person who has had access to the unit-record data has certified that they have been shown, have read, and have understood section 81 of the Tax Administration Act 1994, which relates to secrecy. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

# Abstract

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The paper examines the outcomes of youth not in education, employment or training (NEET) up to four years after the initial long-term spell of NEET. The paper covers outcomes of NEETs in relation to benefit receipt, education, employment and future inactivity. These outcomes are compared across NEETs and a control group of non-NEETs. Propensity Score Matching is used to control for observed characteristics of NEETs and controls to ensure that outcomes are not driven by underlying differences in specific characteristics. The paper finds that individuals who experience a long-term spell of NEET in their youth experience relatively poorer outcomes than their control group peers after the first two years. Long-term NEETs are less likely to be employed, are more likely to be inactive and/or receiving a benefit. There are no differences in the rates of study. The differences in outcomes between NEETs and the control group are reduced after four years.

**JEL CLASSIFICATION**

C1 Econometrics  
I24 Education and Inequality  
I3 Welfare, Well-being, and Poverty

**KEYWORDS**

youth; NEET; outcomes; education; employment; welfare; Propensity Score Matching;

## Executive Summary

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The paper examines outcomes of youth not in education, employment or training (NEET) up to four years after the initial long-term spell (period) of NEET. The paper covers outcomes of NEETs in relation to benefit receipt, education, employment and future inactivity. These outcomes are compared across long-term NEETs and a control group consisting of individuals who have not experienced a long-term spell of NEET.

We control for a range of personal, family and environmental characteristics of NEETs and the control group to ensure that outcomes are not driven by underlying differences in observable characteristics. We use data from the longitudinal Survey of Family, Income and Employment that were individually linked to administrative data from the Inland Revenue Department, Ministry of Social Development and Ministry of Education. The longitudinal nature of the data provides a detailed picture of the outcomes of NEETs and the corresponding control group.

The paper finds that individuals who experience a long-term spell of NEET in their youth experience relatively poorer outcomes than their control group peers after the first two years. Long-term NEETs are less likely to be employed, are more likely to be inactive and/or receiving a benefit. No differences are observed in post-school study rates of NEETs and their peers. However, a small difference in Bachelor degree or above qualification attainment rate is observed.

Outcomes after four years appear to converge, with few significant differences between NEETs and the control group. Long-term NEETs are as likely to be employed and there are no differences in the post-school study rates or rates of inactivity. Results highlight an increasing difference in the Bachelor degree or above attainment rate. The results also show that long-term NEETs are more likely to hold lower level (Level 1 to 3) qualifications than their peers after four years. Long-term NEETs are also more likely to receive a benefit after four years.

Four-year outcomes of long-term NEET vary depending on when they experience their first term spell of NEET. The results show particularly poor outcomes for individuals who leave school between the ages of 15 and 17, regardless of whether they experienced a long-term spell of NEET or not. These individuals are much less likely to have any post-school qualification, are more likely to be inactive and/or receiving a benefit than individuals in other age groups. Long-term NEETs who were in the 18 to 19 year old age group are significantly less likely to have gained a Bachelor degree qualification or above and more likely to have gained a Level 1 to 3 qualification over the four year period. While these differences may not be viewed as a negative outcome, they may lead to long-term differences in income between the long-term NEET and the control group. Individuals who experience their first long-term spell of NEET later in life, between the ages of 20 and 24, experience relatively poorer outcomes within the first two years. However, after four years their outcomes are virtually indistinguishable from those of their peers.

The paper concludes by noting that outcomes of long-term NEET are as varied as the group itself. Further research into labour market and study dynamics, income dynamics, lifecycle pathways and longer term outcomes (more than four years) could add further insight into the challenges faced by various groups described in this paper.

# Table of Contents

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<b>Abstract</b> .....	<b>i</b>
<b>Executive Summary</b> .....	<b>ii</b>
<b>1 Introduction</b> .....	<b>1</b>
<b>2 The NEET population and outcomes</b> .....	<b>2</b>
2.1 Definition of NEETs.....	2
2.2 NEETs in New Zealand.....	3
2.3 Outcomes of NEETs.....	4
<b>3 Data</b> .....	<b>7</b>
3.1 Survey of Family, Income and Employment (SoFIE).....	7
3.2 Integrated Data Infrastructure (IDI).....	7
3.3 The sample.....	8
3.4 NEETs:.....	8
3.5 Control group:.....	9
3.6 Measures of Outcomes.....	9
<b>4 Propensity score matching: methodology, model and results</b> .....	<b>12</b>
4.1 Methodology.....	12
4.2 Model.....	13
4.3 Matching Results.....	15
<b>5 Outcomes: Qualifications, Study, Employment, Benefit Receipt and NEET</b> .....	<b>16</b>
5.1 Employment.....	16
5.2 Education: Study and Qualifications.....	18
5.3 Benefit Receipt.....	20
5.4 NEET.....	23
<b>6 Discussion</b> .....	<b>25</b>
<b>References</b> .....	<b>28</b>

## List of Tables

---

Table 1 – Distribution of the long-term NEET by Age and Cohort.....	9
Table 2 – Socio-demographic characteristics of long-term NEET and non-NEET.....	11
Table 3 – Propensity Score Matching results.....	15
Table 4 – Employment rate in the 12 months after two and four years.....	17
Table 5 – Study rate in the 12 months after two and four years.....	18
Table 6 – Highest educational qualification gained after two and four years.....	20
Table 7 – Benefit receipt rate in the 12 months after two and four years.....	21
Table 8 – NEET rate in the 12 months after two and four years.....	23

### List of Figures

Figure 1 – Outcome years.....	9
Figure 2 – Employment duration in the 12 months after (a) two and (b) four years.....	17
Figure 3 – Study duration in the 12 months after (a) two and (b) four years.....	19
Figure 4 – Benefit duration in the 12 months after (a) two and (b) four years.....	22
Figure 5 – NEET duration in the 12 months after (a) two and (b) four years.....	24

# Economic Outcomes of Youth not in Education, Employment or Training (NEET)

## 1 Introduction

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Individuals between the ages of 15 and 24 are a dynamic group. They experience a number of life transitions through education, training and employment, some of which can have a strong, positive and long lasting impact on their lives. International literature (discussed in Section 2) has also shown that experiencing prolonged periods not in education, employment or training (NEET) can have a scarring effect on the individual, potentially leading to long-term disadvantage and social exclusion.

In recent years, NEETs have been attracting increasing attention from the public, policy makers and researchers alike. In Europe, NEETs are identified as a group of focus for a number of initiatives that aim to provide effective pathways into education and training as well as increasing the contact with the labour market. In Japan, NEETs have been actively studied by both government researchers and academics.

In New Zealand, NEETs have been monitored by the Ministry of Social Development and the Ministry of Business, Innovation and Employment (formerly the Department of Labour) in the past. More recently, Statistics NZ introduced the NEET rate as an indicator of youth engagement in formal learning and work.

As a group, NEETs are very difficult to define and study. In the first instance, the term NEET can include a number of distinct groups, some that face long-term disadvantage and some that are in the state of NEET only momentarily. Furthermore, little is known about the medium and longer-term outcomes of NEETs, mainly due to the lack of high-quality longitudinal data.

The paper explores outcomes of youth who experience a spell of NEET using a mix of data from the Survey of Family, Income and Employment (SoFIE) and linked administrative data from the Integrated Data Infrastructure (IDI). In particular, the paper examines outcomes related to benefit receipt, education, employment and future inactivity.



Outcomes are compared between individuals who experienced a long-term spell of NEETs and individuals who had no instances of or short spells of being NEET. Propensity Score Matching is used to control for a range of personal, family and environmental characteristics of NEETs and the control group to ensure that outcomes are not driven by underlying differences in observable characteristics.

The structure of this paper is as follows: section 2 describes the literature defining and describing NEET populations and the outcomes of NEETs; section 3 describes the data being used; section 4 describes the propensity score matching methodology, model and results; section 5 presents the results of key economic outcomes of NEETs compared to the matched controls two and four years after the initial NEET spell; section 6 summarises and discusses the results.

## 2 The NEET population and outcomes

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### 2.1 Definition of NEETs

As a statistical measure, NEETs include a number of distinct groups (European Foundation (2012)), including:

- The conventionally unemployed: This group is likely to be the largest and includes both long and short term unemployed.
- The unavailable: This group includes care givers, individuals with family responsibilities and young people who are sick or disabled.
- The disengaged: This group includes individuals who are not seeking education or employment and who are not constrained from doing so by obligation or incapacities. This group includes such diverse subgroups as discouraged workers and youth who are pursuing dangerous or antisocial lifestyles.
- The opportunity-seekers: This group includes individuals who are actively seeking work or training, but are purposefully holding out for opportunities that suit their skills or long-term aspirations.
- The voluntary NEETs: This group includes individuals who are travelling and those who are actively engaged in activities such as art, music and self-directed learning.

These five groups include a mix of vulnerable and non-vulnerable youth. In addition, these five groups vary based on how long the individuals in these groups will remain NEET. Some individuals will face strong incentives to enter employment or education as soon as possible, while others might choose not to engage in any formal education or employment for a very long time.

To complicate the matter, research literature does not provide a unified guideline on the definition of NEETs, how long people are NEET and what age group constitutes young NEETs.

In the UK, where the term appears to have originated, the term used to refer to young individuals aged 16-18 who were not in education, employment or training (Department for Children, Schools and Families (2009)). This term was developed to highlight the fact

that these individuals did not participate in any formal education or training and were not yet eligible for the unemployment benefit. In effect, the initial aim of the term was to highlight a group that was falling through the gaps of the support offered by the UK's Welfare System. This definition evolved over time and was popularised around the world in the late 1990's.

In Japan, the term is often applied to individuals between the ages of 15 and 34 who are not in employment, who are not involved in education and who are not undertaking housekeeping duties. The term is applied to a wider age group due to the fact that cultural and institutional arrangements in Japan can lead to individuals becoming disengaged from education and work even in their early 30's (Genda, 2007).

Across Europe, the term usually applies to young individuals between the ages of 15 and 24. The primary focus on this age group comes from the fact that this group is particularly vulnerable to adverse changes in the economic environment (European Foundation (2012)). Substantial downturn in a number of European economies during the Global Financial Crisis made it particularly important to measure the size and composition of NEETs between the ages of 15 and 24 in order to develop effective ways of increasing this group's involvement in formal education and fostering greater contact with the labour market.

## 2.2 NEETs in New Zealand

In New Zealand, Statistics New Zealand produces a measure of NEETs that is very close to the measure used in Europe. The measure covers three distinct groups of individuals aged 15-24: those who are unemployed, those who are not in the labour force and not a caregiver, and those who are not in the labour force and a caregiver. Thus, the measure provides an effective cross-sectional measure of NEETs and highlights some of the heterogeneity in the group's composition (Statistics New Zealand, 2011). The major limitation of the Statistics New Zealand measure of NEETs comes from its cross-sectional nature, which means it cannot inform us about the dynamics of the NEET group. It does not distinguish between individuals who are NEET for a short period of time, who are NEET long term or those who experience multiple spells of NEET within a short period of time.

Recent research by the Ministry of Business, Innovation and Employment highlighted the internal dynamics of NEETs in New Zealand (Dixon, 2013). The paper finds that only 24 percent of the youth population who are aged between 16 and 22 years do not experience any spell of NEET over this six year period. However, 23 percent experience a single short-term spell (1-5 months) of being NEET, 25 percent experience multiple short-term spells of NEET and 28 percent of youth experience at least one spell of NEET six months or longer.

The paper finds a number of characteristics that are associated with higher likelihood of being a long-term NEET. These include living in the most deprived neighbourhoods, living in a rental property and living with a single or a non-working parent. Māori youth were also more likely to experience a long-term spell of NEET than New Zealand Europeans. Moreover, leaving school without completing any qualifications or with a NCEA level 1 equivalent qualification only and becoming a parent between the ages of 16 and 18 were also strongly associated with substantially higher likelihood of being a long-term NEET. Altogether, these results show that the likelihood of being a long-term NEET depends on a range of factors.

## 2.3 Outcomes of NEETs

In general, outcomes of NEETs can be summarised into two broad groups: economic and personal and social outcomes. Economic outcomes most commonly cover outcomes related to income and employment, while personal and social outcomes include a variety of outcomes ranging from health to social exclusion. This section covers international and domestic literature, with an emphasis on the outcomes of NEETs in New Zealand.

### 2.3.1 Economic Outcomes

There is limited information on economic outcomes of NEETs from New Zealand data. Some of the more recent evidence comes from the Christchurch Health and Development Study (Maloney, 2004). The evidence shows that individuals who experience a period of economic inactivity<sup>1</sup> are more likely to experience future periods of economic inactivity than individuals with similar socio-demographic characteristics. This evidence suggests that periods of economic inactivity in early life leave a scarring effect on the individual's education and employment prospects that persists over time.

The study also notes that individuals who experience a period of economic inactivity early in their life have substantially lower income than individuals who experience no instances of inactivity. While these results provide additional support to the notion that early experience of economic inactivity leads to poor economic outcomes, income related results in the paper do not take into account the socio-demographic differences that might exist between youth who experienced economic inactivity and those who did not (unlike the analysis of effects on education and employment). This means that the observed differences in income could be due to fundamental differences in the composition of the two groups.

The most recent New Zealand study of NEET analysed a range of outcomes of individuals who experienced a spell of NEET for least 6 months in duration between the ages of 15 and 17 using the data from the Survey of Family, Income and Employment (Dixon, 2013). Three years after the initial long-term spell of NEET, the paper found that 25-45 percent of these individuals had another long-term spell of NEET (either a new spell or a continuation of the original long-term spell) and 25-50 percent participated in some form of study or training towards a qualification. The paper also found that these teenagers were employed for about 60 percent of the year.

Further analysis in the paper compared individuals who experienced a long-term spell of NEET between the ages of 15 and 19 to individuals who never experienced a long-term spell of NEET. At age 21, about 30 percent of formerly long-term NEET teenagers had a long-term NEET spell, compared to 9 percent of other teenagers. Moreover, only 35 percent of formerly long-term NEET teenagers participated in study or training towards a qualification, compared with 61 percent of other teenagers.

The paper noted that these results were not statistically robust due to a small sample size. However, the rough patterns in the data suggest that those individuals who experience a long-term spell of NEET later in life (between the ages of 18 and 19) recover more quickly than individuals who experience a long-term spell of NEET at an earlier age.

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<sup>1</sup> Definition of economic inactivity in Maloney (2004) is broadly in line with some of the definitions of NEET

In the international literature, few papers focus specifically at the economic outcomes of NEETs due to the complex and changing nature of the group, and the lack of suitable longitudinal data. Instead, the literature tends to concentrate on outcomes from periods out of employment or out of education.

In particular, the literature stresses the scarring effect of unemployment both on the probability of securing future employment and on the wages received (Arulampalam et al. (2000), (2001), Gregory and Jukes (2001)). Unemployment negatively affects future employment outcomes through three main channels. Firstly, individuals could experience greater deterioration of generic and specialist human capital the longer they remain unemployed. Secondly, employers could view the period spent in unemployment as an indicator of individual's overall productivity, which makes long-term unemployed less attractive to employers. Finally, transition out of unemployment could become more problematic for long-term unemployed as they gradually exhaust the information search channels (Carroll, 2006). All of these can lead to long term negative employment outcomes for individuals who experience unemployment.

The effect of unemployment on future earnings is slightly more ambiguous. For some individuals, longer period in unemployment can result in lower long-term earnings as these individuals are forced to accept lower wage jobs. In contrast, some individuals will experience an increase in their long-term earnings if they spend the time in unemployment looking for a job that fits well with their skills and experience.

The extent to which these effects are more or less pronounced for young individuals has not been extensively explored in the literature. Evidence from Europe suggests that longer time spent unemployed has a negative impact on the probability of entering employment in the future, but does not appear to have a strong impact on wages (Cockx & Picchio, 2011). Authors attribute this phenomenon to the collectively agreed industry wage floors for young employees. Thus, it is possible that the wages could be lower for individuals who experience long-term unemployment, but it is impossible to observe this effect due to the imposed minimum wage.

Further evidence from the UK shows that long spells of unemployment before the age of 23 leave a strong wage scar on the individual, with slow recovery over the next 20 years (Gregg & Tominey, 2005). Spending over a year in unemployment before the age of 23 reduces individual's income by about 20% at age 23. At age 33, the wage penalty experienced by the individual decreases to around 15%. Finally, at age 42, the observed wage penalty for individuals who spent more than a year in unemployment before the age of 23 is approximately 10%.

The results also indicate that instances of unemployment after the age of 23 compound the scarring effect of unemployment in youth as well as slowing down the rate of wage recovery. Highest qualification level prior to entry into the labour market is found to have no effect on the size of the wage penalty from unemployment in youth. However, the results do indicate that additional education later in life reduces the size of the scarring effect, but this option is rarely used by the individuals in the sample.

Other papers that study the scarring effect of unemployment on the entire population also note a long-term wage penalty of around 10% (Arulampalam et al. (2001), Gregory and Jukes (2001)).

Overall, this evidence suggests that the effects of NEET status on outcomes are complex and persistent. It implies that NEETs could be facing long-term disadvantage in the labour market when compared to individuals with no experience of being NEET.

### **2.3.2 Personal and Social Outcomes**

In addition to economic outcomes, international literature highlights personal and social outcomes for individuals who have a history of unemployment or low educational attainment. Most of the personal and social outcomes of NEETs are not effectively captured by the available data and are out of scope of this paper. However, it is still necessary to describe some of the outcomes that are noted in the literature in order to stress that the effects of NEET go beyond employment and income.

As with economic outcomes of NEETs, the literature does not usually examine the social outcomes of NEET as a single group. Instead, the literature describes the outcomes of individuals who have a history of disengagement from formal education or employment. It is also important to note that the evidence on personal and social outcomes often comes from qualitative studies, which creates difficulties in determining which outcomes are caused by the NEET status as opposed to outcomes that are simply correlated with being NEET.

In general, the literature highlights the following personal and social outcomes:

- Prolonged periods out of education and employment can lead to marginalisation and dependence, with young people failing to establish a sense of direction (Cote, 2000)
- Unemployment can lead to poor physical and mental health outcomes. Literature notes that unemployment can result in individuals feeling lonely, powerless, anxious or depressed (Creed & Reynolds, 2001).
- Disengagement from education and employment can lead to further exclusion and increased association with risk behaviours. Greater use of drugs, alcohol and criminal activity are often associated with unemployment (Fergusson, Horwood, & Woodward, 2001)
- Finally, NEETs are more likely to be parents at an early age and face ongoing issues with housing and homelessness (Cusworth, et al., 2009).

Overall, the literature shows that NEETs face a number of challenges both in the economic and social spheres, with certain groups facing a high risk of multiple disadvantages.

## 3 Data

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### 3.1 Survey of Family, Income and Employment (SoFIE)

The Survey of Family, Income and Employment (SoFIE) is a longitudinal survey that was run by Statistics New Zealand, covering the period from October 2002 to end of September 2010. Respondents were interviewed annually and all individuals over the age of 15 were required to complete a Personal Questionnaire that included detailed questions on demographics and family, labour market activities and various sources of income. If a child reached the age of 15 during the survey period they were also required to complete a Personal Questionnaire.

Labour market information was collected from individuals by asking them to describe their labour market activity over the period from the date of the previous interview to the date of their current interview. Day, month and year data were collected for the start and end dates of each spell (period of time) of activity over the past 12 months. These spells provide a detailed picture of the individual's labour market activities during the year and highlights any periods over which the individuals were not actively involved in the labour market.

Information on the involvement in education was also collected, but at a more aggregated level. School leaving month and year were collected for all individuals under 20 at the initial interview, or at subsequent interviews if they hadn't left school at the initial interview. With respect to post-school education, individuals were asked to indicate the months during which they studied for at least 5 days towards a qualification. Further details were then collected about the type of qualification gained (tertiary, vocational).

Labour market and educational activities data was combined in order to identify the periods (in days) over which individuals were not enrolled in education or training or in employment (NEET). Using this information NEETs were split into three groups depending on the length of time they spent being NEET: short-term (1 – 3 months) – to cover (expected) breaks from education; medium term (4 months); longer-term (5 months or longer).

### 3.2 Integrated Data Infrastructure (IDI)

In 2013, Statistics New Zealand undertook a project to link SoFIE into the Integrated Data Infrastructure (IDI) (Statistics New Zealand, 2013)<sup>2</sup>. As the result, SoFIE data became available within the IDI which means individuals can be identified using the rich socio-demographic information they provided in SoFIE and as well as the administrative data available in the IDI.

The IDI links administrative data from several government departments and Statistics NZ survey data. The IDI data is anonymised through a process which removes all personal information such as names, addresses and exact dates of birth. All other unique identifiers are encrypted to ensure confidentiality.

Currently, IDI contains economic, education, justice, health and safety, migration and business data. By design, administrative data from government departments is longitudinal. This feature of the data is particularly useful, since the observation window in

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<sup>2</sup> The project achieved an 85% match rate between the administrative data and SoFIE data. We only used observations that were successfully linked to the administrative data.



the SoFIE data is limited to a set number of years and individuals can sometimes be lost due to attrition if they cannot be located for an interview.

The following IDI datasets are used to report on the outcomes of NEETs and non-NEETs over time. These include:

- Inland Revenue Department (IRD): Monthly income data from Wages and Salaries provides employment outcome information. Monthly income data is also used as one of the sources to identify the months during which the individual was NEET during the outcome year.
- Ministry of Education: Course enrolment data, containing the start and end dates for each course undertaken by a particular individual, was used to identify the months during which the individual was studying within the outcome years. In addition, course completions data was used to determine the highest qualification gained between the first instance of a long-term spell of NEET and the outcome year.
- Ministry of Social Development: Benefit and allowances data is used to establish if NEETs are more likely to receive benefit than non-NEETs and establish whether NEETs spend more time receiving some form of assistance from the Government.

### 3.3 The sample

The sample is based on SoFIE respondents who had the following characteristics:

- 1) They were eligible and responding individuals in wave 1 of the survey. This means that they either personally answered a Personal Questionnaire (aged 15 years or older) in wave 1, or were a child of an eligible and responding adult.
- 2) They have completed a Personal Questionnaire in at least one wave of the survey. This condition ensures that individuals were observed for at least one interview period (usually 12 months) and provided information that can be used to identify periods of NEET.
- 3) They reported a school leaving date that was after the start of their initial interview period date. Using individuals who were observed before and after their school leaving date allows us to select the first instances of long-term NEET and ensures that the control group did not experience substantial periods of NEET themselves before being selected (see sections 3.4 and 3.5).

Youth who left the country for more than 6 months were excluded from analysis, since it was not possible to properly measure their outcomes.

### 3.4 NEETs

For the purpose of this paper, NEETs are identified as youth who experience a continuous spell of being not in formal education, employment or training for at least five months. No distinction is made with regards to any activities that individuals might have been undertaking while NEET such as travelling, taking care of children or engaging in self-directed learning.

In order to control for the macroeconomic environment faced by individuals when they become NEET, the sample of NEETs is separated into three cohorts. Cohort 1 covers the period from wave 1 to wave 3 (October 2001 to September 2005). Cohort 2 covers the period from wave 4 to wave 6 (October 2004 to September 2008). Cohort 3 covers waves 7 and 8 (October 2008 to September 2010), which includes the period of the Global Financial Crisis. The size of each cohort of NEETs in our sample and the corresponding age distribution are summarised below:

**Table 1 – Distribution of the long-term NEET by Age and Cohort**

Age	Cohort 1 waves 1-3	Cohort 2 waves 4-6	Cohort 3 waves 7-8
15-17	105	75	33
18-19	84	114	63
20-24	12	87	72
Total	201	276	168

### 3.5 Control group

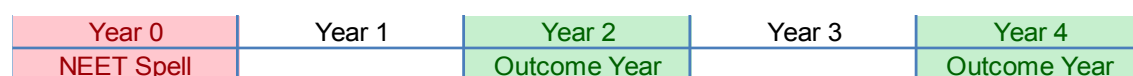
The control group includes individuals who either experienced no NEET spells, or experienced a NEET spell that was three months or less in duration. Preliminary analysis indicated that individuals with short NEET spells had similar characteristics to individuals who haven't experienced a spell of NEET. The similarity between these groups could be explained by the fact that summer holidays between school and university as well as summer holidays between university years are around three months in duration (Dixon, 2013).

Long-term NEETs may also contribute to the control group, but only for the waves that precede the wave in which they experience the spell of NEET. Long-term NEETs are likely to have a specific set of characteristics (for example, they might have left school at a very young age with no qualifications), which can make it difficult to find a non-NEET among individuals who never experienced NEET or only experienced a short-term NEET spell.

### 3.6 Measures of Outcomes

This paper cover outcomes that occur within the year (12 month period) that ends two or four years after the year in which the individual experienced a long-term spell of NEET, or was chosen as a control (see Figure 1). The end dates of the outcome years are determined either from the start date of the NEET spell (NEET group), or from their interview date (control group).

**Figure 1 – Outcome years**





Looking at outcomes over the course of the entire outcome year, as opposed to looking at outcomes at a given point in time, allows for a more detailed look at the chosen set of outcomes. Availability of longer term outcomes is limited for some groups of NEET. Two year outcomes are available for all NEETs and controls. However, four year outcomes are available only for cohorts 1 and 2 as data are not yet available for individuals who were interviewed in 2009 and 2010. Size, composition and timing of each cohort are described further in Section 3.4.1

The following outcomes are covered in this paper:

- Employment rate and duration
- Study rate and duration
- Highest Qualification gained
- Future NEET rate and duration
- Benefit receipt rate and duration

Unlike the cross-sectional measures of the rates which show particular outcomes at a given point in time, rates in this paper show whether an individual was employed, studying, NEET, or receiving a benefit at any given time during the outcome year. Thus, these measures of rates capture all instances of employment, study, NEET or benefit receipt, even if these instances were only for a short period of time. These results are then supplemented by the analysis of the duration of employment, study, NEET or benefit receipt during the outcome years.

### **3.6.1 Unmatched Sample Description:**

Table 2 describes the distribution of key demographic characteristics in the unmatched sample of NEETs against the sample of non-NEETs (non-NEETs are matched to NEETs to create the control group, see Section 4.1). In total, our sample contains around 680 unique NEETs and around 1,920 unique members of the control group. Characteristics presented in Table 2 are not mutually exclusive, so individuals may possess one or more characteristic at the same time.

**Table 2 – Socio-demographic characteristics of long-term NEET and non-NEET**

Characteristic	Non-NEET	NEET
<b>Māori</b>		
Non-Māori	84.1%	72.6%
Māori	15.9%	27.4%
<b>Pasifika</b>		
Non-Pasifika	92.8%	86.5%
Pasifika	7.2%	13.5%
<b>School Qualification</b>		
No Qualification	18.3%	34.4%
NCEA level 1	15.4%	18.7%
NCEA level 2	30.8%	24.4%
NCEA level 3	35.6%	22.5%
<b>NZ Deprivation Index</b>		
1- least deprived	11.4%	7.7%
2	12.4%	7.7%
3	11.4%	6.3%
4	11.0%	9.1%
5	9.0%	8.7%
6	8.6%	8.2%
7	9.0%	11.5%
8	11.0%	11.5%
9	8.1%	11.5%
10-most deprived	8.1%	17.8%
<b>Parents' education</b>		
No Information	10.1%	9.6%
No Qualifications	8.2%	15.4%
School Qualification	13.5%	18.3%
Post School NFD	2.4%	1.4%
Basic and Skilled Vocational	23.1%	22.6%
Intermediate and Advanced Vocational	19.2%	17.8%
Tertiary Qualification	23.6%	14.9%

Table 2 shows that NEETs differ from their non-NEET peers on a number of characteristics. Māori and Pasifika youth are more likely to experience a long-term spell of NEET than non-Māori or non-Pasifika youth. There are high proportions of youth with no school qualifications in the long-term NEET group, which comprise over a third of the NEET sample, compared to 18 percent in the non-NEET group.

NEETs also appear to come from relatively poorly educated families and more deprived neighbourhoods. Over 33% of NEETs have parents with no qualifications or school qualifications only as their highest qualification. Among non-NEETs, just over 21% have parents with no or school qualifications. Almost 30% of NEETs come from the bottom two New Zealand Deprivation Index decile neighbourhoods, compared to just over 16% of non-NEETs. Table 2 highlights that the probability of NEET is affected by a combination of individual, social, economic and environmental factors. Some of these could be interrelated (like low qualifications among Māori and Pasifika), and could have complex interactions. These findings are similar to the findings in previous papers that looked at NEETs in New Zealand, such as Hill (2003) and Dixon (2013).

## 4 Propensity score matching: methodology, model and results

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### 4.1 Methodology

Propensity score matching (PSM) aims to estimate the effect of a treatment, policy or intervention on outcomes controlling for observed confounding factors (Rosenbaum & Rubin, 1983). It is assumed that there are no unobserved characteristics that are associated with both the potential outcome and the probability of treatment ('unconfoundedness') and that suitable control cases can be found/matched for each treated case ('overlap'). Conditioning on the propensity score is sufficient to remove the bias associated with differences in pre-treatment characteristics between the treated and untreated groups. Thus, all systematic differences in outcomes between the treated (long-term NEETs) and control groups are attributable to the treatment or in this present study experiencing a long-term NEET spell.

There are two main steps in PSM methodology (Dehejia & Wahba, 2002). The first is to establish a suitable control group. A logit model is estimated to determine which characteristics predict the 'treatment', whether a youth will experience a long-term spell of NEET. The predicted probability of NEET (propensity score) is calculated and each young NEET is matched to one or more individuals who have similar probability of NEET, but who have not experienced a long-term spell of NEET.

Next, the treatment group are matched using a combination of exact on age group, cohort and sex, and propensity score matching on the remaining characteristics using radius matching with a caliper of 0.02. Self matching is ruled out (matching a young NEET to themselves in a previous year). Balancing tests are then carried out to ensure that young NEETs and the matched control group are sufficiently similar on all observed characteristics. In the second stage, outcomes are compared between NEETs and the control group.

The choice of the PSM model is particularly attractive, because it is possible to perform the matching procedure once and use the matched sample to analyse a variety of outcomes based on a sample of near identical groups.

There are some limitations to PSM that should be highlighted. It is possible that there are some unobservable differences between NEETs and the control group that could be affecting both the probability of being NEET and/or future outcomes. Among others, these unobservable characteristics can include differences in motivation and perseverance, social skills, or attitudes towards work and study. Thus, it is possible that the model does not effectively account for the differences between NEETs and the control group. Another limitation of PSM is that all unmatched comparison units are not included in the subsequent analysis (Dehejia & Wahba, 2002).

Preliminary analysis highlights that long-term NEETs and the control group differ on a number of dimensions. Some long-term NEETs are both very young and have left school with no school qualifications, which makes it particularly difficult to find any individuals in the control group who also left school at a very young age with no qualifications, but who have been active in education or employment. During matching, these differences can lead to some NEETs being matched to individuals who might not be ideal controls, while

some individuals will be completely excluded from the final matched sample based on the unique combination of their characteristics.

## 4.2 Model

This section provides an explanation of the two steps that are involved in the construction of the PSM model, namely the specification of the logit model and the matching procedure. It will explain the variables used in the logit model and the use of exact and propensity score matching in the second stage of the process. The section concludes with a quick explanation of the post-matching steps.

### 4.2.1 Model specification

The variables used in the logit equation reflect characteristics that may affect the probability of experiencing a spell of NEET that is 5 months or longer in duration. Initial analysis (Table 2) points towards differences in characteristics of individuals who experience a long-term spell of NEET and those who do not, consistent with the international and domestic literature covered in Section 2.

In view of this, the logit model is specified to include personal characteristics such as their sex, ethnicity, highest qualification and age group. Ethnicity is used to control for the fact that Māori and Pasifika youth appear to be more likely to become long-term NEET than non-Māori or non-Pasifika youth. Highest qualification is included due to the strong link between education and labour market outcomes. Highest qualification may be a proxy for number of unobservable characteristics such as perseverance and attitude towards further education, which can affect the probability of individuals choosing to pursue further education.

The model also includes individuals' family level characteristics such as their parents' highest qualifications, whether the individual lived with a child of their own, and whether the individual lived with their parent. Parents' highest qualification is a good indicator of lifetime resources that are available to the family of the NEET or the control group. Early parenthood among youth in our sample is extremely rare, both for NEETs and the control group. However, presence of dependent children is likely to have a strong effect on the probability of being NEET as well as on future outcomes and is included in the matching model.

Finally, the model includes two macro and environmental variables: cohort and New Zealand Deprivation Index. Cohort is used to capture the macroeconomic environment faced by youth. Individuals who leave school during an upswing in the economy might find it easier to find a job, leading to shorter amount of time spent as NEET than individuals who might have left school during an economic downturn. New Zealand Deprivation Index captures the complex way in which the neighbourhood can have an impact on individuals' probability of being NEET as well as outcomes. For example, more deprived neighbourhoods might not provide as many opportunities for youth to find suitable employment.

### 4.2.2 Matching

The propensity score (predicted probability) of being a long-term NEET is calculated using the logit model in the first step of the process. In the second step, these propensity scores are used in combination with exact matching on sex, age group and cohort in order to match long-term NEETs with suitable controls.

Exact matching on sex, age group and cohort ensures that individuals are not only matched on their predicted probability of being NEET, but are also matched exactly to individuals of the same sex and in the same age and cohort group.

Matching on propensity score is used to match NEETs and control cases on the remaining characteristics. Radius matching with a calliper of 0.02 was chosen in order to produce high quality matching by using control cases with propensity scores that are very close to the propensity scores of NEETs. The use of radius matching should also eliminate instances where NEETs are matched to unsuitable controls.

One important element of the matching procedure that should be emphasised is the fact that a single individual can act as a control for more than one NEET. In the literature, this is known as matching with replacement (Cameron & Trivedi, 2009). Matching with replacement is advantageous in cases where high quality matches are limited for certain subgroups. The main drawback to matching with replacement comes from potential bias that might be introduced if a small number of individuals are used extensively as controls for a particular subgroup of NEETs.

### 4.2.3 Post-Matching

Up to five randomly chosen control cases are selected for each NEET. In addition to limiting the number of matches to five randomly selected individuals, it is also necessary to account for the uneven number of control cases that are matched to each NEET. In some cases, a NEET might have more than five matches and the number of matches will have to be limited to five. In other cases, due to a small pool of suitable matches, a NEET might have fewer than five matches in total.

One way to adjust for the uneven number of matches is to assign a weight to each control case equal to 1 divided by the total number of matches for each NEET. For a NEET with five matches, the individual weight for each of that NEET's control cases is 0.2 (1 divided by 5). Weighting the control cases in this way means that control cases for NEETs with fewer than five matches will receive a relatively greater weight and will consequently contribute more to the outcome measures than they otherwise would. The sum of weights for a set of controls for each NEET adds up to 1.

In the last post-matching step, balancing tests were performed to determine whether NEETs and controls differed on specific variables. These tests revealed no significant difference between the two groups, which means the two groups are virtually identical based on their observable characteristics.

## 4.3 Matching Results

Table 3 summarises the matching results from PSM for select characteristics. In general, the use of PSM resulted in a very high matching rate between NEETs and controls, with 93% or better match rate achieved among most groups. Therefore, 7% of (the NEET) population were not matched and were discarded.

Table 3 identifies a number of subgroups where the same high match rate was not achieved. In particular, relatively low matching rates were achieved for individuals with no school qualifications or NCEA level 1 qualifications, Māori and for those living in some of the most deprived neighbourhoods (deciles 9 and 10). Relatively low matching rates were also achieved for youth with parents who have no qualifications or school qualifications only. It is possible that these results correspond to a group of youth who simultaneously possess a number of these characteristics, i.e. poorly educated Maori youth who come from poorly educated families that live in the most deprived neighbourhoods. Since there are no effective comparisons that exist within the control group, these individuals have to be excluded from the subsequent analysis. This is likely to lead to a smaller difference in outcomes between NEETs and the control group than would be observed if unmatched NEETs were included in the analysis.

**Table 3 – Propensity Score Matching results**

<i>Characteristic</i>	<i>Matched</i>		<i>Unmatched</i>	
	<i>Count</i>	<i>Percent</i>	<i>Count</i>	<i>Percent</i>
<b>Sex</b>				
Male	312	94.5%	18	5.5%
Female	336	94.1%	21	5.9%
<b>Age Group</b>				
15-17	213	93.4%	15	6.6%
18-19	261	95.6%	12	4.4%
20-24	168	93.3%	12	6.7%
<b>Māori</b>				
Non-Māori	477	97.0%	15	3.0%
Māori	168	87.5%	24	12.5%
<b>School Qualification</b>				
No Qualification	207	89.6%	24	10.4%
NCEA 1	117	92.9%	9	7.1%
NCEA 2	165		S	
NCEA 3	159		S	
<b>Parents' education</b>				
No Information	72		S	
No Qualification	93	88.6%	12	11.4%
School	105	89.7%	12	10.3%
Other Post School	9	100.0%	0	0.0%
Basic and Skilled Vocational	150		S	
Intermediate and Advanced Vocational	111		S	
Tertiary Qualification	102	100.0%	0	0.0%
<b>Dwelling</b>				
Owner Occupied	357	96.0%	15	4.0%
Rented	279	93.9%	18	6.1%
<b>NZ Deprivation Index</b>				
1 - Least Deprived	57	100.0%	0	0.0%
2	51	100.0%	0	0.0%
3	39		S	
4	57		S	
5	60		S	
6	57		S	
7	75		S	
8	72		S	
9	69	85.2%	12	14.8%
10 - Most Deprived	114	90.5%	12	9.5%

## 5 Outcomes: Qualifications, Study, Employment, Benefit Receipt and NEET

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This section describes differences in outcomes between the long-term NEET and control group for employment, study, education, benefit receipt and NEET outcomes two and four years after the initial selection into the sample. The results present the average proportion of NEETs and the control group who were employed or studying, gained a post-school qualification, were NEET or receiving a benefit during the outcome years. The average rates and differences between rates were generated using 634 bootstrap replicate estimations and the 95% confidence interval (C.I.) was calculated using the 2.5<sup>th</sup> and 97.5<sup>th</sup> percentiles (Cameron & Trivedi, 2009). Significant differences between the rates are denoted by an asterisk in the outcomes tables. The absolute difference in rates is calculated by  $(Rate_{Control} - Rate_{NEET})$ . The relative difference in rates is calculated by  $(Rate_{Control} - Rate_{NEET}) / Rate_{Control}$ .

### 5.1 Employment

This section covers two outcomes related to employment: employment rate and duration of employment over a 12 month period. In the first instance, the section compares employment rates of NEETs and the control group after two and four years. Unlike the conventional measure of the employment rate that measures employment at a given point in time, the employment rate in this section shows whether an individual was employed at any given time during the outcome year. Thus, the employment rate captures all and any instances of employment, even if these instances were only for a short period of time. It is also important to note that this measure does not differentiate between part time and full time work.

These results are then supplemented by the analysis of the duration of employment during the outcome years. Given the relatively small sample, employment duration outcomes during the outcome year are aggregated into three categories: short (0-3 months of employment), medium (4-9 months), or long-term (10-12 months). These results provide an indication of the differences in labour market attachment of NEETs and the control group.

Table 4 shows that NEETs are significantly less likely to be employed relative to the control group two years after their initial NEET spell across all age groups. Individuals who experienced a long-term NEET spell between the ages of 20 and 24 experience the largest difference in the probability of being employed relative to the control group, with NEETs 23% less likely, on average, to be employed during the outcome year than their control group peers. Those who experienced a long-term NEET spell between the ages of 18 and 19 are 20% less likely to be employed, while those who were 15-17 are only around 15% less likely to be employed than their peers.



**Table 4 – Employment rate in the 12 months after two and four years**

Age Group	Control		NEET		Significant difference
	%	95% CI	%	95% CI	
<b>Employment after two years</b>					
15 to 17	81.0	(73.7-87.3)	68.8	(62.4-75.1)	*
18 to 19	83.2	(77.7-88.3)	66.9	(61.6-72.4)	*
20 to 24	84.8	(78.0-90.2)	65.7	(57.7-72.5)	*
<b>Employment after four years</b>					
15 to 17	74.5	(66.2-82.2)	68.9	(62.3-74.7)	
18 to 19	76.9	(70.4-82.7)	68.0	(61.8-74.4)	
20 to 24	77.0	(67.1-86.0)	65.2	(57.7-73.9)	

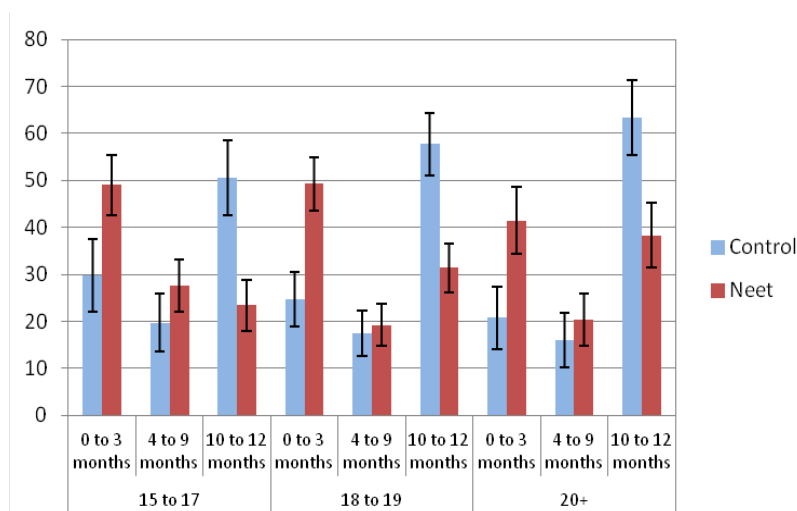
There are also differences in the duration of work in the 12 months of the outcome year. Figure 2 (a) shows that NEETs are significantly more likely to be unemployed or be employed over a short period of time (0-3 months), and much less likely to be working for most of the year (10-12 months). These results are consistent across all age groups.

In contrast to the outcomes after two years, employment outcomes after four years show no statistically significant differences in the employment rate between NEETs and the control group across all ages. Furthermore, results show no differences in duration of employment during the year (Figure 2 (b)). These results suggest that long-term NEETs experience poorer labour market outcomes over the short-term and that these outcomes improve relative to their control group peers over time.

It should be noted that even though these results present an encouraging picture about the relative outcomes of long-term NEETs over the medium term, there are a number of unobserved dimensions that could result in differences in the overall quality of labour market outcomes between long-term NEETs and the control group. Differences may exist in the number of hours worked, the industry of employment, or duties performed by NEETs compared to the control group. Furthermore, analysis in this paper does not address differences in income from paid employment that could persist after four years.

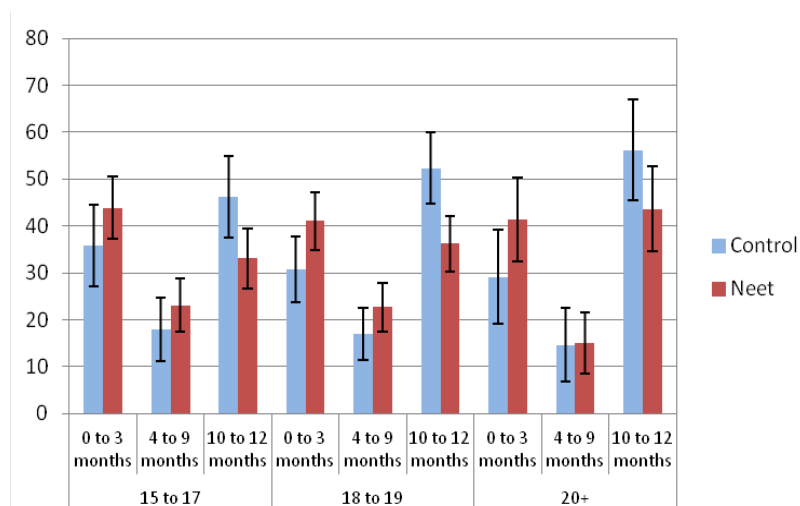
**Figure 2 – Employment duration in the 12 months after (a) two and (b) four years**

(a) two years





(b) four years



## 5.2 Education: Study and Qualifications

This section covers three outcomes with respect to education: study rates, study duration and post-school qualifications gained. The section initially covers study rates and study duration. The latter part of the section covers any qualifications gained by the individual between the year in which they were selected in the sample and the outcome year, two or four years later. Since individuals were originally matched on their highest qualification, highest qualification attainment results only show the new qualifications gained by individuals in either group. Therefore, this measure does not reflect all the qualifications held by the individuals in each age group, only the qualifications gained.

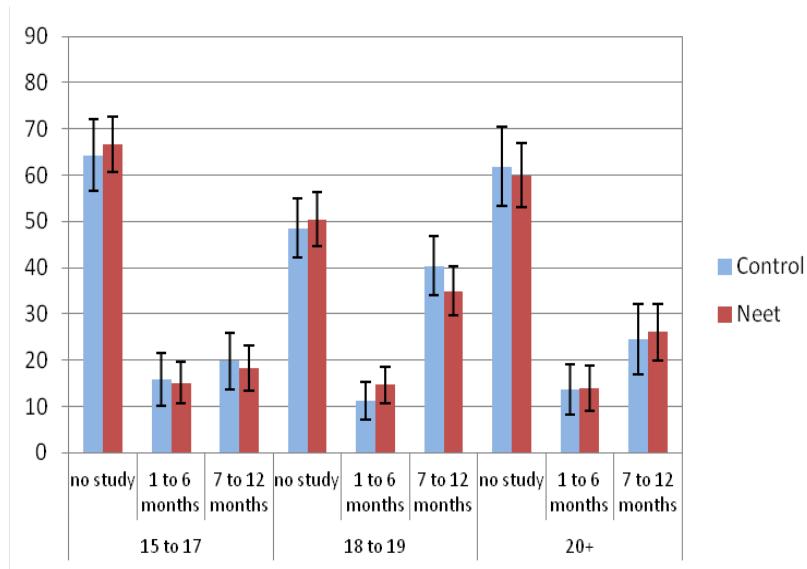
Table 5 and Figure 3 show no significant differences in study rates or study duration between NEETs and the control group after two or four years. There are a number of possible explanations for these results. It is possible that the initial sample selection criteria, which limited NEETs and the control group to individuals who already left school, led to the selection of the control group that has very similar attitudes towards formal study as those held by NEETs. It is also possible that differences in educational outcomes are not visible due to the limitations of the data, which might not be capturing instances where individuals drop out of courses part way through the year. Finally, it is possible that NEETs are as likely to enrol in post-school study, since there are fewer barriers to entering post-school study than there are to finding suitable employment.

**Table 5 – Study rate in the 12 months after two and four years**

Age Group	Control		NEET		Significant Difference
	%	95% CI	%	95% CI	
<b>Studying During the year after 2 years</b>					
15 to 17	35.7	(28.2-43.4)	33.4	(27.2-39.2)	
18 to 19	51.5	(45.2-57.5)	49.6	(43.6-55.6)	
20 to 24	38.2	(30.1-46.5)	40.1	(32.9-47.1)	
<b>Studying During the year after 4 years</b>					
15 to 17	26.1	(18.4-34.4)	19.7	(14.5-25.8)	
18 to 19	36.7	(29.1-44.5)	38.9	(32.5-45.1)	
20 to 24	21.1	(13.5-30.2)	23.2	(15.1-31.7)	

**Figure 3 – Study duration in the 12 months after (a) two and (b) four years**

(a) two years



(b) four years

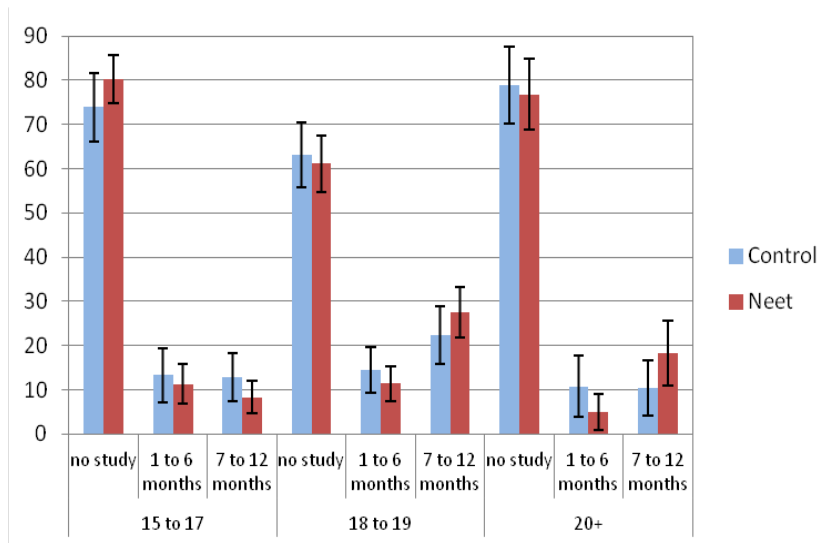


Table 6 presents the highest level of educational qualification gained in the two or four years after initial sampling. There are small numbers of both NEETs and controls gaining a qualification within two years. The results show a significant difference in the highest qualification attained after two years within the 18-19 year old age group, with NEETs being significantly less likely to hold a Bachelor level qualification or above.

However, given the small absolute difference in the qualification attainment rate (around 3%) and the relatively short period of time between the initial selection into the sample and the outcome year, these results could be a reflection of the fact that NEETs may have spent less time studying than their non-NEET peers and might not have had enough time to finish their courses at this point in time.

The results after four years offer additional insight into the difference observed after two years. There is a growing divergence in the highest level of educational qualification gained between the 18 and 19 year old NEET and the control group after four years.

NEETs are less likely to hold a Bachelor degree or above, with the difference in the attainment rate increasing to around 10%. Furthermore, the results show that the 18 or 19 year old NEETs are significantly more likely to hold level 1-3 qualifications after four years. There were no differences in study rates or highest qualification attainment among 15 to 17 year and 20 to 24 year age groups.

**Table 6 – Highest educational qualification gained after two and four years**

Age Group	Control		NEET		Significant Difference
	%	95% CI	%	95% CI	
<b>Highest Qualification gained after two years</b>					
<i>Level 1-3 certificates</i>					
15 to 17	3.8	(1.3-7.5)	3.1	(1.1-5.6)	
18 to 19	2.4	(0.8-4.7)	4.7	(2.4-7.0)	
20 to 24	1.4	(0.2-4.1)	1.9	(0.6-4.0)	
<i>Level 4 certificates or Diplomas</i>					
15 to 17	1.4	(0.2-3.4)	2.3	(0.6-4.2)	
18 to 19	4.0	(1.7-7.1)	3.0	(1.2-5.3)	
20 to 24	3.0	(0.8-6.5)	7.1	(3.6-11)	
<i>Bachelors or above</i>					
15 to 17	0.2	(0.1-0.4)	0.0	(0-0)	
18 to 19	3.4	(1.3-6.1)	0.5	(0.3-1.2)	*
20 to 24	9.8	(5.3-15.2)	5.9	(2.7-9.2)	
<b>Highest Qualification gained after four years</b>					
<i>Level 1-3 certificates</i>					
15 to 17	6.9	(2.9-11.9)	8.0	(4.5-11.9)	
18 to 19	4.5	(1.8-7.8)	9.1	(5.5-12.9)	*
20 to 24	4.0	(0.6-9.0)	3.0	(0.9-6.7)	
<i>Level 4 certificates or Diplomas</i>					
15 to 17	4.4	(1.6-8.3)	3.2	(1.1-5.8)	
18 to 19	8.4	(4.5-13.7)	4.9	(2.4-8.1)	
20 to 24	6.0	(1.8-12.7)	13.1	(6.9-19.8)	
<i>Bachelors or above</i>					
15 to 17	1.6	(0.2-4.0)	0.8	(0.4-1.9)	
18 to 19	18.5	(13.2-24.8)	8.0	(4.3-11.5)	*
20 to 24	21.9	(13.4-31.3)	17.3	(10.9-24.8)	

### 5.3 Benefit Receipt

Results with respect to benefit receipt cover two elements: the rate of receipt of any main benefit and the duration of benefit receipt within the 12 months of the outcome year. The results are limited due to the relatively small sample size that does not allow for the analysis of the types of benefits to be accessed. Furthermore, the benefit data only covers main benefits received by individuals and do not include supplementary benefits, such as the Accommodation Supplement.

**Table 7 – Benefit receipt rate in the 12 months after two and four years**

Age Group	Control		NEET		Significant Difference
	%	95% CI	%	95% CI	
<b>Benefit receipt in a year after two years</b>					
15 to 17	24.7	(18.0-32.5)	39.8	(33.9-45.7)	*
18 to 19	15.8	(11.3-21.1)	37.3	(31.7-42.9)	*
20 to 24	10.2	(5.8-16.2)	33.6	(27.2-40.0)	*
<b>Benefit receipt in a year after four years</b>					
15 to 17	28.7	(21.3-37.5)	49.6	(42.6-57.0)	*
18 to 19	17.3	(11.2-24.6)	32.1	(25.8-38.2)	*
20 to 24	10.4	(4.3-18.0)	30.7	(23.0-38.5)	*

Results after two years (Table 7) show that individuals who experienced a long-term spell of NEET between the ages of 20 and 24 are much more likely (over 200% relative difference) to receive a benefit after two years than individuals in the control group. NEETs in the 18 to 19 year old group are over 100% more likely to receive a benefit than the control group, while those in the 15 to 17 age group are 60% more likely to receive the benefit.

Results after four years (Table 7) show that benefit receipt rates across the age groups in the control group remain roughly unchanged. In contrast, there have been some changes in the benefit receipt rates among the long-term NEET age groups. There is a 10% increase in the NEET 15 to 17 year age group receiving some form of benefit during the year four years after their initial NEET spell. Other NEET age groups experienced minor reductions in the rate of benefit receipt.

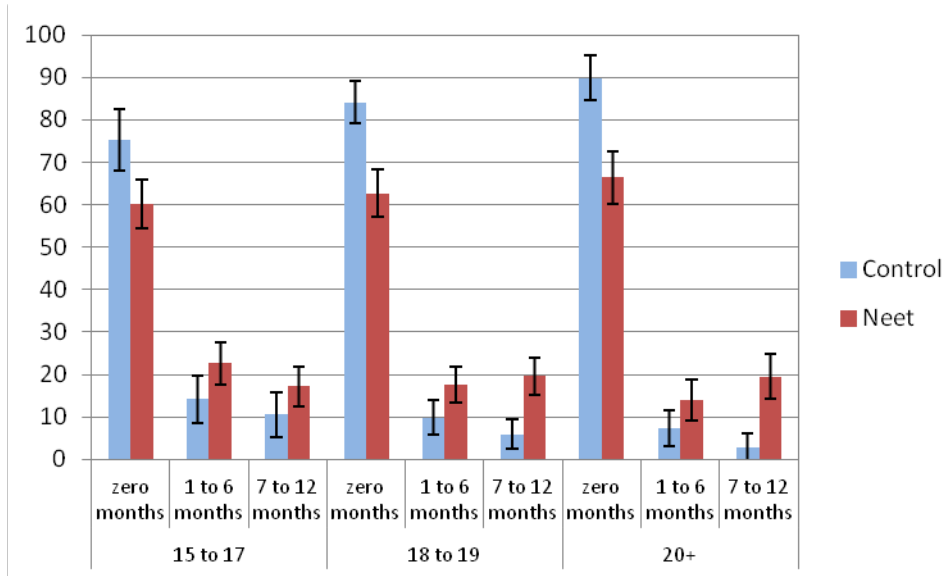
Figure 4 highlights differences in the duration of benefit receipt between long-term NEETs and the control group in the 12 months two and four years after their initial spell. As highlighted in Table 7, there are significant differences between the control and NEET groups who received no benefit during the outcome year, with higher rates of no benefit receipt in the control group. There are also differences across the age groups. For the older age groups, both the 18 to 19 year and 20 to 24 year age groups, the NEET group are not only more likely to be receiving some form of benefit, but they are also more likely to receive it over the longer term (7 months or more).

Benefit receipt duration results after four years exhibit similar trends. The only notable difference in the duration results after four years can be observed for the 15 to 17 year old age group. Long-term NEETs in this group are significantly more likely than the controls to be receiving a benefit over the longer term. No such difference was observed in the two year outcomes.

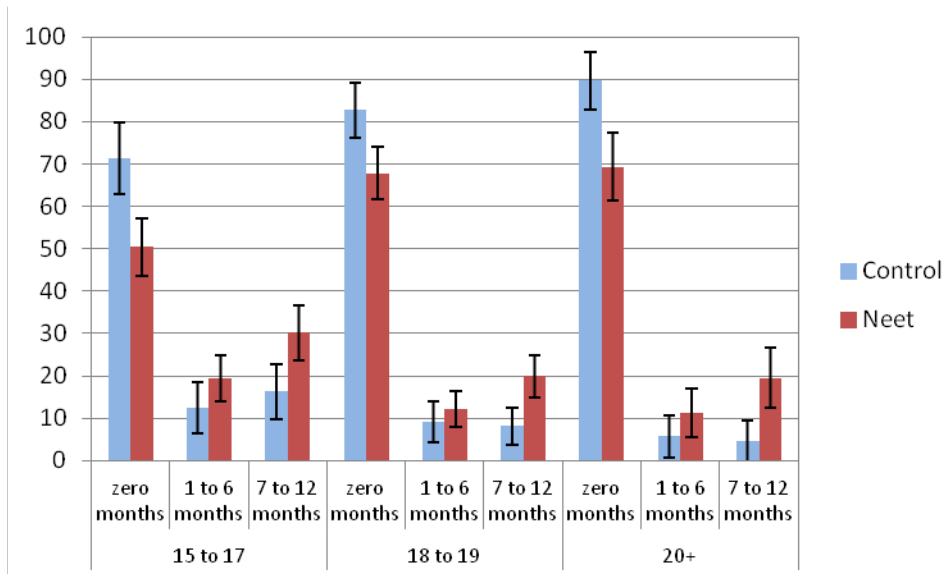
Overall, the results with respect to benefit receipt show that individuals who experience a long-term NEET spell experience poorer outcomes than their peers and that these outcomes do not improve in any substantial way over the medium term. These results suggest that any long-term disengagement from formal study or work can lead to greater benefit dependence in later life.

**Figure 4 – Benefit duration in the 12 months after (a) two and (b) four years**

(a) two years



(b) four years



## 5.4 NEET

This section explores whether long-term NEETs are more likely than the control group to experience spells of NEET in the future, two or four years after the initial spell. It also presents the duration of NEET spells during the outcome years.

**Table 8 – NEET rate in the 12 months after two and four years**

Age Group	Control		NEET		Significant Difference
	%	95% CI	%	95% CI	
<b>NEET During the year after 2 years</b>					
15 to 17 yrs	56.3	(47.9-64.6)	77.0	(71.4-82.5)	*
18 to 19 yrs	41.7	(35.1-48.1)	68.3	(62.7-73.4)	*
20+ yrs	40.5	(32.4-49.0)	64.5	(57.3-71.2)	*
<b>NEET During the year after 4 years</b>					
15 to 17 yrs	58.4	(49.8-67.7)	71.9	(66.0-78.0)	
18 to 19 yrs	50.6	(42.6-58.8)	60.4	(54.2-65.9)	
20+ yrs	45.9	(35.0-56.5)	58.2	(49.0-67.0)	

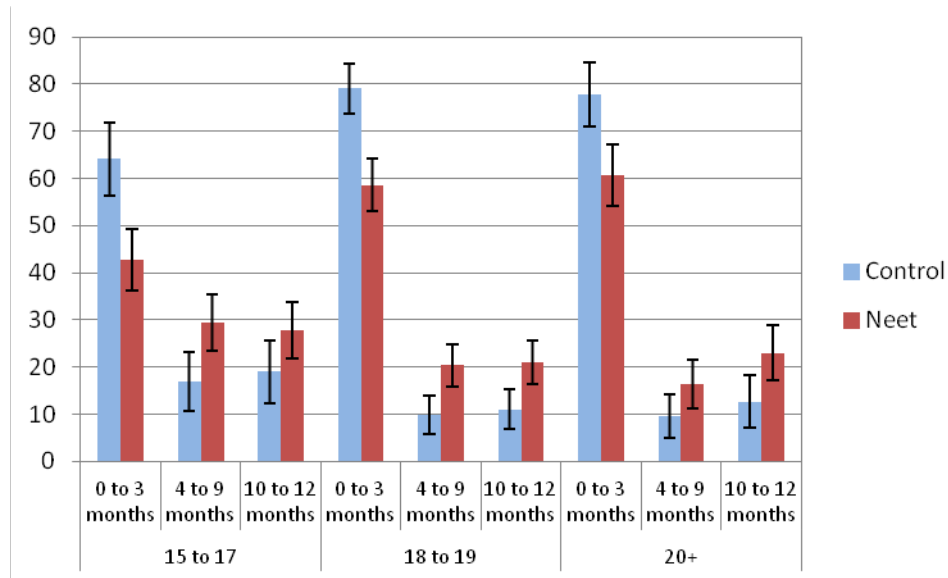
Results in Table 8 and Figure 5 show that individuals who experience a long-term spell of NEET are much more likely to experience another spell of NEET two years later, compared to their control peers. Long-term NEETs in the 20 to 24 year old age group are around 60% more likely to be NEET after 2 years, while those in the 18 to 19 year old age group are around 64% more likely to be NEET after 2 years than individuals in the control group. Although the rate of NEET is high in the NEET 15 to 17 year old age group they are only 37% more likely to be NEET two years after their initial NEET spell compared to individuals in the control group.

Results after four years show a strong convergence in outcomes between the long-term NEET and control groups, with no significant differences observed in either the NEET rate or duration. Convergence between the groups appears to be due to two effects. The NEET rate among the long-term NEET group appears to decline between two and four years, particularly so for the 18 to 19 year old age group. At the same time, it appears that outcomes for the control group deteriorate a little during the same period.

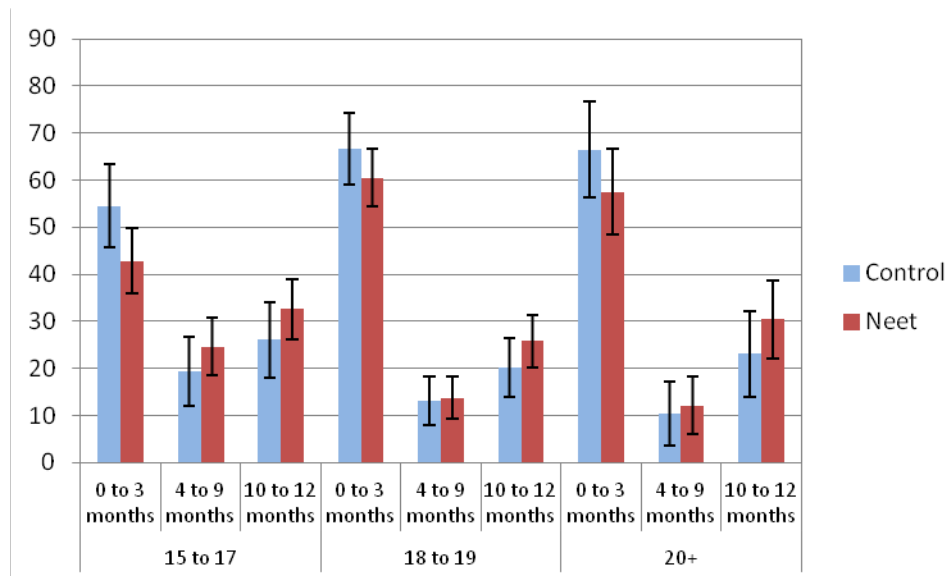
Looking at the duration of NEET (Figure 5) shows that long-term NEETs in the youngest age group are more likely to experience spells of NEET that are longer than three months in duration two years after their initial NEET spell. Convergence in outcomes between the long-term NEET and control groups can also be seen after four years, with no differences in outcomes between the initial NEET and control groups.

**Figure 5 – NEET duration in the 12 months after (a) two and (b) four years**

(a) two years



(b) four years



## 6 Discussion

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This paper examined the outcomes of youth not in education, employment or training (NEET) up to four years after the initial long-term spell (period) of NEET. These outcomes are compared across NEETs and a matched control group using Propensity Score Matching to control for a wide range of individual, family and environmental characteristics. This approach controls for the underlying differences in observable characteristics between NEETs and the control group to explore the differences in outcomes between these two groups.

The biggest limitation of this approach comes from potential unobservable differences that may exist between NEETs and the control group, which could affect both the probability of being NEET and some, if not all, of the outcomes. These unobservable characteristics can include differences in motivation and perseverance, social skills, or attitudes towards work and study. Wider economic conditions, such as the strength of the local labour market, may also have an impact on the reported outcomes. Thus, the results in this paper should be viewed with these limitations in mind.

Our findings highlight a number of differences in outcomes of long-term NEETs when compared to the control group. There are significant differences in the employment and NEET rates as well as in the rate of benefit receipt after two years. Although no differences are found in post-school study rates, small differences in the highest qualifications gained by NEETs and the control group are observed after two years.

Looking at the outcomes after two years across the age groups, the older age groups, who experienced a long-term NEET spell between the ages of 18 and 24, experience the biggest differences in the two year outcomes compared to their peers. Individuals who experienced a long-term NEET spell between the ages of 20 and 24 are, on average, around 23% less likely to be employed, almost 60% more likely to experience another NEET spell and over 200% more likely to receive a benefit than individuals in the control group. Similarly, those who experienced a long-term spell of NEET between the ages of 18 and 19 are around 20% less likely to be employed, almost 64% more likely to be NEET and are 136% more likely to receive a benefit than their peers. In contrast, individuals who experienced a long-term NEET spell between the ages of 15 and 17 are, on average, 15% less likely to be employed, around 21% more likely to be NEET and 61% more likely to receive a benefit than their non-NEET peers.

While there are small differences in the relative outcomes of the long-term NEETs in the youngest age group compared to the controls, youth who left school before the age of 18 (irrespective of whether they were NEET or not) tend to have worse outcomes compared to the older age groups. Individuals from the youngest age group are less likely to be studying, and are more likely to be NEET or receiving a benefit than individuals in the older age groups. These differences point to a lower overall level of activity and suggest that individuals who left school at a young age (15 to 17) are less likely to be engaged in formal study or work than individuals in the older age groups throughout the two year outcome period. However, this may be due to the fact that outcomes are observed at different ages.



Results after four years show convergence across a range of outcomes between the long-term NEETs and the control group. No significant differences were observed in the employment, study or NEET rates between the long-term NEETs or the control group. The only significant differences emerge in the highest qualifications gained after four years and in the rate of benefit receipt.

Convergence in employment and NEET outcomes between the long-term NEET and the control group could potentially reflect the long term distribution of these outcomes. More specifically, it is possible that long-term outcomes across the two groups would be similar due to the strong similarities in the underlying characteristics of the two groups through the initial matching process. It may be that the outcomes of the NEET and control group are regressing towards a common distribution of employment and NEET outcomes over a longer period of time.

It is also possible that there may be unobservable differences in employment outcomes between the two groups, such as differences in income, hours worked, industry, or work-related duties, that weren't picked up in the current analysis.

Outcomes with respect to highest qualification gained after four years show that long-term NEET in the 18 to 19 year old age group are significantly less likely to have gained a Bachelor level qualification or above. Individuals in this age group are also more likely to have gained a level 1 to 3 qualification during the four year outcome period. These results suggest that individuals who become long-term NEET at the age of 18 or 19 may not view a Bachelor level qualification as the next step in life.

Any differences between long-term NEETs and controls in the type of highest qualification gained might not necessarily be a negative outcome for the individual, considering that individuals might have gained a Level 1 to 3 qualification to improve their productivity within their chosen industry.

For 15 to 17 year olds, the fact that individuals in both NEET and the control groups both left secondary school at a young age could indicate early disengagement from formal education or training, resulting in the lowest study rate among the three age groups. Low study rates among 15 to 17 year olds are then reflected in the highest qualifications gained after four years, with a relatively small proportion of 15 to 17 year olds having gained a post school qualification at the end of the observation period.

Persistent differences in the rate and duration of benefit receipt between the long-term NEET and the control group could be due to a number of reasons. Firstly, these results could be an indication of lower income earned by long-term NEETs due to a more tenuous hold on the labour market, poor pay or low number of hours worked. Secondly, these results could reflect a greater tendency by long-term NEETs to access some type of benefit, even if both groups are equally eligible to receive benefit support from the Government. Simply put, the control group could have the same number of individuals who could qualify to receive benefit as the long-term NEET group. However, greater exposure to benefit receipt in the past could make long-term NEETs relatively more likely to apply for benefit in the future (Hill, 2003).

Overall, these results show that outcomes of the long-term NEET are as varied as the group itself. Long-term NEETs in older age groups appear to experience relatively poorer outcomes compared to their peers than long-term NEETs in the younger age groups. However, the results also show that any individuals who leave school between the ages of 15 and 17 are likely to experience some of the worst outcomes over the longer term.

Further research into labour market and study dynamics, income dynamics and longer term outcomes (more than four years) could add further insight into the challenges faced by various groups described in this paper. Administratively linked survey data is particularly useful in studying differences in income, because it provides a higher resolution view of the labour market interactions of the long-term NEET and the control group.

Future research could look into pathways taken by NEETs and the control group to better understand the longer term dynamics of these individual groups and broader age groups as a whole. This will enable the examination of the differences in the pathways and trajectories from the initial state e.g. whether an individual who was long-term NEET cycles in and out of NEET and/or benefit receipt more often than their controls. This type of analysis may also help to identify the cohort of individuals experiencing persistent disadvantage over a period of time. It may also identify which specific characteristics of NEET are more likely to lead to poor outcomes in the future.

Looking at longer term outcomes could show whether low qualification attainment in the youngest age group (15 to 17 year old) persists in the long run. It could be beneficial to compare highest qualifications gained by individuals in the youngest age group to qualifications gained by individuals in the older age groups at the same point in time (at age 25, for example).

Analysis in this paper did not evaluate any of the existing policy interventions that target youths between the ages of 15 and 24. Given the substantial investment in programmes to address issues raised in this paper, greater focus should be given to evaluating whether current programmes are sufficiently targeted to those in need of assistance and lead to better education and employment outcomes.

## References

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- Arulampalam, W., Gregg, P., & Gregory, M. (2001). Unemployment Scarring. *The Economic Journal*, 111.
- Cameron, A. C., & Trivedi, P. K. (2009). *Microeconometrics: Methods and Applications*.
- Carroll, N. (2006). Explaining Unemployment Duration in Australia. *Economic Record*, 82(258), 298-314.
- Cockx, B., & Picchio, M. (2011). Scarring Effects of Remaining Unemployed for Long-Term Unemployed School-Leavers. *CESifo Working Papers*.
- Dehejia, R., & Wahba, S. (2002). Propensity score matching methods for non-experimental causal studies.
- Dixon, S. (2013). Not in Employment, Education or Training: the long-term NEET spells of young people in New Zealand.
- Genda, Y. (2007). Jobless Youths and the NEET Problem in Japan. *Social Science Japan*, 10(1), 23-40.
- Gregg, P., & Tominey, E. (2005). The Wage Scar from Male Youth Unemployment. *Labour Economics*, 12(4).
- Gregory, M., & Jukes, R. (2001). Unemployment and Subsequent Earnings: Estimating Scarring among British Men 1984-94. *The Economic Journal*, 111.
- Hill, J. (2003). *Young People Not in Education, Training or Employment: Key Indicators*: Ministry of Social Development.
- Maloney, T. (2004). Isolating the scarring effects associated with the economic inactivity of youth in New Zealand: Evidence from the Christchurch Health and Development Study.
- Mascherini, M., Salvatore, L., Meierkord, A., & Jungblut, J.-M. (2012). NEETs. Young people not in employment, education or training: Characteristics, costs and policy responses in Europe.
- Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41-55.
- Spielhofer, T., Benton, T., & Evans, K. (2009). *Increasing Participation: Understanding Young People who do not Participate in Education or Training at 16 and 17*: Department for Children, Schools and Families.
- Statistics New Zealand (2011). Introducing the youth not in employment, education, or training indicator.
- Statistics New Zealand (2013). Introduction to the Integrated Data Infrastructure 2013.