

# **The Relationship between Research Achievement of Academics and Student Labour Market Outcomes**

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## **Abstract**

Our study examines the effect of being taught by “research-active departments” on the labour market outcomes of university students. We use detailed data from all New Zealand universities to investigate the effect of department/subject-specific research activity on student labour market status (while controlling for high school achievement). We categorise labour market status into four categories – being on benefit, paid employment, further studies, and other (including being overseas). We then measure the impact of university departments’ research activity six years after the students enrolled themselves in a Bachelors programme. We use a multinomial logit model to estimate whether there are any effects of being taught by research-active academics on student employment outcomes, and if so, what sign and size they are. The primary source of data on the research activity of individual university academics and the departments of majoring subjects is the Performance-Based Research Fund (PBRF). Our primary source of data on student destinations and various student characteristics is the Integrated Data Infrastructure (IDI) database maintained by Stats NZ. Our results show that there is no systematic difference between more research-active and less research-active departments in terms of students’ labour market outcomes.

**Keywords:** Research, University Teaching, Labour Market Outcomes

**JEL codes:** I23, I26

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## **Stats NZ Disclaimer**

### Disclaimer for output produced from Stats NZ surveys or Census data

Access to the data used in this study was provided by Stats NZ under conditions designed to give effect to the security and confidentiality provisions of the Statistics Act 1975. The results presented in this study are the work of the author(s), not Stats NZ or the Ministry of Education.

### Disclaimer for output produced from the IDI

These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI) which is carefully managed by Stats NZ. For more information about the IDI please visit <https://www.stats.govt.nz/integrated-data/>.

### Disclaimer for Inland Revenue tax data

The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994 for statistical purposes. 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.

## 1. Introduction

The relationship between research and teaching is a topic of particular interest in higher education. If nothing else, knowing if there is a link between teaching and research has important implications for how universities are organised and funded. Given that the New Zealand Tertiary Education Commission (TEC) spends \$1.8 billion on universities, the potential budgetary implications are large (Ministry of Education, 2018). One manifestation of the claimed link between research and teaching, which underpins how universities are funded and organised, is the emphasis on what is termed research-informed teaching. This is stated clearly in the Education Act 1989, section 162, subsection 4(a)(ii) and within universities (Ministry of Education n.d., Universities NZ – Te Pōkai Tara 2019). The underlying belief is that teaching is positively affected by research activities of academics. However, theoretical and empirical studies find that the existence - or the sign - of this link is not so clear-cut (Quiggin, 2004; Hughes, 2004; Docherty, 2010; Epstein and Menis, 2013).

The aim of our study is to investigate the link between research and teaching outcomes with a rich, national, individual-level New Zealand dataset. Specifically, our study aims to analyse whether research-active departments produce better teaching outcomes for students. We use labour market status of the students as a proxy for teaching quality given the difficulties in measuring teaching quality directly.

A key strength of our study is its wide, national coverage. Specifically, we use student-level data for all Bachelor students studying at the eight universities in New Zealand. Our measure of the research productivity of academics teaching at these universities is based on Performance-Based Research Fund (PBRF) assessments of NZ academics obtained from the Tertiary Education Commission (TEC). We merge IDI student outcomes with PBRF research outcomes of academics according to subject areas (as proxies for departments). This contrasts with the existing literature which generally focuses on a single university while linking research and teaching outcomes (e.g., Artés et al., 2016; Rodríguez and Rubio, 2016; Palali et al., 2018).

## **2. Background**

### *2.1. Conceptual Framework*

In theory, there is an ambiguous effect of research activities of academics on student outcomes. On the one hand, undertaking research might boost critical thinking skills of academics, making them more productive (Healey, 2005). As a result, even if they have to divide their limited time and resources between teaching and research, research makes them more productive teachers. For this reason, they need less time to prepare for lectures, instructional materials and so forth. Moreover, they can incorporate up to date information in their lectures and hence make classes more relevant and interesting. The fact that research-active staff can relate theoretical knowledge to real-world applications augments the curiosity of their students, building their passion for the subject and their field. This can enhance the attendance rates and attentiveness of students and their overall learning experience (Elton, 2001). This, in turn, may improve their university and subsequent outcomes. Being taught by active researchers may also impart various transferrable skills to students, for instance, problem-solving skills, being organised, being goal-oriented, and being diligent. Research-active staff might also provide an opportunity for their students to assist them in their projects, thus broadening their horizons which might increase their employability. All of these factors can play an influential role in what students accomplish in and beyond university.

On the other hand, the relationship between research and teaching outcomes may also be negative (Ramsden and Moses, 1992, Bak and Kim, 2015). Since academics are required to perform both research and teaching (and service) at the university level, they need to choose how much of their scarce time and effort to expend on these activities. If academics spend more time on research, then they may spend less time teaching students, particularly undergraduate students. For example, research-busy academics might give less personal attention to students or delegate some of their responsibilities to less experienced and knowledgeable teaching assistants (McNay, 1998). In order to reduce teaching effort and time, they might also continue to use past and outdated teaching materials. The choice to substitute research effort for teaching effort is due to the opportunity cost that spending time has in terms of lost research output. Since the modern university system places a high emphasis on university rankings, and rankings are largely determined by research output, universities may reward research more than teaching (Ramsden et al., 1995; Grunig 1997). Consequently, the opportunity cost of time and effort spent teaching is high in terms of the foregone rewards from research.

Another possibility is that being educated in a research-active department/university helps students but not necessarily via teaching. For example, an organisation doing more research may be more difficult for low ability students to be admitted into or to successfully complete a qualification at and thus actually coming out with a qualification from a more research-active department signals that the student is a high ability student even if the education itself did little to enhance his/her abilities. Possession of a degree rather than years spent leading up to a qualification may signal the pre-existing abilities and productivity of a student and hence impact the hiring decisions of employers (Gibson, 2000). This signalling effect was first described by Arrow (1973) who explained that higher education is used as a ‘screening device’ by the buyers of labour. These findings are reinforced by Belman and Heywood (1997) who establish that degrees signal productivity of labour. Moreover, better researchers can write more influential reference letters for their graduates and thus place them in better jobs. Finally, since research attracts money, a research-active department/university might have better resources and facilities, such as student support services and infrastructure, that can improve student achievement.

Lastly, it is important to note that while teaching may benefit from research, there can also be reverse causality, as recognised by Becker and Kennedy (2005). This relationship is also established by Mankiw (1998), Newby (1999), and Jenkins and Healey (2005) who argue that critical thinking and new ideas are sparked in researchers through direct contact with students while preparing lectures, teaching and discussion with students. The research output produced by students in their coursework and the assistance they provide to academics may also contribute positively to research.

An extensive previous literature is available on the link between research productivity and teaching quality, though only a limited number of studies have also investigated the link between teaching quality and subsequent student outcomes (Braga, Paccagnella and Pellizzari, 2016). A short summary of the evidence on the overall effect of research on teaching is very mixed, with some studies finding a positive link (Wood and DeLorme Jr, 1976; Neumann, 1992; Smeby, 1998; Artés et al., 2016; Rodríguez and Rubio, 2016), others a negative one (Boyer, 1987, 1990; Ramsden and Moses, 1992; Clark, 1997), and some suggesting that the two scholarly activities are largely independent (Feldman, 1987; Hattie and Marsh, 1996; Melland, 1996; Hattie and Marsh, 2004). There is also some evidence suggesting that the relationship between teaching and research differs across disciplines, the level of study, workload allocations, faculty-student ratios and institutional settings (Smeby, 1998; J M

Consulting, 2000; Palali, et al., 2018). For example, some studies from New Zealand (Robertson & Bond, 2005) and Australian universities (Neumann, 1994) concluded that postgraduate students benefit from academics' research while undergraduate students may suffer because of staff unavailability.

In our paper, we hope to contribute to the literature by using a rich, individual-level dataset on all undergraduate students in New Zealand to evaluate the impact of research carried out by academics on the labour market outcomes of their students. The underlying idea being that if research activity does have an impact on students' learning and labour market attractiveness, it should be reflected in subsequent labour market outcomes.

## *2.2. Performance Based Research Fund*

To obtain a measure of research performance for all academics/academic departments in New Zealand, we rely on data from the TEC for the Performance-Based Research Fund (PBRF) scheme. PBRF, introduced in 2003, is a New Zealand Government initiative which aims to promote excellence in research at New Zealand tertiary education organisations (TEOs). To achieve this, PBRF comprehensively assesses – and allocates funding based on - the quality of research conducted by each academic as well as other indicators of research performance of each TEO as a whole.

Specifically, three measures form the final PBRF score: Quality Evaluation (60% weight during our sample period), Research Degree Completions (25%), and External Research Income (15%)<sup>1</sup>. Our research focuses on the Quality Evaluation component of the PBRF only. Four Quality Evaluation rounds have been conducted so far, in 2003, 2006, 2012, and 2018. We restrict our study to two rounds, 2003 and 2012. We exclude the 2006 evaluation which was a partial round only, meaning that academics did not have to submit their research portfolios and generally only did so if they did not submit a portfolio in 2003, wanted to (re)submit their portfolio in a different subject area, or wanted their portfolio to be reassessed (Tertiary Education Commission, 2007). The 2018 wave was ongoing at the time of our data collection and so not ready for analysis.

For the purposes of the Quality Evaluation, each academic in New Zealand has to submit an evidence portfolio which is then examined and assessed by an expert peer review panel formed by senior academics from their discipline. During our study period, academics were

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<sup>1</sup> These weights have recently changed. Specifically, from 2016, Quality Evaluation gets a weight of 55%, Research Degree Completion 25% and External Research Income 20% (Tertiary Education Commission, n.d.)

expected to include three elements in their evidence portfolios: ‘research output’, ‘peer esteem’ and ‘contribution to research environment’ (Buckle & Creedy, 2018). Based on their assessment of each evidence portfolio, the panels finally assign each staff member a Quality Category: A, B, C, or R. Academics with an A grade are perceived as excellent researchers while R is awarded to academics who are evaluated as being research inactive (be it due to their teaching-only contracts or otherwise). Additional categories of C(NE) and R(NE) were introduced in 2006 and NE here stands for New and Emerging researchers in appreciation of the time that it takes for new researchers to establish their work and reputation in an academic field.

### *2.3 Labour Market Status of the Students*

In this paper, we measure student outcomes as student labour market destinations six years after the students enrolled themselves in a Bachelors or a STAR<sup>2</sup> programme. Following the procedure used in the Ministry of Education study of the destinations of young graduates (Park, 2014), we categorise labour market status into four categories – receiving a benefit, being in paid employment, being in further studies, and other (including being overseas)<sup>3</sup>. We also follow the methods employed by Park (2014), Scott (2018), Bouchard, Cheung, & Pacheco (2020), Pacheco, Li, & Cochrane (2017), Merwood (2013), Sin, Dasgupta, & Pacheco (2018), Pacheco & Plum (2020), Sin, Dasgupta, & Pacheco (2018), Zinovyeva (2007), Tumen, Dixon, & Crichton (2018) and Urwin & Di Pietro (2005) to select the labour market outcomes for the analysis in this study. Benefit payments include Family Support Tax Credit (FSTC) received from the Ministry of Social Development (MSD). These payments are in place to support eligible families with dependent children based on their yearly income and circumstances (Ministry of Social Development, 2021). Our primary source of data on student destinations and various student characteristics is the Integrated Data Infrastructure (IDI) database maintained by Stats NZ. Specifically, we use the tertiary education (course enrolment and qualification enrolment) and Inland Revenue (IR) tax datasets.

We divide the outcomes/student destinations into four major categories in the sixth ‘tax year’ from the year they enroll themselves in formal tertiary education. Columns 1 and 3 of Table 1

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<sup>2</sup> The Secondary Tertiary Alignment Resource (STAR) programme is designed for Year 12 and 13 secondary students in New Zealand to enrol for first-year university-level courses.

<sup>3</sup> Please note that our categorisation is slightly different from the MOE study as we do not use overseas data to conduct our analysis. Therefore, we group the students going abroad with other residual students.

show how each first year of tertiary education enrolment is aligned to the corresponding sixth tax year<sup>4</sup>.

*Table 1: Alignment of Cohorts with the Sixth Tax Year*

<b>First Year of Formal Tertiary Studies</b>	<b>Calendar Year of Interest (Qualification Enrolment Dataset)</b>	<b>Tax Year of Interest (IR Data) (year ended 31<sup>st</sup> March)</b>
1998	2004	2005
1999	2005	2006
2007	2013	2014
2008	2014	2015

### *2.3.1 Assigning Students' Labour Market Destinations*

In the sixth tax year, we categorise each student in our sample dataset into four labour market states: receiving a benefit, being in paid employment, in further studies, and other (including overseas). Although students can belong to multiple destinations simultaneously, we assign them a unique category in the following manner.

Receiving a benefit – If the income source is identified as 'benefit' in the Inland Revenue tax data at any point of time in the sixth tax year, we assign former students to the 'being on benefit' category.

Paid Employment – The New Zealand Ministry of Education (Park, 2014) defines the criterion for falling into a 'paid employment' category in terms of a minimum number of months worked (four months or more in a tax year). However, we amend this criterion to be in terms of earnings. This is because the Inland Revenue tax data contains information only on monthly (and total) earnings from different income sources in a tax year but does not contain information on hours worked or hourly wages. This means an individual could only be working casually or for a short duration in a month, but the monthly earnings will show a positive amount in the tax dataset. Therefore, in order to define this criterion more meaningfully, we outline it in terms of a threshold level of earnings. Our criterion is as follows: we consider students who are not already classified in the benefit category and who receive any of the following sources of income: (1) wages and salaries; (2) company/director shareholder income; (3) partnership income; (4) sole trader income; (5) paid parental leave payments; (6) accident compensation; and/or (7) self-employment income (8) withholding tax deducted payments

<sup>4</sup> Please note that we aggregate years 1998 and 1999 to align to the 2003 PBRF wave. Similarly, we aggregate years 2007 and 2008 to map them to the 2012 PBRF wave.



(WHP) for this category<sup>5</sup>. This means we exclude benefit, pension and student allowance payments from MSD, and rental incomes when calculating the total earnings of individuals. We define the cut-off limit as NZ\$4,810 in 2005/2006 tax years or NZ\$7,280 in 2014/2015 tax years for a student to be assigned the paid employment category. We define the minimum earnings thresholds in a way that the students are receiving at least one-third of an annual income<sup>6</sup> for working full-time<sup>7</sup> on the minimum wage in the respective tax years.

#### Threshold level of earnings

$$= (\text{number of hours worked in a week} \times \text{number of weeks in a year} \\ \times \text{minimum wage per hour for that tax year}) \div 3$$

For instance, if an individual works for 30 hours in the tax years 2005 and 2006, they will earn a minimum of NZ\$4,810 =  $[30 \times 52 \times \{(9+9.50)/2\}]/3$  where NZ\$9 and NZ\$9.50 are the minimum wage rates for the years 2005 and 2006, respectively. In order to define this threshold, we took an average of the minimum wage rates for the years 2005 and 2006 (Employment New Zealand, 2021). Similarly, for the tax years 2014 and 2015: threshold level of earnings = NZ\$7,280 =  $[30 \times 52 \times \{(13.75+14.25)/2\}]/3$  where NZ\$13.75 and NZ\$14.25 are the minimum wage rates for the years 2014 and 2015, respectively. Similar to the previous threshold, we took an average of the minimum wage rates for the years 2014 and 2015 (Employment New Zealand, 2021).

Table 2 shows the proportions of students falling into different income thresholds for each year. While approximately 61% of individuals earned at least NZ\$4,810 in the 2005/2006 cohort, the proportion of individuals earning more than NZ\$7,280 is approximately 64% in the 2014/2015 cohort. This increase in the proportion of individuals earning more than the threshold level of income in the later cohort may be partly due to the dairy boom from the year 2006 onwards (Wheeler, 2014), Canterbury rebuild post-earthquake, and higher net migration flows (The Treasury, 2014). Also, apart from the increase in the minimum wage, the average weekly earnings also increased from NZ\$815 in 2005 to NZ\$979 in 2015 (Stats NZ, 2021).

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<sup>5</sup> Our approach of including these sources of income is in alignment with MOE's criterion of defining 'paid employment' category.

<sup>6</sup> Following MOE's study (Park, 2014), we take a minimum one-third of the earnings as they define this threshold as at least four months in a tax year.

<sup>7</sup> Stats NZ define working full-time for statistical purposes as working 30 hours or more per week for paid income of some form (Employment New Zealand, 2021).

Table 2: Number and Proportion of Students in Different Income Thresholds

Tax Year	Earnings ≥ \$4,810	Earnings ≥ \$7,280	Totals		%	
			Earnings ≥ \$4,810	Earnings ≥ \$7,280	Earnings ≥ \$4,810	Earnings ≥ \$7,280
2005	1,467	1,386				
2006	2,856	2,697	4,323	4,083	60.70	57.33
2014	9,357	9,357				
2015	10,050	10,053	19,407	19,410	64.21	64.22

Note: The different cut-off amounts for different years reflect changes in minimum wages.

Further Study – Students who are not classified as receiving a benefit or being in paid employment and who enrol themselves in formal tertiary education in the sixth tax year from the year they had enrolled in a formal Bachelors or a STAR programme, are classified as being in further study. In order to capture student destinations in a synchronised way from the qualification enrolment and IR tax datasets, we align the qualification enrolment years (in calendar years) with the tax years (please refer to Table 1).

Other/unknown (including overseas) – Students who do not meet the criteria for any of the above classifications, whether the IDI data does not exist for them, or they went overseas, we classify as in the other/unknown category.

To illustrate how the categorization works, consider five hypothetical students – Alex, Yin, Mary, Kirdan and Olivia.

Scenario 1: Alex, whose first year of formal tertiary enrolment was 2008, studies for 6 months in the 2015 tax year and finishes studies in the middle of this tax year. She then starts working and during the last 6 months of 2015 earns NZ\$ 30,000. Since she is not on benefit during any point of time in 2015 and earns more than NZ\$ 7,280, she is classified in the ‘paid employment’ category.

Scenario 2: Now consider Yin whose first year of formal tertiary enrolment is 1999. Yin initially works in the tax year 2006. However, he loses his job early in the year and starts receiving a benefit. He then finds a job again later in 2006. Let us suppose that he earned NZ\$ 5,000 in the earlier job and after re-employment earned NZ\$ 30,000. Although the total amount of earnings for Yin in the tax year

2006 is more than NZ\$ 4,810, since he was on benefit (even if shortly) during this year, he is classified in the ‘benefits’ category.

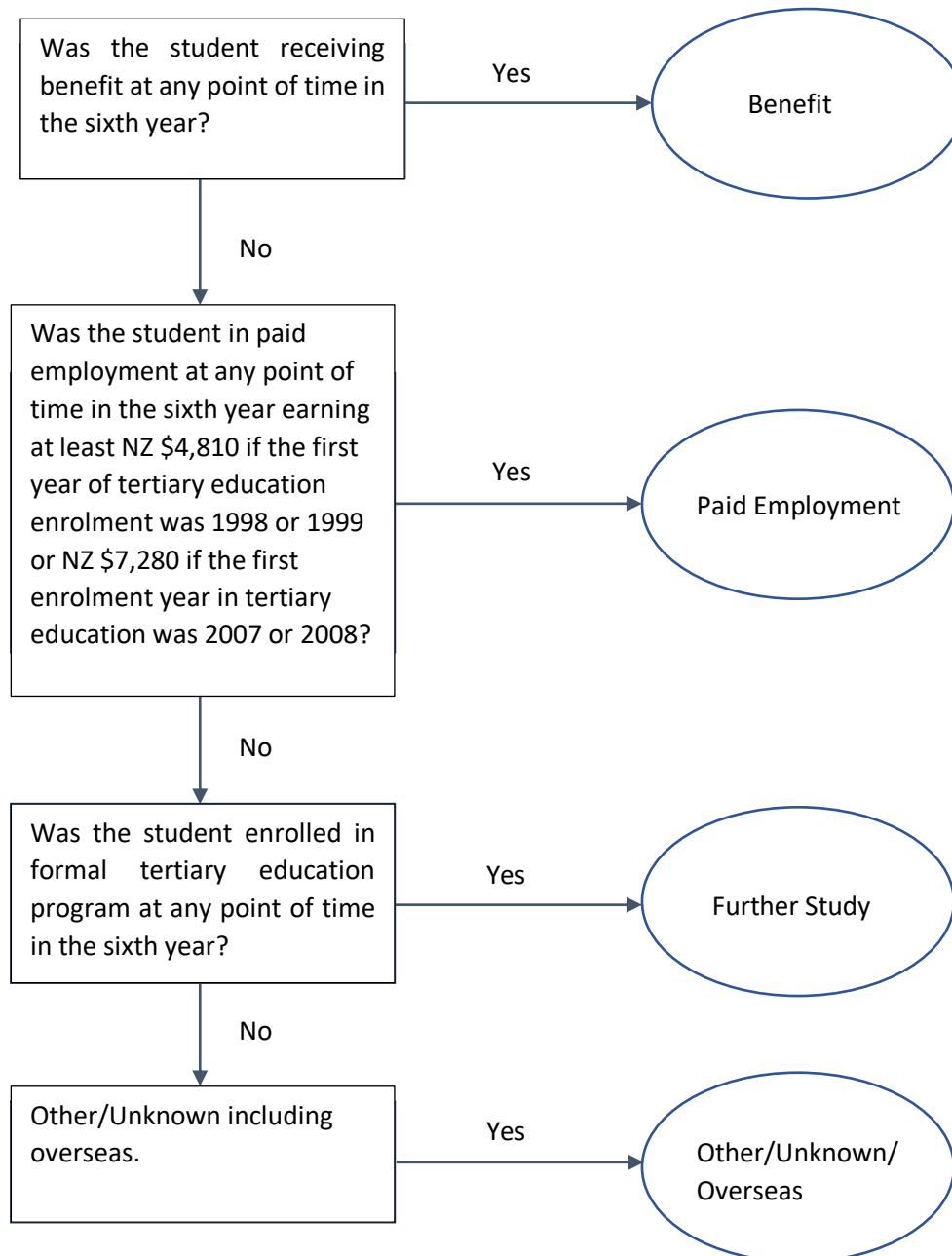
Scenario 3: Mary who started her first formal tertiary education in the year 2007, lives overseas in the tax year 2014 for a part of the year. She then comes back to New Zealand and remains on benefit for a couple of months while looking for work. She finds a job later in 2014 and makes NZ\$ 80,000. She will also be categorized in the ‘benefits’ category.

Scenario 4: Kirdan, who started his first formal tertiary education in the year 2007, first studies full- time and then is self-employed later in the year, earning NZ\$ 6,000 in his company in 2014. Since Kirdan is not on benefit and is earning less than NZ\$ 7,280, we will classify him as in further studies.

Scenario 5: Lastly, consider Olivia whose first year of formal tertiary enrolment is 1998. She is overseas for 9 months in the 2005 calendar year, comes back to New Zealand to study full-time and also work part-time earning NZD 5,000 in the last three months of 2005. Olivia will be classified in the paid employment category since she earned more than NZ\$ 4,810.

Figure 1 presents a flowchart depicting how the categorization algorithm works.

*Figure 1: Flowchart showing the algorithm to categorise students into labour market states. Students get assigned a unique status in the sixth year after they enrolled in a formal Bachelors/STAR programme.*



### 3. Data

Our empirical work uses data from two sources. Our first source is from the PBRF research assessment of university academics from the TEC which we use as a measure of research activities of university academics. The second source of data is the IDI database of Stats NZ which we use to measure students' labour market outcomes/destinations. Data from Inland Revenue is used to capture the information about whether students are on benefit or in paid employment. Data from the Ministry of Education is used as a record of each student's enrolment in further education.

Although PBRF assesses individual academics as explained previously, in this paper, we aggregate research activity data to the level of 42 subject areas in each of the eight New Zealand universities (separately for each PBRF round). For our purposes, subject areas serve as proxies for academic departments. We restrict our analysis to the main 2003 and 2012 PBRF rounds because only some academics voluntarily submitted their research portfolios in the partial 2006 round (Tertiary Education Commission, 2007).

For each academic department (or subject area/university/year), we calculate the numbers and proportions of academics belonging to each PBRF Quality Category (i.e., PBRF letter grade). We similarly measure – and use in our empirical model as controls – the composition of departments in terms of academic ranks, gender, age brackets, and ethnicity categories.

Table 3 summarises the descriptive statistics of academics assessed by PBRF. The percentage of researchers achieving A and B scores nearly doubled between 2003 and 2012. The percentage of academics who received the lowest grade, R, dropped significantly from the first PBRF wave (>15%) to the last wave (~4%). One of the contributing factors may be the promotion of academics, with the proportion of Professors and Associate Professors increasing substantially over this period. Another cause may be the exit of low research active staff combined with the entry of high research active staff in NZ universities. The percentage of female researchers was substantially lower than male researchers in both PBRF waves. However, a declining gap is witnessed between 2003 and 2012. As shown in Table 3, the large majority of academics are of European descent followed by smaller groups of Māori and Asians. However, it is worth noticing that many academics have not reported their ethnicity as they are entitled to do.

**Table 3. Descriptive Statistics of Academics**

<b>PBRF Wave</b>	<b>2003</b>		<b>2012</b>	
	<b>Freq.</b>	<b>Percent</b>	<b>Freq.</b>	<b>Percent</b>
<b>Quality category</b>				
A	338	7.15	721	13.32
B	1,167	24.68	2,131	39.38
C	1,613	34.12	1,534	28.35
C(NE)	-	-	745	13.77
R	712	15.06	201	3.71
<b>Researcher's position title</b>				
Professor	422	8.93	841	15.54
Associate Professor	441	9.33	818	15.12
Senior Lecturer	1,509	31.92	1,804	33.34
Lecturer	1,079	22.82	823	15.21
Other Teaching Staff	450	9.52	106	1.96
Other Non-Teaching Staff	827	17.49	1,019	18.83
<b>Researcher's gender</b>				
Female	1,578	33.38	2,121	39.2
Male	2,613	55.27	3,280	60.62
Unknown	537	11.36	10	0.18
<b>Researcher's age category</b>				
20 to 29	202	4.27	106	1.96
30 to 39	965	20.41	1,094	20.22
40 to 49	1,264	26.73	1,560	28.83
50 to 59	1,177	24.89	1,450	26.8
60 to 69	447	9.45	934	17.26
70 and over	5	0.11	103	1.9
Unknown	668	14.13	164	3.03
<b>Researcher's ethnicity</b>				
Asian	192	4.06	463	8.56
European	2,003	42.36	3,225	59.6
Māori	164	3.47	227	4.2
Middle Eastern/Latin American/African	-	-	53	0.98
Not Stated	1,935	40.93	900	16.63
Other Ethnicity	406	8.59	461	8.52
Pasifika	28	0.59	82	1.52
<b>Total</b>	<b>4,728</b>	<b>100</b>	<b>5,411</b>	<b>100</b>

To assess student outcomes, we have obtained tertiary education data and Inland Revenue tax data from the IDI. The raw education database covers all students enrolled for formal tertiary qualifications in any of the tertiary education organisations (that receive government funding)

in New Zealand from 1994. In our analysis, we are specifically interested in the ‘course’ and ‘enrolment’ datasets. The course dataset includes over 59 million<sup>8</sup> observations of the courses taken by students from tertiary education institutes in New Zealand. This dataset includes information on the students’ level of study, courses taken, course completion status (successful vs. unsuccessful), EFTS<sup>9</sup> and several background characteristics such as the students’ nationality, ethnicity, age, gender, last high school decile, and the highest secondary qualification.

Since we study the effect of research as assessed by the two PBRF waves on student performance, we have taken the first year of study at a tertiary institution to be 1998/1999 or 2007/2008, allowing for three or four years of study to be completed by 2002 and 2011 (corresponding to the two Quality Evaluation waves of the PBRF in 2003 and 2012, respectively). We restricted the sample to those students for whom total EFTS of courses taken were at least 80% full-time because part-time students take longer to complete a qualification and hence are ‘out of sync’ with the pre-PBRF cohorts. Further, to obtain a more homogenous student sample, we have restricted course providers to only universities and have dropped various other tertiary education organisations such as institutes of technology and polytechnics, wānanga, and private training establishments. We have also limited the qualification type to formal or STAR, thus excluding formal short courses and non-formal programmes. Additionally, we have confined the sample to only Bachelors and STAR students who were NZ-based and intramural students as they are most likely to be directly exposed to the academics in a department. We have also restricted our analysis to students who have attended secondary school in New Zealand in order to better approximate the value added by university study. Next, we have only included those courses for which withdrawal date was not given and allowed the courses to be either completed successfully or unsuccessfully. Only completed courses count towards a qualification. We excluded a small number of students with discrepancies in data related to gender and birth year. In this manner, we obtain our baseline dataset to study the impact of research activity on the students’ labour market status.

We use Inland Revenue tax data via the IDI database to obtain information on two labour market outcomes – being on a benefit and the total income of the individual students. The income tax year table contains information on all records in the Employer Monthly Schedule

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<sup>8</sup> The numbers of observations reported in this paper are approximate to satisfy a Stats NZ privacy clause.

<sup>9</sup> EFTS or Equivalent Full Time Student is a measure of study workload. 0.125 EFTS is equivalent to 15 credits or points.

(EMS)<sup>10</sup>, sole traders receiving self-employed income, information on rental income, company director/shareholder income and partnership income. We use the IR table organised by tax year and not by calendar year because the earnings we list before, apart from the EMS, relate to the entire tax year. The raw data in this table comprises of one record per payee/payer relationship, per income source, per year, beginning with the 2000 tax year<sup>11</sup> (Stats NZ, 2017).

We restricted the tax year to the sixth year from initial enrolment corresponding to each student cohort (1998, 1999, 2007 and 2008). Therefore, the corresponding tax years are 2005, 2006, 2014 and 2015, respectively. Since we study the effect of research as assessed by the two PBRF waves on student labour market outcomes/destinations, we align the tax years of 2005 and 2006 with the 2003 cohort of PBRF research assessments and the tax years 2007 and 2008 with the 2012 PBRF cohort.

Next, we obtain information on individuals who were on a benefit in any part of their sixth tax year post enrolment from tertiary study. Further, we calculate the total earnings of the individuals. Please note that there can be multiple observations for an individual in a year because individuals may work for multiple employers or may have multiple income sources. In this manner, we obtain information from the IR tax dataset for two destinations – being on a benefit and being in paid employment. We use the Ministry of Education qualification enrolment dataset accessed from the IDI to obtain information on ‘further education’.

We merge our baseline dataset with the IR tax dataset and the qualification enrolment dataset using the Central Linking Concordance (CLC) table which contains details of unique identifiers for each dataset (please refer to Figure 2). We first merged our baseline dataset with the tax dataset to obtain two variables – ‘being on a benefit’ variable and the total income earned in the sixth tax year. Next, we merged this dataset with the cleaned qualification enrolment dataset to obtain indicators for whether an individual was enrolled in further studies in 2005, 2006, 2014 or 2015.

Our final sample consists of 37,341 individuals. Although individuals can be involved in more than one activity in a particular tax year (see Table 4), we assign each individual a unique labour market status as explained in Figure 1. Table 5 shows descriptive statistics related to the labour market status of students six years after their first enrollment in a Bachelors or a STAR

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<sup>10</sup> The Employer Monthly Schedule (EMS) is filed every month by employers and contains details on gross earnings where tax is deducted at the source of the earnings (Stats NZ, 2017).

<sup>11</sup> Please note that a tax year is defined as the period from 1<sup>st</sup> April of a given year to 31<sup>st</sup> March of the subsequent year. For instance, the tax year 2000 runs from 1<sup>st</sup> April 1999 to 31<sup>st</sup> March 2000.



programme. The proportion of students being in paid employment has remained at over 55% for all tax years. While there is approximately a 9-percentage point increase in the proportion of students being in paid employment, the proportion of students receiving benefit has fallen by approximately 19 percentage points from the 2004/2005 cohort to the 2013/2014 cohort. This is interesting as the seasonally adjusted unemployment rate in New Zealand has increased by approximately 1.5 percentage points from the year 2004 to 2014 (Stats NZ, 2021). Whilst the proportion of individuals in further studies has fallen by approximately 12 percentage points, the proportion of students in the ‘others’ category (including those who went overseas) has almost doubled (increased by approximately 22 percentage points). This might be because of an increasing number of students going abroad (which are included in ‘other’ category). This possibility is consistent with data in the reports published by the Ministry of Business, Innovation and Employment (Papadopoulos, 2012) and by the Ministry of Education (Smyth & Spackman, 2012). A major conclusion in both reports was that students with a Bachelors qualification tend to go abroad straight after graduation or within a couple of years in the labour force.

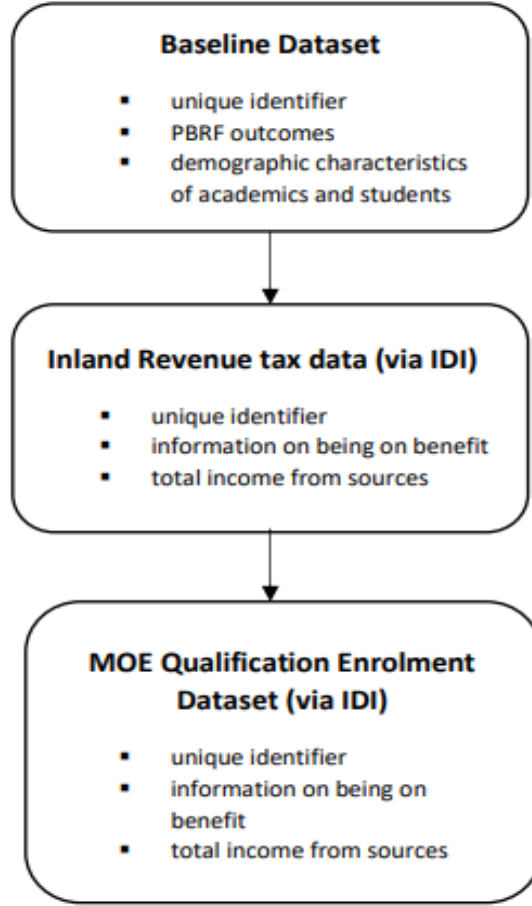
*Table 4: Status Matrix*

	<b>Benefit</b>	<b>Employment</b>	<b>Further Study</b>	<b>Total</b>
<b>Benefit</b>	2,655	1,632	1,542	5,829
<b>Employment</b>	1,632	23,730	7,494	32,856
<b>Further Study</b>	1,542	7,494	3,009	12,045
<b>Total</b>	5,829	32,856	12,045	50,730

*Table 5: Descriptive Statistics of Students*

First Year of Tertiary Education Enrolment	Corresponding Sixth Tax Year	Labour Market Status Category					Total
		Benefit	Employment	Further Study	Other		
1998	2004	Freq.	468	1,464	402	273	2,607
		Percent	17.95	56.16	15.42	10.47	
1999	2005	Freq.	531	2,856	495	630	4,512
		Percent	11.77	63.3	10.97	13.96	
2007	2013	Freq.	840	9,357	1,101	3,498	14,796
		Percent	5.68	63.24	7.44	23.64	
2008	2014	Freq.	813	10,050	1,011	3,546	15,420
		Percent	5.27	65.18	6.56	23	
		Total	2,652	23,727	3,009	7,947	37,335

Figure 2: Data Sources



#### 4. Empirical Model and Methods

We use multinomial regression to estimate our empirical model. The empirical model we use to study the relationship between the research activity of academics and labour market outcomes/destinations of students takes the following form:

$$\begin{aligned}
 L_{ijt} &= f(PBRF\ outcomes_{jt}, ranks_{jt}, gender\ composition_{jt}, age\ composition_{jt}, ethnicity_{jt} \\
 &\quad gender_i, age_i, ethnicity_i, high\ school\ decile_i, NCEA_i, \\
 &\quad university\ fixed\ effects, subject\ fixed\ effects, year\ fixed\ effects)
 \end{aligned}$$

where  $L_{ijt}$  is the labour market status of a student  $i$  majoring in the subject taught by department  $j$  and part of cohort (time period)  $t$ . We categorise the *labour market status* into four mutually exclusive states – being on a benefit, paid employment, further study and others/unknown

(including overseas). In our model, the key independent variables are the aggregated *PBRF assessments*, that is, percentage of A, B, C, C(NE), R and R(NE) staff members of each academic department at each New Zealand university. The academic *ranks* are percentages of Professors, Associate Professors, Senior Lecturers, Lecturers, ‘other teaching staff’ and ‘other non-teaching staff’. We include two variables as controls to capture the socio-economic characteristics of the students and value added by university education. One is the *decile* of the last high school attended and the second is high school (NCEA) achievement. We also include various demographic characteristics of academics and students as controls. We then use multinomial logit to estimate our empirical model, taking into account the fact that our dependent variable is categorical.

## 5. Results

Table 6 presents the estimated effects of PBRF research assessments of academics on student labour market outcomes using a multinomial logit model. An overall summary of our results is that we find no significant impact of research activity of academics on the labour market states of their students. That is, there is no impact on the likelihood of a student being on a benefit, in paid employment, in further studies, or in an ‘other’ state (including being overseas). All the coefficients are economically and statistically insignificant. For instance, the coefficient of -0.003 for ‘being in paid employment’ suggests that increasing the percentage of A-grade academics in a department by 10 percentage points decreases the likelihood of students being in paid employment by 0.03 percentage points. The coefficient estimates for the proportion of B, C(NE) and R grade researchers are also very close to zero. We therefore infer that there is little to no impact of the departmental PBRF grade composition on the labour market outcomes of the students six years after they first enrol in tertiary education study.

The implication of our findings is that the negative effect of research on teaching (the trade-off of time and effort between two activities) seems to cancel out the positive effect (such as skill transfers and boost in curiosity among students) for undergraduate students at New Zealand universities.

Table 6: Determinants of Labour Market Outcomes; Baseline Model  
(Marginal Effects of Multinomial Logit)

	dy/dx	Standard Error
<b><u>PBRF Outcomes</u></b>		
<b>Proportion of academics attaining PBRF rank A</b>		
Being on Benefit	0.0000	0.0002
Paid Employment	-0.0003	0.0006
Further Study	0.0003	0.0003
Others/Unknown/Overseas	-0.0001	0.0005
<b>Proportion of academics attaining PBRF rank B</b>		
Being on Benefit	0.0003*	0.0001
Paid Employment	-0.0004	0.0003
Further Study	0.0002	0.0002
Others/Unknown/Overseas	-0.0001	0.0003
<b>Proportion of academics attaining PBRF rank C(NE)</b>		
Being on Benefit	0.0002	0.0002
Paid Employment	0.0002	0.0006
Further Study	0.0001	0.0003
Others/Unknown/Overseas	-0.0006	0.0004
<b>Proportion of academics attaining PBRF rank R</b>		
Being on Benefit	0.0005**	0.0002
Paid Employment	-0.0009	0.0007
Further Study	0.0009**	0.0003
Others/Unknown/Overseas	-0.0005	0.0005
<b>Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave</b>		
Being on Benefit	0.0000	0.0002
Paid Employment	-0.0019**	0.0006
Further Study	0.0009***	0.0002
Others/Unknown/Overseas	0.0010	0.0005

Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 531 clusters in *id*. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) We have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) We are not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) \*  $p < 0.05$ , \*\*  $p < 0.01$  and \*\*\*  $p < 0.001$ .

## 6. Sub-sample Analysis

To allow for possible heterogeneity of effects, we re-estimate our baseline model for various subsamples (Table 7). First, we disaggregate our dataset into each of the two PBRF waves. We run these models separately for two PBRF waves because two potentially influential changes occurred over the sample period. One was to do with the submission of Evidence Portfolios and the other one concerned the inclusion of additional PBRF grade categories for new and emerging researchers. However, the main results are qualitatively the same for both cohorts: academics' research performance has no impact on subsequent student outcomes. Next, we stratify our sample by student gender and ethnicity. Once again, we do not find any meaningful effects of research performance on student labour market outcomes in any of these subgroups.

*Table 7: Determinants of Labour Market Outcomes; Subsample Analysis  
(Marginal Effects of Multinomial Logit)*

	<b>PBRF Wave 2003</b>	<b>PBRF Wave 2012</b>	<b>Male Student</b>	<b>Female Student</b>
<b><u>PBRF Outcomes</u></b>				
<b>Proportion of academics attaining PBRF rank A</b>				
Being on Benefit	0.0006 (0.0008)	0.0000 (0.0003)	0.0002 (0.0003)	-0.0001 (0.0003)
Paid Employment	0.0006 (0.0014)	0.0001 (0.0006)	-0.0012 (0.0007)	0.0002 (0.0008)
Further Study	-0.0011 (0.0009)	0.0002 (0.0003)	0.0007 (0.0005)	0.0001 (0.0004)
Others/Unknown/Overseas	-0.0001 (0.0008)	-0.0003 (0.0005)	0.0003 (0.0006)	-0.0001 (0.0007)
<b>Proportion of academics attaining PBRF rank B</b>				
Being on Benefit	0.0003 (0.0005)	0.0002 (0.0001)	0.0001 (0.0002)	0.0004** (0.0001)
Paid Employment	-0.0009 (0.0010)	-0.0002 (0.0004)	-0.0009 (0.0005)	0.0000 (0.0004)
Further Study	0.0012 (0.0007)	0.0001 (0.0002)	0.0006 (0.0003)	-0.0002 (0.0002)
Others/Unknown/Overseas	-0.0006 (0.0006)	-0.0001 (0.0003)	0.0002 (0.0004)	-0.0002 (0.0003)
<b>Proportion of academics attaining PBRF rank C(NE)</b>				
Being on Benefit	n.a. n.a.	0.0004 (0.0002)	0.0002 (0.0003)	0.0002 (0.0002)
Paid Employment	n.a. n.a.	0.0001 (0.0006)	-0.0005 (0.0008)	0.0007 (0.0007)

Further Study	n.a.	0.0001	0.0005	-0.0003
	n.a.	(0.0003)	(0.0005)	(0.0005)
Others/Unknown/Overseas	n.a.	-0.0006	-0.0001	-0.0006
	n.a.	(0.0005)	(0.0006)	(0.0006)
<b>Proportion of academics attaining PBRF rank R</b>				
Being on Benefit	0.0005	0.0006	0.0003	0.0006**
	(0.0006)	(0.0004)	(0.0002)	(0.0002)
Paid Employment	0.0003	-0.0013	-0.0013	-0.0009
	(0.0011)	(0.0010)	(0.0009)	(0.0008)
Further Study	0.0007	0.0011*	0.0008	0.0010**
	(0.0008)	(0.0004)	(0.0005)	(0.0004)
Others/Unknown/Overseas	-0.0015*	-0.0004	0.0003	-0.0007
	(0.0007)	(0.0008)	(0.0007)	(0.0007)
<b>Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave</b>				
Being on Benefit	-0.0002	n.a.	-0.0001	-0.0001
	(0.0005)	n.a.	(0.0002)	(0.0002)
Paid Employment	-0.0001	n.a.	-0.0020**	-0.0016*
	(0.0010)	n.a.	(0.0008)	(0.0007)
Further Study	0.0009	n.a.	0.0003	0.0012***
	(0.0007)	n.a.	(0.0004)	(0.0003)
Others/Unknown/Overseas	-0.0006	n.a.	0.0018**	0.0005
	(0.0007)	n.a.	(0.0007)	(0.0007)

Notes: (1) The dependent variable is the *labour market status* of the student. The top values are the marginal effects of multinomial logit. (2) The bottom values in parentheses are the associated robust standard errors which are clustered on the id level. (3) Robust standard errors are clustered on the id (id is composed of evaluation year, university, and subject area) level. (4) Only coefficients on PBRF grades are reported for brevity. However, all the models control for researchers' position title, gender, age, and ethnicity. All the models also control for students' gender, age, ethnicity, high school decile and level of NCEA achieved. Please refer to the Appendix for the full table. (5) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (6) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (7) We have estimated all the above coefficients by using university, subject area, and year fixed effects. (8) We are not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (9) \*  $p < 0.05$ , \*\*  $p < 0.01$  and \*\*\*  $p < 0.001$ .

*Table 7: Determinants of Labour Market Outcomes; Subsample Analysis  
(Marginal Effects of Multinomial Logit) Continued*

	<b>Student Ethnicity</b>			
	<b>Pakeha Student</b>	<b>NZ Māori Student</b>	<b>Pasifika Student</b>	<b>Asian Student</b>
<b>PBRF Outcomes</b>				
<b>Proportion of academics attaining PBRF rank A</b>				
Being on Benefit	0.0001	0.0031*	-0.0035	-0.0005

	(0.0002)	(0.0016)	.	(0.0004)
Paid Employment	-0.0001	0.0008	-0.0051	0.0011
	(0.0006)	(0.0023)	.	(0.0016)
Further Study	0.0002	-0.0002	0.0028	-0.0010
	(0.0003)	(0.0010)	.	(0.0008)
Others/Unknown/Overseas	-0.0002	-0.0037**	0.0058	0.0003
	(0.0005)	(0.0013)	.	(0.0013)
<b>Proportion of academics attaining PBRF rank B</b>				
Being on Benefit	0.0003*	0.0010	-0.0002	0.0000
	(0.0001)	(0.0010)	.	(0.0003)
Paid Employment	-0.0003	-0.0001	-0.0034	-0.0004
	(0.0003)	(0.0013)	.	(0.0011)
Further Study	0.0001	-0.0006	0.0014	0.0006
	(0.0002)	(0.0006)	.	(0.0005)
Others/Unknown/Overseas	-0.0001	-0.0004	0.0022	-0.0003
	(0.0002)	(0.0009)	.	(0.0009)
<b>Proportion of academics attaining PBRF rank C(NE)</b>				
Being on Benefit	0.0002	-0.0026	0.0017	0.0001
	(0.0002)	(0.0019)	.	(0.0003)
Paid Employment	0.0004	0.0030	-0.0034	0.0000
	(0.0006)	(0.0026)	.	(0.0015)
Further Study	0.0002	-0.0010	-0.0020	0.0000
	(0.0003)	(0.0012)	.	(0.0008)
Others/Unknown/Overseas	-0.0008	0.0007	0.0037	-0.0001
	(0.0004)	(0.0016)	.	(0.0014)
<b>Proportion of academics attaining PBRF rank R</b>				
Being on Benefit	0.0004*	-0.0009	0.0012	0.0007*
	(0.0002)	(0.0012)	.	(0.0003)
Paid Employment	-0.0003	0.0013	-0.0067	-0.0014
	(0.0007)	(0.0020)	.	(0.0017)
Further Study	0.0008**	0.0006	0.0021	0.0007
	(0.0003)	(0.0005)	.	(0.0008)
Others/Unknown/Overseas	-0.0009	-0.0010	0.0035	0.0000
	(0.0006)	(0.0015)	.	(0.0017)
<b>Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave</b>				
Being on Benefit	-0.0001	-0.0005	0.0020	-0.0003
	(0.0002)	(0.0010)	.	(0.0003)
Paid Employment	-0.0010	-0.0001	-0.0051	-0.0049***
	(0.0006)	(0.0019)	.	(0.0014)
Further Study	0.0008***	-0.0007	-0.0015	0.0018**
	(0.0002)	(0.0008)	.	(0.0006)
Others/Unknown/Overseas	0.0003	0.0014	0.0047	0.0034**
	(0.0005)	(0.0014)	.	(0.0013)

Notes: (1) The dependent variable is the *labour market status* of the student. The top values are the marginal effects of multinomial logit. (2) The bottom values in parentheses are the associated robust standard errors which are clustered on the id level. (3) Robust standard errors are clustered on the id (id is composed of evaluation year, university, and

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subject area) level. (4) Only coefficients on PBRF grades are reported for brevity. However, all the models control for researchers' position title, gender, age, and ethnicity. All the models also control for students' gender, age, ethnicity, high school decile and level of NCEA achieved. Please refer to the Appendix for the full table. (5) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (6) The coefficient effect of proportion of researchers C(NE) grades is not applicable in the PBRF wave 2003 as this grade category was introduced in the later PBRF wave. Similarly, the academics did not have a choice to submit their EPs if they wanted to be assessed in the PBRF wave 2012 unlike the PBRF wave 2003. (7) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (8) Please note that we were not able to estimate the standard errors for the Pasifika students because there was not enough variation in the data. However, the mean effects for the Pasifika students are not out of the main pattern of the results. (9) We have estimated all the above coefficients by using university, subject area, and year fixed effects. (10) We are not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (11) \*  $p < 0.05$ , \*\*  $p < 0.01$  and \*\*\*  $p < 0.001$ .

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## **7. Conclusion**

This paper presents the results from our study investigating the impact of academics' research performance on undergraduate students' subsequent labour market outcomes/destinations in New Zealand. Our findings suggest that whether a department is highly research active or a department does little research has no economically or statistically significant effect on the likelihood of students receiving a benefit, being in paid employment or being in further studies. This conclusion is robust to using different subsamples of our complete dataset.

One plausible reason for these results could be that more research-active academics are disproportionately involved in post-graduate teaching and supervision. Moreover, it could be that benefits to academics from research are more likely to benefit post-graduate students than undergraduate students as a critical minimum level of discipline knowledge is required of students before they can benefit from academics' gains from their research. Also, various counteracting mechanisms affecting the relation between research and teaching could be the cause of these findings. For instance, more research-active academics might not find enough time for individualized student interaction.

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*Table A.1: Determinants of Labour Market Outcomes; Baseline Model  
(Marginal Effects of Multinomial Logit)*

	dy/dx	Standard Error
<b><u>PBRF Outcomes</u></b>		
<b>Proportion of academics attaining PBRF rank A</b>		
Being on Benefit	0.0000	0.0002
Paid Employment	-0.0003	0.0006
Further Study	0.0003	0.0003
Others/Unknown/Overseas	-0.0001	0.0005
<b>Proportion of academics attaining PBRF rank B</b>		
Being on Benefit	0.0003*	0.0001
Paid Employment	-0.0004	0.0003
Further Study	0.0002	0.0002
Others/Unknown/Overseas	-0.0001	0.0003
<b>Proportion of academics attaining PBRF rank C(NE)</b>		
Being on Benefit	0.0002	0.0002
Paid Employment	0.0002	0.0006
Further Study	0.0001	0.0003
Others/Unknown/Overseas	-0.0006	0.0004
<b>Proportion of academics attaining PBRF rank R</b>		
Being on Benefit	0.0005**	0.0002
Paid Employment	-0.0009	0.0007
Further Study	0.0009**	0.0003
Others/Unknown/Overseas	-0.0005	0.0005
<b>Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave</b>		
Being on Benefit	0.0000	0.0002
Paid Employment	-0.0019**	0.0006
Further Study	0.0009***	0.0002
Others/Unknown/Overseas	0.0010	0.0005
<b><u>Department Level Characteristics</u></b>		
<b><u>Researcher's Position Title</u></b>		
<b>Proportion of Professors</b>		
Being on Benefit	0.0000	0.0002
Paid Employment	0.0006	0.0006
Further Study	-0.0006	0.0003
Others/Unknown/Overseas	0.0000	0.0005
<b>Proportion of Associate Professors</b>		
Being on Benefit	0.0004*	0.0002
Paid Employment	-0.0004	0.0006
Further Study	-0.0003	0.0003
Others/Unknown/Overseas	0.0003	0.0004
<b>Proportion of Lecturers</b>		
Being on Benefit	0.0001	0.0002
Paid Employment	0.0006	0.0004

Further Study	-0.0001	0.0002
Others/Unknown/Overseas	-0.0006	0.0003
<b>Proportion of Other Teaching Staff</b>		
Being on Benefit	-0.0002	0.0002
Paid Employment	0.0010	0.0007
Further Study	-0.0001	0.0003
Others/Unknown/Overseas	-0.0006	0.0006
<b>Proportion of Other Non-Teaching Staff</b>		
Being on Benefit	0.0001	0.0002
Paid Employment	-0.0009	0.0005
Further Study	0.0000	0.0003
Others/Unknown/Overseas	0.0008	0.0004
 <b><u>Researcher's Gender</u></b>		
<b>Proportion of female academics</b>		
Being on Benefit	0.0001	0.0001
Paid Employment	-0.0006	0.0004
Further Study	0.0000	0.0002
Others/Unknown/Overseas	0.0005	0.0003
<b>Proportion of academics for whom gender is unknown</b>		
Being on Benefit	-0.0003	0.0002
Paid Employment	-0.0009	0.0007
Further Study	0.0006	0.0003
Others/Unknown/Overseas	0.0006	0.0006
 <b><u>Researcher's Age Band</u></b>		
<b>Proportion of academics in the age band of 20 to 29</b>		
Being on Benefit	-0.0001	0.0005
Paid Employment	-0.0032*	0.0013
Further Study	-0.0002	0.0007
Others/Unknown/Overseas	0.0035**	0.0012
<b>Proportion of academics in the age band of 40 to 49</b>		
Being on Benefit	0.0001	0.0001
Paid Employment	0.0002	0.0004
Further Study	-0.0001	0.0002
Others/Unknown/Overseas	-0.0001	0.0004
<b>Proportion of academics in the age band of 50 to 59</b>		
Being on Benefit	-0.0001	0.0002
Paid Employment	0.0003	0.0005
Further Study	-0.0002	0.0003
Others/Unknown/Overseas	0.0000	0.0004
 <b>Proportion of academics in the age band of 60 to 69</b>		
Being on Benefit	-0.0002	0.0002
Paid Employment	0.0008	0.0007

Further Study	0.0001	0.0003
Others/Unknown/Overseas	-0.0007	0.0005
<b>Proportion of academics in the age band of 70 and Over</b>		
Being on Benefit	0.0001	0.0005
Paid Employment	-0.0021	0.0015
Further Study	0.0016*	0.0007
Others/Unknown/Overseas	0.0003	0.0010
<b>Proportion of academics for whom age band is unknown</b>		
Being on Benefit	0.0004	0.0002
Paid Employment	0.0006	0.0007
Further Study	-0.0004	0.0003
Others/Unknown/Overseas	-0.0006	0.0005
<b><u>Researcher's Ethnicity</u></b>		
<b>Proportion of Asian academics</b>		
Being on Benefit	0.0000	0.0003
Paid Employment	0.0002	0.0005
Further Study	0.0004	0.0003
Others/Unknown/Overseas	-0.0005	0.0004
<b>Proportion of Māori academics</b>		
Being on Benefit	0.0001	0.0002
Paid Employment	-0.0016**	0.0006
Further Study	0.0003	0.0003
Others/Unknown/Overseas	0.0013**	0.0005
<b>Proportion of Pasifika academics</b>		
Being on Benefit	-0.0002	0.0006
Paid Employment	0.0016	0.0015
Further Study	-0.0009	0.0008
Others/Unknown/Overseas	-0.0006	0.0011
<b>Proportion of Middle Eastern/Latin American/African academics</b>		
Being on Benefit	0.0004	0.0009
Paid Employment	-0.0036*	0.0015
Further Study	0.0019	0.0012
Others/Unknown/Overseas	0.0012	0.0014
<b>Proportion of academics belonging to "other ethnicity"</b>		
Being on Benefit	0.0002	0.0002
Paid Employment	-0.0012*	0.0005
Further Study	0.0005*	0.0002
Others/Unknown/Overseas	0.0005	0.0004
<b>Proportion of academics for whom ethnicity is unknown</b>		
Being on Benefit	0.0000	0.0001
Paid Employment	-0.0002	0.0003
Further Study	0.0001	0.0002
Others/Unknown/Overseas	0.0001	0.0003

### **Student Level Characteristics**



**Student's gender****Female student**

Being on Benefit	-0.0076**	0.0025
Paid Employment	0.0094	0.0061
Further Study	-0.0230***	0.0039
Others/Unknown/Overseas	0.0211***	0.0049

**Student's ethnicity****Asian student**

Being on Benefit	-0.0017	0.0036
Paid Employment	-0.1308***	0.0112
Further Study	0.0327***	0.0065
Others/Unknown/Overseas	0.0997***	0.0090

**Māori student**

Being on Benefit	0.0231***	0.0049
Paid Employment	-0.0662***	0.0145
Further Study	0.0421***	0.0078
Others/Unknown/Overseas	0.0010	0.0127

**Pasifika student**

Being on Benefit	0.0319***	0.0055
Paid Employment	-0.0991***	0.0164
Further Study	0.0365***	0.0091
Others/Unknown/Overseas	0.0307*	0.0135

**Middle Eastern/Latin American/African student**

Being on Benefit	0.0388***	0.0103
Paid Employment	-0.2191***	0.0292
Further Study	0.0514**	0.0156
Others/Unknown/Overseas	0.1289***	0.0199

**Student belonging to "other ethnicity"**

Being on Benefit	0.0168*	0.0077
Paid Employment	-0.1038***	0.0177
Further Study	0.0149	0.0098
Others/Unknown/Overseas	0.0722***	0.0150

**Student for whom ethnicity is unknown**

Being on Benefit	0.0099	0.0149
Paid Employment	-0.1037**	0.0383
Further Study	-0.0088	0.0234
Others/Unknown/Overseas	0.1026***	0.0285

**Student's high school decile****School decile 1**

Being on Benefit	0.0004	0.0088
Paid Employment	0.0516*	0.0223
Further Study	0.0042	0.0122
Others/Unknown/Overseas	-0.0561*	0.0223

**School decile 2**

Being on Benefit	0.0049	0.0072
Paid Employment	-0.0049	0.0196
Further Study	0.0018	0.0110
Others/Unknown/Overseas	-0.0018	0.0172
<b>School decile 3</b>		
Being on Benefit	-0.0021	0.0057
Paid Employment	0.0071	0.0140
Further Study	0.0117	0.0082
Others/Unknown/Overseas	-0.0167	0.0130
<b>School decile 4</b>		
Being on Benefit	-0.0018	0.0066
Paid Employment	0.0178	0.0150
Further Study	-0.0013	0.0090
Others/Unknown/Overseas	-0.0146	0.0122
<b>School decile 6</b>		
Being on Benefit	0.0008	0.0058
Paid Employment	0.0249*	0.0124
Further Study	-0.0065	0.0074
Others/Unknown/Overseas	-0.0191	0.0124
<b>School decile 7</b>		
Being on Benefit	-0.0079	0.0059
Paid Employment	-0.0124	0.0124
Further Study	0.0051	0.0069
Others/Unknown/Overseas	0.0152	0.0106
<b>School decile 8</b>		
Being on Benefit	-0.0092	0.0059
Paid Employment	0.0119	0.0132
Further Study	-0.0035	0.0077
Others/Unknown/Overseas	0.0008	0.0115
<b>School decile 9</b>		
Being on Benefit	-0.0104	0.0059
Paid Employment	-0.0007	0.0129
Further Study	0.0030	0.0073
Others/Unknown/Overseas	0.0081	0.0110
<b>School decile 10</b>		
Being on Benefit	-0.0302***	0.0058
Paid Employment	0.0089	0.0121
Further Study	-0.0004	0.0069
Others/Unknown/Overseas	0.0217	0.0117
<b>School decile missing</b>		
Being on Benefit	0.0070	0.0145
Paid Employment	-0.0552	0.0321
Further Study	0.0278	0.0180
Others/Unknown/Overseas	0.0204	0.0285

**Level of NCEA achieved by the student**

**Achieved less than NCEA level 3**

Being on Benefit	0.0240***	0.0029
Paid Employment	-0.0542***	0.0074
Further Study	0.0226***	0.0043
Others/Unknown/Overseas	0.0076	0.0059

**Overseas equivalent to NCEA level 3**

Being on Benefit	-0.0248**	0.0091
Paid Employment	-0.0109	0.0171
Further Study	-0.0041	0.0080
Others/Unknown/Overseas	0.0398***	0.0107

**Missing Observations on NCEA Level Achieved**

Being on Benefit	0.0128	0.0088
Paid Employment	-0.0766**	0.0245
Further Study	0.0275*	0.0116
Others/Unknown/Overseas	0.0363	0.0208

**University fixed effects****University 1**

(base outcome)

**University 2**

Being on Benefit	-0.0323**	0.0106
Paid Employment	0.0627*	0.0311
Further Study	-0.041*	0.0166
Others/Unknown/Overseas	0.0105	0.0193

**University 3**

Being on Benefit	-0.0072	0.0098
Paid Employment	0.0138	0.0231
Further Study	-0.0125	0.0111
Others/Unknown/Overseas	0.0059	0.0157

**University 4**

Being on Benefit	-0.0173	0.0093
Paid Employment	0.0321	0.0266
Further Study	-0.025*	0.0097
Others/Unknown/Overseas	0.0102	0.0176

**University 5**

Being on Benefit	-0.0137	0.0089
Paid Employment	0.0016	0.0259
Further Study	-0.0161	0.0109
Others/Unknown/Overseas	0.0282	0.0172

**University 6**

Being on Benefit	0.0106	0.0101
Paid Employment	-0.0398	0.0266
Further Study	-0.0083	0.0107
Others/Unknown/Overseas	0.0375*	0.0182

**University 7**

Being on Benefit	0.0064	0.0092
Paid Employment	-0.0261	0.0261

Further Study	-0.0100	0.0110
Others/Unknown/Overseas	0.0297	0.0173
<b>University 8</b>		
Being on Benefit	-0.0149	0.0099
Paid Employment	-0.0125	0.0283
Further Study	-0.0209	0.0132
Others/Unknown/Overseas	0.0483*	0.0235

### **Subject area fixed effects**

#### **Accounting and Finance**

(base outcome)

#### **Agriculture and Other Applied Biological Sciences**

Being on Benefit	0.0192	0.0124
Paid Employment	-0.0369	0.0304
Further Study	0.0572**	0.0173
Others/Unknown/Overseas	-0.0395	0.0209

#### **Anthropology and Archaeology**

Being on Benefit	0.0633**	0.0223
Paid Employment	-0.1402***	0.0399
Further Study	0.0713**	0.0209
Others/Unknown/Overseas	0.0056	0.0326

#### **Architecture, Design, Planning, Surveying**

Being on Benefit	0.0268**	0.0097
Paid Employment	-0.1014***	0.0257
Further Study	0.0249*	0.0115
Others/Unknown/Overseas	0.0497*	0.0229

#### **Biomedical**

Being on Benefit	-0.0008	0.0150
Paid Employment	0.0190	0.0638
Further Study	0.0690*	0.0273
Others/Unknown/Overseas	-0.0871	0.0594

#### **Chemistry**

Being on Benefit	0.0312*	0.0125
Paid Employment	-0.1601***	0.0439
Further Study	0.1678***	0.0429
Others/Unknown/Overseas	-0.0389	0.0233

#### **Clinical Medicine**

Being on Benefit	-0.0237***	0.0055
Paid Employment	0.1404***	0.0328
Further Study	0.0480*	0.0196
Others/Unknown/Overseas	-0.1646***	0.0165

#### **Communications, Journalism and Media Studies**

Being on Benefit	0.0203	0.0122
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Paid Employment	-0.0824**	0.0278
Further Study	-0.0077	0.0104
Others/Unknown/Overseas	0.0698**	0.0240
<b>Computer Science, Information Technology, Information Sciences</b>		
Being on Benefit	0.0177*	0.0085
Paid Employment	-0.0232	0.0261
Further Study	0.0255*	0.0110
Others/Unknown/Overseas	-0.0200	0.0218
<b>Dentistry</b>		
Being on Benefit	0.0412***	0.0106
Paid Employment	0.0035	0.0316
Further Study	-0.0071	0.0090
Others/Unknown/Overseas	-0.0376	0.0288
<b>Design</b>		
Being on Benefit	0.0256*	0.0124
Paid Employment	-0.1457***	0.0337
Further Study	-0.0027	0.0117
Others/Unknown/Overseas	0.1228***	0.0296
<b>Earth Sciences</b>		
Being on Benefit	0.0234*	0.0110
Paid Employment	-0.1403***	0.0251
Further Study	0.0489**	0.0175
Others/Unknown/Overseas	0.0679**	0.0230
<b>Ecology, Evolution and Behaviour</b>		
Being on Benefit	0.0513***	0.0136
Paid Employment	-0.0966**	0.0291
Further Study	0.0668***	0.0182
Others/Unknown/Overseas	-0.0215	0.0216
<b>Economics</b>		
Being on Benefit	0.0027	0.0069
Paid Employment	-0.1063***	0.0225
Further Study	0.0210*	0.0104
Others/Unknown/Overseas	0.0826***	0.0191
<b>Education</b>		
Being on Benefit	0.0404***	0.0104
Paid Employment	0.0025	0.0272
Further Study	0.0152	0.0109
Others/Unknown/Overseas	-0.0581**	0.0173
<b>Engineering and Technology</b>		
Being on Benefit	0.0066	0.0113
Paid Employment	-0.0575	0.0329
Further Study	0.0130	0.0147
Others/Unknown/Overseas	0.0378	0.0330
<b>English Language and Literature</b>		
Being on Benefit	0.0600***	0.0126
Paid Employment	-0.1243***	0.0265

Further Study	0.0643***	0.0173
Others/Unknown/Overseas	-0.0001	0.0206
<b>Foreign Languages and Linguistics</b>		
Being on Benefit	0.0229	0.0118
Paid Employment	-0.1918***	0.0261
Further Study	0.0772***	0.0117
Others/Unknown/Overseas	0.0917***	0.0199
<b>History, History of Art, Classics and Curatorial Studies</b>		
Being on Benefit	0.0537***	0.0108
Paid Employment	-0.1140***	0.0243
Further Study	0.0668***	0.0135
Others/Unknown/Overseas	-0.0065	0.0165
<b>Human Geography</b>		
Being on Benefit	0.0479	0.0307
Paid Employment	-0.142**	0.0496
Further Study	0.0363	0.0212
Others/Unknown/Overseas	0.0578*	0.0289
<b>Law</b>		
Being on Benefit	0.0159*	0.0072
Paid Employment	0.0094	0.0238
Further Study	0.0441***	0.0110
Others/Unknown/Overseas	-0.0694***	0.0166
<b>Management, Human Resources, Industrial Relations, International Business and Other Business</b>		
Being on Benefit	0.0076	0.0075
Paid Employment	-0.0616**	0.0219
Further Study	0.0056	0.0085
Others/Unknown/Overseas	0.0484**	0.0169
<b>Marketing and Tourism</b>		
Being on Benefit	0.0069	0.0065
Paid Employment	-0.0852**	0.0248
Further Study	-0.0103	0.0073
Others/Unknown/Overseas	0.0886***	0.0218
<b>Molecular, Cellular and Whole Organism Biology</b>		
Being on Benefit	0.0285**	0.0098
Paid Employment	-0.1702***	0.0313
Further Study	0.0916***	0.0189
Others/Unknown/Overseas	0.0501	0.0306
<b>Music, Literary Arts and Other Arts</b>		
Being on Benefit	0.0831***	0.0167
Paid Employment	-0.2142***	0.0301
Further Study	0.0526**	0.0189
Others/Unknown/Overseas	0.0785**	0.0228
<b>Māori Knowledge and Development</b>		
Being on Benefit	0.0758*	0.0292
Paid Employment	-0.0120	0.0477

Further Study	0.0241	0.0273
Others/Unknown/Overseas	-0.0879**	0.0334
<b>Other Health Studies (including Rehabilitation Therapies)</b>		
Being on Benefit	0.0156	0.0088
Paid Employment	0.0176	0.0284
Further Study	0.0195*	0.0097
Others/Unknown/Overseas	-0.0526*	0.0211
<b>Philosophy</b>		
Being on Benefit	0.0790***	0.0158
Paid Employment	-0.2154***	0.0352
Further Study	0.1228***	0.0246
Others/Unknown/Overseas	0.0135	0.0233
<b>Physics</b>		
Being on Benefit	0.0309	0.0185
Paid Employment	-0.1888***	0.0499
Further Study	0.1492**	0.0442
Others/Unknown/Overseas	0.0087	0.0222
<b>Political Science, International Relations and Public Policy</b>		
Being on Benefit	0.0159*	0.0075
Paid Employment	-0.0850***	0.0239
Further Study	0.0350**	0.0119
Others/Unknown/Overseas	0.0341*	0.0173
<b>Psychology</b>		
Being on Benefit	0.0441***	0.0092
Paid Employment	-0.0996**	0.0299
Further Study	0.0782***	0.0146
Others/Unknown/Overseas	-0.0226	0.0198
<b>Public Health</b>		
Being on Benefit	0.1029**	0.0300
Paid Employment	-0.1529*	0.0681
Further Study	0.0697	0.0363
Others/Unknown/Overseas	-0.0197	0.0287
<b>Pure and Applied Mathematics</b>		
Being on Benefit	0.0310*	0.0120
Paid Employment	-0.1816***	0.0292
Further Study	0.0653**	0.0214
Others/Unknown/Overseas	0.0853**	0.0295
<b>Religious Studies and Theology</b>		
Being on Benefit	0.0331	0.0187
Paid Employment	-0.1471***	0.0386
Further Study	0.0733*	0.0294
Others/Unknown/Overseas	0.0407	0.0292
<b>Sociology, Social Policy, Social Work, Criminology and Gender Studies</b>		
Being on Benefit	0.0589***	0.0122
Paid Employment	-0.1026***	0.0253

Further Study	0.0383**	0.0116
Others/Unknown/Overseas	0.0054	0.0180
<b>Sport and Exercise Science</b>		
Being on Benefit	0.0015	0.0079
Paid Employment	0.0298	0.0271
Further Study	-0.0093	0.0097
Others/Unknown/Overseas	-0.0221	0.0240
<b>Statistics</b>		
Being on Benefit	0.0213	0.0141
Paid Employment	-0.1847***	0.0269
Further Study	0.0942***	0.0168
Others/Unknown/Overseas	0.0692**	0.0241
<b>Theatre and Dance, Film and Television and Multimedia</b>		
Being on Benefit	0.1304***	0.0303
Paid Employment	-0.2224***	0.0596
Further Study	0.0320	0.0214
Others/Unknown/Overseas	0.0599	0.0359
<b>Veterinary Studies and Large Animal Science</b>		
Being on Benefit	0.02378**	0.0091
Paid Employment	0.0376	0.0267
Further Study	0.0225	0.0121
Others/Unknown/Overseas	-0.0840***	0.0215
<b>Visual Arts and Crafts</b>		
Being on Benefit	0.0670***	0.0165
Paid Employment	-0.2006***	0.0482
Further Study	0.0297*	0.0151
Others/Unknown/Overseas	0.1038**	0.0376
<b><u>Year fixed effects</u></b>		
<b>First year at the tertiary education institute of the student – 1999</b>		
Being on Benefit	-0.0294***	0.0038
Paid Employment	0.0320*	0.0153
Further Study	-0.0322***	0.0067
Others/Unknown/Overseas	0.0296	0.0164
<b>First year at the tertiary education institute of the student – 2007</b>		
Being on Benefit	-0.0708***	0.0074
Paid Employment	-0.0162	0.0255
Further Study	-0.0376**	0.0121
Others/Unknown/Overseas	0.1245***	0.0231
<b>First year at the tertiary education institute of the student – 2008</b>		
Being on Benefit	-0.0750***	0.0075
Paid Employment	0.0048	0.0250
Further Study	-0.0484***	0.0120
Others/Unknown/Overseas	0.1185***	0.0229
<b>Number of observations</b>	<b>37,341</b>	



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Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 531 clusters in *id*. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) \*  $p < 0.05$ , \*\*  $p < 0.01$  and \*\*\*  $p < 0.001$ .

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Table A.2: Determinants of Labour Market Outcomes  
Subsample Analysis – PBRF Wave 2003 (Marginal Effects of Multinomial Logit)

	dy/dx	Standard Error
<b><u>PBRF Outcomes</u></b>		
<b>Proportion of academics attaining PBRF rank A</b>		
Being on Benefit	0.0006	0.0008
Paid Employment	0.0006	0.0014
Further Study	-0.0011	0.0009
Others/Unknown/Overseas	-0.0001	0.0008
<b>Proportion of academics attaining PBRF rank B</b>		
Being on Benefit	0.0003	0.0005
Paid Employment	-0.0009	0.0010
Further Study	0.0012	0.0007
Others/Unknown/Overseas	-0.0006	0.0006
<b>Proportion of academics attaining PBRF rank C(NE)</b>		
Being on Benefit	n.a.	n.a.
Paid Employment	n.a.	n.a.
Further Study	n.a.	n.a.
Others/Unknown/Overseas	n.a.	n.a.
<b>Proportion of academics attaining PBRF rank R</b>		
Being on Benefit	0.0005	0.0006
Paid Employment	0.0003	0.0011
Further Study	0.0007	0.0008
Others/Unknown/Overseas	-0.0015*	0.0007
<b>Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave</b>		
Being on Benefit	-0.0002	0.0005
Paid Employment	-0.0001	0.0010
Further Study	0.0009	0.0007
Others/Unknown/Overseas	-0.0006	0.0007
<b><u>Department Level Characteristics</u></b>		
<b><u>Researcher's Position Title</u></b>		
<b>Proportion of Professors</b>		
Being on Benefit	0.0004	0.0009
Paid Employment	0.0003	0.0017
Further Study	-0.0007	0.0009
Others/Unknown/Overseas	0.0000	0.0009
<b>Proportion of Associate Professors</b>		
Being on Benefit	-0.0008	0.0007
Paid Employment	0.0013	0.0014
Further Study	0.0003	0.0008
Others/Unknown/Overseas	-0.0008	0.0008
<b>Proportion of Lecturers</b>		
Being on Benefit	0.0000	0.0005

Paid Employment	-0.0003	0.0009
Further Study	0.0015*	0.0007
Others/Unknown/Overseas	-0.0011*	0.0005

**Proportion of Other Teaching Staff**

Being on Benefit	-0.0003	0.0007
Paid Employment	0.0011	0.0011
Further Study	-0.0004	0.0007
Others/Unknown/Overseas	-0.0004	0.0006

**Proportion of Other Non-Teaching Staff**

Being on Benefit	0.0003	0.0005
Paid Employment	-0.0004	0.0010
Further Study	0.0000	0.0008
Others/Unknown/Overseas	0.0001	0.0006

**Researcher's Gender**

**Proportion of female academics**

Being on Benefit	0.0002	0.0004
Paid Employment	-0.0007	0.0007
Further Study	-0.0006	0.0005
Others/Unknown/Overseas	0.0011*	0.0005

**Proportion of academics for whom gender is unknown**

Being on Benefit	0.0050	0.0033
Paid Employment	-0.0149*	0.0065
Further Study	0.0121*	0.0052
Others/Unknown/Overseas	-0.0022	0.0023

**Researcher's Age Band**

**Proportion of academics in the age band of 20 to 29**

Being on Benefit	-0.0004	0.0010
Paid Employment	0.0005	0.0023
Further Study	0.0022	0.0015
Others/Unknown/Overseas	-0.0022	0.0013

**Proportion of academics in the age band of 40 to 49**

Being on Benefit	0.0005	0.0004
Paid Employment	0.0005	0.0008
Further Study	-0.0002	0.0006
Others/Unknown/Overseas	-0.0008	0.0006

**Proportion of academics in the age band of 50 to 59**

Being on Benefit	-0.0006	0.0006
Paid Employment	0.0023*	0.0011
Further Study	-0.0011	0.0008
Others/Unknown/Overseas	-0.0006	0.0008

**Proportion of academics in the age band of 60 to 69**

Being on Benefit	-0.0014	0.0008
Paid Employment	0.0035*	0.0014
Further Study	0.0000	0.0009

Others/Unknown/Overseas	-0.0021*	0.0009
<b>Proportion of academics in the age band of 70 and Over</b>		
Being on Benefit	0.0001	0.0109
Paid Employment	0.0016	0.0135
Further Study	0.0024	0.0119
Others/Unknown/Overseas	-0.0040	0.0071
<b>Proportion of academics for whom age band is unknown</b>		
Being on Benefit	0.0001	0.0005
Paid Employment	0.0004	0.0009
Further Study	-0.0001	0.0006
Others/Unknown/Overseas	-0.0004	0.0005
<b><u>Researcher's Ethnicity</u></b>		
<b>Proportion of Asian academics</b>		
Being on Benefit	0.0005	0.0009
Paid Employment	0.001	0.0016
Further Study	-0.0016	0.0011
Others/Unknown/Overseas	0.0001	0.0010
<b>Proportion of Māori academics</b>		
Being on Benefit	0.0003	0.0007
Paid Employment	-0.0003	0.0015
Further Study	-0.001	0.0009
Others/Unknown/Overseas	0.0010	0.0011
<b>Proportion of Pasifika academics</b>		
Being on Benefit	-0.0024	0.0023
Paid Employment	0.004	0.0049
Further Study	-0.0048	0.0041
Others/Unknown/Overseas	0.0031	0.0030
<b>Proportion of Middle Eastern/Latin American/African academics</b>		
Being on Benefit	n.a.	n.a.
Paid Employment	n.a.	n.a.
Further Study	n.a.	n.a.
Others/Unknown/Overseas	n.a.	n.a.
<b>Proportion of academics belonging to "other ethnicity"</b>		
Being on Benefit	0.0000	0.0005
Paid Employment	0.0006	0.0011
Further Study	-0.0002	0.0008
Others/Unknown/Overseas	-0.0004	0.0005
<b>Proportion of academics for whom ethnicity is unknown</b>		
Being on Benefit	-0.0001	0.0003
Paid Employment	0.0001	0.0006
Further Study	0.0000	0.0004
Others/Unknown/Overseas	0.0000	0.0004

### **Student Level Characteristics**

#### **Student's gender**

**Female student**

Being on Benefit	0.0197*	0.0086
Paid Employment	-0.0175	0.0157
Further Study	-0.0225	0.0141
Others/Unknown/Overseas	0.0203*	0.0088

**Student's ethnicity****Asian student**

Being on Benefit	-0.0144	0.0140
Paid Employment	-0.1483***	0.0331
Further Study	0.0849***	0.0248
Others/Unknown/Overseas	0.0777***	0.0106

**Māori student**

Being on Benefit	0.0490***	0.0141
Paid Employment	-0.1070	0.0256
Further Study	0.0740***	0.0206
Others/Unknown/Overseas	-0.0160	0.0185

**Pasifika student**

Being on Benefit	0.0850***	0.0172
Paid Employment	-0.0729*	0.0336
Further Study	0.0082	0.0324
Others/Unknown/Overseas	-0.0202	0.0248

**Middle Eastern/Latin American/African student**

Being on Benefit	n.a.	n.a.
Paid Employment	n.a.	n.a.
Further Study	n.a.	n.a.
Others/Unknown/Overseas	n.a.	n.a.

**Student belonging to "other ethnicity"**

Being on Benefit	0.0151	0.0222
Paid Employment	-0.1372***	0.0396
Further Study	0.0612*	0.0270
Others/Unknown/Overseas	0.0609***	0.0183

**Student for whom ethnicity is unknown**

Being on Benefit	0.0175	0.0399
Paid Employment	-0.0530	0.0780
Further Study	-0.0530	0.0723
Others/Unknown/Overseas	0.0884**	0.0339

**Student's high school decile****School decile 1**

Being on Benefit	-0.0154	0.0252
Paid Employment	-0.0523	0.0506
Further Study	0.0501	0.0311
Others/Unknown/Overseas	0.0177	0.0377

**School decile 2**

Being on Benefit	0.0079	0.0228
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Paid Employment	-0.0545	0.0406
Further Study	0.0392	0.0320
Others/Unknown/Overseas	0.0073	0.0234
<b>School decile 3</b>		
Being on Benefit	-0.0106	0.0175
Paid Employment	-0.0345	0.0328
Further Study	0.0500*	0.0213
Others/Unknown/Overseas	-0.0049	0.0206
<b>School decile 4</b>		
Being on Benefit	-0.0073	0.0179
Paid Employment	-0.0180	0.0277
Further Study	0.0343	0.0233
Others/Unknown/Overseas	-0.0090	0.0174
<b>School decile 6</b>		
Being on Benefit	-0.0017	0.0158
Paid Employment	-0.0002	0.0242
Further Study	0.0218	0.0184
Others/Unknown/Overseas	-0.0199	0.0170
<b>School decile 7</b>		
Being on Benefit	-0.0400*	0.0181
Paid Employment	0.0367	0.0282
Further Study	0.0090	0.0211
Others/Unknown/Overseas	-0.0057	0.0173
<b>School decile 8</b>		
Being on Benefit	-0.0230	0.0180
Paid Employment	0.0043	0.0267
Further Study	0.0005	0.0195
Others/Unknown/Overseas	0.0182	0.0179
<b>School decile 9</b>		
Being on Benefit	-0.0367*	0.0172
Paid Employment	-0.0118	0.0268
Further Study	0.0482*	0.0202
Others/Unknown/Overseas	0.0004	0.0156
<b>School decile 10</b>		
Being on Benefit	-0.0596***	0.0163
Paid Employment	0.0286	0.0257
Further Study	0.0334	0.0190
Others/Unknown/Overseas	-0.0024	0.0150
<b>School decile missing</b>		
Being on Benefit	0.0050	0.0515
Paid Employment	-0.0169	0.1132
Further Study	0.0113	0.0697
Others/Unknown/Overseas	0.0006	0.0531

**Level of NCEA achieved by the student**  
**Achieved less than NCEA level 3**

Being on Benefit	0.0412***	0.0091
Paid Employment	-0.0561***	0.0139
Further Study	0.0178	0.0093
Others/Unknown/Overseas	-0.0028	0.0086
<b>Overseas equivalent to NCEA level 3</b>		
Being on Benefit	0.0401	0.0530
Paid Employment	0.0375	0.0870
Further Study	0.0063	0.0500
Others/Unknown/Overseas	-0.0839	0.0504
<b>Missing observations on NCEA level achieved</b>		
Being on Benefit	0.0221	0.0216
Paid Employment	-0.0454	0.0359
Further Study	0.0459	0.0240
Others/Unknown/Overseas	-0.0226	0.0204
<b><u>University fixed effects</u></b>		
<b>University 1</b>		
<b>University 2</b>		
Being on Benefit	-0.0396	0.0591
Paid Employment	-0.0324	0.0565
Further Study	0.0661	0.1090
Others/Unknown/Overseas	0.0058	0.0161
<b>University 3</b>		
Being on Benefit	0.0301	0.0681
Paid Employment	0.0164	0.0452
Further Study	-0.0477	0.1009
Others/Unknown/Overseas	0.0013	0.0159
<b>University 4</b>		
Being on Benefit	-0.1699	0.1535
Paid Employment	0.7587**	0.2662
Further Study	-0.6631**	0.2542
Others/Unknown/Overseas	0.0743	0.1837
<b>University 5</b>		
Being on Benefit	-0.0275	0.0583
Paid Employment	-0.0253	0.0468
Further Study	0.058	0.0919
Others/Unknown/Overseas	-0.0052	0.0115
<b>University 6</b>		
Being on Benefit	0.0246	0.0544
Paid Employment	-0.0177	0.0339
Further Study	-0.0102	0.0696
Others/Unknown/Overseas	0.0033	0.0095
<b>University 7</b>		
Being on Benefit	-0.0073	0.0377
Paid Employment	0.0096	0.0317

Further Study	0.0066	0.0571
Others/Unknown/Overseas	-0.009	0.0110
<b>University 8</b>		
Being on Benefit	0.0008	0.0564
Paid Employment	0.0551	0.0531
Further Study	-0.0633	0.0888
Others/Unknown/Overseas	0.0074	0.0135
<b><u>Subject area fixed effects</u></b>		
<b>Accounting and Finance</b>		
<b>Agriculture and Other Applied Biological Sciences</b>		
Being on Benefit	0.0395	0.0432
Paid Employment	-0.0206	0.0673
Further Study	0.0129	0.0538
Others/Unknown/Overseas	-0.0317	0.0466
<b>Anthropology and Archaeology</b>		
Being on Benefit	0.0023	0.0370
Paid Employment	-0.1065	0.1136
Further Study	0.0995	0.0784
Others/Unknown/Overseas	0.0048	0.0720
<b>Architecture, Design, Planning, Surveying</b>		
Being on Benefit	0.0365	0.0295
Paid Employment	-0.0620	0.0513
Further Study	0.0561	0.0290
Others/Unknown/Overseas	-0.0306	0.0342
<b>Biomedical</b>		
Being on Benefit	-0.0124	0.0537
Paid Employment	0.0825	0.1025
Further Study	0.0165	0.0859
Others/Unknown/Overseas	-0.0867*	0.0378
<b>Chemistry</b>		
Being on Benefit	0.0280	0.0535
Paid Employment	-0.1477	0.1414
Further Study	0.1732	0.1173
Others/Unknown/Overseas	-0.0535	0.0579
<b>Clinical Medicine</b>		
Being on Benefit	-0.0791***	0.0183
Paid Employment	0.1052**	0.0386
Further Study	0.1039**	0.0352
Others/Unknown/Overseas	-0.1300***	0.0238
<b>Communications, Journalism and Media Studies</b>		
Being on Benefit	0.1141*	0.0523
Paid Employment	0.0063	0.0611
Further Study	-0.0413	0.0305
Others/Unknown/Overseas	-0.0790*	0.0395



**Computer Science, Information Technology, Information Sciences**

Being on Benefit	0.0431	0.0307
Paid Employment	-0.0259	0.0497
Further Study	-0.0276	0.0246
Others/Unknown/Overseas	0.0104	0.0372

**Dentistry**

Being on Benefit	0.0402	0.0245
Paid Employment	-0.0221	0.0403
Further Study	-0.0080	0.0320
Others/Unknown/Overseas	-0.0101	0.0343

**Design**

Being on Benefit	0.0350	0.0344
Paid Employment	-0.1055*	0.0471
Further Study	0.0033	0.0251
Others/Unknown/Overseas	0.0672	0.0469

**Earth Sciences**

Being on Benefit	0.1116*	0.0481
Paid Employment	-0.0829	0.0900
Further Study	-0.0054	0.0413
Others/Unknown/Overseas	-0.0233	0.0516

**Ecology, Evolution and Behaviour**

Being on Benefit	0.0715	0.0498
Paid Employment	-0.0413	0.0751
Further Study	0.0603	0.0855
Others/Unknown/Overseas	-0.0905*	0.0400

**Economics**

Being on Benefit	0.0323	0.0258
Paid Employment	-0.0646	0.0469
Further Study	0.0336	0.0317
Others/Unknown/Overseas	-0.0013	0.0386

**Education**

Being on Benefit	0.0483	0.0255
Paid Employment	-0.0377	0.0473
Further Study	0.0324	0.0312
Others/Unknown/Overseas	-0.043	0.0325

**Engineering and Technology**

Being on Benefit	-0.0228	0.0246
Paid Employment	0.1303	0.0698
Further Study	-0.0414	0.0355
Others/Unknown/Overseas	-0.0661	0.0440

**English Language and Literature**

Being on Benefit	0.0962*	0.0379
Paid Employment	-0.1281**	0.0454
Further Study	0.0382	0.0345
Others/Unknown/Overseas	-0.0064	0.0331

**Foreign Languages and Linguistics**

Being on Benefit	-0.0316	0.0295
Paid Employment	-0.1529***	0.0439
Further Study	0.1289***	0.0354
Others/Unknown/Overseas	0.0556	0.0385

**History, History of Art, Classics and Curatorial Studies**

Being on Benefit	0.0921**	0.0353
Paid Employment	-0.0629	0.0452
Further Study	0.0467	0.0366
Others/Unknown/Overseas	-0.0758*	0.0321

**Human Geography**

Being on Benefit	0.2631**	0.1018
Paid Employment	-0.1630	0.0996
Further Study	-0.0335	0.0888
Others/Unknown/Overseas	-0.0667	0.0610

**Law**

Being on Benefit	0.015	0.0212
Paid Employment	0.0374	0.0297
Further Study	0.0090	0.0178
Others/Unknown/Overseas	-0.0614**	0.0235

**Management, Human Resources, Industrial Relations,  
International Business and Other Business**

Being on Benefit	0.0328	0.0296
Paid Employment	0.0138	0.0388
Further Study	-0.0415*	0.0208
Others/Unknown/Overseas	-0.0052	0.0286

**Marketing and Tourism**

Being on Benefit	-0.0271	0.0207
Paid Employment	-0.0071	0.0401
Further Study	-0.0360	0.0279
Others/Unknown/Overseas	0.0702*	0.0336

**Molecular, Cellular and Whole Organism Biology**

Being on Benefit	0.0165	0.0341
Paid Employment	-0.1079	0.0832
Further Study	0.1515*	0.0701
Others/Unknown/Overseas	-0.0602	0.0484

**Music, Literary Arts and Other Arts**

Being on Benefit	0.1766	0.0953
Paid Employment	-0.1040	0.0749
Further Study	-0.0333	0.0445
Others/Unknown/Overseas	-0.0393	0.0415

**Māori Knowledge and Development**

Being on Benefit	0.1324	0.1100
Paid Employment	0.0065	0.1149
Further Study	-0.0052	0.0620
Others/Unknown/Overseas	-0.1338***	0.0282

**Other Health Studies (including Rehabilitation Therapies)**

Being on Benefit	-0.0111	0.0226
Paid Employment	0.0592	0.0364
Further Study	0.0272	0.0222
Others/Unknown/Overseas	-0.0753**	0.0285

**Philosophy**

Being on Benefit	0.0701	0.0578
Paid Employment	-0.1723*	0.0858
Further Study	0.1614*	0.0688
Others/Unknown/Overseas	-0.0592	0.0533

**Physics**

Being on Benefit	0.0497	0.0660
Paid Employment	-0.0919	0.1143
Further Study	0.0165	0.0633
Others/Unknown/Overseas	0.0257	0.0400

**Political Science, International Relations and Public Policy**

Being on Benefit	0.0098	0.0288
Paid Employment	-0.0063	0.0459
Further Study	-0.0069	0.0301
Others/Unknown/Overseas	0.0034	0.0401

**Psychology**

Being on Benefit	0.0755	0.0400
Paid Employment	-0.0946	0.0562
Further Study	0.0793*	0.0341
Others/Unknown/Overseas	-0.0602	0.0345

**Public Health**

Being on Benefit	0.0142	0.0395
Paid Employment	-0.0579	0.1352
Further Study	0.1279	0.1457
Others/Unknown/Overseas	-0.0841	0.0496

**Pure and Applied Mathematics**

Being on Benefit	0.0117	0.0299
Paid Employment	-0.0533	0.0485
Further Study	-0.0223	0.0285
Others/Unknown/Overseas	0.0639	0.0466

**Religious Studies and Theology**

Being on Benefit	0.0168	0.0575
Paid Employment	-0.0159	0.1147
Further Study	0.0243	0.0506
Others/Unknown/Overseas	-0.0252	0.0872

**Sociology, Social Policy, Social Work, Criminology and Gender Studies**

Being on Benefit	0.1125***	0.0337
Paid Employment	-0.0694	0.0437
Further Study	0.0260	0.0374
Others/Unknown/Overseas	-0.0691	0.0359

**Sport and Exercise Science**

Being on Benefit	-0.0079	0.0361
Paid Employment	0.0319	0.0615
Further Study	-0.0638*	0.0276
Others/Unknown/Overseas	0.0398	0.0775

**Statistics**

Being on Benefit	0.0772	0.0781
Paid Employment	-0.1908**	0.0665
Further Study	0.1111*	0.0475
Others/Unknown/Overseas	0.0025	0.0462

**Theatre and Dance, Film and Television and Multimedia**

Being on Benefit	0.3381**	0.1320
Paid Employment	-0.2361	0.1833
Further Study	-0.0578	0.0565
Others/Unknown/Overseas	-0.0443	0.0450

**Veterinary Studies and Large Animal Science**

Being on Benefit	0.0239	0.0269
Paid Employment	0.0777*	0.0376
Further Study	0.0063	0.0283
Others/Unknown/Overseas	-0.1079***	0.0254

**Visual Arts and Crafts**

Being on Benefit	0.1285*	0.0531
Paid Employment	-0.2127***	0.0504
Further Study	0.0254	0.0337
Others/Unknown/Overseas	0.0588	0.0477

**Year fixed effects****First year at the tertiary education institute of the student – 1999**

Being on Benefit	-0.0559***	0.0072
Paid Employment	0.0822***	0.0131
Further Study	-0.0463***	0.0107
Others/Unknown/Overseas	0.0201*	0.0097

**Number of observations**

7,122

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Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 258 clusters in *id*. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) \*  $p < 0.05$ , \*\*  $p < 0.01$  and \*\*\*  $p < 0.001$ .

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*Table A.3: Determinants of Labour Market Outcomes*  
*Subsample Analysis – PBRF Wave 2012 (Marginal Effects of Multinomial Logit)*

	<b>dy/dx</b>	<b>Standard Error</b>
<b><u>PBRF Outcomes</u></b>		
<b>Proportion of academics attaining PBRF rank A</b>		
Being on Benefit	0.0000	0.0003
Paid Employment	0.0001	0.0006
Further Study	0.0002	0.0003
Others/Unknown/Overseas	-0.0003	0.0005
<b>Proportion of academics attaining PBRF rank B</b>		
Being on Benefit	0.0002	0.0001
Paid Employment	-0.0002	0.0004
Further Study	0.0001	0.0002
Others/Unknown/Overseas	-0.0001	0.0003
<b>Proportion of academics attaining PBRF rank C(NE)</b>		
Being on Benefit	0.0004	0.0002
Paid Employment	0.0001	0.0006
Further Study	0.0001	0.0003
Others/Unknown/Overseas	-0.0006	0.0005
<b>Proportion of academics attaining PBRF rank R</b>		
Being on Benefit	0.0006	0.0004
Paid Employment	-0.0013	0.0010
Further Study	0.0011*	0.0004
Others/Unknown/Overseas	-0.0004	0.0008
<b>Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave</b>		
Being on Benefit	n.a.	n.a.
Paid Employment	n.a.	n.a.
Further Study	n.a.	n.a.
Others/Unknown/Overseas	n.a.	n.a.
<b><u>Department Level Characteristics</u></b>		
<b><u>Researcher's Position Title</u></b>		
<b>Proportion of Professors</b>		
Being on Benefit	-0.0002	0.0002
Paid Employment	0.0003	0.0006
Further Study	-0.0004	0.0003
Others/Unknown/Overseas	0.0002	0.0005
<b>Proportion of Associate Professors</b>		
Being on Benefit	0.0007***	0.0002
Paid Employment	-0.0014*	0.0006
Further Study	-0.0001	0.0003
Others/Unknown/Overseas	0.0009	0.0005
<b>Proportion of Lecturers</b>		
Being on Benefit	0.0000	0.0002
Paid Employment	0.0006	0.0004

Further Study	-0.0002	0.0002
Others/Unknown/Overseas	-0.0004	0.0004
<b>Proportion of Other Teaching Staff</b>		
Being on Benefit	-0.0005	0.0005
Paid Employment	0.0034*	0.0014
Further Study	-0.0016**	0.0006
Others/Unknown/Overseas	-0.0013	0.0011
<b>Proportion of Other Non-Teaching Staff</b>		
Being on Benefit	-0.0002	0.0002
Paid Employment	-0.0007	0.0006
Further Study	0.0002	0.0003
Others/Unknown/Overseas	0.0007	0.0005
<b><u>Researcher's Gender</u></b>		
<b>Proportion of female academics</b>		
Being on Benefit	0.0001	0.0001
Paid Employment	-0.0006	0.0004
Further Study	0.0002	0.0002
Others/Unknown/Overseas	0.0003	0.0004
<b>Proportion of academics for whom gender is unknown</b>		
Being on Benefit	0.0019*	0.0009
Paid Employment	-0.0036	0.0032
Further Study	0.0006	0.0017
Others/Unknown/Overseas	0.0010	0.0021
<b><u>Researcher's Age Band</u></b>		
<b>Proportion of academics in the age band of 20 to 29</b>		
Being on Benefit	-0.0004	0.0008
Paid Employment	-0.0038*	0.0016
Further Study	-0.0012	0.0011
Others/Unknown/Overseas	0.0054**	0.0017
<b>Proportion of academics in the age band of 40 to 49</b>		
Being on Benefit	0.0000	0.0001
Paid Employment	0.0001	0.0004
Further Study	0.0000	0.0002
Others/Unknown/Overseas	-0.0002	0.0004
<b>Proportion of academics in the age band of 50 to 59</b>		
Being on Benefit	0.0000	0.0002
Paid Employment	-0.0002	0.0005
Further Study	0.0001	0.0003
Others/Unknown/Overseas	0.0000	0.0004
<b>Proportion of academics in the age band of 60 to 69</b>		
Being on Benefit	0.0000	0.0002
Paid Employment	0.0005	0.0007
Further Study	0.0003	0.0003
Others/Unknown/Overseas	-0.0007	0.0005
<b>Proportion of academics in the age band of 70 and Over</b>		
Being on Benefit	0.0004	0.0005

Paid Employment	-0.0028	0.0015
Further Study	0.0016**	0.0006
Others/Unknown/Overseas	0.0008	0.0011
<b>Proportion of academics for whom age band is unknown</b>		
Being on Benefit	0.0003	0.0002
Paid Employment	0.0014	0.0008
Further Study	-0.0005	0.0004
Others/Unknown/Overseas	-0.0011*	0.0006
<b><u>Researcher's Ethnicity</u></b>		
<b>Proportion of Asian academics</b>		
Being on Benefit	-0.0001	0.0003
Paid Employment	-0.0003	0.0005
Further Study	0.0006*	0.0003
Others/Unknown/Overseas	-0.0003	0.0005
<b>Proportion of Māori academics</b>		
Being on Benefit	0.0002	0.0002
Paid Employment	-0.0020***	0.0006
Further Study	0.0003	0.0003
Others/Unknown/Overseas	0.0015**	0.0005
<b>Proportion of Pasifika academics</b>		
Being on Benefit	0.0001	0.0005
Paid Employment	0.0008	0.0014
Further Study	-0.0002	0.0007
Others/Unknown/Overseas	-0.0007	0.0012
<b>Proportion of Middle Eastern/Latin American/African academics</b>		
Being on Benefit	0.0005	0.0008
Paid Employment	-0.0024	0.0014
Further Study	0.0010	0.0010
Others/Unknown/Overseas	0.0009	0.0015
<b>Proportion of academics belonging to “other ethnicity”</b>		
Being on Benefit	-0.0001	0.0003
Paid Employment	-0.0011*	0.0005
Further Study	0.0003	0.0003
Others/Unknown/Overseas	0.0009	0.0005
<b>Proportion of academics for whom ethnicity is unknown</b>		
Being on Benefit	0.0000	0.0001
Paid Employment	-0.0011*	0.0005
Further Study	0.0005	0.0002
Others/Unknown/Overseas	0.0006	0.0004

### **Student Level Characteristics**

#### **Student's gender**

##### **Female student**

Being on Benefit	-0.0127***	0.0023
Paid Employment	0.0137*	0.0063
Further Study	-0.0222***	0.0037
Others/Unknown/Overseas	0.0212***	0.0056

#### **Student's ethnicity**

##### **Asian student**

Being on Benefit	0.0006	0.0035
Paid Employment	-0.1284***	0.0118
Further Study	0.0229***	0.0061
Others/Unknown/Overseas	0.1049***	0.0104

##### **Māori student**

Being on Benefit	0.0171**	0.0054
Paid Employment	-0.0592***	0.0172
Further Study	0.0357***	0.0084
Others/Unknown/Overseas	0.0063	0.0152

##### **Pasifika student**

Being on Benefit	0.0214***	0.0059
Paid Employment	-0.1051***	0.0187
Further Study	0.0406***	0.0086
Others/Unknown/Overseas	0.0431**	0.0156

##### **Middle Eastern/Latin American/African student**

Being on Benefit	0.0315***	0.0086
Paid Employment	-0.2136***	0.0291
Further Study	0.0413**	0.0136
Others/Unknown/Overseas	0.1409***	0.0217

##### **Student belonging to "other ethnicity"**

Being on Benefit	0.0199*	0.0084
Paid Employment	-0.0910***	0.0194
Further Study	-0.0004	0.0113
Others/Unknown/Overseas	0.0715***	0.0182

##### **Student for whom ethnicity is unknown**

Being on Benefit	0.0082	0.0173
Paid Employment	-0.1098*	0.0455
Further Study	-0.0013	0.0235
Others/Unknown/Overseas	0.1030**	0.0361

#### **Student's high school decile**

##### **School decile 1**

Being on Benefit	0.0054	0.0099
Paid Employment	0.0770**	0.0247
Further Study	-0.0092	0.0134
Others/Unknown/Overseas	-0.0732**	0.0251

##### **School decile 2**

Being on Benefit	0.0041	0.0079
Paid Employment	0.0088	0.0224
Further Study	-0.0085	0.0115



Others/Unknown/Overseas	-0.0043	0.0206
<b>School decile 3</b>		
Being on Benefit	0.0001	0.0063
Paid Employment	0.0157	0.0156
Further Study	0.0028	0.0086
Others/Unknown/Overseas	-0.0187	0.0151
<b>School decile 4</b>		
Being on Benefit	-0.001	0.0076
Paid Employment	0.0261	0.0174
Further Study	-0.0099	0.0096
Others/Unknown/Overseas	-0.0151	0.0145
<b>School decile 6</b>		
Being on Benefit	0.0012	0.0068
Paid Employment	0.0305*	0.0141
Further Study	-0.0130	0.0078
Others/Unknown/Overseas	-0.0187	0.0148
<b>School decile 7</b>		
Being on Benefit	-0.0032	0.0066
Paid Employment	-0.0188	0.0140
Further Study	0.0015	0.0071
Others/Unknown/Overseas	0.0204	0.0124
<b>School decile 8</b>		
Being on Benefit	-0.0064	0.0065
Paid Employment	0.0134	0.0150
Further Study	-0.0057	0.0081
Others/Unknown/Overseas	-0.0013	0.0135
<b>School decile 9</b>		
Being on Benefit	-0.0049	0.0066
Paid Employment	0.0016	0.0148
Further Study	-0.0070	0.0076
Others/Unknown/Overseas	0.0102	0.0131
<b>School decile 10</b>		
Being on Benefit	-0.0246***	0.0066
Paid Employment	0.0051	0.0138
Further Study	-0.0082	0.0072
Others/Unknown/Overseas	0.0277*	0.0140
<b>School decile missing</b>		
Being on Benefit	0.0087	0.0148
Paid Employment	-0.0564	0.0345
Further Study	0.0224	0.0177
Others/Unknown/Overseas	0.0253	0.0328
<b><u>Level of NCEA achieved by the student</u></b>		
<b>Achieved less than NCEA level 3</b>		
Being on Benefit	0.0216***	0.0030
Paid Employment	-0.0573***	0.0088
Further Study	0.0237***	0.0049

Others/Unknown/Overseas	0.0120	0.0071
<b>Overseas equivalent to NCEA level 3</b>		
Being on Benefit	-0.0265***	0.0080
Paid Employment	-0.0154	0.0169
Further Study	-0.0022	0.0074
Others/Unknown/Overseas	0.0441***	0.0116
<b>Missing observations on NCEA level achieved</b>		
Being on Benefit	0.0116	0.0152
Paid Employment	-0.1149**	0.0369
Further Study	0.0229	0.0184
Others/Unknown/Overseas	0.0804**	0.0309
<b><u>University fixed effects</u></b>		
<b>University 1</b>		
<b>University 2</b>		
Being on Benefit	-0.0394***	0.0074
Paid Employment	0.1092***	0.0275
Further Study	-0.0524***	0.0103
Others/Unknown/Overseas	-0.0173	0.0225
<b>University 3</b>		
Being on Benefit	-0.0085	0.0091
Paid Employment	0.0149	0.0228
Further Study	-0.0116	0.0098
Others/Unknown/Overseas	0.0052	0.0167
<b>University 4</b>		
Being on Benefit	-0.0094	0.0094
Paid Employment	0.0173	0.0291
Further Study	-0.0113	0.0105
Others/Unknown/Overseas	0.0034	0.0225
<b>University 5</b>		
Being on Benefit	-0.0149	0.0077
Paid Employment	0.0029	0.0256
Further Study	-0.0116	0.0108
Others/Unknown/Overseas	0.0236	0.0185
<b>University 6</b>		
Being on Benefit	0.0083	0.0092
Paid Employment	-0.0209	0.0275
Further Study	-0.0138	0.0114
Others/Unknown/Overseas	0.0264	0.0211
<b>University 7</b>		
Being on Benefit	0.0080	0.0088
Paid Employment	-0.0271	0.0285
Further Study	-0.0127	0.0107
Others/Unknown/Overseas	0.0318	0.0213
<b>University 8</b>		

Being on Benefit	-0.0101	0.0097
Paid Employment	-0.0146	0.0332
Further Study	-0.0202	0.0150
Others/Unknown/Overseas	0.0449	0.0300

#### **Subject area fixed effects**

##### **Accounting and Finance**

##### **Agriculture and Other Applied Biological Sciences**

Being on Benefit	0.0289*	0.0118
Paid Employment	-0.0644*	0.0290
Further Study	0.0647***	0.0150
Others/Unknown/Overseas	-0.0292	0.0219

##### **Anthropology and Archaeology**

Being on Benefit	0.0812**	0.0263
Paid Employment	-0.1463***	0.0392
Further Study	0.0621*	0.0243
Others/Unknown/Overseas	0.0030	0.0281

##### **Architecture, Design, Planning, Surveying**

Being on Benefit	0.0242*	0.0106
Paid Employment	-0.1078***	0.0240
Further Study	0.0172	0.0089
Others/Unknown/Overseas	0.0664**	0.0223

##### **Biomedical**

Being on Benefit	0.001	0.0173
Paid Employment	-0.0085	0.0790
Further Study	0.0805*	0.0316
Others/Unknown/Overseas	-0.073	0.0758

##### **Chemistry**

Being on Benefit	0.0354*	0.0139
Paid Employment	-0.1947***	0.0458
Further Study	0.2005***	0.0444
Others/Unknown/Overseas	-0.0412	0.0251

##### **Clinical Medicine**

Being on Benefit	-0.0168**	0.0055
Paid Employment	0.1718***	0.0176
Further Study	0.0205**	0.0078
Others/Unknown/Overseas	-0.1755***	0.0136

##### **Communications, Journalism and Media Studies**

Being on Benefit	0.0135	0.0107
Paid Employment	-0.0992***	0.0288
Further Study	-0.0003	0.0098
Others/Unknown/Overseas	0.086***	0.0258

##### **Computer Science, Information Technology, Information Sciences**

Being on Benefit	0.0133	0.0091
Paid Employment	-0.0262	0.0245

Further Study	0.0416***	0.0105
Others/Unknown/Overseas	-0.0287	0.0216
<b>Dentistry</b>		
Being on Benefit	0.0411***	0.0098
Paid Employment	-0.0143	0.0216
Further Study	0.0056	0.0074
Others/Unknown/Overseas	-0.0325	0.0172
<b>Design</b>		
Being on Benefit	0.0231	0.0133
Paid Employment	-0.1735***	0.0316
Further Study	0.0045	0.0131
Others/Unknown/Overseas	0.1458***	0.0314
<b>Earth Sciences</b>		
Being on Benefit	0.0175	0.0104
Paid Employment	-0.1661***	0.0228
Further Study	0.0653***	0.0174
Others/Unknown/Overseas	0.0834***	0.0240
<b>Ecology, Evolution and Behaviour</b>		
Being on Benefit	0.0541***	0.0152
Paid Employment	-0.1231***	0.0304
Further Study	0.0719***	0.0174
Others/Unknown/Overseas	-0.0030	0.0238
<b>Economics</b>		
Being on Benefit	0.0017	0.0073
Paid Employment	-0.1203***	0.0190
Further Study	0.0209**	0.0077
Others/Unknown/Overseas	0.0977***	0.0190
<b>Education</b>		
Being on Benefit	0.0334**	0.0110
Paid Employment	0.0015	0.0256
Further Study	0.0133	0.0093
Others/Unknown/Overseas	-0.0481**	0.0186
<b>Engineering and Technology</b>		
Being on Benefit	0.0154	0.0132
Paid Employment	-0.0909**	0.0318
Further Study	0.0289	0.0170
Others/Unknown/Overseas	0.0465	0.0345
<b>English Language and Literature</b>		
Being on Benefit	0.0552***	0.0124
Paid Employment	-0.1227***	0.0276
Further Study	0.0561**	0.0190
Others/Unknown/Overseas	0.0113	0.0249
<b>Foreign Languages and Linguistics</b>		
Being on Benefit	0.0261*	0.0112
Paid Employment	-0.1966***	0.0279
Further Study	0.0655***	0.0125

Others/Unknown/Overseas	0.105***	0.0214
<b>History, History of Art, Classics and Curatorial Studies</b>		
Being on Benefit	0.0444***	0.0101
Paid Employment	-0.1122***	0.0222
Further Study	0.0576***	0.0089
Others/Unknown/Overseas	0.0102	0.0174
<b>Human Geography</b>		
Being on Benefit	0.0278	0.0281
Paid Employment	-0.1770***	0.0497
Further Study	0.0540**	0.0191
Others/Unknown/Overseas	0.0952**	0.0324
<b>Law</b>		
Being on Benefit	0.0136	0.0085
Paid Employment	-0.0029	0.0231
Further Study	0.0565***	0.0114
Others/Unknown/Overseas	-0.0671***	0.0172
<b>Management, Human Resources, Industrial Relations, International Business and Other Business</b>		
Being on Benefit	0.0015	0.0061
Paid Employment	-0.0741***	0.0198
Further Study	0.0121	0.0079
Others/Unknown/Overseas	0.0605***	0.0162
<b>Marketing and Tourism</b>		
Being on Benefit	0.0101	0.0056
Paid Employment	-0.1008***	0.0243
Further Study	-0.0066	0.0053
Others/Unknown/Overseas	0.0973***	0.0229
<b>Molecular, Cellular and Whole Organism Biology</b>		
Being on Benefit	0.0417***	0.0116
Paid Employment	-0.208***	0.0306
Further Study	0.0889***	0.0200
Others/Unknown/Overseas	0.0774*	0.0314
<b>Music, Literary Arts and Other Arts</b>		
Being on Benefit	0.0616***	0.0162
Paid Employment	-0.2435***	0.0320
Further Study	0.0625***	0.0186
Others/Unknown/Overseas	0.1194***	0.0274
<b>Māori Knowledge and Development</b>		
Being on Benefit	0.0465	0.0240
Paid Employment	-0.0231	0.0494
Further Study	0.0387	0.0341
Others/Unknown/Overseas	-0.0621	0.0413
<b>Other Health Studies (including Rehabilitation Therapies)</b>		
Being on Benefit	0.0211*	0.0088
Paid Employment	-0.0121	0.0282
Further Study	0.0207*	0.0081

Others/Unknown/Overseas	-0.0296	0.0224
<b>Philosophy</b>		
Being on Benefit	0.0769***	0.0146
Paid Employment	-0.2051***	0.0355
Further Study	0.1040***	0.0203
Others/Unknown/Overseas	0.0242	0.0245
<b>Physics</b>		
Being on Benefit	0.0285	0.0212
Paid Employment	-0.2172***	0.0475
Further Study	0.1930***	0.0429
Others/Unknown/Overseas	-0.0043	0.0234
<b>Political Science, International Relations and Public Policy</b>		
Being on Benefit	0.0175*	0.0076
Paid Employment	-0.1028***	0.0257
Further Study	0.0442***	0.0129
Others/Unknown/Overseas	0.0411*	0.0180
<b>Psychology</b>		
Being on Benefit	0.0372***	0.0105
Paid Employment	-0.1180***	0.0265
Further Study	0.0871***	0.0133
Others/Unknown/Overseas	-0.0063	0.0209
<b>Public Health</b>		
Being on Benefit	0.1326***	0.0275
Paid Employment	-0.1975**	0.0652
Further Study	0.0565	0.0300
Others/Unknown/Overseas	0.0083	0.0336
<b>Pure and Applied Mathematics</b>		
Being on Benefit	0.0383**	0.0127
Paid Employment	-0.2245***	0.0293
Further Study	0.0990***	0.0202
Others/Unknown/Overseas	0.0871**	0.0320
<b>Religious Studies and Theology</b>		
Being on Benefit	0.0414	0.0252
Paid Employment	-0.1594***	0.0388
Further Study	0.0687	0.0416
Others/Unknown/Overseas	0.0493	0.0348
<b>Sociology, Social Policy, Social Work, Criminology and Gender Studies</b>		
Being on Benefit	0.0470***	0.0124
Paid Employment	-0.1165***	0.0273
Further Study	0.0393***	0.0114
Others/Unknown/Overseas	0.0302	0.0207
<b>Sport and Exercise Science</b>		
Being on Benefit	0.0075	0.0083
Paid Employment	0.0257	0.0299
Further Study	0.0017	0.0087

Others/Unknown/Overseas	-0.0349	0.0301
<b>Statistics</b>		
Being on Benefit	0.0082	0.0088
Paid Employment	-0.1802***	0.0233
Further Study	0.0919***	0.0162
Others/Unknown/Overseas	0.0801***	0.0221
<b>Theatre and Dance, Film and Television and Multimedia</b>		
Being on Benefit	0.0905***	0.0228
Paid Employment	-0.2261***	0.0506
Further Study	0.0393*	0.0181
Others/Unknown/Overseas	0.0962*	0.0416
<b>Veterinary Studies and Large Animal Science</b>		
Being on Benefit	0.0259**	0.0098
Paid Employment	-0.0017	0.0250
Further Study	0.0377***	0.0109
Others/Unknown/Overseas	-0.0618**	0.0231
<b>Visual Arts and Crafts</b>		
Being on Benefit	0.0356**	0.0130
Paid Employment	-0.1813***	0.0415
Further Study	0.0221	0.0117
Others/Unknown/Overseas	0.1236***	0.0363
<b><u>Year fixed effects</u></b>		
<b>First year at the tertiary education institute of the student – 2008</b>		
Being on Benefit	-0.0035	0.0025
Paid Employment	0.0207***	0.0064
Further Study	-0.0098**	0.0032
Others/Unknown/Overseas	-0.0073	0.0059

#### **Number of observations**

30,222

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Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 273 clusters in *id*. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender,

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European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) \*  $p < 0.05$ , \*\*  $p < 0.01$  and \*\*\*  $p < 0.001$ .

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*Table A.4: Determinants of Labour Market Outcomes; Subsample Analysis  
Student's Gender – Male (Marginal Effects of Multinomial Logit)*

	<b>dy/dx</b>	<b>Standard Error</b>
<b><u>PBRF Outcomes</u></b>		
<b>Proportion of academics attaining PBRF rank A</b>		
Being on Benefit	0.0002	0.0003
Paid Employment	-0.0012	0.0007
Further Study	0.0007	0.0005
Others/Unknown/Overseas	0.0003	0.0006
<b>Proportion of academics attaining PBRF rank B</b>		
Being on Benefit	0.0001	0.0002
Paid Employment	-0.0009	0.0005
Further Study	0.0006	0.0003
Others/Unknown/Overseas	0.0002	0.0004
<b>Proportion of academics attaining PBRF rank C(NE)</b>		
Being on Benefit	0.0002	0.0003
Paid Employment	-0.0005	0.0008
Further Study	0.0005	0.0005
Others/Unknown/Overseas	-0.0001	0.0006
<b>Proportion of academics attaining PBRF rank R</b>		
Being on Benefit	0.0003	0.0002
Paid Employment	-0.0013	0.0009
Further Study	0.0008	0.0005
Others/Unknown/Overseas	0.0003	0.0007
<b>Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave</b>		
Being on Benefit	-0.0001	0.0002
Paid Employment	-0.0020**	0.0008
Further Study	0.0003	0.0004
Others/Unknown/Overseas	0.0018**	0.0007
<b><u>Department Level Characteristics</u></b>		
<b><u>Researcher's Position Title</u></b>		
<b>Proportion of Professors</b>		
Being on Benefit	-0.0001	0.0003
Paid Employment	0.0013	0.0007
Further Study	-0.0009*	0.0004
Others/Unknown/Overseas	-0.0003	0.0006
<b>Proportion of Associate Professors</b>		
Being on Benefit	0.0006*	0.0003
Paid Employment	0.0007	0.0007
Further Study	-0.0014**	0.0004
Others/Unknown/Overseas	0.0002	0.0006
<b>Proportion of Lecturers</b>		
Being on Benefit	-0.0003	0.0002
Paid Employment	0.0008	0.0006
Further Study	-0.0002	0.0004

Others/Unknown/Overseas	-0.0004	0.0005
<b>Proportion of Other Teaching Staff</b>		
Being on Benefit	0.0001	0.0004
Paid Employment	0.0009	0.0010
Further Study	-0.0011	0.0006
Others/Unknown/Overseas	0.0000	0.0008
<b>Proportion of Other Non-Teaching Staff</b>		
Being on Benefit	-0.0001	0.0002
Paid Employment	-0.0002	0.0007
Further Study	-0.0003	0.0004
Others/Unknown/Overseas	0.0006	0.0006
<b><u>Researcher's Gender</u></b>		
<b>Proportion of female academics</b>		
Being on Benefit	0.0000	0.0002
Paid Employment	-0.0007	0.0005
Further Study	0.0002	0.0003
Others/Unknown/Overseas	0.0005	0.0004
<b>Proportion of academics for whom gender is unknown</b>		
Being on Benefit	0.0001	0.0003
Paid Employment	-0.0006	0.0010
Further Study	0.0001	0.0007
Others/Unknown/Overseas	0.0003	0.0007
<b><u>Researcher's Age Band</u></b>		
<b>Proportion of academics in the age band of 20 to 29</b>		
Being on Benefit	-0.0002	0.0007
Paid Employment	-0.0037*	0.0018
Further Study	0.0009	0.0011
Others/Unknown/Overseas	0.0030	0.0016
<b>Proportion of academics in the age band of 40 to 49</b>		
Being on Benefit	-0.0002	0.0002
Paid Employment	-0.0003	0.0006
Further Study	0.0001	0.0004
Others/Unknown/Overseas	0.0005	0.0005
<b>Proportion of academics in the age band of 50 to 59</b>		
Being on Benefit	-0.0002	0.0002
Paid Employment	0.0001	0.0006
Further Study	-0.0002	0.0004
Others/Unknown/Overseas	0.0003	0.0005
<b>Proportion of academics in the age band of 60 to 69</b>		
Being on Benefit	-0.0005	0.0003
Paid Employment	0.0000	0.0008
Further Study	0.0008	0.0006
Others/Unknown/Overseas	-0.0002	0.0006
<b>Proportion of academics in the age band of 70 and Over</b>		
Being on Benefit	-0.0001	0.0007
Paid Employment	-0.0029	0.0016

Further Study	0.0019	0.0014
Others/Unknown/Overseas	0.0012	0.0014
<b>Proportion of academics for whom age band is unknown</b>		
Being on Benefit	0.0001	0.0003
Paid Employment	0.0002	0.0009
Further Study	0.0001	0.0006
Others/Unknown/Overseas	-0.0004	0.0005
<b><u>Researcher's Ethnicity</u></b>		
<b>Proportion of Asian academics</b>		
Being on Benefit	-0.0003	0.0003
Paid Employment	0.0007	0.0007
Further Study	0.0001	0.0005
Others/Unknown/Overseas	-0.0005	0.0006
<b>Proportion of Māori academics</b>		
Being on Benefit	0.0002	0.0003
Paid Employment	-0.0016*	0.0007
Further Study	0.0003	0.0006
Others/Unknown/Overseas	0.0012*	0.0006
<b>Proportion of Pasifika academics</b>		
Being on Benefit	-0.0005	0.0007
Paid Employment	0.0022	0.0020
Further Study	-0.0012	0.0014
Others/Unknown/Overseas	-0.0005	0.0014
<b>Proportion of Middle Eastern/Latin American/African academics</b>		
Being on Benefit	0.0010	0.0010
Paid Employment	-0.0051*	0.0020
Further Study	0.0019	0.0016
Others/Unknown/Overseas	0.0022	0.0021
<b>Proportion of academics belonging to "other ethnicity"</b>		
Being on Benefit	0.0002	0.0002
Paid Employment	-0.0010	0.0006
Further Study	0.0004	0.0003
Others/Unknown/Overseas	0.0004	0.0005
<b>Proportion of academics for whom ethnicity is unknown</b>		
Being on Benefit	-0.0004*	0.0001
Paid Employment	-0.0001	0.0005
Further Study	0.0002	0.0003
Others/Unknown/Overseas	0.0003	0.0004
<b><u>Student Level Characteristics</u></b>		
<b><u>Student's ethnicity</u></b>		
<b>Asian student</b>		
Being on Benefit	0.0067	0.0055
Paid Employment	-0.1543***	0.0138
Further Study	0.0358***	0.0088
Others/Unknown/Overseas	0.1117***	0.0096

**Māori student**

Being on Benefit	0.0101	0.0083
Paid Employment	-0.088***	0.0228
Further Study	0.0489***	0.0145
Others/Unknown/Overseas	0.029	0.0187

**Pasifika student**

Being on Benefit	0.0262**	0.0099
Paid Employment	-0.0882**	0.0308
Further Study	0.0131	0.0188
Others/Unknown/Overseas	0.049*	0.0224

**Middle Eastern/Latin American/African student**

Being on Benefit	0.0337*	0.0165
Paid Employment	-0.2300***	0.0457
Further Study	0.0599*	0.0241
Others/Unknown/Overseas	0.1363***	0.0306

**Student belonging to “other ethnicity”**

Being on Benefit	0.0244*	0.0103
Paid Employment	-0.1216***	0.0267
Further Study	0.0099	0.0160
Others/Unknown/Overseas	0.0874***	0.0208

**Student for whom ethnicity is unknown**

Being on Benefit	0.0011	0.0235
Paid Employment	-0.1091	0.0595
Further Study	-0.0023	0.0357
Others/Unknown/Overseas	0.1102*	0.0436

**Student’s high school decile****School decile 1**

Being on Benefit	0.0027	0.0141
Paid Employment	0.0306	0.0402
Further Study	0.0147	0.0252
Others/Unknown/Overseas	-0.0480	0.0293

**School decile 2**

Being on Benefit	0.0106	0.0106
Paid Employment	-0.0072	0.0312
Further Study	-0.0132	0.0202
Others/Unknown/Overseas	0.0098	0.0261

**School decile 3**

Being on Benefit	-0.0081	0.0101
Paid Employment	0.0038	0.0256
Further Study	0.0086	0.0151
Others/Unknown/Overseas	-0.0042	0.0203

**School decile 4**

Being on Benefit	-0.0039	0.0092
Paid Employment	0.0173	0.0237
Further Study	-0.0116	0.0150
Others/Unknown/Overseas	-0.0018	0.0186

**School decile 6**

Being on Benefit	-0.0002	0.0084
Paid Employment	0.0284	0.0215
Further Study	-0.0190	0.0138
Others/Unknown/Overseas	-0.0092	0.0172

**School decile 7**

Being on Benefit	-0.0091	0.0086
Paid Employment	-0.0269	0.0215
Further Study	0.0082	0.0129
Others/Unknown/Overseas	0.0278	0.0170

**School decile 8**

Being on Benefit	-0.0144	0.0081
Paid Employment	0.0146	0.0230
Further Study	-0.0075	0.0136
Others/Unknown/Overseas	0.0072	0.0174

**School decile 9**

Being on Benefit	-0.0034	0.0077
Paid Employment	-0.0148	0.0203
Further Study	0.0029	0.0124
Others/Unknown/Overseas	0.0152	0.0174

**School decile 10**

Being on Benefit	-0.0307***	0.0084
Paid Employment	0.0027	0.0187
Further Study	-0.0009	0.0119
Others/Unknown/Overseas	0.0288	0.0157

**School decile missing**

Being on Benefit	-0.0220	0.0339
Paid Employment	-0.0042	0.0552
Further Study	0.0049	0.0403
Others/Unknown/Overseas	0.0214	0.0420

**Level of NCEA achieved by the student****Achieved less than NCEA level 3**

Being on Benefit	0.0196***	0.0041
Paid Employment	-0.0535***	0.0109
Further Study	0.0248***	0.0067
Others/Unknown/Overseas	0.0090	0.0088

**Overseas equivalent to NCEA level 3**

Being on Benefit	-0.0372**	0.0134
Paid Employment	0.0224	0.0245
Further Study	-0.0160	0.0126
Others/Unknown/Overseas	0.0308*	0.0120

**Missing observations on NCEA level achieved**

Being on Benefit	0.0154	0.0124
Paid Employment	-0.0955**	0.0364
Further Study	0.0335	0.0199

Others/Unknown/Overseas	0.0466	0.0319
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### **University fixed effects**

#### **University 1**

#### **University 2**

Being on Benefit	-0.0294*	0.0120
Paid Employment	0.0666	0.0424
Further Study	-0.0312	0.0317
Others/Unknown/Overseas	-0.0061	0.0263

#### **University 3**

Being on Benefit	0.0144	0.0133
Paid Employment	0.0060	0.0227
Further Study	-0.0121	0.0195
Others/Unknown/Overseas	-0.0083	0.0164

#### **University 4**

Being on Benefit	-0.0159	0.0111
Paid Employment	0.0184	0.0224
Further Study	-0.0268	0.0174
Others/Unknown/Overseas	0.0244	0.0169

#### **University 5**

Being on Benefit	-0.0104	0.0114
Paid Employment	-0.0105	0.0256
Further Study	-0.0238	0.0188
Others/Unknown/Overseas	0.0447*	0.0190

#### **University 6**

Being on Benefit	0.0210	0.0123
Paid Employment	-0.0665**	0.0237
Further Study	-0.0196	0.0190
Others/Unknown/Overseas	0.0651***	0.0179

#### **University 7**

Being on Benefit	0.0120	0.0110
Paid Employment	-0.0353	0.0237
Further Study	-0.0300	0.0198
Others/Unknown/Overseas	0.0533**	0.0203

#### **University 8**

Being on Benefit	0.0115	0.0143
Paid Employment	-0.0031	0.0339
Further Study	-0.0523**	0.0202
Others/Unknown/Overseas	0.0439	0.0303

### **Subject area fixed effects**

#### **Accounting and Finance**

#### **Agriculture and Other Applied Biological Sciences**

Being on Benefit	0.0045	0.0157
Paid Employment	-0.0005	0.0420

Further Study	0.0100	0.0217
Others/Unknown/Overseas	-0.014	0.0333
<b>Anthropology and Archaeology</b>		
Being on Benefit	0.0728*	0.0321
Paid Employment	-0.0988	0.0566
Further Study	0.0746	0.0394
Others/Unknown/Overseas	-0.0486	0.0354
<b>Architecture, Design, Planning, Surveying</b>		
Being on Benefit	0.0153	0.0150
Paid Employment	-0.0676*	0.0333
Further Study	0.0209	0.0235
Others/Unknown/Overseas	0.0314	0.0384
<b>Biomedical</b>		
Being on Benefit	0.0171	0.0463
Paid Employment	-0.0584	0.0806
Further Study	0.1080	0.0566
Others/Unknown/Overseas	-0.0667	0.0669
<b>Chemistry</b>		
Being on Benefit	0.0238	0.0189
Paid Employment	-0.1478**	0.0489
Further Study	0.1867***	0.0577
Others/Unknown/Overseas	-0.0627	0.0477
<b>Clinical Medicine</b>		
Being on Benefit	-0.029***	0.0089
Paid Employment	0.1826***	0.0234
Further Study	0.0241	0.0187
Others/Unknown/Overseas	-0.1777***	0.0166
<b>Communications, Journalism and Media Studies</b>		
Being on Benefit	0.0286	0.0181
Paid Employment	-0.0213	0.0326
Further Study	0.0003	0.0227
Others/Unknown/Overseas	-0.0075	0.0321
<b>Computer Science, Information Technology, Information Sciences</b>		
Being on Benefit	0.0196	0.0117
Paid Employment	0.0011	0.0294
Further Study	0.0254	0.0191
Others/Unknown/Overseas	-0.0462	0.0259
<b>Dentistry</b>		
Being on Benefit	0.0275	0.0189
Paid Employment	0.1004***	0.0313
Further Study	-0.0173	0.0190
Others/Unknown/Overseas	-0.1106***	0.0325
<b>Design</b>		
Being on Benefit	0.0385*	0.0173
Paid Employment	-0.1317***	0.0344

Further Study	-0.0038	0.0237
Others/Unknown/Overseas	0.0971*	0.0424
<b>Earth Sciences</b>		
Being on Benefit	0.0233	0.0153
Paid Employment	-0.1125***	0.0328
Further Study	0.0277	0.0252
Others/Unknown/Overseas	0.0614*	0.0307
<b>Ecology, Evolution and Behaviour</b>		
Being on Benefit	0.0491*	0.0218
Paid Employment	-0.0646	0.0354
Further Study	0.0803*	0.0319
Others/Unknown/Overseas	-0.0648*	0.0289
<b>Economics</b>		
Being on Benefit	-0.0085	0.0083
Paid Employment	-0.0723**	0.0242
Further Study	0.0199	0.0169
Others/Unknown/Overseas	0.0608***	0.0180
<b>Education</b>		
Being on Benefit	0.0308	0.0183
Paid Employment	0.0951**	0.0340
Further Study	-0.0129	0.0196
Others/Unknown/Overseas	-0.113***	0.0216
<b>Engineering and Technology</b>		
Being on Benefit	0.0050	0.0140
Paid Employment	-0.0285	0.0369
Further Study	0.0073	0.0219
Others/Unknown/Overseas	0.0162	0.0311
<b>English Language and Literature</b>		
Being on Benefit	0.0744***	0.0212
Paid Employment	-0.0732*	0.0363
Further Study	0.0124	0.0267
Others/Unknown/Overseas	-0.0136	0.0316
<b>Foreign Languages and Linguistics</b>		
Being on Benefit	0.0406*	0.0184
Paid Employment	-0.1816***	0.0325
Further Study	0.0770**	0.0270
Others/Unknown/Overseas	0.0640*	0.0267
<b>History, History of Art, Classics and Curatorial Studies</b>		
Being on Benefit	0.0802***	0.0185
Paid Employment	-0.1376***	0.0329
Further Study	0.0698**	0.0249
Others/Unknown/Overseas	-0.0124	0.0224
<b>Human Geography</b>		
Being on Benefit	0.0736	0.0441
Paid Employment	-0.1632***	0.0469



Further Study	0.0030	0.0349
Others/Unknown/Overseas	0.0866*	0.0408
<b>Law</b>		
Being on Benefit	0.0094	0.0122
Paid Employment	0.0284	0.0287
Further Study	0.0484*	0.0204
Others/Unknown/Overseas	-0.0862***	0.0201
<b>Management, Human Resources, Industrial Relations, International Business and Other Business</b>		
Being on Benefit	0.0050	0.0102
Paid Employment	-0.0345	0.0249
Further Study	0.0005	0.0173
Others/Unknown/Overseas	0.0290	0.0197
<b>Marketing and Tourism</b>		
Being on Benefit	0.0082	0.0107
Paid Employment	-0.0528	0.0317
Further Study	-0.0274	0.0156
Others/Unknown/Overseas	0.0720*	0.0296
<b>Molecular, Cellular and Whole Organism Biology</b>		
Being on Benefit	0.0244	0.0154
Paid Employment	-0.1825***	0.0377
Further Study	0.1098**	0.0349
Others/Unknown/Overseas	0.0484	0.0428
<b>Music, Literary Arts and Other Arts</b>		
Being on Benefit	0.0928***	0.0250
Paid Employment	-0.1549***	0.0368
Further Study	0.0380	0.0280
Others/Unknown/Overseas	0.0241	0.0323
<b>Māori Knowledge and Development</b>		
Being on Benefit	0.0465	0.0367
Paid Employment	0.0722	0.0574
Further Study	0.004	0.0515
Others/Unknown/Overseas	-0.1227***	0.0304
<b>Other Health Studies (including Rehabilitation Therapies)</b>		
Being on Benefit	0.0145	0.0133
Paid Employment	0.0537	0.0284
Further Study	0.0112	0.0196
Others/Unknown/Overseas	-0.0793***	0.0219
<b>Philosophy</b>		
Being on Benefit	0.0837***	0.0200
Paid Employment	-0.1972***	0.0402
Further Study	0.1515***	0.0352
Others/Unknown/Overseas	-0.038	0.0345
<b>Physics</b>		
Being on Benefit	0.0052	0.0171
Paid Employment	-0.1728***	0.0484

Further Study	0.1592**	0.0567
Others/Unknown/Overseas	0.0084	0.0333
<b>Political Science, International Relations and Public Policy</b>		
Being on Benefit	0.0169	0.0116
Paid Employment	-0.0324	0.0279
Further Study	0.0264	0.0213
Others/Unknown/Overseas	-0.0109	0.0256
<b>Psychology</b>		
Being on Benefit	0.0504***	0.0143
Paid Employment	-0.0340	0.0333
Further Study	0.0259	0.0241
Others/Unknown/Overseas	-0.0423	0.0250
<b>Public Health</b>		
Being on Benefit	0.1270*	0.0586
Paid Employment	-0.2082*	0.1038
Further Study	0.1681*	0.0701
Others/Unknown/Overseas	-0.0869*	0.0377
<b>Pure and Applied Mathematics</b>		
Being on Benefit	0.0297*	0.0123
Paid Employment	-0.1719***	0.0337
Further Study	0.0756*	0.0328
Others/Unknown/Overseas	0.0666*	0.0280
<b>Religious Studies and Theology</b>		
Being on Benefit	0.0433	0.0332
Paid Employment	-0.2427***	0.0664
Further Study	0.0923	0.0565
Others/Unknown/Overseas	0.1071	0.0846
<b>Sociology, Social Policy, Social Work, Criminology and Gender Studies</b>		
Being on Benefit	0.0949***	0.0193
Paid Employment	-0.0985***	0.0294
Further Study	0.0329	0.0225
Others/Unknown/Overseas	-0.0294	0.0231
<b>Sport and Exercise Science</b>		
Being on Benefit	-0.0027	0.0130
Paid Employment	0.0455	0.0301
Further Study	-0.0125	0.0191
Others/Unknown/Overseas	-0.0303	0.0293
<b>Statistics</b>		
Being on Benefit	0.0064	0.0126
Paid Employment	-0.1779***	0.0355
Further Study	0.1303***	0.0326
Others/Unknown/Overseas	0.0412	0.0314
<b>Theatre and Dance, Film and Television and Multimedia</b>		
Being on Benefit	0.1524***	0.0468
Paid Employment	-0.1555	0.0833

Further Study	-0.0111	0.0438
Others/Unknown/Overseas	0.0143	0.0428
<b>Veterinary Studies and Large Animal Science</b>		
Being on Benefit	-0.037***	0.0077
Paid Employment	0.0828	0.0506
Further Study	-0.0039	0.0263
Others/Unknown/Overseas	-0.0419	0.0437
<b>Visual Arts and Crafts</b>		
Being on Benefit	0.0784*	0.0365
Paid Employment	-0.1448***	0.0439
Further Study	0.0279	0.0258
Others/Unknown/Overseas	0.0385	0.0330
<b><u>Year fixed effects</u></b>		
<b>First year at the tertiary education institute of the student – 1999</b>		
Being on Benefit	-0.0266***	0.0066
Paid Employment	0.013	0.0184
Further Study	-0.0461***	0.0101
Others/Unknown/Overseas	0.0597***	0.0169
<b>First year at the tertiary education institute of the student – 2007</b>		
Being on Benefit	-0.0577***	0.0101
Paid Employment	-0.0324	0.0351
Further Study	-0.077***	0.0181
Others/Unknown/Overseas	0.1672***	0.0305

**First year at the tertiary education institute of the student – 2008**

Being on Benefit	-0.0633***	0.0101
Paid Employment	-0.0014	0.0349
Further Study	-0.0866***	0.0183
Others/Unknown/Overseas	0.1513***	0.0305
<b>Number of observations</b>	16,116	

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Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area)

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level. Standard error adjusted for 498 clusters in id. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) \*  $p < 0.05$ , \*\*  $p < 0.01$  and \*\*\*  $p < 0.001$ .

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*Table A.5: Determinants of Labour Market Outcomes; Subsample Analysis  
Student's Gender – Female (Marginal Effects of Multinomial Logit)*

	<b>dy/dx</b>	<b>Standard Error</b>
<b><u>PBRF Outcomes</u></b>		
<b>Proportion of academics attaining PBRF rank A</b>		
Being on Benefit	-0.0001	0.0003
Paid Employment	0.0002	0.0008
Further Study	0.0001	0.0004
Others/Unknown/Overseas	-0.0001	0.0007
<b>Proportion of academics attaining PBRF rank B</b>		
Being on Benefit	0.0004**	0.0001
Paid Employment	0.0000	0.0004
Further Study	-0.0002	0.0002
Others/Unknown/Overseas	-0.0002	0.0003
<b>Proportion of academics attaining PBRF rank C(NE)</b>		
Being on Benefit	0.0002	0.0002
Paid Employment	0.0007	0.0007
Further Study	-0.0003	0.0005
Others/Unknown/Overseas	-0.0006	0.0006
<b>Proportion of academics attaining PBRF rank R</b>		
Being on Benefit	0.0006**	0.0002
Paid Employment	-0.0009	0.0008
Further Study	0.0010**	0.0004
Others/Unknown/Overseas	-0.0007	0.0007
<b>Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave</b>		
Being on Benefit	-0.0001	0.0002
Paid Employment	-0.0016*	0.0007
Further Study	0.0012***	0.0003
Others/Unknown/Overseas	0.0005	0.0007
<b><u>Department Level Characteristics</u></b>		
<b><u>Researcher's Position Title</u></b>		
<b>Proportion of Professors</b>		
Being on Benefit	-0.0001	0.0003
Paid Employment	0.0002	0.0007
Further Study	-0.0002	0.0004
Others/Unknown/Overseas	0.0000	0.0006
<b>Proportion of Associate Professors</b>		
Being on Benefit	0.0002	0.0002
Paid Employment	-0.0013	0.0007
Further Study	0.0007*	0.0003
Others/Unknown/Overseas	0.0003	0.0006
<b>Proportion of Lecturers</b>		
Being on Benefit	0.0005*	0.0002
Paid Employment	0.0005	0.0005

Further Study	0.0001	0.0003
Others/Unknown/Overseas	-0.0011*	0.0005
<b>Proportion of Other Teaching Staff</b>		
Being on Benefit	-0.0002	0.0003
Paid Employment	0.0009	0.0009
Further Study	0.0007*	0.0003
Others/Unknown/Overseas	-0.0013	0.0008
<b>Proportion of Other Non-Teaching Staff</b>		
Being on Benefit	0.0002	0.0002
Paid Employment	-0.0013*	0.0007
Further Study	0.0003	0.0003
Others/Unknown/Overseas	0.0009	0.0005
<b><u>Researcher's Gender</u></b>		
<b>Proportion of female academics</b>		
Being on Benefit	0.0002	0.0002
Paid Employment	-0.0007	0.0004
Further Study	-0.0001	0.0002
Others/Unknown/Overseas	0.0006	0.0004
<b>Proportion of academics for whom gender is unknown</b>		
Being on Benefit	-0.0004	0.0003
Paid Employment	-0.0012	0.0009
Further Study	0.0010*	0.0005
Others/Unknown/Overseas	0.0006	0.0009
<b><u>Researcher's Age Band</u></b>		
<b>Proportion of academics in the age band of 20 to 29</b>		
Being on Benefit	-0.0001	0.0006
Paid Employment	-0.0023	0.0015
Further Study	-0.0011	0.0007
Others/Unknown/Overseas	0.0035**	0.0013
<b>Proportion of academics in the age band of 40 to 49</b>		
Being on Benefit	0.0003	0.0002
Paid Employment	0.0005	0.0005
Further Study	-0.0004	0.0003
Others/Unknown/Overseas	-0.0004	0.0005
<b>Proportion of academics in the age band of 50 to 59</b>		
Being on Benefit	0.0001	0.0002
Paid Employment	0.0002	0.0006
Further Study	-0.0001	0.0003
Others/Unknown/Overseas	-0.0002	0.0005
<b>Proportion of academics in the age band of 60 to 69</b>		
Being on Benefit	0.0003	0.0003
Paid Employment	0.0013	0.0008
Further Study	-0.0005	0.0004
Others/Unknown/Overseas	-0.0011	0.0007
<b>Proportion of academics in the age band of 70 and Over</b>		

Being on Benefit	0.0002	0.0006
Paid Employment	-0.0021	0.0021
Further Study	0.0019*	0.0008
Others/Unknown/Overseas	0.0000	0.0018
<b>Proportion of academics for whom age band is unknown</b>		
Being on Benefit	0.0005	0.0003
Paid Employment	0.0007	0.0008
Further Study	-0.0007	0.0004
Others/Unknown/Overseas	-0.0005	0.0008
<b><u>Researcher's Ethnicity</u></b>		
<b>Proportion of Asian academics</b>		
Being on Benefit	0.0002	0.0003
Paid Employment	-0.0005	0.0008
Further Study	0.0006	0.0004
Others/Unknown/Overseas	-0.0003	0.0006
<b>Proportion of Māori academics</b>		
Being on Benefit	-0.0001	0.0002
Paid Employment	-0.0017*	0.0007
Further Study	0.0002	0.0004
Others/Unknown/Overseas	0.0015*	0.0006
<b>Proportion of Pasifika academics</b>		
Being on Benefit	0.0001	0.0007
Paid Employment	0.0009	0.0018
Further Study	-0.0003	0.0009
Others/Unknown/Overseas	-0.0007	0.0015
<b>Proportion of Middle Eastern/Latin American/African academics</b>		
Being on Benefit	0.0000	0.0009
Paid Employment	-0.0019	0.0019
Further Study	0.0013	0.0013
Others/Unknown/Overseas	0.0006	0.0013
<b>Proportion of academics belonging to "other ethnicity"</b>		
Being on Benefit	0.0001	0.0002
Paid Employment	-0.0013*	0.0006
Further Study	0.0006*	0.0003
Others/Unknown/Overseas	0.0006	0.0005
<b>Proportion of academics for whom ethnicity is unknown</b>		
Being on Benefit	0.0002	0.0001
Paid Employment	-0.0001	0.0004
Further Study	0.0000	0.0002
Others/Unknown/Overseas	0.0000	0.0004

## **Student Level Characteristics**

### **Student's ethnicity**

**Asian student**

Being on Benefit	-0.0093	0.0051
Paid Employment	-0.1137***	0.0128
Further Study	0.0320***	0.0068
Others/Unknown/Overseas	0.0910***	0.0120

**Māori student**

Being on Benefit	0.0289***	0.0058
Paid Employment	-0.0501**	0.0177
Further Study	0.0372***	0.0081
Others/Unknown/Overseas	-0.0159	0.0166

**Pasifika student**

Being on Benefit	0.0322***	0.0063
Paid Employment	-0.0995***	0.0219
Further Study	0.0454***	0.0102
Others/Unknown/Overseas	0.0218	0.0197

**Middle Eastern/Latin American/African student**

Being on Benefit	0.0391**	0.0130
Paid Employment	-0.2067***	0.0390
Further Study	0.0444*	0.0175
Others/Unknown/Overseas	0.1232***	0.0313

**Student belonging to “other ethnicity”**

Being on Benefit	0.0083	0.0108
Paid Employment	-0.0869***	0.0224
Further Study	0.0180	0.0125
Others/Unknown/Overseas	0.0607***	0.0189

**Student for whom ethnicity is unknown**

Being on Benefit	0.0162	0.0184
Paid Employment	-0.0942*	0.0444
Further Study	-0.0183	0.0287
Others/Unknown/Overseas	0.0963**	0.0332

**Student’s high school decile****School decile 1**

Being on Benefit	-0.0010	0.0096
Paid Employment	0.0611*	0.0282
Further Study	-0.0019	0.0144
Others/Unknown/Overseas	-0.0583	0.0298

**School decile 2**

Being on Benefit	0.0005	0.0098
Paid Employment	-0.0014	0.0257
Further Study	0.0078	0.0131
Others/Unknown/Overseas	-0.0068	0.0233

**School decile 3**

Being on Benefit	0.0014	0.0069
Paid Employment	0.0108	0.0176
Further Study	0.0120	0.0096
Others/Unknown/Overseas	-0.0241	0.0175



**School decile 4**

Being on Benefit	-0.0008	0.0083
Paid Employment	0.0187	0.0189
Further Study	0.0038	0.0106
Others/Unknown/Overseas	-0.0218	0.0157

**School decile 6**

Being on Benefit	0.0004	0.0069
Paid Employment	0.0242	0.0150
Further Study	-0.0004	0.0088
Others/Unknown/Overseas	-0.0242	0.0154

**School decile 7**

Being on Benefit	-0.0071	0.0070
Paid Employment	0.0015	0.0149
Further Study	0.0012	0.0085
Others/Unknown/Overseas	0.0044	0.0131

**School decile 8**

Being on Benefit	-0.0041	0.0072
Paid Employment	0.0064	0.0164
Further Study	-0.0018	0.0095
Others/Unknown/Overseas	-0.0005	0.0146

**School decile 9**

Being on Benefit	-0.0148*	0.0075
Paid Employment	0.0077	0.0157
Further Study	0.0028	0.0084
Others/Unknown/Overseas	0.0042	0.0136

**School decile 10**

Being on Benefit	-0.0273***	0.0074
Paid Employment	0.0131	0.0156
Further Study	-0.0025	0.0089
Others/Unknown/Overseas	0.0166	0.0145

**School decile missing**

Being on Benefit	0.0123	0.0153
Paid Employment	-0.0573	0.0396
Further Study	0.0293	0.0178
Others/Unknown/Overseas	0.0156	0.0384

**Level of NCEA achieved by the student****Achieved less than NCEA level 3**

Being on Benefit	0.0253***	0.0037
Paid Employment	-0.0521***	0.0096
Further Study	0.0204***	0.0056
Others/Unknown/Overseas	0.0065	0.0082

**Overseas equivalent to NCEA level 3**

Being on Benefit	-0.0108	0.0142
Paid Employment	-0.0521*	0.0250
Further Study	0.0073	0.0123

Others/Unknown/Overseas	0.0556**	0.0183
<b>Missing observations on NCEA level achieved</b>		
Being on Benefit	0.0106	0.0105
Paid Employment	-0.0595	0.0308
Further Study	0.0232	0.0146
Others/Unknown/Overseas	0.0257	0.0274
<b><u>University fixed effects</u></b>		
<b>University 1</b>		
<b>University 2</b>		
Being on Benefit	-0.0263	0.0165
Paid Employment	0.0433	0.0336
Further Study	-0.0512***	0.0120
Others/Unknown/Overseas	0.0343	0.0264
<b>University 3</b>		
Being on Benefit	-0.0221*	0.0109
Paid Employment	0.0166	0.0292
Further Study	-0.0123	0.0127
Others/Unknown/Overseas	0.0179	0.0202
<b>University 4</b>		
Being on Benefit	-0.0156	0.0111
Paid Employment	0.0334	0.0329
Further Study	-0.0258*	0.0110
Others/Unknown/Overseas	0.0080	0.0223
<b>University 5</b>		
Being on Benefit	-0.0146	0.0105
Paid Employment	0.0002	0.0320
Further Study	-0.0105	0.0127
Others/Unknown/Overseas	0.0248	0.0223
<b>University 6</b>		
Being on Benefit	0.0032	0.0122
Paid Employment	-0.0284	0.0334
Further Study	0.0001	0.0120
Others/Unknown/Overseas	0.0252	0.0233
<b>University 7</b>		
Being on Benefit	0.0017	0.0099
Paid Employment	-0.0246	0.0316
Further Study	0.0028	0.0118
Others/Unknown/Overseas	0.0201	0.0229
<b>University 8</b>		
Being on Benefit	-0.0277*	0.0113
Paid Employment	-0.0342	0.0365
Further Study	0.0043	0.0170
Others/Unknown/Overseas	0.0577	0.0302

**Subject area fixed effects**

**Accounting and Finance****Agriculture and Other Applied Biological Sciences**

Being on Benefit	0.0293*	0.0137
Paid Employment	-0.0988**	0.0366
Further Study	0.1093***	0.0272
Others/Unknown/Overseas	-0.0397	0.0244

**Anthropology and Archaeology**

Being on Benefit	0.0525*	0.0258
Paid Employment	-0.1759***	0.0474
Further Study	0.0664***	0.0172
Others/Unknown/Overseas	0.0570	0.0425

**Architecture, Design, Planning, Surveying**

Being on Benefit	0.0429***	0.0101
Paid Employment	-0.1526***	0.0310
Further Study	0.0291*	0.0140
Others/Unknown/Overseas	0.0807***	0.0239

**Biomedical**

Being on Benefit	-0.0063	0.0114
Paid Employment	0.0344	0.0639
Further Study	0.0545	0.0373
Others/Unknown/Overseas	-0.0826	0.0570

**Chemistry**

Being on Benefit	0.0338*	0.0170
Paid Employment	-0.1922***	0.0588
Further Study	0.1626***	0.0470
Others/Unknown/Overseas	-0.0041	0.0354

**Clinical Medicine**

Being on Benefit	-0.0188**	0.0061
Paid Employment	0.0837	0.0529
Further Study	0.0745*	0.0302
Others/Unknown/Overseas	-0.1394***	0.0256

**Communications, Journalism and Media Studies**

Being on Benefit	0.0165	0.0113
Paid Employment	-0.1447***	0.0349
Further Study	-0.0033	0.0079
Others/Unknown/Overseas	0.1315***	0.0323

**Computer Science, Information Technology, Information Sciences**

Being on Benefit	0.0008	0.0129
Paid Employment	-0.0709	0.0415
Further Study	0.0310	0.0162
Others/Unknown/Overseas	0.0391	0.0365

**Dentistry**

Being on Benefit	0.0479**	0.0157
Paid Employment	-0.0889*	0.0386
Further Study	0.0041	0.0094

Others/Unknown/Overseas	0.0369	0.0326
<b>Design</b>		
Being on Benefit	0.0198	0.0117
Paid Employment	-0.1875***	0.0418
Further Study	0.0004	0.0082
Others/Unknown/Overseas	0.1673***	0.0374
<b>Earth Sciences</b>		
Being on Benefit	0.0219	0.0131
Paid Employment	-0.1856***	0.0371
Further Study	0.0778*	0.0332
Others/Unknown/Overseas	0.0860**	0.0311
<b>Ecology, Evolution and Behaviour</b>		
Being on Benefit	0.0542**	0.0176
Paid Employment	-0.1359***	0.0371
Further Study	0.0608**	0.0215
Others/Unknown/Overseas	0.0210	0.0316
<b>Economics</b>		
Being on Benefit	0.0260	0.0153
Paid Employment	-0.1549***	0.0374
Further Study	0.0211	0.0131
Others/Unknown/Overseas	0.1078**	0.0341
<b>Education</b>		
Being on Benefit	0.0341***	0.0096
Paid Employment	-0.0432	0.0326
Further Study	0.0273**	0.0097
Others/Unknown/Overseas	-0.0182	0.0260
<b>Engineering and Technology</b>		
Being on Benefit	0.0125	0.0262
Paid Employment	-0.1080	0.0699
Further Study	0.0192	0.0338
Others/Unknown/Overseas	0.0762	0.0597
<b>English Language and Literature</b>		
Being on Benefit	0.0511***	0.0147
Paid Employment	-0.1732***	0.0362
Further Study	0.0970***	0.0226
Others/Unknown/Overseas	0.0252	0.0313
<b>Foreign Languages and Linguistics</b>		
Being on Benefit	0.0128	0.0124
Paid Employment	-0.2183***	0.0305
Further Study	0.0805***	0.0139
Others/Unknown/Overseas	0.1249***	0.0266
<b>History, History of Art, Classics and Curatorial Studies</b>		
Being on Benefit	0.0387***	0.0113
Paid Employment	-0.1231***	0.0278
Further Study	0.0691***	0.0136

Others/Unknown/Overseas	0.0152	0.0264
<b>Human Geography</b>		
Being on Benefit	0.0202	0.0307
Paid Employment	-0.1439*	0.0648
Further Study	0.0708	0.0394
Others/Unknown/Overseas	0.0530	0.0426
<b>Law</b>		
Being on Benefit	0.0209**	0.0072
Paid Employment	-0.0243	0.0276
Further Study	0.0456***	0.0103
Others/Unknown/Overseas	-0.0421	0.0228
<b>Management, Human Resources, Industrial Relations, International Business and Other Business</b>		
Being on Benefit	0.0124	0.0076
Paid Employment	-0.0985***	0.0287
Further Study	0.0076	0.0064
Others/Unknown/Overseas	0.0786**	0.0252
<b>Marketing and Tourism</b>		
Being on Benefit	0.0068	0.0055
Paid Employment	-0.1270***	0.0276
Further Study	0.0035	0.0063
Others/Unknown/Overseas	0.1167***	0.0267
<b>Molecular, Cellular and Whole Organism Biology</b>		
Being on Benefit	0.0338*	0.0139
Paid Employment	-0.1782***	0.0373
Further Study	0.0773***	0.0182
Others/Unknown/Overseas	0.0672*	0.0332
<b>Music, Literary Arts and Other Arts</b>		
Being on Benefit	0.0765***	0.0207
Paid Employment	-0.2835***	0.0417
Further Study	0.0624*	0.0288
Others/Unknown/Overseas	0.1446***	0.0414
<b>Māori Knowledge and Development</b>		
Being on Benefit	0.0970*	0.0392
Paid Employment	-0.0918	0.0705
Further Study	0.0507	0.0406
Others/Unknown/Overseas	-0.0559	0.0495
<b>Other Health Studies (including Rehabilitation Therapies)</b>		
Being on Benefit	0.0159	0.0081
Paid Employment	-0.0221	0.0332
Further Study	0.0261**	0.0084
Others/Unknown/Overseas	-0.0199	0.0280
<b>Philosophy</b>		
Being on Benefit	0.0717***	0.0210
Paid Employment	-0.2223***	0.0563
Further Study	0.0516	0.0341

Others/Unknown/Overseas	0.0990*	0.0423
<b>Physics</b>		
Being on Benefit	0.1267***	0.0388
Paid Employment	-0.2465*	0.1064
Further Study	0.1617*	0.0790
Others/Unknown/Overseas	-0.0420	0.0464
<b>Political Science, International Relations and Public Policy</b>		
Being on Benefit	0.0185	0.0100
Paid Employment	-0.1451***	0.0362
Further Study	0.0431***	0.0115
Others/Unknown/Overseas	0.0835**	0.0306
<b>Psychology</b>		
Being on Benefit	0.0434***	0.0090
Paid Employment	-0.1520***	0.0341
Further Study	0.1029***	0.0148
Others/Unknown/Overseas	0.0057	0.0279
<b>Public Health</b>		
Being on Benefit	0.0921**	0.0310
Paid Employment	-0.1495*	0.0629
Further Study	0.0406	0.0220
Others/Unknown/Overseas	0.0167	0.0367
<b>Pure and Applied Mathematics</b>		
Being on Benefit	0.0029	0.0202
Paid Employment	-0.1553***	0.0409
Further Study	0.0489	0.0300
Others/Unknown/Overseas	0.1034	0.0542
<b>Religious Studies and Theology</b>		
Being on Benefit	0.0285	0.0220
Paid Employment	-0.1316**	0.0422
Further Study	0.0692**	0.0218
Others/Unknown/Overseas	0.0338	0.0325
<b>Sociology, Social Policy, Social Work, Criminology and Gender Studies</b>		
Being on Benefit	0.0394***	0.0111
Paid Employment	-0.1309***	0.0317
Further Study	0.0462***	0.0120
Others/Unknown/Overseas	0.0453	0.0276
<b>Sport and Exercise Science</b>		
Being on Benefit	0.0110	0.0130
Paid Employment	-0.0084	0.0422
Further Study	-0.0055	0.0148
Others/Unknown/Overseas	0.0028	0.0330
<b>Statistics</b>		
Being on Benefit	0.0386	0.0218
Paid Employment	-0.1927***	0.0364
Further Study	0.0518***	0.0142

Others/Unknown/Overseas	0.1023**	0.0327
<b>Theatre and Dance, Film and Television and Multimedia</b>		
Being on Benefit	0.1041***	0.0286
Paid Employment	-0.2744***	0.0725
Further Study	0.0635	0.0368
Others/Unknown/Overseas	0.1068*	0.0538
<b>Veterinary Studies and Large Animal Science</b>		
Being on Benefit	0.0483***	0.0126
Paid Employment	-0.0185	0.0308
Further Study	0.0492***	0.0147
Others/Unknown/Overseas	-0.079**	0.0254
<b>Visual Arts and Crafts</b>		
Being on Benefit	0.0588***	0.0137
Paid Employment	-0.2551***	0.0571
Further Study	0.0413*	0.0180
Others/Unknown/Overseas	0.1550**	0.0516

#### **Year fixed effects**

##### **First year at the tertiary education institute of the student – 1999**

Being on Benefit	-0.0287***	0.0045
Paid Employment	0.0517*	0.0217
Further Study	-0.0229**	0.0086
Others/Unknown/Overseas	-0.0001	0.0234

##### **First year at the tertiary education institute of the student – 2007**

Being on Benefit	-0.0767***	0.0098
Paid Employment	0.0018	0.0322
Further Study	-0.0036	0.0140
Others/Unknown/Overseas	0.0785*	0.0312

##### **First year at the tertiary education institute of the student – 2008**

Being on Benefit	-0.0797***	0.0097
Paid Employment	0.0143	0.0319

Further Study	-0.0145	0.0141
Others/Unknown/Overseas	0.0800**	0.0310
<b>Number of observations</b>	21,228	

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Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 502 clusters in *id*. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) \*  $p < 0.05$ , \*\*  $p < 0.01$  and \*\*\*  $p < 0.001$ .

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*Table A.6: Determinants of Labour Market Outcomes; Subsample Analysis*  
*Student's Ethnicity – NZ European/Pākehā (Marginal Effects of Multinomial Logit)*

	dy/dx	Standard Error
<b><u>PBRF Outcomes</u></b>		
<b>Proportion of academics attaining PBRF rank A</b>		
Being on Benefit	0.0001	0.0002
Paid Employment	-0.0001	0.0006
Further Study	0.0002	0.0003
Others/Unknown/Overseas	-0.0002	0.0005
<b>Proportion of academics attaining PBRF rank B</b>		
Being on Benefit	0.0003*	0.0001
Paid Employment	-0.0003	0.0003
Further Study	0.0001	0.0002
Others/Unknown/Overseas	-0.0001	0.0002
<b>Proportion of academics attaining PBRF rank C(NE)</b>		
Being on Benefit	0.0002	0.0002
Paid Employment	0.0004	0.0006
Further Study	0.0002	0.0003
Others/Unknown/Overseas	-0.0008	0.0004
<b>Proportion of academics attaining PBRF rank R</b>		
Being on Benefit	0.0004*	0.0002
Paid Employment	-0.0003	0.0007
Further Study	0.0008**	0.0003
Others/Unknown/Overseas	-0.0009	0.0006
<b>Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave</b>		
Being on Benefit	-0.0001	0.0002
Paid Employment	-0.0010	0.0006
Further Study	0.0008***	0.0002
Others/Unknown/Overseas	0.0003	0.0005
<b><u>Department Level Characteristics</u></b>		
<b><u>Researcher's Position Title</u></b>		
<b>Proportion of Professors</b>		
Being on Benefit	-0.0001	0.0002
Paid Employment	0.0009	0.0006
Further Study	-0.0003	0.0003
Others/Unknown/Overseas	-0.0005	0.0004
<b>Proportion of Associate Professors</b>		
Being on Benefit	0.0003	0.0002
Paid Employment	-0.0001	0.0006
Further Study	-0.0003	0.0003
Others/Unknown/Overseas	0.0001	0.0004
<b>Proportion of Lecturers</b>		
Being on Benefit	0.0002	0.0002
Paid Employment	0.0004	0.0004
Further Study	-0.0002	0.0002

Others/Unknown/Overseas	-0.0003	0.0004
<b>Proportion of Other Teaching Staff</b>		
Being on Benefit	0.0001	0.0003
Paid Employment	0.0006	0.0008
Further Study	-0.0002	0.0003
Others/Unknown/Overseas	-0.0005	0.0006
<b>Proportion of Other Non-Teaching Staff</b>		
Being on Benefit	0.0001	0.0002
Paid Employment	-0.0009	0.0005
Further Study	0.0000	0.0003
Others/Unknown/Overseas	0.0008	0.0004
<b><u>Researcher's Gender</u></b>		
<b>Proportion of female academics</b>		
Being on Benefit	0.0001	0.0001
Paid Employment	-0.0002	0.0004
Further Study	-0.0002	0.0002
Others/Unknown/Overseas	0.0003	0.0003
<b>Proportion of academics for whom gender is unknown</b>		
Being on Benefit	-0.0001	0.0003
Paid Employment	0.0001	0.0007
Further Study	-0.0001	0.0003
Others/Unknown/Overseas	0.0001	0.0006
<b><u>Researcher's Age Band</u></b>		
<b>Proportion of academics in the age band of 20 to 29</b>		
Being on Benefit	0.0001	0.0005
Paid Employment	-0.0032*	0.0013
Further Study	0.0004	0.0007
Others/Unknown/Overseas	0.0027*	0.0012
<b>Proportion of academics in the age band of 40 to 49</b>		
Being on Benefit	0.0001	0.0002
Paid Employment	0.0004	0.0004
Further Study	-0.0004	0.0002
Others/Unknown/Overseas	0.0000	0.0003
<b>Proportion of academics in the age band of 50 to 59</b>		
Being on Benefit		0.0002
Paid Employment	0.0006	0.0005
Further Study	-0.0006*	0.0002
Others/Unknown/Overseas	0.0001	0.0003
<b>Proportion of academics in the age band of 60 to 69</b>		
Being on Benefit	-0.0001	0.0003
Paid Employment	0.0006	0.0006
Further Study	-0.0002	0.0003
Others/Unknown/Overseas	-0.0004	0.0005
<b>Proportion of academics in the age band of 70 and Over</b>		
Being on Benefit	0.0002	0.0006
Paid Employment	-0.0017	0.0014

Further Study	0.0000	0.0006
Others/Unknown/Overseas	0.0016	0.0010
<b>Proportion of academics for whom age band is unknown</b>		
Being on Benefit	0.0001	0.0003
Paid Employment	0.0002	0.0006
Further Study	-0.0003	0.0003
Others/Unknown/Overseas	-0.0001	0.0005
<b><u>Researcher's Ethnicity</u></b>		
<b>Proportion of Asian academics</b>		
Being on Benefit	0.0001	0.0003
Paid Employment	-0.0003	0.0006
Further Study	0.0009*	0.0004
Others/Unknown/Overseas	-0.0007	0.0004
<b>Proportion of Māori academics</b>		
Being on Benefit	0.0003	0.0002
Paid Employment	-0.0011	0.0006
Further Study	0.0002	0.0004
Others/Unknown/Overseas	0.0007	0.0005
<b>Proportion of Pasifika academics</b>		
Being on Benefit	0.0002	0.0005
Paid Employment	0.0015	0.0014
Further Study	-0.0019*	0.0008
Others/Unknown/Overseas	0.0002	0.0010
<b>Proportion of Middle Eastern/Latin American/African academics</b>		
Being on Benefit	0.0007	0.0010
Paid Employment	-0.0041**	0.0016
Further Study	0.002	0.0011
Others/Unknown/Overseas	0.0014	0.0014
<b>Proportion of academics belonging to “other ethnicity”</b>		
Being on Benefit	0.0003	0.0002
Paid Employment	-0.0006	0.0005
Further Study	0.0004	0.0002
Others/Unknown/Overseas	0.0000	0.0004
<b>Proportion of academics for whom ethnicity is unknown</b>		
Being on Benefit	0.0000	0.0001
Paid Employment	0.0000	0.0003
Further Study	0.0002	0.0002
Others/Unknown/Overseas	-0.0002	0.0003
<b><u>Student Level Characteristics</u></b>		
<b><u>Student's gender</u></b>		
<b>Female student</b>		
Being on Benefit	-0.0078**	0.0028
Paid Employment	0.0091	0.0072
Further Study	-0.0219***	0.0039
Others/Unknown/Overseas	0.0207***	0.0060

**Student's high school decile****School decile 1**

Being on Benefit	-0.0014	0.0135
Paid Employment	0.0132	0.0314
Further Study	0.0121	0.0217
Others/Unknown/Overseas	-0.0240	0.0278

**School decile 2**

Being on Benefit	0.0106	0.0086
Paid Employment	-0.0236	0.0240
Further Study	0.0006	0.0130
Others/Unknown/Overseas	0.0125	0.0207

**School decile 3**

Being on Benefit	-0.0003	0.0064
Paid Employment	-0.0078	0.0156
Further Study	0.0131	0.0092
Others/Unknown/Overseas	-0.0049	0.0144

**School decile 4**

Being on Benefit	0.0028	0.0073
Paid Employment	0.0034	0.0155
Further Study	-0.0025	0.0089
Others/Unknown/Overseas	-0.0036	0.0129

**School decile 6**

Being on Benefit	0.0037	0.0062
Paid Employment	0.0236	0.0126
Further Study	-0.0065	0.0074
Others/Unknown/Overseas	-0.0208	0.0121

**School decile 7**

Being on Benefit	-0.0049	0.0062
Paid Employment	-0.0068	0.0126
Further Study	0.0066	0.0073
Others/Unknown/Overseas	0.0051	0.0106

**School decile 8**

Being on Benefit	-0.0085	0.0065
Paid Employment	0.0061	0.0132
Further Study	-0.0048	0.0075
Others/Unknown/Overseas	0.0071	0.0113

**School decile 9**

Being on Benefit	-0.0145*	0.0067
Paid Employment	0.0051	0.0127
Further Study	0.0022	0.0074
Others/Unknown/Overseas	0.0072	0.0104

**School decile 10**

Being on Benefit	-0.0299***	0.0064
Paid Employment	0.0066	0.0121
Further Study	-0.0023	0.0069
Others/Unknown/Overseas	0.0256*	0.0113

**School decile missing**

Being on Benefit	0.0149	0.0157
Paid Employment	-0.0319	0.0354
Further Study	0.0284	0.0167
Others/Unknown/Overseas	-0.0114	0.0311

**Level of NCEA achieved by the student****Achieved less than NCEA level 3**

Being on Benefit	0.0241***	0.0033
Paid Employment	-0.056***	0.0074
Further Study	0.0219***	0.0041
Others/Unknown/Overseas	0.0100	0.0061

**Overseas equivalent to NCEA level 3**

Being on Benefit	-0.0313*	0.0129
Paid Employment	0.0150	0.0181
Further Study	-0.0028	0.0100
Others/Unknown/Overseas	0.0191	0.0146

**Missing observations on NCEA level achieved**

Being on Benefit	0.0106	0.0128
Paid Employment	-0.0390	0.0315
Further Study	0.0062	0.0159
Others/Unknown/Overseas	0.0222	0.0281

**University fixed effects****University 1****University 2**

Being on Benefit	-0.0352*	0.0142
Paid Employment	0.0934***	0.0289
Further Study	-0.0395***	0.0114
Others/Unknown/Overseas	-0.0187	0.0181

**University 3**

Being on Benefit	-0.0183	0.0111
Paid Employment	0.0366	0.0253
Further Study	-0.0173	0.0099
Others/Unknown/Overseas	-0.0010	0.0157

**University 4**

Being on Benefit	-0.0214*	0.0108
Paid Employment	0.0272	0.0294
Further Study	-0.0025	0.0104
Others/Unknown/Overseas	-0.0033	0.0197

**University 5**

Being on Benefit	-0.0221*	0.0106
Paid Employment	0.0160	0.0260
Further Study	-0.0061	0.0103
Others/Unknown/Overseas	0.0121	0.0164

**University 6**

Being on Benefit	0.0020	0.0118
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Paid Employment	-0.0320	0.0275
Further Study	-0.0006	0.0102
Others/Unknown/Overseas	0.0306	0.0173
<b>University 7</b>		
Being on Benefit	0.0018	0.0113
Paid Employment	-0.0131	0.0269
Further Study	-0.0023	0.0100
Others/Unknown/Overseas	0.0136	0.0167
<b>University 8</b>		
Being on Benefit	-0.0152	0.0120
Paid Employment	-0.0094	0.0299
Further Study	-0.0147	0.0123
Others/Unknown/Overseas	0.0393	0.0232
<b><u>Subject Area fixed effects</u></b>		
<b>Accounting and Finance</b>		
<b>Agriculture and Other Applied Biological Sciences</b>		
Being on Benefit	0.0181	0.0163
Paid Employment	-0.0476	0.0288
Further Study	0.0591***	0.0176
Others/Unknown/Overseas	-0.0297	0.0188
<b>Anthropology and Archaeology</b>		
Being on Benefit	0.0640**	0.0231
Paid Employment	-0.1580***	0.0417
Further Study	0.0797**	0.0258
Others/Unknown/Overseas	0.0144	0.0335
<b>Architecture, Design, Planning, Surveying</b>		
Being on Benefit	0.0219*	0.0103
Paid Employment	-0.0908***	0.0273
Further Study	0.0293**	0.0108
Others/Unknown/Overseas	0.0397	0.0214
<b>Biomedical</b>		
Being on Benefit	-0.0070	0.0124
Paid Employment	-0.0310	0.0859
Further Study	0.0667*	0.0307
Others/Unknown/Overseas	-0.0288	0.0673
<b>Chemistry</b>		
Being on Benefit	0.0127	0.0144
Paid Employment	-0.1846***	0.0389
Further Study	0.1705***	0.0453
Others/Unknown/Overseas	0.0015	0.0345
<b>Clinical Medicine</b>		
Being on Benefit	-0.0220**	0.0075
Paid Employment	0.0883	0.0502
Further Study	0.0696	0.0356
Others/Unknown/Overseas	-0.1359***	0.0179

**Communications, Journalism and Media Studies**

Being on Benefit	0.0162	0.0133
Paid Employment	-0.0909***	0.0275
Further Study	-0.0036	0.0093
Others/Unknown/Overseas	0.0783***	0.0222

**Computer Science, Information Technology, Information Sciences**

Being on Benefit	0.0198	0.0113
Paid Employment	-0.0131	0.0280
Further Study	0.02600**	0.0100
Others/Unknown/Overseas	-0.0326	0.0222

**Dentistry**

Being on Benefit	0.0283	0.0227
Paid Employment	0.0136	0.0288
Further Study	0.0150	0.0101
Others/Unknown/Overseas	-0.0569**	0.0211

**Design**

Being on Benefit	0.0216	0.0131
Paid Employment	-0.1485***	0.0368
Further Study	0.0062	0.0120
Others/Unknown/Overseas	0.1207***	0.0298

**Earth Sciences**

Being on Benefit	0.0292*	0.0131
Paid Employment	-0.1582***	0.0253
Further Study	0.0469***	0.0145
Others/Unknown/Overseas	0.0821***	0.0200

**Ecology, Evolution and Behaviour**

Being on Benefit	0.0408**	0.0134
Paid Employment	-0.1144***	0.0273
Further Study	0.0663***	0.0171
Others/Unknown/Overseas	0.0073	0.0209

**Economics**

Being on Benefit	0.0059	0.0090
Paid Employment	-0.0809**	0.0278
Further Study	-0.0013	0.0075
Others/Unknown/Overseas	0.0764**	0.0265

**Education**

Being on Benefit	0.0315**	0.0113
Paid Employment	-0.0220	0.0265
Further Study	0.0263*	0.0109
Others/Unknown/Overseas	-0.0359*	0.0172

**Engineering and Technology**

Being on Benefit	-0.0103	0.0108
Paid Employment	-0.0520	0.0350
Further Study	-0.0037	0.0103
Others/Unknown/Overseas	0.0660	0.0361

**English Language and Literature**

Being on Benefit	0.0666***	0.0145
Paid Employment	-0.1537***	0.0259
Further Study	0.0751***	0.0174
Others/Unknown/Overseas	0.0120	0.0215
<b>Foreign Languages and Linguistics</b>		
Being on Benefit	0.0316*	0.0138
Paid Employment	-0.2092***	0.0241
Further Study	0.0741***	0.0102
Others/Unknown/Overseas	0.1034***	0.0200
<b>History, History of Art, Classics and Curatorial Studies</b>		
Being on Benefit	0.0519***	0.0108
Paid Employment	-0.1464***	0.0245
Further Study	0.0815***	0.0141
Others/Unknown/Overseas	0.0130	0.0177
<b>Human Geography</b>		
Being on Benefit	0.0240	0.0253
Paid Employment	-0.1230**	0.0455
Further Study	0.0355	0.0207
Others/Unknown/Overseas	0.0635	0.0350
<b>Law</b>		
Being on Benefit	0.0132	0.0078
Paid Employment	-0.0046	0.0236
Further Study	0.0379***	0.0111
Others/Unknown/Overseas	-0.0465**	0.0173
<b>Management, Human Resources, Industrial Relations, International Business and Other Business</b>		
Being on Benefit	0.0085	0.0098
Paid Employment	-0.0804***	0.0237
Further Study	0.0100	0.0084
Others/Unknown/Overseas	0.0619***	0.0174
<b>Marketing and Tourism</b>		
Being on Benefit	0.0056	0.0078
Paid Employment	-0.1038***	0.0265
Further Study	-0.0084	0.0069
Others/Unknown/Overseas	0.1066***	0.0214
<b>Molecular, Cellular and Whole Organism Biology</b>		
Being on Benefit	0.0254*	0.0127
Paid Employment	-0.1439***	0.0325
Further Study	0.0801***	0.0172
Others/Unknown/Overseas	0.0384	0.0281
<b>Music, Literary Arts and Other Arts</b>		
Being on Benefit	0.0856***	0.0185
Paid Employment	-0.1942***	0.0321
Further Study	0.0521**	0.0194
Others/Unknown/Overseas	0.0565*	0.0228
<b>Māori Knowledge and Development</b>		



Being on Benefit	0.0887	0.0457
Paid Employment	-0.1260	0.0829
Further Study	0.0882	0.0594
Others/Unknown/Overseas	-0.0509	0.0421
<b>Other Health Studies (including Rehabilitation Therapies)</b>		
Being on Benefit	0.0144	0.0101
Paid Employment	-0.0340	0.0288
Further Study	0.0380***	0.0090
Others/Unknown/Overseas	-0.0184	0.0214
<b>Philosophy</b>		
Being on Benefit	0.0835***	0.0187
Paid Employment	-0.2217***	0.0405
Further Study	0.1279***	0.0272
Others/Unknown/Overseas	0.0102	0.0235
<b>Physics</b>		
Being on Benefit	0.0292	0.0201
Paid Employment	-0.1923***	0.0564
Further Study	0.1466***	0.0427
Others/Unknown/Overseas	0.0165	0.0240
<b>Political Science, International Relations and Public Policy</b>		
Being on Benefit	0.0127	0.0094
Paid Employment	-0.1035***	0.0239
Further Study	0.0508***	0.0111
Others/Unknown/Overseas	0.0400*	0.0171
<b>Psychology</b>		
Being on Benefit	0.0469***	0.0098
Paid Employment	-0.1367***	0.0293
Further Study	0.0856***	0.0146
Others/Unknown/Overseas	0.0042	0.0208
<b>Public Health</b>		
Being on Benefit	0.1238**	0.0466
Paid Employment	-0.2081**	0.0804
Further Study	0.1309*	0.0668
Others/Unknown/Overseas	-0.0466	0.0278
<b>Pure and Applied Mathematics</b>		
Being on Benefit	0.0458**	0.0162
Paid Employment	-0.1677***	0.0408
Further Study	0.0634**	0.0203
Others/Unknown/Overseas	0.0585	0.0399
<b>Religious Studies and Theology</b>		
Being on Benefit	0.0401	0.0222
Paid Employment	-0.1544***	0.0471
Further Study	0.0760*	0.0308
Others/Unknown/Overseas	0.0382	0.0270
<b>Sociology, Social Policy, Social Work, Criminology and Gender Studies</b>		

Being on Benefit	0.0531***	0.0127
Paid Employment	-0.1161***	0.0255
Further Study	0.0493***	0.0112
Others/Unknown/Overseas	0.0138	0.0185

#### **Sport and Exercise Science**

Being on Benefit	-0.0024	0.0087
Paid Employment	0.0059	0.0274
Further Study	-0.0052	0.0084
Others/Unknown/Overseas	0.0017	0.0241

#### **Statistics**

Being on Benefit	0.0516	0.0269
Paid Employment	-0.0977**	0.0315
Further Study	0.0739***	0.0130
Others/Unknown/Overseas	-0.0278	0.0267

#### **Theatre and Dance, Film and Television and Multimedia**

Being on Benefit	0.1276***	0.0297
Paid Employment	-0.2048***	0.0628
Further Study	0.0282	0.0300
Others/Unknown/Overseas	0.0490	0.0321

#### **Veterinary Studies and Large Animal Science**

Being on Benefit	0.0379**	0.0122
Paid Employment	-0.0043	0.0259
Further Study	0.0358**	0.0124
Others/Unknown/Overseas	-0.0695***	0.0209

#### **Visual Arts and Crafts**

Being on Benefit	0.0895***	0.0196
Paid Employment	-0.2338***	0.0474
Further Study	0.0467***	0.0134
Others/Unknown/Overseas	0.0975*	0.0467

#### **Year fixed effects**

##### **First year at the tertiary education institute of the student – 1999**

Being on Benefit	-0.0305***	0.0047
Paid Employment	0.0364*	0.0183
Further Study	-0.0230***	0.0061
Others/Unknown/Overseas	0.0171	0.0179

##### **First year at the tertiary education institute of the student – 2007**

Being on Benefit	-0.0692***	0.0078
Paid Employment	-0.0004	0.0260
Further Study	-0.0223*	0.0114
Others/Unknown/Overseas	0.0919***	0.0227

##### **First year at the tertiary education institute of the student – 2008**

Being on Benefit	-0.0726***	0.0079
Paid Employment	0.0137	0.0258
Further Study	-0.0343**	0.0113
Others/Unknown/Overseas	0.0932***	0.0227

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Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 521 clusters in *id*. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) \*  $p < 0.05$ , \*\*  $p < 0.01$  and \*\*\*  $p < 0.001$ .

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*Table A.7: Determinants of Labour Market Outcomes; Subsample Analysis  
Student's Ethnicity NZ Māori (Marginal Effects of Multinomial Logit)*

	dy/dx	Standard Error
<b><u>PBRF Outcomes</u></b>		
<b>Proportion of academics attaining PBRF rank A</b>		
Being on Benefit	0.0031*	0.0016
Paid Employment	0.0008	0.0023
Further Study	-0.0002	0.0010
Others/Unknown/Overseas	-0.0037**	0.0013
<b>Proportion of academics attaining PBRF rank B</b>		
Being on Benefit	0.0010	0.0010
Paid Employment	-0.0001	0.0013
Further Study	-0.0006	0.0006
Others/Unknown/Overseas	-0.0004	0.0009
<b>Proportion of academics attaining PBRF rank C(NE)</b>		
Being on Benefit	-0.0026	0.0019
Paid Employment	0.0030	0.0026
Further Study	-0.0010	0.0012
Others/Unknown/Overseas	0.0007	0.0016
<b>Proportion of academics attaining PBRF rank R</b>		
Being on Benefit	-0.0009	0.0012
Paid Employment	0.0013	0.0020
Further Study	0.0006	0.0005
Others/Unknown/Overseas	-0.0010	0.0015
<b>Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave</b>		
Being on Benefit	-0.0005	0.0010
Paid Employment	-0.0001	0.0019
Further Study	-0.0007	0.0008
Others/Unknown/Overseas	0.0014	0.0014
<b><u>Department Level Characteristics</u></b>		
<b><u>Researcher's Position Title</u></b>		
<b>Proportion of Professors</b>		
Being on Benefit	-0.0017	0.0018
Paid Employment	-0.0017	0.0024
Further Study	-0.0009	0.0009
Others/Unknown/Overseas	0.0042*	0.0017
<b>Proportion of Associate Professors</b>		
Being on Benefit	0.0005	0.0015
Paid Employment	-0.0009	0.0022
Further Study	-0.0018*	0.0008
Others/Unknown/Overseas	0.0022	0.0015
<b>Proportion of Lecturers</b>		
Being on Benefit	-0.0009	0.0012
Paid Employment	0.0018	0.0015

Further Study	-0.0010	0.0006
Others/Unknown/Overseas	0.0002	0.0011
<b>Proportion of Other Teaching Staff</b>		
Being on Benefit	-0.0005	0.0019
Paid Employment	0.0013	0.0030
Further Study	0.0002	0.0012
Others/Unknown/Overseas	-0.0009	0.0021
<b>Proportion of Other Non-Teaching Staff</b>		
Being on Benefit	-0.0002	0.0012
Paid Employment	-0.0021	0.0017
Further Study	-0.0011	0.0007
Others/Unknown/Overseas	0.0034***	0.0010
<b><u>Researcher's Gender</u></b>		
<b>Proportion of female academics</b>		
Being on Benefit	0.0011	0.0008
Paid Employment	-0.0014	0.0013
Further Study	0.0002	0.0005
Others/Unknown/Overseas	0.0000	0.0011
<b>Proportion of academics for whom gender is unknown</b>		
Being on Benefit	-0.0012	0.0011
Paid Employment	-0.0015	0.0025
Further Study	0.0019	0.0013
Others/Unknown/Overseas	0.0008	0.0016
<b><u>Researcher's Age Band</u></b>		
<b>Proportion of academics in the age band of 20 to 29</b>		
Being on Benefit	-0.0028	0.0033
Paid Employment	0.0080	0.0042
Further Study	0.0005	0.0019
Others/Unknown/Overseas	-0.0057	0.0031
<b>Proportion of academics in the age band of 40 to 49</b>		
Being on Benefit	-0.0017*	0.0008
Paid Employment	-0.0014	0.0013
Further Study	0.0006	0.0007
Others/Unknown/Overseas	0.0024*	0.0010
<b>Proportion of academics in the age band of 50 to 59</b>		
Being on Benefit	-0.0026*	0.0011
Paid Employment	0.0023	0.0017
Further Study	0.0001	0.0008
Others/Unknown/Overseas	0.0002	0.0014
<b>Proportion of academics in the age band of 60 to 69</b>		
Being on Benefit	-0.0010	0.0013
Paid Employment	-0.0009	0.0020
Further Study	0.0005	0.0009
Others/Unknown/Overseas	0.0014	0.0012
<b>Proportion of academics in the age band of 70 and Over</b>		
Being on Benefit	0.0053	0.0031

Paid Employment	-0.0069	0.0043
Further Study	0.0061**	0.0020
Others/Unknown/Overseas	-0.0045	0.0024
<b>Proportion of academics for whom age band is unknown</b>		
Being on Benefit	-0.0013	0.0015
Paid Employment	0.0027	0.0023
Further Study	-0.0008	0.0012
Others/Unknown/Overseas	-0.0007	0.0013
<b><u>Researcher's Ethnicity</u></b>		
<b>Proportion of Asian academics</b>		
Being on Benefit	-0.0003	0.0020
Paid Employment	0.0008	0.0027
Further Study	-0.0005	0.0012
Others/Unknown/Overseas	0.0001	0.0017
<b>Proportion of Māori academics</b>		
Being on Benefit	-0.0001	0.0007
Paid Employment	0.0006	0.0011
Further Study	-0.0004	0.0004
Others/Unknown/Overseas	0.0000	0.0008
<b>Proportion of Pasifika academics</b>		
Being on Benefit	-0.0115**	0.0044
Paid Employment	0.0092	0.0052
Further Study	0.0004	0.0024
Others/Unknown/Overseas	0.0020	0.0029
<b>Proportion of Middle Eastern/Latin American/African academics</b>		
Being on Benefit	-0.0014	0.0069
Paid Employment	-0.0123	0.0095
Further Study	0.0063	0.0037
Others/Unknown/Overseas	0.0073	0.0041
<b>Proportion of academics belonging to "other ethnicity"</b>		
Being on Benefit	0.0016	0.0012
Paid Employment	-0.0035*	0.0017
Further Study	0.0002	0.0007
Others/Unknown/Overseas	0.0016	0.0010
<b>Proportion of academics for whom ethnicity is unknown</b>		
Being on Benefit	0.0012	0.0008
Paid Employment	-0.0020	0.0013
Further Study	-0.0004	0.0004
Others/Unknown/Overseas	0.0012	0.0009

## **Student Level Characteristics**

### **Student's gender**

#### **Female student**

Being on Benefit	0.0383	0.0201
Paid Employment	-0.0112	0.0246
Further Study	-0.0168	0.0100
Others/Unknown/Overseas	-0.0103	0.0150

#### **Student's high school decile**

##### **School decile 1**

Being on Benefit	0.0314	0.0344
Paid Employment	0.0472	0.0513
Further Study	-0.0246	0.0181
Others/Unknown/Overseas	-0.0539	0.0398

##### **School decile 2**

Being on Benefit	0.0098	0.0390
Paid Employment	0.0295	0.0572
Further Study	-0.0474*	0.0225
Others/Unknown/Overseas	0.0082	0.0309

##### **School decile 3**

Being on Benefit	-0.0151	0.0299
Paid Employment	0.0760	0.0486
Further Study	-0.0291	0.0158
Others/Unknown/Overseas	-0.0317	0.0317

##### **School decile 4**

Being on Benefit	-0.0307	0.0346
Paid Employment	0.0676	0.0506
Further Study	-0.0245	0.0172
Others/Unknown/Overseas	-0.0125	0.0344

##### **School decile 6**

Being on Benefit	-0.0415	0.0380
Paid Employment	0.1419**	0.0543
Further Study	-0.0354	0.0211
Others/Unknown/Overseas	-0.0649	0.0368

##### **School decile 7**

Being on Benefit	-0.1046*	0.0451
Paid Employment	0.1479*	0.0626
Further Study	-0.0492*	0.0219
Others/Unknown/Overseas	0.0059	0.0369

##### **School decile 8**

Being on Benefit	-0.1068*	0.0476
Paid Employment	0.1562*	0.0621
Further Study	-0.0289	0.0214
Others/Unknown/Overseas	-0.0205	0.0373

##### **School decile 9**

Being on Benefit	-0.0141	0.0376
Paid Employment	0.0575	0.0585
Further Study	-0.0460	0.0306
Others/Unknown/Overseas	0.0026	0.0398

##### **School decile 10**

Being on Benefit	-0.1063*	0.0543
Paid Employment	0.1583*	0.0661
Further Study	-0.0525*	0.0248
Others/Unknown/Overseas	0.0005	0.0378

#### **School decile missing**

Being on Benefit	0.1438	0.1403
Paid Employment	-0.0081	0.2568
Further Study	0.0319	0.0861
Others/Unknown/Overseas	-0.1676	0.1220

#### **Level of NCEA achieved by the student**

##### **Achieved less than NCEA level 3**

Being on Benefit	0.0271	0.0222
Paid Employment	-0.0641*	0.0304
Further Study	0.0191	0.0133
Others/Unknown/Overseas	0.018	0.0164

##### **Overseas equivalent to NCEA level 3**

Being on Benefit	-1.4697***	0.1315
Paid Employment	1.1506***	0.1475
Further Study	0.1235*	0.0502
Others/Unknown/Overseas	0.1956	0.1046

##### **Missing observations on NCEA level achieved**

Being on Benefit	0.0753*	0.0368
Paid Employment	-0.1901**	0.0612
Further Study	0.0244	0.0201
Others/Unknown/Overseas	0.0905*	0.0389

#### **University fixed effects**

##### **University 1**

##### **University 2**

Being on Benefit	-0.0646	0.0823
Paid Employment	-0.0482	0.1066
Further Study	0.0721	0.0753
Others/Unknown/Overseas	0.0407	0.0640

##### **University 3**

Being on Benefit	-0.0296	0.0762
Paid Employment	-0.0081	0.0811
Further Study	0.0138	0.0237
Others/Unknown/Overseas	0.0238	0.0517

##### **University 4**

Being on Benefit	-0.0449	0.0646
Paid Employment	0.0366	0.0721
Further Study	-0.0027	0.0145
Others/Unknown/Overseas	0.0110	0.0438

##### **University 5**

Being on Benefit	-0.0299	0.0753
Paid Employment	0.0453	0.0850



Further Study	-0.0064	0.0164
Others/Unknown/Overseas	-0.0090	0.0402
<b>University 6</b>		
Being on Benefit	-0.0352	0.0714
Paid Employment	-0.0241	0.0878
Further Study	0.0466	0.0299
Others/Unknown/Overseas	0.0127	0.0396
<b>University 7</b>		
Being on Benefit	-0.0102	0.0594
Paid Employment	-0.0233	0.0612
Further Study	0.0434*	0.0179
Others/Unknown/Overseas	-0.0099	0.0281
<b>University 8</b>		
Being on Benefit	-0.0888	0.0664
Paid Employment	-0.0104	0.0945
Further Study	0.0494	0.0378
Others/Unknown/Overseas	0.0498	0.0665
<b><u>Subject area fixed effects</u></b>		
<b>Accounting and Finance</b>		
<b>Agriculture and Other Applied Biological Sciences</b>		
Being on Benefit	0.0014	0.1454
Paid Employment	0.0642	0.1590
Further Study	0.0524	0.0913
Others/Unknown/Overseas	-0.1181	0.0606
<b>Anthropology and Archaeology</b>		
Being on Benefit	-0.0935	0.1370
Paid Employment	-0.0288	0.1945
Further Study	0.2017	0.1490
Others/Unknown/Overseas	-0.0793	0.0845
<b>Architecture, Design, Planning, Surveying</b>		
Being on Benefit	-0.1053	0.1143
Paid Employment	-0.2075	0.1271
Further Study	0.1985*	0.0854
Others/Unknown/Overseas	0.1143	0.0878
<b>Chemistry</b>		
Being on Benefit	-0.0038	0.2330
Paid Employment	-0.1676	0.2550
Further Study	0.2320	0.2936
Others/Unknown/Overseas	-0.0605	0.1425
<b>Clinical Medicine</b>		
Being on Benefit	-0.1327	0.1220
Paid Employment	0.2467*	0.1224
Further Study	0.0260	0.0437
Others/Unknown/Overseas	-0.1400*	0.0578
<b>Communications, Journalism and Media Studies</b>		

Being on Benefit	-0.0957	0.1149
Paid Employment	-0.0317	0.1424
Further Study	0.0191	0.0373
Others/Unknown/Overseas	0.1083	0.1135
<b>Computer Science, Information Technology, Information Sciences</b>		
Being on Benefit	-0.0850	0.1263
Paid Employment	0.0068	0.1671
Further Study	0.1768	0.1204
Others/Unknown/Overseas	-0.0986	0.0579
<b>Dentistry</b>		
Being on Benefit	0.1364	0.1321
Paid Employment	0.0499	0.1438
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	-0.1536**	0.0566
<b>Design</b>		
Being on Benefit	-0.1145	0.1329
Paid Employment	-0.2289	0.1660
Further Study	0.0717	0.0702
Others/Unknown/Overseas	0.2717	0.1549
<b>Earth Sciences</b>		
Being on Benefit	-0.0871	0.1170
Paid Employment	-0.0712	0.1613
Further Study	0.0291	0.0626
Others/Unknown/Overseas	0.1292	0.1267
<b>Ecology, Evolution and Behaviour</b>		
Being on Benefit	0.0153	0.1584
Paid Employment	-0.3259	0.2421
Further Study	0.4641	0.2477
Others/Unknown/Overseas	-0.1536**	0.0566
<b>Economics</b>		
Being on Benefit	-0.1657	0.1009
Paid Employment	0.1019	0.1410
Further Study	0.0327	0.0784
Others/Unknown/Overseas	0.0310	0.0937
<b>Education</b>		
Being on Benefit	-0.0728	0.1164
Paid Employment	0.0981	0.1298
Further Study	0.0455	0.0358
Others/Unknown/Overseas	-0.0707	0.0693
<b>Engineering and Technology</b>		
Being on Benefit	-0.0712	0.1100
Paid Employment	-0.0338	0.1368
Further Study	0.1907	0.1146
Others/Unknown/Overseas	-0.0857	0.0522
<b>English Language and Literature</b>		

Being on Benefit	-0.0905	0.1149
Paid Employment	0.0836	0.1609
Further Study	0.0411	0.0737
Others/Unknown/Overseas	-0.0342	0.1260
<b>Foreign Languages and Linguistics</b>		
Being on Benefit	-0.0582	0.1183
Paid Employment	0.0382	0.1268
Further Study	0.0879	0.0684
Others/Unknown/Overseas	-0.0679	0.0695
<b>History, History of Art, Classics and Curatorial Studies</b>		
Being on Benefit	-0.0245	0.1241
Paid Employment	0.0411	0.1529
Further Study	0.0297	0.0656
Others/Unknown/Overseas	-0.0462	0.0743
<b>Human Geography</b>		
Being on Benefit	-0.1867	0.1045
Paid Employment	-0.0267	0.1939
Further Study	0.1808	0.1234
Others/Unknown/Overseas	0.0326	0.1288
<b>Law</b>		
Being on Benefit	-0.1244	0.1060
Paid Employment	0.0272	0.1187
Further Study	0.1722***	0.0513
Others/Unknown/Overseas	-0.0749	0.0582
<b>Management, Human Resources, Industrial Relations, International Business and Other Business</b>		
Being on Benefit	-0.1385	0.1011
Paid Employment	0.1296	0.1185
Further Study	0.0714	0.0418
Others/Unknown/Overseas	-0.0625	0.0608
<b>Marketing and Tourism</b>		
Being on Benefit	-0.0738	0.0999
Paid Employment	0.0174	0.1055
Further Study	0.0307	0.0394
Others/Unknown/Overseas	0.0257	0.0776
<b>Molecular, Cellular and Whole Organism Biology</b>		
Being on Benefit	-0.0648	0.1129
Paid Employment	0.0362	0.1385
Further Study	0.1054	0.0756
Others/Unknown/Overseas	-0.0769	0.0696
<b>Music, Literary Arts and Other Arts</b>		
Being on Benefit	-0.0464	0.1449
Paid Employment	-0.0908	0.2090
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	0.1699	0.1785
<b>Māori Knowledge and Development</b>		

Being on Benefit	0.0056	0.1823
Paid Employment	-0.2008	0.1792
Further Study	0.2034	0.1185
Others/Unknown/Overseas	-0.0082	0.1049
<b>Other Health Studies (including Rehabilitation Therapies)</b>		
Being on Benefit	-0.0754	0.1063
Paid Employment	0.0388	0.1236
Further Study	0.0955	0.0508
Others/Unknown/Overseas	-0.0589	0.0695
<b>Philosophy</b>		
Being on Benefit	-0.1324	0.1184
Paid Employment	0.0832	0.1557
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	0.0819	0.1159
<b>Physics</b>		
Being on Benefit	-0.1401	0.1179
Paid Employment	0.3264**	0.1229
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	-0.1536**	0.0566
<b>Political Science, International Relations and Public Policy</b>		
Being on Benefit	-0.1680	0.1042
Paid Employment	0.1326	0.1352
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	0.0681	0.0936
<b>Psychology</b>		
Being on Benefit	-0.1269	0.1143
Paid Employment	-0.1515	0.1601
Further Study	0.2115***	0.0651
Others/Unknown/Overseas	0.0670	0.0947
<b>Public Health</b>		
Being on Benefit	-0.1522	0.1057
Paid Employment	0.1241	0.2215
Further Study	0.1185	0.1970
Others/Unknown/Overseas	-0.0904	0.0727
<b>Pure and Applied Mathematics</b>		
Being on Benefit	-0.1125	0.1352
Paid Employment	-0.1207	0.2537
Further Study	0.3364	0.2646
Others/Unknown/Overseas	-0.1031	0.0773
<b>Religious Studies and Theology</b>		
Being on Benefit	-0.1867	0.1045
Paid Employment	0.0996	0.2629
Further Study	0.2407	0.2423
Others/Unknown/Overseas	-0.1536**	0.0566
<b>Sociology, Social Policy, Social Work, Criminology and Gender Studies</b>		

Being on Benefit	-0.0243	0.1202
Paid Employment	-0.1037	0.1327
Further Study	0.0253	0.0456
Others/Unknown/Overseas	0.1027	0.0891
<b>Sport and Exercise Science</b>		
Being on Benefit	-0.0638	0.1299
Paid Employment	0.1375	0.1285
Further Study	0.0303	0.0584
Others/Unknown/Overseas	-0.1040	0.0612
<b>Statistics</b>		
Being on Benefit	-0.1782	0.1036
Paid Employment	0.3385**	0.1139
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	-0.1275*	0.0632
<b>Theatre and Dance, Film and Television and Multimedia</b>		
Being on Benefit	-0.0889	0.1595
Paid Employment	-0.3216	0.3098
Further Study	-0.0285	0.0262
Others/Unknown/Overseas	0.4390	0.3897
<b>Veterinary Studies and Large Animal Science</b>		
Being on Benefit	-0.1867	0.1045
Paid Employment	0.3730***	0.1107
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	-0.1536**	0.0566
<b>Visual Arts and Crafts</b>		
Being on Benefit	-0.1513	0.1138
Paid Employment	-0.0547	0.1621
Further Study	0.2543	0.1343
Others/Unknown/Overseas	-0.0483	0.1143
<b><u>Year fixed effects</u></b>		
<b>First year at the tertiary education institute of the student – 1999</b>		
Being on Benefit	-0.0783***	0.0236
Paid Employment	0.1484***	0.0448
Further Study	-0.0338*	0.0173
Others/Unknown/Overseas	-0.0362	0.0390
<b>First year at the tertiary education institute of the student – 2007</b>		
Being on Benefit	-0.1709***	0.0533
Paid Employment	0.1680	0.0904
Further Study	-0.0481	0.0366
Others/Unknown/Overseas	0.0509	0.0612
<b>First year at the tertiary education institute of the student – 2008</b>		
Being on Benefit	-0.1797***	0.0524
Paid Employment	0.1748	0.0903
Further Study	-0.0390	0.0356
Others/Unknown/Overseas	0.0440	0.0618

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Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 321 clusters in *id*. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) \*  $p < 0.05$ , \*\*  $p < 0.01$  and \*\*\*  $p < 0.001$ .

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*Table A.8: Determinants of Labour Market Outcomes; Subsample Analysis  
Student's Ethnicity – NZ Pasifika (Marginal Effects of Multinomial Logit)*

	dy/dx	Standard Error
<b><u>PBRF Outcomes</u></b>		
<b>Proportion of academics attaining PBRF rank A</b>		
Being on Benefit	-0.0035	.
Paid Employment	-0.0051	.
Further Study	0.0028	.
Others/Unknown/Overseas	0.0058	.
<b>Proportion of academics attaining PBRF rank B</b>		
Being on Benefit	-0.0002	.
Paid Employment	-0.0034	.
Further Study	0.0014	.
Others/Unknown/Overseas	0.0022	.
<b>Proportion of academics attaining PBRF rank C(NE)</b>		
Being on Benefit	0.0017	.
Paid Employment	-0.0034	.
Further Study	-0.0020	.
Others/Unknown/Overseas	0.0037	.
<b>Proportion of academics attaining PBRF rank R</b>		
Being on Benefit	0.0012	.
Paid Employment	-0.0067	.
Further Study	0.0021	.
Others/Unknown/Overseas	0.0035	.
<b>Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave</b>		
Being on Benefit	0.0020	.
Paid Employment	-0.0051	.
Further Study	-0.0015	.
Others/Unknown/Overseas	0.0047	.
<b><u>Department Level Characteristics</u></b>		
<b><u>Researcher's Position Title</u></b>		
<b>Proportion of Professors</b>		
Being on Benefit	0.0014	.
Paid Employment	0.0017	.
Further Study	-0.0022	.
Others/Unknown/Overseas	-0.0009	.
<b>Proportion of Associate Professors</b>		
Being on Benefit	0.0034	.
Paid Employment	-0.0010	.
Further Study	0.0006	.
Others/Unknown/Overseas	-0.0030	.
<b>Proportion of Lecturers</b>		
Being on Benefit	0.0002	.
Paid Employment	0.0033	.

Further Study	0.0010	.
Others/Unknown/Overseas	-0.0045	.
<b>Proportion of Other Teaching Staff</b>		
Being on Benefit	-0.0027	.
Paid Employment	0.0014	.
Further Study	0.0001	.
Others/Unknown/Overseas	0.0012	.
<b>Proportion of Other Non-Teaching Staff</b>		
Being on Benefit	0.0017	.
Paid Employment	0.0005	.
Further Study	0.0010	.
Others/Unknown/Overseas	-0.0032	.
<b><u>Researcher's Gender</u></b>		
<b>Proportion of female academics</b>		
Being on Benefit	0.0016	.
Paid Employment	-0.0039	.
Further Study	0.0009	.
Others/Unknown/Overseas	0.0014	.
<b>Proportion of academics for whom gender is unknown</b>		
Being on Benefit	0.0026	.
Paid Employment	-0.0047	.
Further Study	0.0043	.
Others/Unknown/Overseas	-0.0023	.
<b><u>Researcher's Age Band</u></b>		
<b>Proportion of academics in the age band of 20 to 29</b>		
Being on Benefit	-0.0014	.
Paid Employment	0.0095	.
Further Study	-0.0118	.
Others/Unknown/Overseas	0.0037	.
<b>Proportion of academics in the age band of 40 to 49</b>		
Being on Benefit	0.0011	.
Paid Employment	0.0003	.
Further Study	-0.0017	.
Others/Unknown/Overseas	0.0003	.
<b>Proportion of academics in the age band of 50 to 59</b>		
Being on Benefit	0.0008	.
Paid Employment	0.0021	.
Further Study	-0.0003	.
Others/Unknown/Overseas	-0.0027	.
<b>Proportion of academics in the age band of 60 to 69</b>		
Being on Benefit	0.0006	.
Paid Employment	-0.0029	.
Further Study	0.0004	.
Others/Unknown/Overseas	0.0018	.
<b>Proportion of academics in the age band of 70 and Over</b>		



Being on Benefit	-0.0046	.
Paid Employment	0.0085	.
Further Study	0.0075	.
Others/Unknown/Overseas	-0.0114	.
<b>Proportion of academics for whom age band is unknown</b>		
Being on Benefit	0.0003	.
Paid Employment	0.0040	.
Further Study	-0.0048	.
Others/Unknown/Overseas	0.0006	.
 <b><u>Researcher's Ethnicity</u></b>		
<b>Proportion of Asian academics</b>		
Being on Benefit	-0.0007	.
Paid Employment	0.0041	.
Further Study	-0.0025	.
Others/Unknown/Overseas	-0.0009	.
<b>Proportion of Māori academics</b>		
Being on Benefit	0.0021	.
Paid Employment	-0.0056	.
Further Study	-0.0008	.
Others/Unknown/Overseas	0.0043	.
<b>Proportion of Pasifika academics</b>		
Being on Benefit	0.0008	.
Paid Employment	0.0025	.
Further Study	-0.0018	.
Others/Unknown/Overseas	-0.0015	.
<b>Proportion of Middle Eastern/Latin American/African academics</b>		
Being on Benefit	-0.0016	.
Paid Employment	0.0000	.
Further Study	-0.0059	.
Others/Unknown/Overseas	0.0075	.
<b>Proportion of academics belonging to "other ethnicity"</b>		
Being on Benefit	0.0012	.
Paid Employment	0.0002	.
Further Study	-0.0002	.
Others/Unknown/Overseas	-0.0011	.
<b>Proportion of academics for whom ethnicity is unknown</b>		
Being on Benefit	-0.0004	.
Paid Employment	0.0005	.
Further Study	-0.0003	.
Others/Unknown/Overseas	0.0002	.

### **Student Level Characteristics**

**Student's gender****Female student**

Being on Benefit	0.0001	.
Paid Employment	-0.0205	.
Further Study	0.0032	.
Others/Unknown/Overseas	0.0172	.

**Student's high school decile****School decile 1**

Being on Benefit	-0.0477	.
Paid Employment	0.0429	.
Further Study	0.0090	.
Others/Unknown/Overseas	-0.0042	.

**School decile 2**

Being on Benefit	-0.0355	.
Paid Employment	-0.0012	.
Further Study	0.0225	.
Others/Unknown/Overseas	0.0142	.

**School decile 3**

Being on Benefit	-0.0103	.
Paid Employment	-0.0020	.
Further Study	0.0308	.
Others/Unknown/Overseas	-0.0185	.

**School decile 4**

Being on Benefit	-0.0414	.
Paid Employment	0.0845	.
Further Study	-0.0437	.
Others/Unknown/Overseas	0.0006	.

**School decile 6**

Being on Benefit	-0.0481	.
Paid Employment	0.0744	.
Further Study	-0.0133	.
Others/Unknown/Overseas	-0.0130	.

**School decile 7**

Being on Benefit	-0.0117	.
Paid Employment	-0.0288	.
Further Study	0.0147	.
Others/Unknown/Overseas	0.0258	.

**School decile 8**

Being on Benefit	-0.0314	.
Paid Employment	0.0336	.
Further Study	0.0206	.
Others/Unknown/Overseas	-0.0228	.

**School decile 9**

Being on Benefit	-0.0134	.
Paid Employment	0.0987	.
Further Study	0.0085	.

Others/Unknown/Overseas	-0.0938	.
<b>School decile 10</b>		
Being on Benefit	-0.1092	.
Paid Employment	0.0854	.
Further Study	-0.0023	.
Others/Unknown/Overseas	0.0261	.
<b>School decile missing</b>		
Being on Benefit	1.0478	.
Paid Employment	-3.1633	.
Further Study	-0.1789	.
Others/Unknown/Overseas	2.2944	.
<b><u>Level of NCEA achieved by the student</u></b>		
<b>Achieved less than NCEA level 3</b>		
Being on Benefit	0.0240	.
Paid Employment	-0.0946	.
Further Study	0.0005	.
Others/Unknown/Overseas	0.0701	.
<b>Overseas equivalent to NCEA level 3</b>		
Being on Benefit	0.0381	.
Paid Employment	-0.1823	.
Further Study	0.0229	.
Others/Unknown/Overseas	0.1213	.
<b>Missing observations on NCEA level achieved</b>		
Being on Benefit	-0.0746	.
Paid Employment	0.1005	.
Further Study	0.0992	.
Others/Unknown/Overseas	-0.1251	.
<b><u>University fixed effects</u></b>		
<b>University 1</b>	(base outcome)	
<b>University 2</b>		
Being on Benefit	-0.0445	.
Paid Employment	0.1145	.
Further Study	-0.0534	.
Others/Unknown/Overseas	-0.0165	.
<b>University 3</b>		
Being on Benefit	0.2841	.
Paid Employment	-0.2318	.
Further Study	-0.0672	.
Others/Unknown/Overseas	0.0149	.
<b>University 4</b>		
Being on Benefit	0.0121	.
Paid Employment	0.0001	.
Further Study	-0.0316	.
Others/Unknown/Overseas	0.0194	.

**University 5**

Being on Benefit	0.0598	.
Paid Employment	-0.1133	.
Further Study	-0.0385	.
Others/Unknown/Overseas	0.0919	.

**University 6**

Being on Benefit	0.2234	.
Paid Employment	-0.2158	.
Further Study	-0.0367	.
Others/Unknown/Overseas	0.0291	.

**University 7**

Being on Benefit	0.0090	.
Paid Employment	-0.1202	.
Further Study	-0.0447	.
Others/Unknown/Overseas	0.1559	.

**University 8**

Being on Benefit	0.0544	.
Paid Employment	-0.0307	.
Further Study	-0.0052	.
Others/Unknown/Overseas	-0.0186	.

**Subject area fixed effects****Accounting and Finance**

(base outcome)

**Agriculture and Other Applied Biological Sciences**

Being on Benefit	0.0282	.
Paid Employment	-0.3780	.
Further Study	0.3548	.
Others/Unknown/Overseas	-0.0049	.

**Anthropology and Archaeology**

Being on Benefit	-0.0059	.
Paid Employment	-0.0193	.
Further Study	-0.1035	.
Others/Unknown/Overseas	0.1286	.

**Architecture, Design, Planning, Surveying**

Being on Benefit	-0.0477	.
Paid Employment	-0.0947	.
Further Study	0.2270	.
Others/Unknown/Overseas	-0.0847	.

**Biomedical**

Being on Benefit	-0.0477	.
Paid Employment	0.4555	.
Further Study	-0.1680	.
Others/Unknown/Overseas	-0.2398	.

**Chemistry**

Being on Benefit	0.2610	.
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Paid Employment	0.0940	.
Further Study	-0.1560	.
Others/Unknown/Overseas	-0.1990	.
<b>Clinical Medicine</b>		
Being on Benefit	-0.0477	.
Paid Employment	-0.1811	.
Further Study	0.4686	.
Others/Unknown/Overseas	-0.2398	.
<b>Communications, Journalism and Media Studies</b>		
Being on Benefit	0.1057	.
Paid Employment	0.0658	.
Further Study	-0.1263	.
Others/Unknown/Overseas	-0.0451	.
<b>Computer Science, Information Technology, Information Sciences</b>		
Being on Benefit	0.0657	.
Paid Employment	-0.1000	.
Further Study	0.1383	.
Others/Unknown/Overseas	-0.1040	.
<b>Dentistry</b>		
Being on Benefit	-0.0477	.
Paid Employment	0.2955	.
Further Study	-0.1680	.
Others/Unknown/Overseas	-0.0797	.
<b>Design</b>		
Being on Benefit	0.0489	.
Paid Employment	0.2773	.
Further Study	-0.1419	.
Others/Unknown/Overseas	-0.1843	.
<b>Earth Sciences</b>		
Being on Benefit	-0.0477	.
Paid Employment	0.1290	.
Further Study	0.1041	.
Others/Unknown/Overseas	-0.1853	.
<b>Ecology, Evolution and Behaviour</b>		
Being on Benefit	-0.0477	.
Paid Employment	0.0577	.
Further Study	-0.1680	.
Others/Unknown/Overseas	0.1580	.
<b>Economics</b>		
Being on Benefit	0.0270	.
Paid Employment	-0.1023	.
Further Study	0.1083	.
Others/Unknown/Overseas	-0.0330	.
<b>Education</b>		

Being on Benefit	0.0633	.
Paid Employment	0.2109	.
Further Study	-0.1257	.
Others/Unknown/Overseas	-0.1485	.
<b>Engineering and Technology</b>		
Being on Benefit	-0.0280	.
Paid Employment	-0.4108	.
Further Study	0.3735	.
Others/Unknown/Overseas	0.0653	.
<b>English Language and Literature</b>		
Being on Benefit	0.0629	.
Paid Employment	0.1324	.
Further Study	-0.1272	.
Others/Unknown/Overseas	-0.0681	.
<b>Foreign Languages and Linguistics</b>		
Being on Benefit	0.2262	.
Paid Employment	0.0294	.
Further Study	-0.0811	.
Others/Unknown/Overseas	-0.1744	.
<b>History, History of Art, Classics and Curatorial Studies</b>		
Being on Benefit	0.0636	.
Paid Employment	0.1312	.
Further Study	-0.1003	.
Others/Unknown/Overseas	-0.0944	.
<b>Human Geography</b>		
Being on Benefit	0.6641	.
Paid Employment	-0.2943	.
Further Study	-0.1680	.
Others/Unknown/Overseas	-0.2018	.
<b>Law</b>		
Being on Benefit	0.0773	.
Paid Employment	0.0082	.
Further Study	0.0759	.
Others/Unknown/Overseas	-0.1613	.
<b>Management, Human Resources, Industrial Relations, International Business and Other Business</b>		
Being on Benefit	-0.0018	.
Paid Employment	0.0794	.
Further Study	-0.0733	.
Others/Unknown/Overseas	-0.0043	.
<b>Marketing and Tourism</b>		
Being on Benefit	0.0736	.
Paid Employment	0.1146	.
Further Study	-0.0217	.
Others/Unknown/Overseas	-0.1665	.
<b>Molecular, Cellular and Whole Organism Biology</b>		

Being on Benefit	0.0395	.
Paid Employment	-0.0417	.
Further Study	-0.0263	.
Others/Unknown/Overseas	0.0284	.
<b>Music, Literary Arts and Other Arts</b>		
Being on Benefit	0.1679	.
Paid Employment	-0.1352	.
Further Study	-0.0049	.
Others/Unknown/Overseas	-0.0278	.
<b>Māori Knowledge and Development</b>		
Being on Benefit	-0.0477	.
Paid Employment	0.4555	.
Further Study	-0.1680	.
Others/Unknown/Overseas	-0.2398	.
<b>Other Health Studies (including Rehabilitation Therapies)</b>		
Being on Benefit	-0.0064	.
Paid Employment	0.2468	.
Further Study	-0.1121	.
Others/Unknown/Overseas	-0.1283	.
<b>Philosophy</b>		
Being on Benefit	0.3825	.
Paid Employment	-0.2650	.
Further Study	-0.1454	.
Others/Unknown/Overseas	0.0279	.
<b>Physics</b>		
Being on Benefit	0.0171	.
Paid Employment	-0.0134	.
Further Study	-0.1680	.
Others/Unknown/Overseas	0.1644	.
<b>Political Science, International Relations and Public Policy</b>		
Being on Benefit	0.1916	.
Paid Employment	-0.0458	.
Further Study	-0.1393	.
Others/Unknown/Overseas	-0.0065	.
<b>Psychology</b>		
Being on Benefit	0.0485	.
Paid Employment	0.2441	.
Further Study	-0.1074	.
Others/Unknown/Overseas	-0.1852	.
<b>Public Health</b>		
Being on Benefit	0.0030	.
Paid Employment	0.1394	.
Further Study	0.0110	.
Others/Unknown/Overseas	-0.1533	.
<b>Pure and Applied Mathematics</b>		

Being on Benefit	0.1221	.
Paid Employment	-0.0657	.
Further Study	-0.0245	.
Others/Unknown/Overseas	-0.0318	.
<b>Religious Studies and Theology</b>		
Being on Benefit	0.1257	.
Paid Employment	0.2152	.
Further Study	-0.1010	.
Others/Unknown/Overseas	-0.2398	.
<b>Sociology, Social Policy, Social Work, Criminology and Gender Studies</b>		
Being on Benefit	0.0423	.
Paid Employment	-0.0003	.
Further Study	-0.1031	.
Others/Unknown/Overseas	0.0611	.
<b>Sport and Exercise Science</b>		
Being on Benefit	0.1180	.
Paid Employment	0.1513	.
Further Study	-0.1680	.
Others/Unknown/Overseas	-0.1012	.
<b>Statistics</b>		
Being on Benefit	0.3397	.
Paid Employment	-0.1221	.
Further Study	-0.1421	.
Others/Unknown/Overseas	-0.0755	.
<b>Theatre and Dance, Film and Television and Multimedia</b>		
Being on Benefit	0.6209	.
Paid Employment	-0.3097	.
Further Study	-0.1680	.
Others/Unknown/Overseas	-0.1433	.
<b>Visual Arts and Crafts</b>		
Being on Benefit	0.1637	.
Paid Employment	0.1475	.
Further Study	-0.1473	.
Others/Unknown/Overseas	-0.1639	.
<b><u>Year fixed effects</u></b>		
<b>First year at the tertiary education institute of the student – 1999</b>		
Being on Benefit	-0.0478	.
Paid Employment	0.0565	.
Further Study	0.0165	.
Others/Unknown/Overseas	-0.0253	.
<b>First year at the tertiary education institute of the student – 2007</b>		
Being on Benefit	-0.0497	.
Paid Employment	-0.0228	.
Further Study	-0.0062	.



Others/Unknown/Overseas	0.0786	.
<b>First year at the tertiary education institute of the student – 2008</b>		
Being on Benefit	-0.0817	.
Paid Employment	0.0196	.
Further Study	-0.0200	.
Others/Unknown/Overseas	0.0821	.

<b>Number of observations</b>	1,254
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Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 250 clusters in *id*. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) \*  $p < 0.05$ , \*\*  $p < 0.01$  and \*\*\*  $p < 0.001$ .

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*Table A.9: Determinants of Labour Market Outcomes; Subsample Analysis  
Student's Ethnicity – Asian (Marginal Effects of Multinomial Logit)*

	dy/dx	Standard Error
<b><u>PBRF Outcomes</u></b>		
<b>Proportion of academics attaining PBRF rank A</b>		
Being on Benefit	-0.0005	0.0004
Paid Employment	0.0011	0.0016
Further Study	-0.0010	0.0008
Others/Unknown/Overseas	0.0003	0.0013
<b>Proportion of academics attaining PBRF rank B</b>		
Being on Benefit	0.0000	0.0003
Paid Employment	-0.0004	0.0011
Further Study	0.0006	0.0005
Others/Unknown/Overseas	-0.0003	0.0009
<b>Proportion of academics attaining PBRF rank C(NE)</b>		
Being on Benefit	0.0001	0.0003
Paid Employment	0.0000	0.0015
Further Study	0.0000	0.0008
Others/Unknown/Overseas	-0.0001	0.0014
<b>Proportion of academics attaining PBRF rank R</b>		
Being on Benefit	0.0007*	0.0003
Paid Employment	-0.0014	0.0017
Further Study	0.0007	0.0008
Others/Unknown/Overseas	0.0000	0.0017
<b>Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave</b>		
Being on Benefit	-0.0003	0.0003
Paid Employment	-0.0049***	0.0014
Further Study	0.0018**	0.0006
Others/Unknown/Overseas	0.0034**	0.0013
<b><u>Department Level Characteristics</u></b>		
<b><u>Researcher's Position Title</u></b>		
<b>Proportion of Professors</b>		
Being on Benefit	0.0006	0.0004
Paid Employment	-0.0008	0.0017
Further Study	0.0002	0.0008
Others/Unknown/Overseas	0.0000	0.0014
<b>Proportion of Associate Professors</b>		
Being on Benefit	0.0010**	0.0004
Paid Employment	0.0012	0.0014
Further Study	-0.0008	0.0007
Others/Unknown/Overseas	-0.0014	0.0013
<b>Proportion of Lecturers</b>		
Being on Benefit	0.0003	0.0003
Paid Employment	0.0014	0.0011

Further Study	0.0000	0.0006
Others/Unknown/Overseas	-0.0017	0.0010
<b>Proportion of Other Teaching Staff</b>		
Being on Benefit	-0.0002	0.0005
Paid Employment	0.0005	0.0019
Further Study	0.0007	0.0009
Others/Unknown/Overseas	-0.0009	0.0017
<b>Proportion of Other Non-Teaching Staff</b>		
Being on Benefit	0.0001	0.0003
Paid Employment	-0.0029*	0.0014
Further Study	0.0013*	0.0006
Others/Unknown/Overseas	0.0015	0.0013
<b><u>Researcher's Gender</u></b>		
<b>Proportion of female academics</b>		
Being on Benefit	0.0002	0.0002
Paid Employment	0.0005	0.0008
Further Study	-0.0004	0.0004
Others/Unknown/Overseas	-0.0003	0.0008
<b>Proportion of academics for whom gender is unknown</b>		
Being on Benefit	-0.0003	0.0005
Paid Employment	-0.0022	0.0016
Further Study	0.0027*	0.0011
Others/Unknown/Overseas	-0.0002	0.0013
<b><u>Researcher's Age Band</u></b>		
<b>Proportion of academics in the age band of 20 to 29</b>		
Being on Benefit	-0.0004	0.0009
Paid Employment	-0.0049	0.0038
Further Study	-0.0011	0.0019
Others/Unknown/Overseas	0.0064	0.0036
<b>Proportion of academics in the age band of 40 to 49</b>		
Being on Benefit	0.0001	0.0003
Paid Employment	-0.0003	0.0012
Further Study	0.0009	0.0008
Others/Unknown/Overseas	-0.0007	0.0010
<b>Proportion of academics in the age band of 50 to 59</b>		
Being on Benefit	0.0001	0.0003
Paid Employment	-0.0021	0.0012
Further Study	0.0015	0.0008
Others/Unknown/Overseas	0.0005	0.0011
<b>Proportion of academics in the age band of 60 to 69</b>		
Being on Benefit	0.0001	0.0004
Paid Employment	0.0020	0.0016
Further Study	0.0010	0.0008
Others/Unknown/Overseas	-0.0031*	0.0013
<b>Proportion of academics in the age band of 70 and Over</b>		

Being on Benefit	-0.0003	0.0009
Paid Employment	0.0014	0.0046
Further Study	0.0031	0.0021
Others/Unknown/Overseas	-0.0043	0.0039
<b>Proportion of academics for whom age band is unknown</b>		
Being on Benefit	0.0006	0.0004
Paid Employment	0.0016	0.0015
Further Study	-0.0012	0.0009
Others/Unknown/Overseas	-0.001	0.0011
<b><u>Researcher's Ethnicity</u></b>		
<b>Proportion of Asian academics</b>		
Being on Benefit	0.0000	0.0003
Paid Employment	0.0022	0.0013
Further Study	-0.0008	0.0007
Others/Unknown/Overseas	-0.0013	0.0011
<b>Proportion of Māori academics</b>		
Being on Benefit	-0.0002	0.0006
Paid Employment	-0.0065**	0.0024
Further Study	0.0041***	0.0012
Others/Unknown/Overseas	0.0027	0.0023
<b>Proportion of Pasifika academics</b>		
Being on Benefit	-0.0023	0.0013
Paid Employment	0.0094*	0.0047
Further Study	0.0014	0.0022
Others/Unknown/Overseas	-0.0085*	0.0042
<b>Proportion of Middle Eastern/Latin American/African academics</b>		
Being on Benefit	0.0012	0.0011
Paid Employment	-0.0019	0.0055
Further Study	0.0047	0.0025
Others/Unknown/Overseas	-0.0040	0.0060
<b>Proportion of academics belonging to "other ethnicity"</b>		
Being on Benefit	-0.0003	0.0002
Paid Employment	-0.0018	0.0014
Further Study	0.0013*	0.0006
Others/Unknown/Overseas	0.0009	0.0011
<b>Proportion of academics for whom ethnicity is unknown</b>		
Being on Benefit	-0.0003	0.0002
Paid Employment	-0.0008	0.0010
Further Study	0.0001	0.0006
Others/Unknown/Overseas	0.0009	0.0009

## **Student Level Characteristics**

### **Student's gender**

**Female student**

Being on Benefit	-0.0132***	0.0038
Paid Employment	0.0170	0.0132
Further Study	-0.0221*	0.0088
Others/Unknown/Overseas	0.0183	0.0128

**Student's high school decile****School decile 1**

Being on Benefit	0.0162	0.0152
Paid Employment	0.1372*	0.0688
Further Study	0.0446	0.0387
Others/Unknown/Overseas	-0.1979*	0.0855

**School decile 2**

Being on Benefit	0.0042	0.0134
Paid Employment	0.0142	0.0462
Further Study	0.0443	0.0284
Others/Unknown/Overseas	-0.0627	0.0411

**School decile 3**

Being on Benefit	0.0011	0.0105
Paid Employment	0.0057	0.0520
Further Study	0.0491	0.0265
Others/Unknown/Overseas	-0.0559	0.0430

**School decile 4**

Being on Benefit	-0.0045	0.0104
Paid Employment	0.0220	0.0468
Further Study	0.0441	0.0244
Others/Unknown/Overseas	-0.0615	0.0389

**School decile 6**

Being on Benefit	-0.0094	0.0122
Paid Employment	-0.0266	0.0484
Further Study	0.0395	0.0255
Others/Unknown/Overseas	-0.0036	0.0422

**School decile 7**

Being on Benefit	-0.009	0.0111
Paid Employment	-0.0778	0.0466
Further Study	0.0460	0.0245
Others/Unknown/Overseas	0.0408	0.0366

**School decile 8**

Being on Benefit	0.0050	0.0096
Paid Employment	-0.0287	0.0428
Further Study	0.0396	0.0260
Others/Unknown/Overseas	-0.0159	0.0353

**School decile 9**

Being on Benefit	0.0048	0.0097
Paid Employment	-0.0696	0.0426
Further Study	0.0490*	0.0221

Others/Unknown/Overseas	0.0157	0.0389
<b>School decile 10</b>		
Being on Benefit	-0.0062	0.0102
Paid Employment	-0.0581	0.0400
Further Study	0.0537*	0.0228
Others/Unknown/Overseas	0.0105	0.0366
<b>School decile missing</b>		
Being on Benefit	-0.4191***	0.0309
Paid Employment	0.0283	0.0897
Further Study	0.1298**	0.0419
Others/Unknown/Overseas	0.2610***	0.0709
<b><u>Level of NCEA achieved by the student</u></b>		
<b>Achieved less than NCEA level 3</b>		
Being on Benefit	0.0094*	0.0044
Paid Employment	-0.0272	0.0199
Further Study	0.0239*	0.0120
Others/Unknown/Overseas	-0.0061	0.0178
<b>Overseas equivalent to NCEA level 3</b>		
Being on Benefit	-0.0123	0.0101
Paid Employment	-0.0476	0.0268
Further Study	-0.0109	0.0157
Others/Unknown/Overseas	0.0709***	0.0200
<b>Missing observations on NCEA level achieved</b>		
Being on Benefit	-0.0188	0.0236
Paid Employment	-0.2100*	0.0971
Further Study	0.0792**	0.0307
Others/Unknown/Overseas	0.1496	0.0847
<b><u>University fixed effects</u></b>		
<b>University 1</b>		
<b>University 2</b>		
Being on Benefit	-0.0089	0.0237
Paid Employment	-0.3380***	0.0795
Further Study	0.0649	0.0723
Others/Unknown/Overseas	0.2820**	0.0941
<b>University 3</b>		
Being on Benefit	-0.0080	0.0130
Paid Employment	-0.0839	0.0483
Further Study	0.0758	0.0502
Others/Unknown/Overseas	0.0161	0.0450
<b>University 4</b>		
Being on Benefit	-0.0057	0.0103
Paid Employment	-0.0083	0.0485
Further Study	-0.0691*	0.0329
Others/Unknown/Overseas	0.0832*	0.0340
<b>University 5</b>		

Being on Benefit	-0.0097	0.0100
Paid Employment	-0.1164*	0.0490
Further Study	-0.0172	0.0370
Others/Unknown/Overseas	0.1433***	0.0430
<b>University 6</b>		
Being on Benefit	0.0285	0.0191
Paid Employment	-0.0766	0.0537
Further Study	-0.0057	0.0436
Others/Unknown/Overseas	0.0539	0.0409
<b>University 7</b>		
Being on Benefit	0.0031	0.0109
Paid Employment	-0.0787	0.0503
Further Study	-0.0600	0.0333
Others/Unknown/Overseas	0.1355***	0.0399
<b>University 8</b>		
Being on Benefit	-0.0051	0.0171
Paid Employment	0.0068	0.0642
Further Study	-0.0478	0.0489
Others/Unknown/Overseas	0.0461	0.0493
<b><u>Subject area fixed effects</u></b>		
<b>Accounting and Finance</b>		
<b>Agriculture and Other Applied Biological Sciences</b>		
Being on Benefit	0.0073	0.0246
Paid Employment	-0.0366	0.1025
Further Study	-0.0119	0.0301
Others/Unknown/Overseas	0.0412	0.0898
<b>Anthropology and Archaeology</b>		
Being on Benefit	0.0939	0.0757
Paid Employment	-0.0805	0.1692
Further Study	0.0333	0.0970
Others/Unknown/Overseas	-0.0467	0.0760
<b>Architecture, Design, Planning, Surveying</b>		
Being on Benefit	0.0442**	0.0172
Paid Employment	-0.1201	0.0620
Further Study	-0.0193	0.0207
Others/Unknown/Overseas	0.0952	0.0675
<b>Biomedical</b>		
Being on Benefit	0.0355	0.0487
Paid Employment	0.1540*	0.0752
Further Study	0.0202	0.0539
Others/Unknown/Overseas	-0.2097**	0.0680
<b>Chemistry</b>		
Being on Benefit	0.0599	0.0442
Paid Employment	-0.0470	0.0845
Further Study	0.1431*	0.0722

Others/Unknown/Overseas	-0.1560***	0.0483
<b>Clinical Medicine</b>		
Being on Benefit	-0.0148**	0.0050
Paid Employment	0.2977***	0.0326
Further Study	-0.0279	0.0226
Others/Unknown/Overseas	-0.2550***	0.0257
<b>Communications, Journalism and Media Studies</b>		
Being on Benefit	0.0341	0.0331
Paid Employment	-0.0395	0.0802
Further Study	0.0351	0.0482
Others/Unknown/Overseas	-0.0298	0.0584
<b>Computer Science, Information Technology, Information Sciences</b>		
Being on Benefit	0.0076	0.0083
Paid Employment	0.0209	0.0489
Further Study	-0.0046	0.0228
Others/Unknown/Overseas	-0.0240	0.0484
<b>Dentistry</b>		
Being on Benefit	0.0122	0.0116
Paid Employment	0.0247	0.0555
Further Study	-0.0437*	0.0178
Others/Unknown/Overseas	0.0069	0.0552
<b>Design</b>		
Being on Benefit	0.0577	0.0309
Paid Employment	-0.1634**	0.0612
Further Study	-0.0306	0.0201
Others/Unknown/Overseas	0.1363*	0.0618
<b>Earth Sciences</b>		
Being on Benefit	0.0153	0.0222
Paid Employment	-0.0040	0.0584
Further Study	0.0045	0.0357
Others/Unknown/Overseas	-0.0158	0.0611
<b>Ecology, Evolution and Behaviour</b>		
Being on Benefit	-0.0186***	0.0045
Paid Employment	0.2377**	0.0834
Further Study	-0.0132	0.0737
Others/Unknown/Overseas	-0.2058***	0.0489
<b>Economics</b>		
Being on Benefit	-0.0023	0.0113
Paid Employment	-0.1840***	0.0370
Further Study	0.1070***	0.0275
Others/Unknown/Overseas	0.0793*	0.0323
<b>Education</b>		
Being on Benefit	0.1261**	0.0461
Paid Employment	-0.0528	0.0766
Further Study	0.0029	0.0292



Others/Unknown/Overseas	-0.0762	0.0638
<b>Engineering and Technology</b>		
Being on Benefit	0.0818**	0.0304
Paid Employment	-0.0667	0.0548
Further Study	0.0282	0.0352
Others/Unknown/Overseas	-0.0433	0.0492
<b>English Language and Literature</b>		
Being on Benefit	0.0323	0.0276
Paid Employment	-0.1577*	0.0704
Further Study	0.0366	0.0377
Others/Unknown/Overseas	0.0887	0.0601
<b>Foreign Languages and Linguistics</b>		
Being on Benefit	-0.0006	0.0101
Paid Employment	-0.2322***	0.0466
Further Study	0.1058**	0.0351
Others/Unknown/Overseas	0.1269**	0.0450
<b>History, History of Art, Classics and Curatorial Studies</b>		
Being on Benefit	-0.0186***	0.0045
Paid Employment	-0.0276	0.0772
Further Study	-0.0113	0.0377
Others/Unknown/Overseas	0.0576	0.0646
<b>Human Geography</b>		
Being on Benefit	-0.0186***	0.0045
Paid Employment	-0.4485***	0.0627
Further Study	0.4539	0.3004
Others/Unknown/Overseas	0.0133	0.3445
<b>Law</b>		
Being on Benefit	0.0195	0.0134
Paid Employment	-0.0092	0.0481
Further Study	0.0767*	0.0305
Others/Unknown/Overseas	-0.0870*	0.0376
<b>Management, Human Resources, Industrial Relations, International Business and Other Business</b>		
Being on Benefit	0.0044	0.0079
Paid Employment	-0.0582	0.0381
Further Study	-0.0202	0.0202
Others/Unknown/Overseas	0.0740*	0.0333
<b>Marketing and Tourism</b>		
Being on Benefit	0.0020	0.0086
Paid Employment	-0.0629	0.0364
Further Study	-0.0029	0.0260
Others/Unknown/Overseas	0.0637	0.0356
<b>Molecular, Cellular and Whole Organism Biology</b>		
Being on Benefit	0.0223	0.0244
Paid Employment	-0.1269	0.0674
Further Study	0.0514	0.0399

Others/Unknown/Overseas	0.0531	0.0656
<b>Music, Literary Arts and Other Arts</b>		
Being on Benefit	0.0810*	0.0359
Paid Employment	-0.2375***	0.0722
Further Study	0.0846	0.0511
Others/Unknown/Overseas	0.0719	0.0628
<b>Other Health Studies (including Rehabilitation Therapies)</b>		
Being on Benefit	0.0109	0.0096
Paid Employment	0.1555***	0.0446
Further Study	-0.0275	0.0216
Others/Unknown/Overseas	-0.1389***	0.0380
<b>Philosophy</b>		
Being on Benefit	0.0244	0.0333
Paid Employment	-0.2323**	0.0855
Further Study	0.1383	0.0726
Others/Unknown/Overseas	0.0697	0.0550
<b>Physics</b>		
Being on Benefit	0.0770*	0.0321
Paid Employment	-0.1933	0.1166
Further Study	0.1220	0.0676
Others/Unknown/Overseas	-0.0056	0.0816
<b>Political Science, International Relations and Public Policy</b>		
Being on Benefit	0.0428	0.0258
Paid Employment	-0.0085	0.0776
Further Study	0.0347	0.0459
Others/Unknown/Overseas	-0.069	0.0492
<b>Psychology</b>		
Being on Benefit	0.0358	0.0197
Paid Employment	-0.0591	0.0531
Further Study	0.1129**	0.0415
Others/Unknown/Overseas	-0.0896*	0.0442
<b>Public Health</b>		
Being on Benefit	0.0344	0.0328
Paid Employment	-0.1868*	0.0909
Further Study	-0.0054	0.0337
Others/Unknown/Overseas	0.1579	0.0881
<b>Pure and Applied Mathematics</b>		
Being on Benefit	0.0112	0.0122
Paid Employment	-0.1783***	0.0485
Further Study	0.0623	0.0584
Others/Unknown/Overseas	0.1048*	0.0459
<b>Religious Studies and Theology</b>		
Being on Benefit	0.1066	0.1371
Paid Employment	-0.0756	0.1028
Further Study	-0.0767***	0.0159
Others/Unknown/Overseas	0.0457	0.1023

**Sociology, Social Policy, Social Work, Criminology and Gender Studies**

Being on Benefit	0.0516	0.0370
Paid Employment	-0.0994	0.0670
Further Study	0.0790	0.0506
Others/Unknown/Overseas	-0.0312	0.0511

**Sport and Exercise Science**

Being on Benefit	-0.0186***	0.0045
Paid Employment	0.2992***	0.0548
Further Study	-0.0659**	0.0212
Others/Unknown/Overseas	-0.2146***	0.0531

**Statistics**

Being on Benefit	0.0048	0.0097
Paid Employment	-0.2793***	0.0408
Further Study	0.2076***	0.0430
Others/Unknown/Overseas	0.0670	0.0558

**Theatre and Dance, Film and Television and Multimedia**

Being on Benefit	0.1125	0.1265
Paid Employment	-0.5463***	0.0639
Further Study	0.3932*	0.1842
Others/Unknown/Overseas	0.0407	0.1918

**Veterinary Studies and Large Animal Science**

Being on Benefit	-0.0186***	0.0045
Paid Employment	0.0800	0.0625
Further Study	-0.0767***	0.0159
Others/Unknown/Overseas	0.0153	0.0600

**Visual Arts and Crafts**

Being on Benefit	0.0441	0.0292
Paid Employment	-0.1941**	0.0712
Further Study	0.0207	0.0506
Others/Unknown/Overseas	0.1294*	0.0641

**Year fixed effects****First year at the tertiary education institute of the student – 1999**

Being on Benefit	-0.0059	0.0072
Paid Employment	-0.0274	0.0316
Further Study	-0.0531**	0.0180
Others/Unknown/Overseas	0.0864*	0.0365

**First year at the tertiary education institute of the student – 2007**

Being on Benefit	-0.0403**	0.0155
Paid Employment	-0.1911**	0.0669
Further Study	-0.0414	0.0313
Others/Unknown/Overseas	0.2728***	0.0680

**First year at the tertiary education institute of the student – 2008**

Being on Benefit	-0.0395**	0.0152
Paid Employment	-0.1473*	0.0668

Further Study	-0.0528	0.0315
Others/Unknown/Overseas	0.2396***	0.0682

<b>Number of observations</b>	6,258
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Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 340 clusters in *id*. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) \*  $p < 0.05$ , \*\*  $p < 0.01$  and \*\*\*  $p < 0.001$ .

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