

HOW DOES INVESTMENT IN TERTIARY EDUCATION IMPROVE OUTCOMES FOR NEW ZEALANDERS?

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Abstract

Recent research conducted by the Ministry of Education implies that the level of tertiary study has a bigger impact on people's earnings than the completion of a qualification. However, controlling for level of study, qualification completion does have a significant impact on earnings. Using data drawn from the integrated dataset on Student Loan Scheme borrowers, this study uses generalised logistic regression and other techniques to analyse the association between individuals' post-study earnings and demographic factors, study-related variables and industry of employment to isolate the earnings premium from qualification completion. It also examines the extent to which that premium endures over time. The study finds that while the main determinants of the level of earnings are factors such as industry of employment, qualification level, the type of tertiary education provider and the field of study, those who complete a qualification do have a substantial earnings margin over those who study at that level without completing. The paper also surveys evidence of the non-economic benefits of tertiary education in an effort to get a sense of breadth of the returns to society from its spending on tertiary education.

INTRODUCTION

New Zealand invests heavily in tertiary education. In 2005/2006, the total government expenditure in tertiary education was \$4.3 billion² – of which 47% went on tuition subsidies and 6% to training for designated groups (Ministry of Education 2006). Individuals and their families also invest substantial amounts in their tertiary education. In the public tertiary institutions alone, \$634 million was spent on domestic tuition fees in 2005, while businesses paid about \$56 million in cash (and also made substantial non-cash contributions) to subsidise industry training (Ministry of Education 2006).

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2 This figure excludes the one-off fair-value write-down of the Student Loan Scheme.

The purpose of this investment – both the private and the government components – is to lift economic and social outcomes for individuals, and hence, for New Zealand.

This paper looks at evidence for the returns on that investment, by examining evidence for the influence of tertiary education on the formation of human capital – principally by examining the incomes paid to holders of tertiary qualifications in the labour market. It concludes:

- Attainment of tertiary qualifications is associated with a higher likelihood of employment – especially during times of economic recession.
- Those with tertiary qualifications earn more than those without.
- The successful completion of a tertiary qualification results in a premium on earnings over those who do not complete.
- There are better health and lifestyle outcomes for those who attain tertiary qualifications.

HUMAN CAPITAL

Human capital has been defined as “the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being” (OECD 2001). There is great interest in the concept of human capital because a country’s prosperity is widely considered to be dependent on its stocks of human capital (Le et al. 2005).

The measurement of human capital is complex. In their review of the literature on the measurement of human capital for the New Zealand Treasury, Le et al. (2005) identify three broad approaches to measuring human capital:

- initial attempts to measure human capital concentrated on the costs of raising and educating a person, that is, the costs incurred in the acquisition of skills and competencies
- secondly, human capital was estimated by looking at the level of educational qualifications in the population, with qualifications being treated as a proxy for skills
- thirdly, human capital has been measured by looking at people’s earnings in the labour market.

Earnings are an important index of human capital because a rational employer pays an employee such that the marginal return from the investment made in that employee is positive. In crude terms, if the cost of employing a worker – principally wages – exceeds the value created by the worker, the employer has an incentive to reduce that worker’s wages or else to dispense with their services. Thus, income reflects the value a worker creates and, by implication, the skills he or she brings to the workplace. The use of income as a measure of human capital also recognises the acquisition of skills in the workforce, following the completion of formal education.

The use of people's labour market earnings in the quantification of human capital stocks is complex. However, for the purposes of this paper, what matters is that there is a relationship between human capital and earnings – the higher the lifetime earnings of an individual the higher that person's level of human capital, all other things being equal.

This paper explores the connection between tertiary education and human capital through examining the influence of tertiary education on employment and earnings.

LABOUR MARKET OUTCOMES OF TERTIARY EDUCATION

Unemployment

Unemployment data from Statistics New Zealand's *Household Labour Force Survey* shows that those who hold a tertiary qualification have lower unemployment rates compared with those who do not. Figure 1 presents unemployment rates by highest qualification and age group in 2006. Overall, for those aged 15–64 there is a clear relationship between holding tertiary qualifications and lower unemployment. The unemployment rate for those with a bachelor's degree or higher qualification³ is 2.1% and for those with an "other tertiary" qualification⁴ 3.0%. This compares with an unemployment rate for those with school qualifications⁵ of 4.1% and no qualifications 5.4%.

However, this level of aggregation masks an underlying relationship between age, highest qualification and likelihood of employment in the 2006 data. To show this, Figure 1 also presents the unemployment rate by highest qualification in the 15–24, 25–39 and 40–64 age groups. The data shows that the unemployment rate of those aged 40–64 with school qualifications (1.8%) is actually slightly lower than those with tertiary qualifications (2.5% for bachelor's degree or higher and 2% for "other tertiary" qualifications). Even for those with no qualifications in that age group, there is little difference in their unemployment rate compared to those with tertiary qualifications.

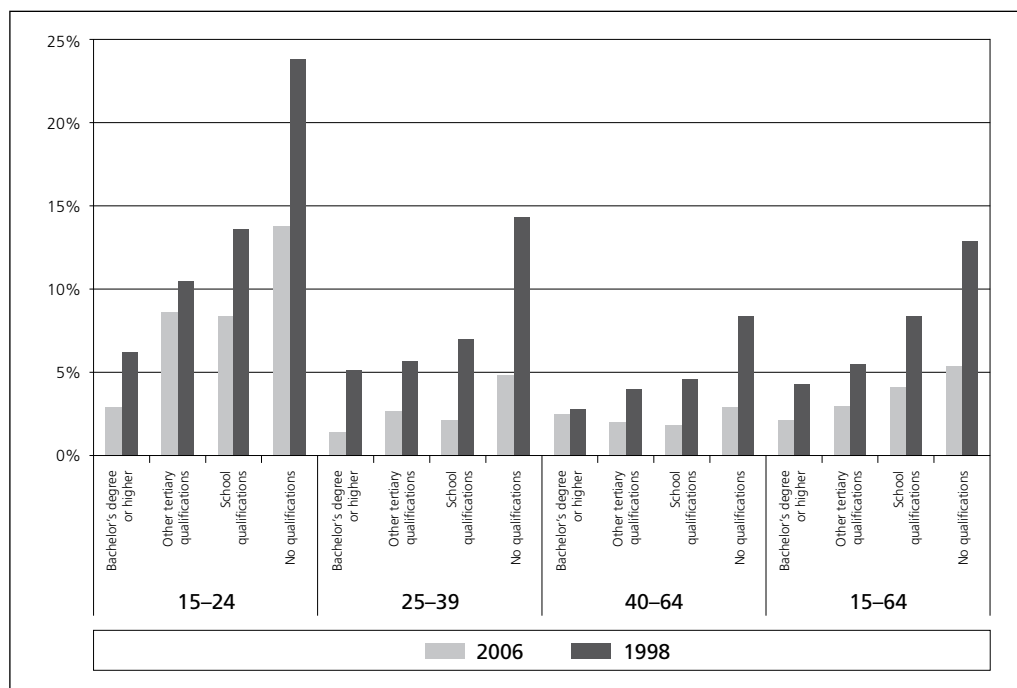
The greatest employment advantage in holding tertiary qualifications is in the 15–24 age group, where a bachelor's degree or higher qualification provides an easier initial entry into the labour market. The unemployment rate of a person in this age group with a bachelor's degree or higher qualification was 2.9%, "other tertiary" qualification 8.6%, school qualification 8.4% and no qualification 13.8%.

3 "Bachelor's or higher" qualifications include postgraduate degrees, certificates or diplomas.

4 "Other tertiary" qualifications include university certificates or diplomas, teaching certificates or diplomas, nursing certificates or diplomas, New Zealand certificates or diplomas, technician's certificates, local polytechnic certificates or diplomas, and trade certificates or advanced trade certificates.

5 "School" qualifications include year 11, 12 and 13 qualifications and overseas school qualifications.

Figure 1 Unemployment Rate by Age Group and Highest Qualification, 2006 and 1998



Source: Statistics New Zealand, Household Labour Force Survey
 Note: Data is from the June quarter.

There are a number of potential reasons for these outcomes. The work experience of older workers may help to reduce the disparity in unemployment rate. In addition, the current tight nature of the New Zealand labour market may reduce the advantage that tertiary qualifications bring to the likelihood of employment in the older age groups.

To illustrate the impact of the business cycle on unemployment, Figure 1 also displays the unemployment rates in the various age groups for 1998, this being the last year that the New Zealand economy was in a sizeable recession. The unemployment data in that year presents a different pattern to that observed in the 2006 data. In 1998, the advantage that holding tertiary qualifications had on employment likelihood was maintained across all the age groups. In the 40-64 age group for example, the unemployment rate of those with a bachelor's degree or higher qualification was 2.8%, compared with 4.6% for those with school qualifications and 8.4% for those with no qualifications.

This would imply that a key advantage of holding tertiary qualifications is that employment levels are sustained during a recession, whereas, those with school or no qualifications are more likely to have their likelihood of employment reduced.

Income

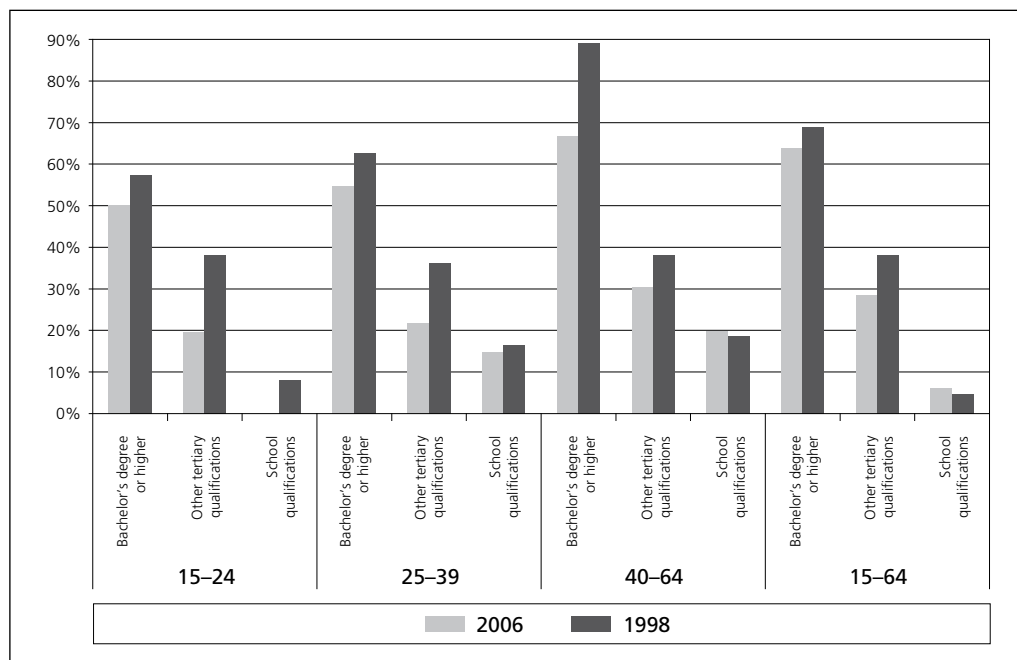
Data from Statistics New Zealand's *Income Survey* shows a strong association between the attainment of tertiary qualifications and higher incomes. Figure 2 displays the premium on median hourly earnings by age group and highest qualification, compared with a person with no qualifications. The 2006 data shows that in the 15–64 age group, those holding a bachelor's degree or higher qualifications had hourly earnings that were 64% higher than those with no qualifications. The figures were 29% higher for those with "other tertiary" qualifications and 6% higher for those with school qualifications. In the 40–64 age group, the premiums were 67%, 30% and 20%, respectively. Therefore, the premium on higher qualifications would appear to persist across all of the age groups.

The 1998 premiums on median income are also displayed in Figure 2. It is evident that there has been some reduction in the premium on median income between 1998 and 2006, especially for those with tertiary qualifications. For example, for those aged 15–24, the premium on a bachelor's or higher degree fell from 57% in 1998 to 50% in 2006. A likely explanation for this trend is a significant fall in the unemployment rate for those with no qualifications during the current period of record low unemployment. In 2006, the unemployment rate of the population aged 15–64 in 2006 was 5.4%, compared with 12.9% in 1998. For those with a bachelor's degree or higher qualification, the fall in unemployment was relatively smaller – from 4.3% to 2.1%.

This would have raised the relative earnings of those with no qualifications significantly, thereby reducing the premium. Given this pattern, if the New Zealand economy should go through another significant downturn, it is likely that the premium on income will once again increase for those with tertiary qualifications.

A number of analytical studies have estimated the premium on income that holding a tertiary qualification provides in New Zealand. Maani (1999) analysed New Zealand Census data between 1981 and 1996 and found that there was a significant premium on attaining tertiary qualifications. Further, the premium on the qualifications was higher in 1996 than it was in 1981 and 1996, despite an increase in the proportion of people in the New Zealand labour force holding a tertiary qualification over that time. Penny (2005) updated Maani's analysis by examining 2001 Census data. He found that the premiums on income from attaining higher qualifications had been sustained, despite a further significant lift in the number of people with tertiary qualifications during this period.

Figure 2 Premium on Median Hourly Earnings by Age Group and Highest Qualification Compared with those with No Qualifications, 2006 and 1998



Source: Statistics New Zealand, New Zealand Income Survey
 Note: Data is from the June quarter.

RETURNS TO TERTIARY EDUCATION

The 2006 edition of the OECD's education indicators collection, *Education at a Glance* (OECD 2006), included estimates of private and public internal rates of return (IRR) for attaining tertiary qualifications in New Zealand. They show that there are positive returns to attaining tertiary qualifications for both the individual and the government, but that these decline as the age of starting the qualification increases.

The private IRR for a man and woman starting a university qualification directly after finishing school was 9.3% and 12.9%, respectively. For a person starting a degree aged 40, and bearing the full cost of their education, the IRRs fall to 6.5% for men and 7.5% for women (see OECD 2006:150 Table A9.6). These private IRRs are above the five-year government bond rate, meaning again, that the return is positive, if more modest than among those who started studying earlier.

The public IRRs measure the extra tax income and reduced government expenditure on benefits that result from people attaining tertiary qualifications. In the case of

someone entering degree study directly from school, these were 9.9% for men and women. For a person aged 40 starting a degree the public IRR was 2.4% for men and 2.1% for women (OECD 2006:151 Table A9.8).

Using the Integrated Dataset to Explore Returns

The integrated dataset on Student Loan Scheme borrowers managed by Statistics New Zealand provides a means of analysing the employment outcomes of tertiary education for all of those who have used the Student Loan Scheme – a substantial group of those who access tertiary education. This dataset links data on students' tertiary education, data on borrowing, data on loan balances and data on income.⁶ It is a longitudinal dataset, which includes: individuals' demographic data; details of their tertiary study – the type of tertiary provider, the qualification studied, the field of study, whether the qualification is completed or not; details of the amount and source of income each year and data on the industry of employment. Because it is longitudinal, the dataset allows statistical studies that isolate the impact of a range of explanatory variables on post-study income.

Nair (2006) used generalised logistic regression on the integrated dataset to examine the relationship between educational, demographic and employment-related factors and income three years following tertiary study. This paper augments that study by considering incomes three and five years post-study using a generalised logistic regression model in combination with a bootstrapping approach with 100 replications to estimate the predicted probability of an individual being in a particular income band. This model isolates the independent relationship of each variable to student earnings after accounting for the relationship of other relevant variables (Nair 2007).

The generalised logistic regression model explained about 73% of the variability in the dependent variable. The individual effect of each explanatory variable is estimated by keeping all other factors constant. The key findings from this study are that factors such as industry of employment, level of study, the tertiary education provider, and the field of study influenced graduate earnings significantly. The interaction effects of the variables such as level of study by industry, level of study by provider, field of study by industry, and age group by level of study, exerted a greater influence on post-study earnings than the factors considered individually. The demographic variables were generally not strongly related to earnings. The exception to that finding was age where there was moderate relationship to student earnings – largely because age is a proxy that captures the effects of previous labour market experience on income.

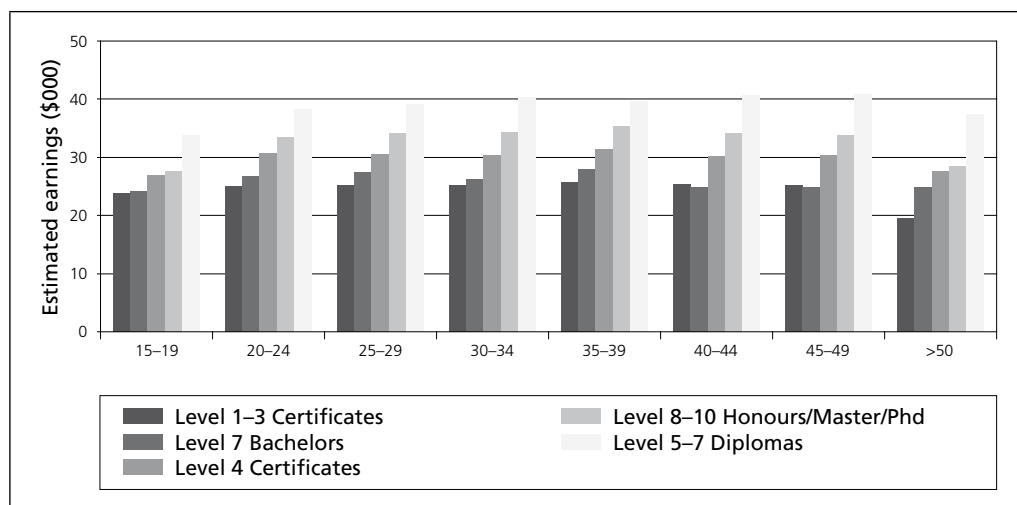
6 For information on the integrated dataset, refer to Ministry of Education (2005) *About the Integrated Dataset*, available at educationcounts.edcentre.govt.nz/publications/downloads/about-the-integrated-dataset.doc.

Demographic Factors

Figure 3 shows little significant difference in the estimated earnings five years post-study for those aged between 25 and 50 years at the point of leaving study by level of qualification studied, controlling for other factors. However, those who finished study before turning 25 years and those finishing after turning 50 earned less five years after leaving study, at each level of study.⁷

The trend observed in Figure 3 was similar at three years post-study.

Figure 3 Estimated Earnings by Level of Study and Age Group, Five Years Post-Study



Source: Statistics New Zealand: Integrated dataset on Student Loan Scheme borrowers

Notes: 1. Earnings means income from wages, salaries and self-employment but excludes income from benefits, interest and investments.

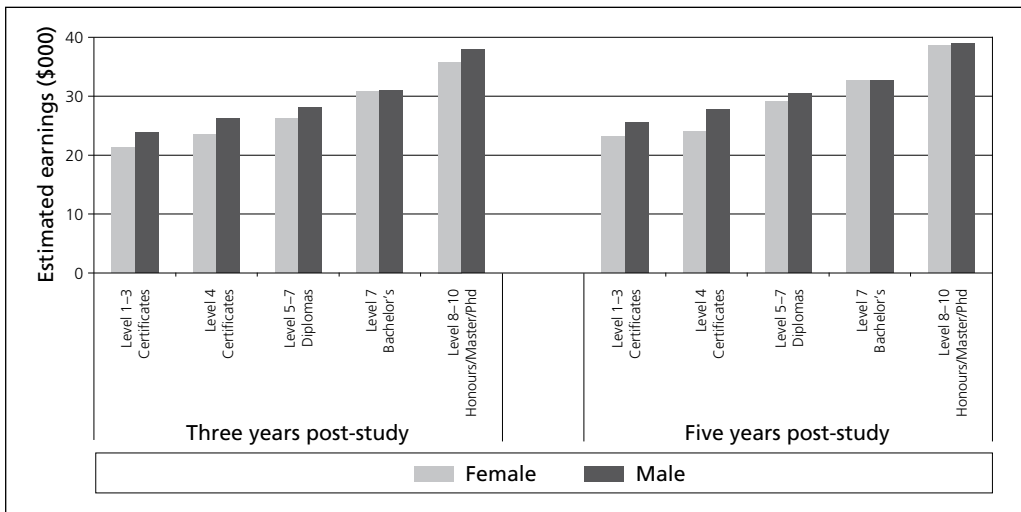
2. Earnings five years post-study are expressed in 2004 dollars, using the Labour Cost Index as the deflator.

Figure 4 confirms that men generally earn more than women who study at the same level of qualification. However, these disparities in earnings are lower at higher levels of study and tend to diminish over time for women at higher levels of tertiary study – controlling for all other factors, the disparities five years post-study are less at diploma, degree and postgraduate levels than they were at three years post-study.

The gender gap in earnings within the same qualification level may be attributable partly to the choice of fields of study, industry of employment and time spent in the labour force.

⁷ Estimated earnings refer to earnings calculated from sum of products of event probabilities determined from the statistical model and the midpoint of corresponding income band.

Figure 4 Estimated Earnings by Level of Study and Gender, Three and Five Years Post-Study



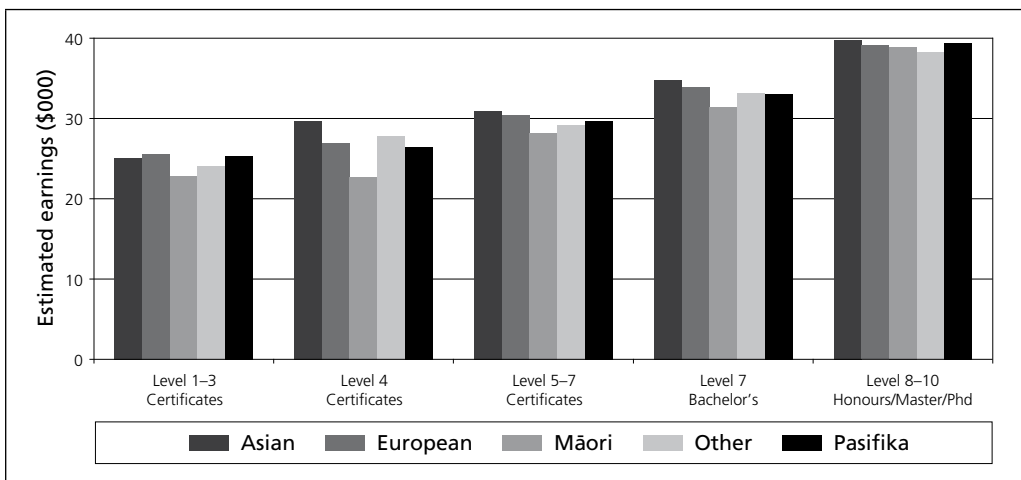
Source: Statistics New Zealand: Integrated dataset on Student Loan Scheme borrowers

Notes: 1. Earnings means income from wages, salaries and self-employment but excludes income from benefits, interest and investments.

2. Earnings three and five years post-study are expressed in 2004 dollars, using the Labour Cost Index as the deflator.

As can be seen in Figure 5, disparities in earnings between ethnic groups are mostly associated with study at lower qualification levels.

Figure 5 Estimated Earnings by Level of Study and Ethnicity, 5 Years Post-Study



Source: Statistics New Zealand: Integrated dataset on Student Loan Scheme borrowers

Notes: 1. Earnings means income from wages, salaries and self-employment but excludes income from benefits, interest and investments.

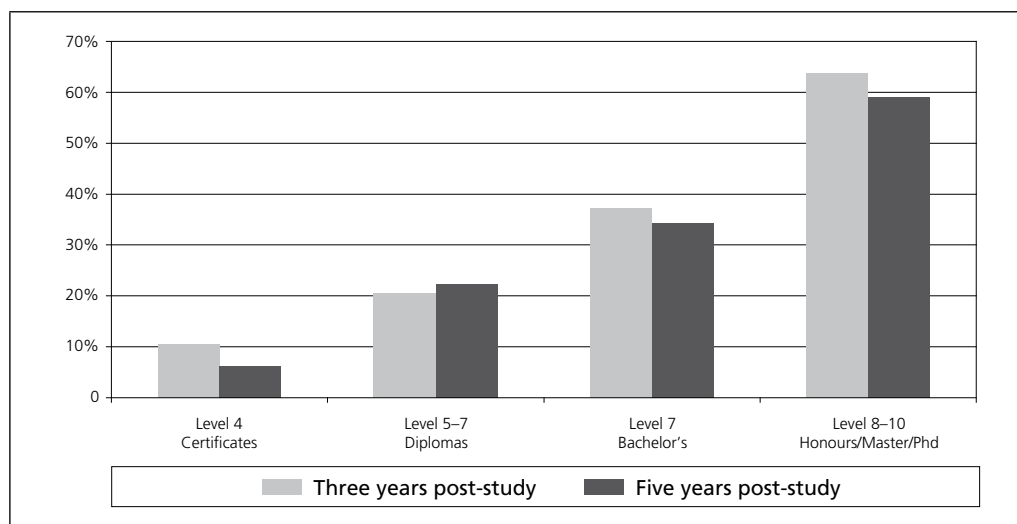
2. Earnings five years post-study are expressed in 2004 dollars, using the Labour Cost Index as the deflator.

Level and Field of Study

The level of the qualification studied and the field of study are the two most important factors impacting on the economic return to tertiary education – whether the qualification is completed or not. Although these two factors influenced earnings independently, their interaction effect with industry, completion status, prior activity and provider type had a stronger impact on earnings. The premium for studying a higher level of tertiary qualification is shown in Figure 6. The estimated earnings premium for an individual who studied at bachelor’s level is around 30% more than someone who studied towards levels 1–3 certificates.⁸ Those who studied at the postgraduate level earned about 20% higher than someone who studied at the bachelor’s level, controlling for all other factors.

Choice of field of study also has a considerable impact on the individual earnings. The field with the highest earnings, however, varies with different qualification levels, but there are some patterns common to the levels.

Figure 6 Predicted Earnings Premium by Level of Study Compared with Levels 1–3 Certificates, Three and Five Years Post-Study



Source: Statistics New Zealand: Integrated dataset on Student Loan Scheme borrowers

Notes: 1. Earnings means income from wages, salaries and self-employment but excludes income from benefits, interest and investments.

2. Earnings three and five years post-study are expressed in 2004 dollars, using the Labour Cost Index as the deflator.

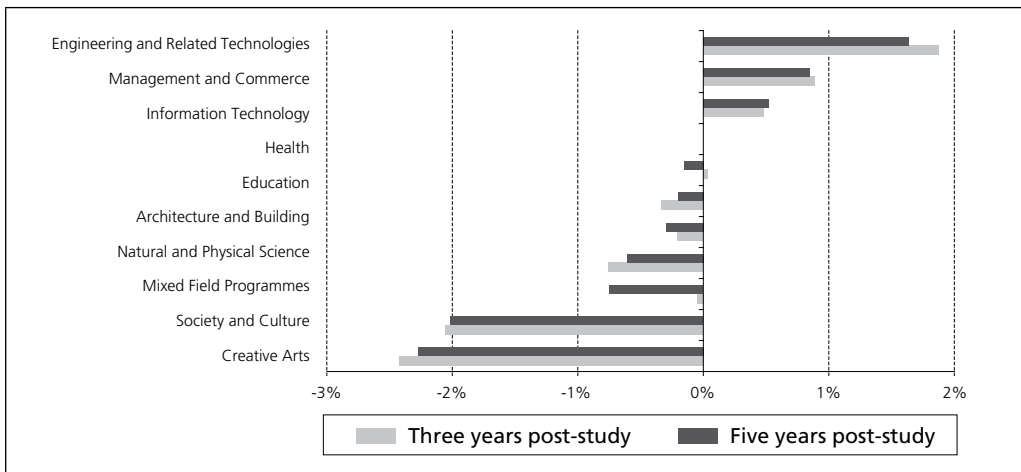
⁸ Qualification levels in this paper are classified using the system of the New Zealand Register of Quality Assured Qualifications. Levels 1–3 cover the same level as senior secondary school, bachelor’s degrees are at level 7, while levels 8, 9 and 10 represent three postgraduate levels.

The estimated earnings premium associated with fields of study at the bachelor's degree level three and five years post-study period is shown in Figure 7. The premium is calculated for different fields with reference to agriculture and related studies.

Bachelor's degree study in engineering and related studies, management studies and information technology showed a positive premium over agriculture and related studies. Earnings for those who studied at the bachelor's degree level in health and education were around the same as those who studied at the bachelor's degree level in agriculture and related studies. Creative arts and society and culture recorded a much lower premium.

There are some similarities at other qualification levels. Information technology, management and commerce, health, engineering and related studies tend to receive a positive premium compared to agriculture and related studies.

Figure 7 Predicted Earnings Premium for Study at the Bachelor's Degree Level by Field of Study Compared with Agriculture and Related Studies, Three and Five Years Post-Study



Source: Statistics New Zealand: Integrated dataset on Student Loan Scheme borrowers

Notes: 1. Earnings means income from wages, salaries and self-employment but excludes income from benefits, interest and investments.

2. Earnings three and five years post-study are expressed in 2004 dollars, using the Labour Cost Index as the deflator.

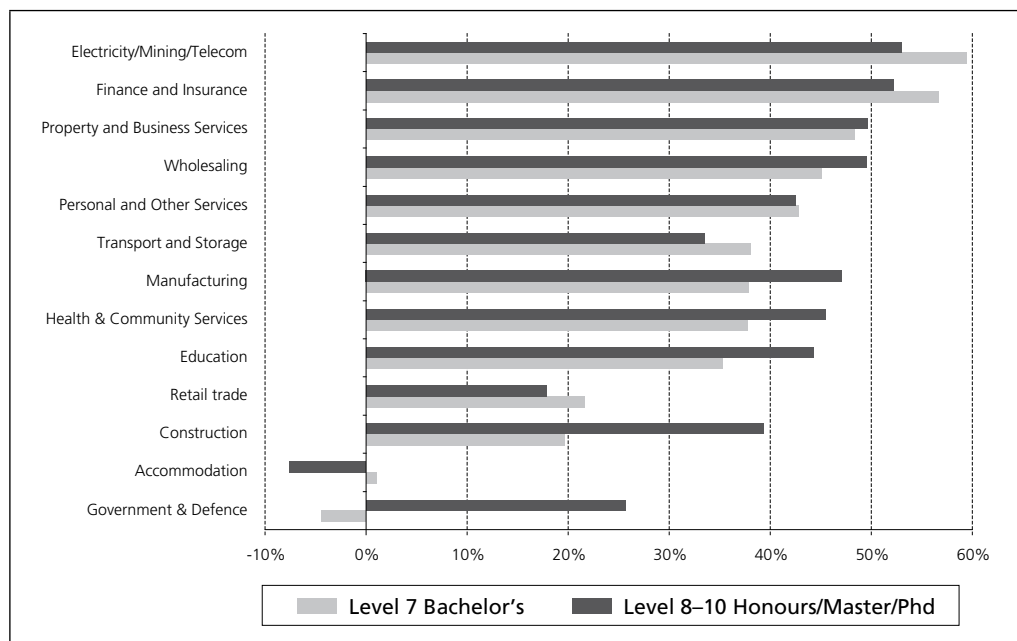
Industry of Employment

Industry of employment has a considerable impact on an individual's earnings. This factor is one of the most important determinants of the economic returns to education. Inclusion of this factor in the model also controls for skills specific to particular

industries. Variation in individual earnings due to industry by level of study is a result of the fact that wages depend on the sector of employment and the level of qualification in New Zealand.⁹ Some results from the interaction effects of level of study and industry are depicted in Figure 8, where earnings five years post-study in a variety of industries are compared with earnings in the agriculture industry at the bachelor's degree and postgraduate qualification level.

Higher earnings are observed in finance and insurance, electricity, mining and related industries, property and business services. Accommodation and government and defence sectors had a negative premium when compared with agriculture at the bachelor's degree level.

Figure 8 Predicted Earnings Premium by Industry of Employment for Study at the Bachelor's Degree or Higher Levels Compared with Agriculture, Five Years Post-Study



Source: Statistics New Zealand: Integrated dataset on Student Loan Scheme borrowers

Notes: 1. Earnings means income from wages, salaries and self-employment but excludes income from benefits, interest and investments.

2. Earnings three and five years post-study are expressed in 2004 dollars, using the Labour Cost Index as the deflator.

9 Bellman and Gartner (2003) find evidence for Germany in the qualification- and sector-based wage structures, which are consistent with the hypothesis of skill biased technology change.

THE NATURE OF THE RELATIONSHIP BETWEEN EDUCATION AND INCOME

The strong linkage noted above between the level of qualification and income does not mean that the relationship is causal – we cannot attribute all of the increased income to the higher qualifications (Smart 2006) because few of the statistical models used above can control for the attitudes and innate ability individuals bring to their employment (Smart 2006). In other words, there is an argument that the individuals who earn higher incomes would have had an advantage in the labour market and would have earned more than their peers anyway, even without higher qualifications, because they have the qualities that employers are prepared to reward. Therefore, the returns to educational qualifications may be best understood as the combination of the effects of educational qualifications and attitude and ability on income levels (Smart 2006, Maani 1999, Maani and Maloney 2004).

One way of getting some measure of control for the effects of innate ability and isolating some of the effects of the educational qualification, is to compare the earnings of those who did complete a qualification with those who studied at the same level but abandoned study without completing. Such an analysis is possible using the longitudinal integrated dataset on Student Loan Scheme borrowers. This allows us to compare groups whose prior qualifications (and by implication, their innate ability and/or attitudes to learning) are broadly similar. For instance, nearly all master's students enter their studies having completed an undergraduate degree and it is likely that their outcomes, if they do not succeed in their master's, will at least reflect their earlier qualifications. Further, those who progress to higher level study are excluded from the comparison – meaning that those with exceptional ability in each group are removed from the analysis. This approach provides a more realistic assessment of the value added by tertiary qualifications than is evident in population-based models that compare outcomes for those with a qualification with the outcomes for all those without (Hyatt and Smyth 2006, Hyatt et al. 2005).

Given the strength of the association between qualifications and income, it would be possible to infer that it is completion that has the greatest influence on income. However, in the study referred to above, Nair (2006) finds that completion of a qualification does not have a statistically significant impact on earnings, except when considered in combination with the level of study.

THE PREMIUM FOR COMPLETION OF A QUALIFICATION

Consistent with Nair's findings, an integrated dataset study by Hyatt and Smyth (2006) found that the median earnings of those who have taken a bachelor's degree and abandoned without completion is higher than the median earnings of those who

studied at certificate level and did earn a qualification. Bachelor's degree students go on to earn more than certificate students, whether they are successful in their studies or not. In other words, the level of study was a more important predictor of earnings than success in study. The *level* of study may be seen as a crude index of the innate qualities – ability, attitudes and competencies – the person brings to the labour market. However, *within each qualification level studied*, Hyatt and Smyth find a difference between the median earnings of those who did and did not complete – a premium for completion of the qualification. It is this premium for completion that may represent a better indicator of the effects on earnings (and hence on human capital) of the tertiary education.

Given the important linkage between earnings and human capital referred to above, tracking the premium for completion over time gives an understanding of the extent to which it is the tertiary education qualification that makes a difference in earnings and consequently, the extent to which the system is contributing to the economy. Looking at changes in that premium over time as people settle in their careers and gain experience in the workforce, gives a sense of whether the qualification system is simply acting as a screening and sorting device – telling employers which individuals have ability. If the premium increases over time, it is possible to infer that tertiary study is building and enhancing individuals' skills and competencies.

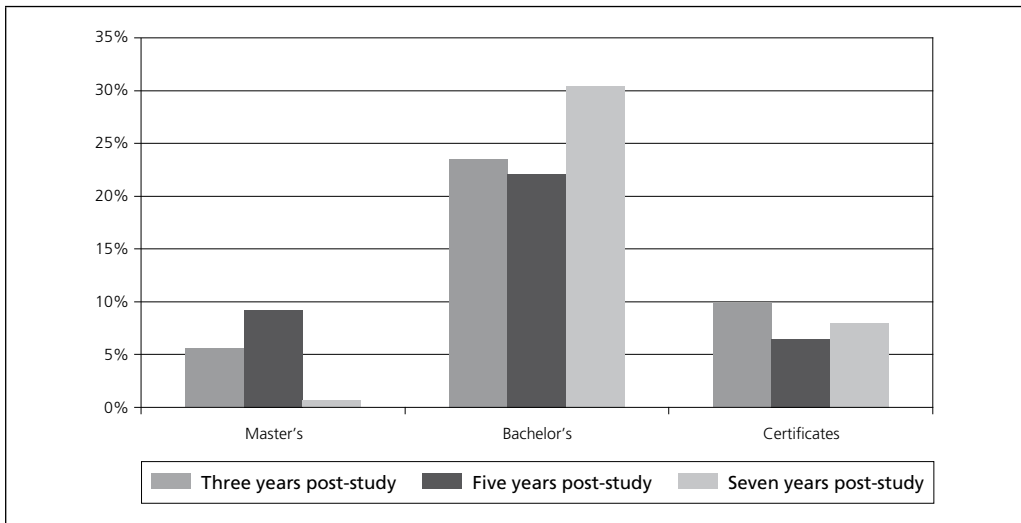
In this paper, we extend Hyatt and Smyth's analysis, by adding an extra two years' data. Overall, the premium for completion appears significant, once one controls for the level of a qualification. Figure 9 presents the results of comparing the mean earned income¹⁰ of those who completed a qualification with the mean earnings of those who started the same level of qualification but abandoned without completing. The three qualification levels chosen for the analysis are levels 1–3 certificates, bachelor's degrees and master's degrees. The figures for the completion premium three years post-study are derived from the weighted averages of earnings data for three cohorts: those who had used the loan scheme and last studied in 1997, 1999 and 2001, with the earnings figures standardised using the Labour Cost Index. The five year premium uses standardised data from two leaving cohorts – 1997 and 1999 – while the figures for the premium seven years post-study are drawn from the 1997 leaving cohort only.

The most significant premium is for completion of a bachelor's degree. Levels 1–3 certificates are shorter qualifications, designed to cover more basic material at a level that overlaps with school qualifications and hence, those who study at this level tend to be aiming towards lower skill jobs where experience may matter as much as, or more than, a qualification. Almost all of those studying for a master's degree will have already acquired a bachelor's degree before entering study and hence, they enter the labour

10 Earned income means income from wages, salaries and self-employment but excludes income from benefits, interest and investments.

market with evidence of having acquired higher level skills, whether they complete the master's or not. Therefore, it is not surprising that these two groups have a lower premium for completion.¹¹ (Note that this analysis omits reference to industry training – because the dataset from which it is drawn relates to the Student Loan Scheme and industry trainees tend not to use the scheme.)

Figure 9 The Premium for Completion of a Qualification by Level, at Three, Five And Seven Years after Leaving Tertiary Study



Source: Statistics New Zealand: Integrated dataset on Student Loan Scheme borrowers

Notes: 1. Earnings means income from wages, salaries and self-employment but excludes income from benefits, interest and investments.

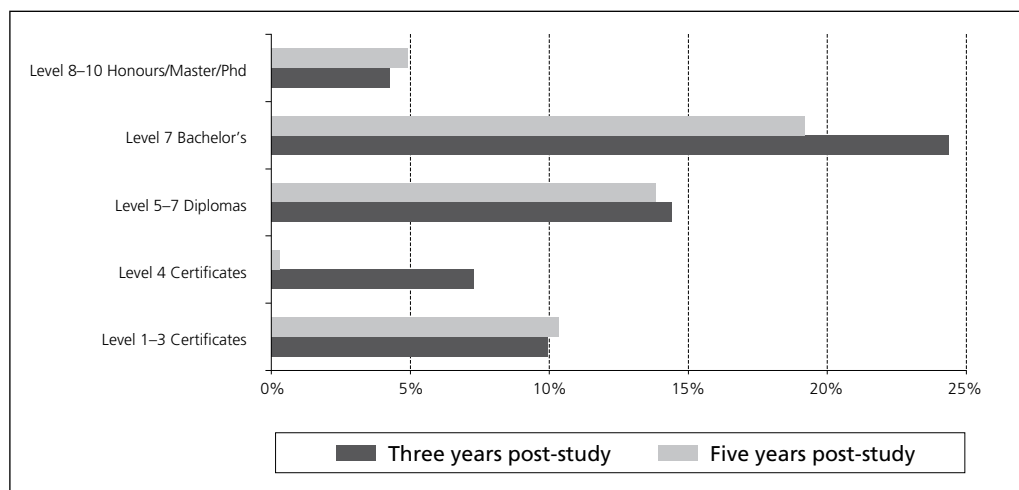
2. Earnings three, five and seven years post-study are standardised, using the Labour Cost Index as the deflator.

Using generalised logistic regression to control for all other factors three and five years post-study, we see similar results – which are displayed in Figure 10.

The results described above apply to all groups in the population of Student Loan borrowers. Outcomes differ, however, among different subgroups. Confining our attention to bachelor's degrees only, we see that the premium for completion of a bachelor's degree among Māori is higher than among Pasifika, while Pasifika appear to have better outcomes than all groups until the seventh year post-study. This implies that completion of a bachelor's degree reduces income inequality between Māori and other groups and, initially at least, between Pasifika and other groups.

11 The result for master's degrees seven years post-study reflects unusual features in the way the labour market responded to qualifications at that level in 2004, observable three, five and seven years post-study. It is likely that the labour market rewards the additional qualities these people have acquired while studying for master's, as much as the degree itself – because someone who started a master's degree and left without completing earned more than someone who had completed a bachelor's degree.

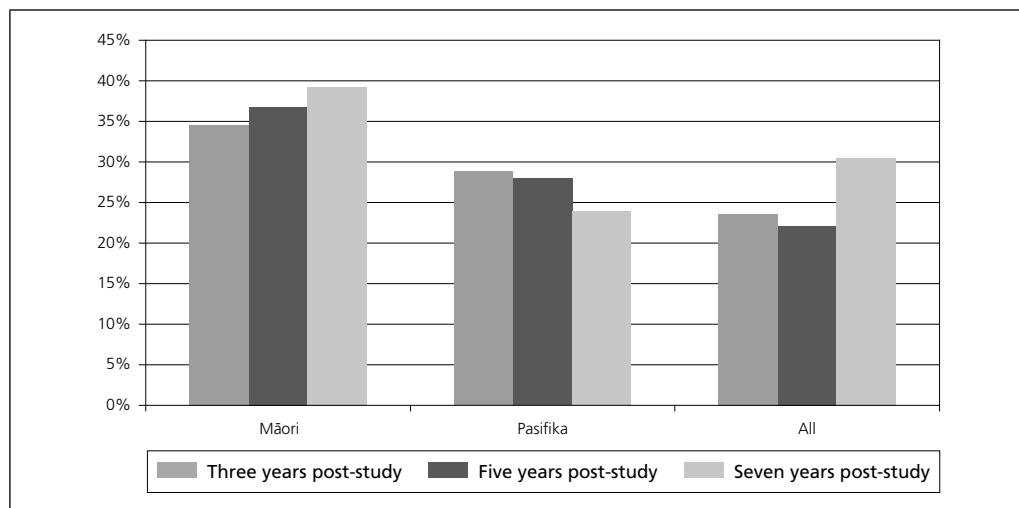
Figure 10 Predicted Premium for Completion of a Qualification by Level of Study, at Three and Five Years Post-Study



Source: Statistics New Zealand: Integrated dataset on Student Loan Scheme borrowers

- Notes: 1. Earnings means income from wages, salaries and self-employment but excludes income from benefits, interest and investments.
 2. Earnings three and five years post-study are standardised, using the Labour Cost Index as the deflator.
 3. This graph shows the results of a logistic regression analysis of premiums.

Figure 11 The Premium for Completion of Bachelor's Degree, at Three, Five and Seven Years after Leaving Tertiary Study, by Ethnic Group



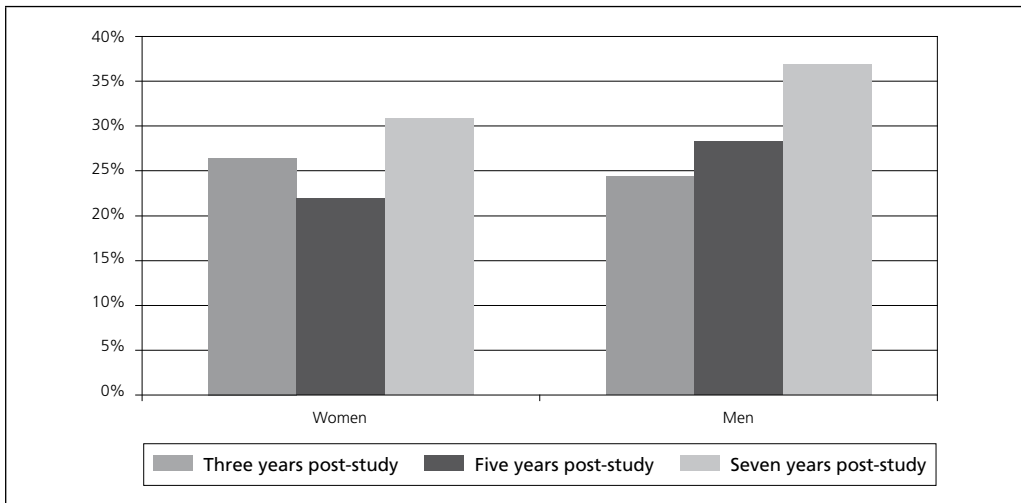
Source: Statistics New Zealand: Integrated dataset on Student Loan Scheme borrowers

- Notes: 1. Earnings means income from wages, salaries and self-employment but excludes income from benefits, interest and investments.
 2. Earnings three, five and seven years post-study are standardised, using the Labour Cost Index as the deflator.

Completion of qualifications by different ethnic groups at other levels shows a higher level of premium overall for Māori and Pasifika than for people of European ethnicity – again implying that completion of tertiary education does reduce disparities in the labour market between different ethnic groups.

Figure 12 looks at the premium for completion of a bachelor’s degree among men and women. While women have a higher premium for completion initially, this does not endure. By the fifth year post-study, the premium for completion among men is higher than among women and is increasing more quickly – so that income disparities increase.

Figure 12 The Premium for Completion of a Bachelor’s Degree at Three, Five and Seven Years after Leaving Tertiary Study, by Gender



Source: Statistics New Zealand: Integrated dataset on Student Loan Scheme borrowers

Notes:

1. Earnings means income from wages, salaries and self-employment but excludes income from benefits, interest and investments.
2. Earnings three, five and seven years post-study are standardised, using the Labour Cost Index as the deflator.

The premium for men tends to be higher than for women at other levels also, although the differences are not as sharp at the sub-degree levels.¹² In part, the gender differences in the premium are distorted by the fact that it is men who tend to earn the highest incomes – which have a disproportionate effect on the mean – whereas women’s incomes tend to cluster more around the mean and median.

¹² This result may appear to contradict the result shown in Figure 4. Figure 4 uses results from a statistical model that controls for all factors included in the model. The result shown here controls only for level of study and gender.

This consideration raises the questions of the spread of the premium across these cohorts. While the premium on the mean income is interesting, it is equally important to look at the variations that occur in the distribution – comparing the premium for completion three, five and seven years post-study at the 5th, 10th, 25th, 75th, 90th and 95th percentiles of the distributions of the earnings of those who did and did not complete. Table 1 sets out the results for those who studied at the bachelor’s degree level.

The data in Table 1 show that in all years, the premium is higher for percentiles below the median and lower for percentiles above the median. This is consistent with the messages set out above – the completion of a qualification acts as a protection against very low income. There are some people who do not complete who nonetheless have high earnings in the first seven years following completion. What is interesting, however, is that the disparity between those who do and do not complete at the upper levels of the distribution appears to grow over time.

Table 1 The Distribution of the Premium for Completion of a Bachelor’s Degree at Three, Five and Seven Years Post-Study

		Annual Earnings (\$)						
		Percentile						
	Years post-study	Fifth	10th	25th	Median	75th	90th	95th
Completed	three	3,820	8,420	23,850	35,900	42,490	52,500	61,390
	five	2,660	6,730	25,000	40,700	50,070	63,560	76,560
	seven	3,400	8,500	28,290	46,540	59,870	76,570	92,320
Incomplete	three	1,100	3,420	12,970	26,670	37,080	48,060	57,100
	five	1,190	3,810	15,370	30,630	42,340	54,610	66,480
	seven	980	3,600	16,760	34,030	48,430	64,340	77,110
		Premium (%)						
Premium (%)	three	247.3%	146.2%	83.9%	34.6%	14.6%	9.2%	7.5%
	five	123.5%	76.6%	62.7%	32.9%	18.3%	16.4%	15.2%
	seven	246.9%	136.1%	68.8%	36.8%	23.6%	19.0%	19.7%

Source: Statistics New Zealand: Integrated dataset on Student Loan Scheme borrowers

Notes: 1. Earnings means income from wages, salaries and self-employment but excludes income from benefits, interest and investments.

2. Earnings data in this table are not standardised or deflated.

The corresponding data for levels 1–3 certificates show similar advantages at the lower end of the distribution, with almost no premium at and above the upper quartile. Where the certificate data differs from the bachelor’s degree figures reported above is that the premium at all points on the distribution tends to reduce between the third and seventh years post-study. This is consistent with the observation made above – those who study

at this level tend to be aiming towards lower skill jobs where experience may matter as much as, or more than, a qualification.

NON-MONETARY OUTCOMES OF TERTIARY EDUCATION

Although the focus of the paper so far has been on the economic returns to education, especially the premium on income, the benefits from attaining tertiary qualifications are much broader than purely monetary ones. There are also positive health and lifestyle outcomes associated with holding higher qualifications.¹³

The OECD (2005) reported there are a number of ways in which attaining higher levels of education can flow through to better health outcomes. Firstly, people with higher education can make better informed health decisions. The OECD mentions that research has found a positive association between attaining higher levels of education and lower rates of smoking and excessive alcohol consumption. Also, the lower rates of unemployment for those with higher qualifications results in lower stress on the individual. Finally, the higher incomes that are associated with people attaining tertiary qualifications are likely to result in better access to health care.

It is acknowledged by the OECD that the relationship between the level of education and health is a complex one and the positive association between attaining higher qualifications and better health outcomes does not hold across all countries. However, there is evidence that this positive association exists in the New Zealand context.

The association between the level of education and mortality rates was examined in the New Zealand Census-Mortality Study.¹⁴ This study linked Census data between 1981 and 1996 with mortality records in the three years following each Census. The study produced age and ethnic group standardised mortality rates of the population for each of the Census cohorts.

The results showed that people with a highest qualification at the tertiary level had lower mortality rates from all causes than people with a highest qualification at school level or those with no qualifications. A feature of the analysis was that although the standardised mortality rates have fallen in each subsequent Census cohort, the high qualification/low mortality relationship has remained.

Figure 13 shows the age and ethnic group standardised mortality rates (and their associated 95% confidence intervals) from all causes for those aged between 25 and

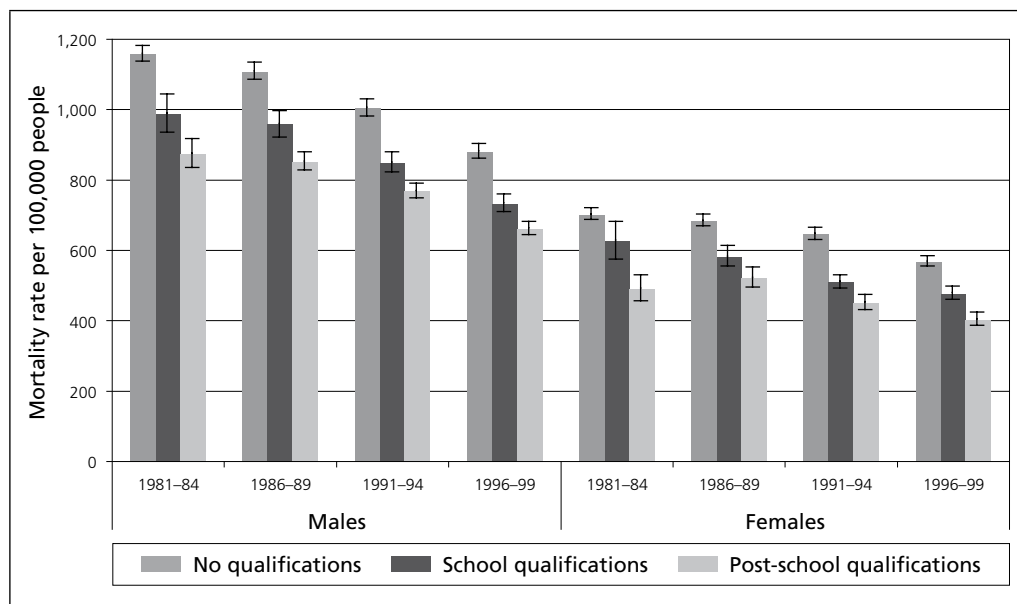
13 Johnston (2004) and Smart (2006) provide useful summaries of the non-economic benefits that flow from attaining tertiary education.

14 See Atkinson (2004).

77 by gender for each of the four Census cohorts analysed. Focusing on the most recent cohort analysed, between 1996 and 1999, women with post-school qualifications had a standardised mortality rate of 402 per 100,000 women.¹⁵ This compares with a mortality rate for women with school qualifications of 477 per 100,000 and 567 per 100,000 for women with no qualifications.

Although men have higher mortality rates than women, the same high qualification/ low mortality rate relationship exists. Between 1996 and 1999, men with post-school qualifications had a standardised mortality rate of 874 per 100,000 men. This compares with 988 per 100,000 for men with school qualifications and 1,158 per 100,000 for men with no qualifications.

Figure 13 Standardised Mortality Rates (From All Causes) of the New Zealand Population Aged 25–77 by Gender and Census Cohort 1981–1984 to 1996–1999



Source: Atkinson (2004)

- Notes: 1. These mortality rates have been standardised by age group and ethnic group.
 2. The graph includes 95% confidence intervals for the mortality rates.

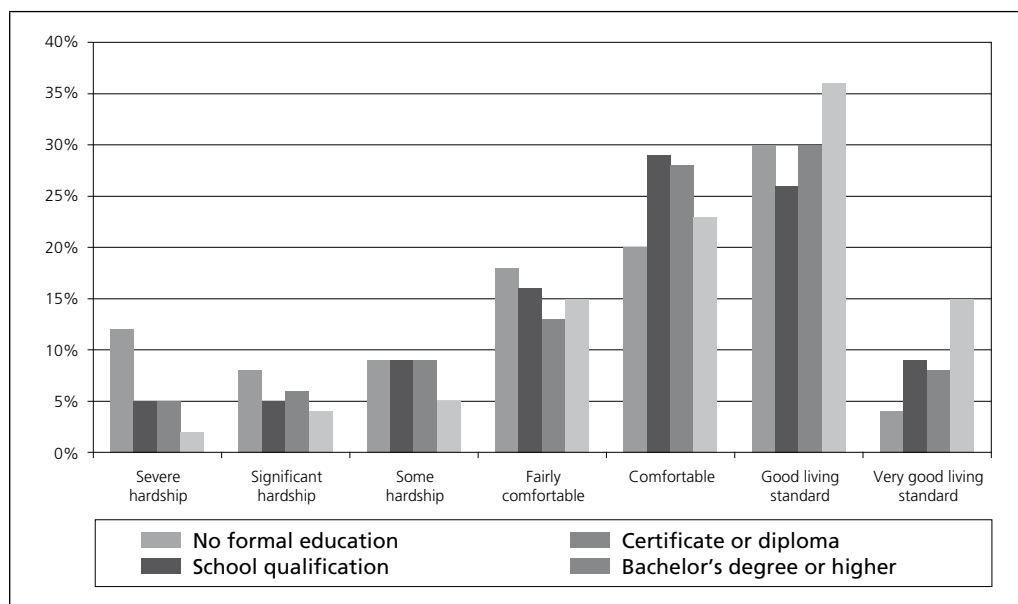
¹⁵ Although these standardised mortality rates are reported here as point estimates, there are confidence intervals that apply. The 95% confidence intervals are included in Figure 13.

There is also evidence indicating that attaining tertiary qualifications is associated with a higher standard of living. A recent report by the Ministry of Social Development (MSD), *Living Standards 2004*, updated results using their social measurement tool, the Economic Living Standards Index (ELSI), which consolidates large amounts of information about different aspects of economic wellbeing into a single score.

The ELSI scale has seven bands which describe the living standards of the New Zealand population from “severe hardship” to “very good”. Figure 14 shows, for people with tertiary qualifications, the percentages in each of these seven bands compared with the percentages for people with lower levels of qualifications.

Jensen et al. (2006) show that for the population as a whole 24% fell into the bottom three categories of “severe hardship”, “significant hardship” or “some hardship”, compared with only 11% of those with tertiary degrees. Whilst 51% of those with tertiary degrees fell into the top two categories of “good” or “very good”, only 35% of the total population were in those categories.¹⁶

Figure 14 Living Standards of the New Zealand Population by Highest Qualification 2004



Source: Jensen et al (2006)

16 While the percentage of the population with a degree in the top two categories fell from 55% in 2000, the MSD study suggests that a possible contributor was a rise in consumption expectations between 2000 and 2004.

CONCLUSION

The investment made in the tertiary education system is significant by government and students alike. The evidence shows that the return on this investment is considerable, with those attaining tertiary qualifications having a higher likelihood of employment and higher incomes. The data also shows that there is a significant premium associated with successfully completing a tertiary qualification.

The benefits of tertiary education are not restricted to just monetary gains, with the evidence showing better health and lifestyle outcomes for New Zealanders are also associated with attaining tertiary qualifications.

Overall, the outcomes of the tertiary education system would appear to be positive and substantial. However, with the current record levels of participation and attainment at the tertiary level, the continued monitoring of these outcomes is essential to ensure that the system continues to generate positive outcomes and maintain its relevancy over time.

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