



MINISTRY OF EDUCATION

Te Tāhuhu o te Mātauranga

How do graduates' earnings change over time?

Report

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Disclaimer

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Summary Statistics New Zealand Security Statement: Integrated Data Disclaimer

The integrated dataset on Student Loan Scheme Borrowers is based on the integration of data from the Ministry of Social Development, the Inland Revenue Department and the Ministry of Education. This project has been approved by Statistics New Zealand as a data integration project with data access provided through the Data Laboratory under relevant legislation and policy. Only approved researchers who have signed Statistics New Zealand's declaration of secrecy can access the integrated data in the Data Laboratory. For further information about confidentiality matters in regard to this study please contact Statistics New Zealand.

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1 Introduction

This note looks at the earnings of Student Loan Scheme borrowers three years and five years after they finish their tertiary education. It considers how earnings change between the third and fifth years following study.

The study considers the earned income¹ in 2002² of those who left tertiary study in 1997 – that is, it looks at earnings five years after people leave tertiary study. It updates information presented in an analysis published by the Ministry of Education in March 2005.³ That earlier analysis looked at the earned income of the same group of students in 2000, ie three years after they finished study. To consider the movement in incomes between the third and fifth years following study, this study compares earnings in 2002 with findings from that earlier analysis.⁴ The data is also compared with the earned income in 2002 of those who last studied in 1999 – again, three years post-study.

All comparisons are made having controlled for the level of study attempted. Within the bachelors and certificate levels of study, gender and ethnic differences are explored. There is no disaggregation by field of study or by other study-related variables; analysis by other variables will be included in subsequent analyses of integrated data. The analysis looks only at those with non-zero earnings.

The information in this report is drawn from the integrated dataset on Student Loan Scheme borrowers. This dataset links data on students' tertiary education (supplied by the Ministry of Education), data on borrowing (supplied by the Ministry of Social Development) and data on loan balances and on income (supplied by Inland Revenue). The dataset is managed by Statistics New Zealand, following strict privacy protocols⁵.

The focus statistic in this analysis is the ratio of earned income among those who completed a qualification in their last year of study to the income of those who took the same level of qualification but who did not complete. This gives the 'benefit of completion' or the premium in earned income that students receive for completion. Comparing the earnings of those who did complete with those who studied at the same level but abandoned study without completing means we are comparing groups whose prior qualifications and by implication, their ability, are broadly similar. For instance, nearly all masters students enter their studies having completed an undergraduate degree and it is likely that their outcomes, if they don't succeed in their masters, will at least reflect their earlier qualifications.⁶ 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 studies that compare outcomes for those with a qualification with the outcomes for

¹ Earned income means income that results from employment or self employment. It excludes income from benefits, interest and dividends.

² The data on income in 2000 was drawn from records in the integrated dataset of income in the tax year ending 31 March 2001, while the income data for 2002 was for the tax year to 31 March 2003.

³ Refer to Hyatt, J and R Smyth (2005) *Income of Student Loan Scheme Borrowers*, Ministry of Education. This report is available on the Education Counts website: <http://educationcounts.edcentre.govt.nz/>

⁴ Differences exist between the earlier published figures and those presented here. The new results are from the 2004 integrated dataset release (rather than from the 2002 release) and slightly different level and population definitions have been used.

⁵ For more information on the integrated dataset, refer to Ministry of Education (2005) *About the integrated dataset*, available at <http://educationcounts.edcentre.govt.nz/publications/downloads/about-the-integrated-dataset.doc>

⁶ Refer to Hyatt and Smyth (2005) *op cit* pp 62, 85, 86 for further explanation of the reasoning behind this focus.

all those without. In such population studies, it is hard to separate the contribution of innate ability and attitudes from the effects of the education.⁷

For the sake of simplicity, much of this paper analyses the median earnings. A focus on the median gives an idea of the broad shifts that have occurred in a population but it doesn't reflect the variations that occur in the distribution. Therefore, in two appendices to this report, we present graphically some information on the distribution of earnings for the subgroups under consideration.

2 Key findings of this study

The benefits of completion five years after finishing study are significant. They are as strong as the benefits previously seen three years out of study, but with higher levels of study showing increasing premiums, while at lower levels of study, completion of a qualification carries a decreasing premium.

The premium paid for completion of a masters degree five years after study is higher than the premium observed three years post study. For a bachelors degree, the premium is unchanged – the earnings of those who completed and those who didn't have risen at roughly the same rate between the third and fifth years post study. By contrast, at lower levels, the premium has decreased; the earnings of those who completed successfully are still ahead of those who studied but didn't complete, but the margin has narrowed in the fourth and fifth years following leaving study.

From this finding, it is possible to infer that, in occupations largely filled by those who have studied at lower levels, the labour market values experience to a significant extent. In other words, having a qualification gives those entering the workforce at that level something of a 'jump-start' in their careers. Over time, however, that advantage is somewhat eroded as those with no qualifications gain experience. By contrast, at the postgraduate level, the advantage enjoyed by those successful in gaining a qualification builds over time, implying that the skills, attitudes and competencies associated with completion at that level are increasingly valued in the labour market as time goes on.

The second group of findings relate to the movement that people experienced in their earnings between the third and fifth years post-study. The earnings of all groups in the 1997 cohort rose between 2000 and 2002 – well beyond the growth in the overall wage level in New Zealand, as would be expected for groups of people at the outset of their careers. The largest increases were experienced by those who had studied at the certificate level – reflecting the strengthening of the labour market over that time – and at the masters level, where graduates appear to be more highly valued by the labour market over time.

⁷ This is not to deny the value of such studies as those by Maani (1999), Penny (2005) and Maani and Maloney (2004).

3 Income three years after study

This section looks at the premium for completion of qualifications three years after study. It looks at two distinct cohorts – those who last studied in 1997 and those who last studied in 1999 – and considers the earned incomes of those groups three years post-study.

Comparing the 1997 and 1999 cohorts - median earnings

Table 1 shows the ratio between the median earned incomes three years post study of those who did and did not complete qualifications in each of the two leaving cohorts.

Table 1: Median earned income of former students three years after study⁸

	income in 2000 of those who last studied in 1997			income in 2002 of those who last studied in 1999		
	not completed	completed	ratio – completed: not completed	not completed	completed	ratio – completed: not completed
Bachelors						
European	27,490	35,510	1.292	29,820	37,470	1.257
Māori	25,140	35,230	1.401	25,990	37,960	1.461
Pasifika	28,650			29,510	39,000	1.322
Asian	29,110	37,650	1.293	30,050	37,860	1.260
Level 1-3 Certificate						
European	20,050	21,580	1.076	21,970	24,030	1.094
Māori	13,890	19,980	1.438	16,370	19,670	1.202
Pasifika	21,160	22,610	1.069	21,020	23,560	1.121
Asian	15,900	22,150	1.393	14,680	21,700	1.478
By gender, controlling for level						
Bachelors Male	27,500	37,370	1.359	30,170	39,320	1.303
Bachelors Female	27,080	34,790	1.285	27,530	37,000	1.344
Level 1-3 Certificate. Male	20,190	22,730	1.126	22,510	25,250	1.122
Level 1-3 Certificate. Female	16,420	19,990	1.217	16,850	20,980	1.245
By level of study						
Masters	37,670	40,970	1.088	38,540	42,950	1.114
Honours / Postgraduate certificate/diploma	37,010	39,450	1.066	38,530	40,580	1.053
Bachelors	27,340	35,630	1.303	28,970	37,630	1.299
Diplomas	24,970	31,230	1.251	26,000	29,920	1.151
Level 1-3 Certificate	18,850	21,270	1.128	20,300	23,020	1.134

There were interesting changes in the premium for completion paid three years post-study.

- At the bachelors level, premiums for Europeans, Asians and men have decreased, while the premiums for Māori and women have increased.
- At the certificate level, there are decreasing premiums for Māori (sharply down from 44 percent for the 1997 cohort to 20 percent in the 1999 cohort), and increasing premiums for the other three main ethnic groups. The premium for men is static, and that for women has increased slightly.

⁸ This reports disaggregates only on the basis of gender, ethnic group, the level of study and completion status. Some of the differences observed in this report will be linked to other study-related characteristics – such as field of study. Earlier and subsequent reports on income from the integrated dataset will examine the effects of other variables.

- The premium for completing a masters degree has risen slightly from 9 percent for the 1997 leavers to 11 percent for those who last studied in 1999, while that for honours the premium decreased slightly (7 percent to 5 percent). The bachelors premium remained static (roughly 30 percent in each cohort). The certificate premium was also static (at 13 percent). The reward for completing a diploma however has decreased from 25 percent to 15 percent.

There are two likely sources of difference between the two cohorts. One is the inherent differences between the cohorts; that is the (presumably slight) differences between generations of students separated by only two years.

The second – and more significant – factor is that there were changes in conditions over that time. The economic conditions improved between 2000/01 and 2002/03 with a consequent change in the labour market⁹. The unemployment rate in 2000 was 5.3 percent, compared with 4.9 percent in 2002¹⁰. The consequence of this shift is that slightly fewer of the 1999 cohort would be likely to be unemployed three years post study, compared with the 1997 cohort. As the unemployment rate falls, the advantage in earnings enjoyed by those who have successfully completed a qualification would tend to reduce, all other things being equal¹¹.

The reason the benefit of completion falls as employment rises is this: as the unemployment rate falls, only a small number of people come into employment, as it is measured here, on an annual basis. Most unemployed people have been unemployed for less than six months, with only a small proportion unemployed for periods in excess of 12 months. Thus, most unemployed are counted as earners at some point in the year as they will earn income at some point in the year. It follows that the major effect of a decrease in unemployment is a rise in earned income. The effect can be expected to be stronger among the non completers, as they might be expected to be over-represented among the unemployed. The effect, if observable, would be expected to be experienced mainly among those studying at lower qualification levels. This is because the unemployment rate of those with higher qualifications in New Zealand is relatively steady; falling unemployment is mostly as a result of those with lower qualifications or with no qualifications entering employment.¹²

Because falling unemployment would be likely to affect the earnings of those who have completed lower level qualifications – as well as those who don't – the effects of falling unemployment on the premium for completion would not be especially clearly visible in these data.

Comparing the 1997 and 1999 cohorts – value of earnings

The effects of the change in economic conditions between 2000 and 2002 would be more likely visible in trends in the value of earnings of the different groups. If we compare the 1997 and the 1999 cohorts three years after study, most groups in the 1999 cohort have higher median earnings in nominal terms three years post-study than the 1997 cohort. For instance, it will be seen in Table 1 that for males who have been successful in

⁹ Another change in conditions over that time was the fall in outward migration in 2001, while many New Zealanders living overseas returned to New Zealand.

¹⁰ The figures used are for the March quarter in each year and are drawn from Statistics New Zealand's Household Labour Force Survey.

¹¹ OECD data shows that returns to qualifications in New Zealand are very low, compared with other countries. The reduced unemployment in this country is one of the principal reasons.

¹² We would expect a decrease in unemployment to cause a rise in the mean level of earned income. But how this will effect the median depends upon whether the newly fully employed tend to receive incomes below the median or above it.

How do graduates' earnings change over time

completing a bachelors degree, the income three years post-study for the 1999 cohort was nearly \$2,000 or 5 percent higher than the corresponding figure for the 1997 cohort. That comparison, however, does not allow for the effects of inflation. Table 2 presents some of the same data as Table 1, but with the 2002 income figures adjusted for changes in the labour cost index between 2000 and 2002.

Table 2: Median earned income of former students three years after study, adjusted for movements in the Labour Cost Index

By gender, controlling for level	income in 2000 of those who last studied in 1997		income in 2002 of those who last studied in 1999 (in 2000 dollars)		percentage gain	
	not completed	completed	not completed	completed	not completed	completed
Bachelors Male	27,500	37,370	28,927	37,699	5.2%	0.9%
Bachelors Female	27,080	34,790	26,395	35,475	-2.5%	2.0%
Level 1-3 Certificate. Male	20,190	22,730	21,582	24,209	6.9%	6.5%
Level 1-3 Certificate. Female	16,420	19,990	16,156	20,115	-1.6%	0.6%
By level of study						
Masters	37,670	40,970	36,952	41,180	-1.9%	0.5%
Honours / Postgraduate certificate/diploma	37,010	39,450	36,942	38,908	-0.2%	-1.4%
Bachelors	27,340	35,630	27,776	36,079	1.6%	1.3%
Diplomas	24,970	31,230	24,928	28,687	-0.2%	-8.1%
Level 1-3 Certificate	18,850	21,270	19,463	22,071	3.3%	3.8%

These data show that earnings three years post-study were higher for men in the 1999 leaving cohort – whether they had studied at the certificate or bachelors level and whether they completed or not. Women who successfully completed a bachelors degree or a certificate in 1999 earned more three years post study than women who completed in 1997. But women who left without completing a bachelors or certificate in 1999 earned less in real terms than women who left without completing in 1997.

The group in the 1999 leaver cohort whose earnings three years post-study had shown the greatest relative increase over the corresponding 1997 leavers was the group that had studied at the certificate level. Among those who completed successfully, the 2002 earnings for the 1999 group was 3.8 percent above the 2000 earnings of the 1997 certificate leavers. The corresponding figure for those who didn't complete successfully was 3.3 percent. The relatively better progress in earnings of those who had studied at the certificate level is consistent with the observation made above that falling unemployment tends to give the greatest benefit to those with lower qualifications.

4 Income five years after finishing study

Table 3 below presents the median earned income in 2002 of those who used the Student Loan Scheme and last studied in 1997 – that is, their income five years post-study.

Table 3: Median earned income in 2002 of former students who last studied in 1997

Bachelors ¹³	not completed	completed	ratio – completed:not completed
European	30,820	39,490	1.281
Māori	29,340	41,090	1.400
Level 1-3 Certificate			
European	24,440	26,180	1.071
Māori	19,250	24,010	1.247
Pasifika	25,230	28,000	1.110
Asian	21,840	26,480	1.212
By gender, controlling for level			
Bachelors Male	31,720	43,530	1.372
Bachelors Female	29,440	37,950	1.289
Level 1-3 Certificate. Male	25,560	27,990	1.095
Level 1-3 Certificate. Female	18,040	23,480	1.302
By level of study			
Masters	44,080	49,130	1.115
Honours / Postgraduate certificate/diploma	40,880	44,110	1.079
Bachelors	30,600	40,000	1.307
Diplomas	29,390	34,930	1.188
Level 1-3 Certificate	23,210	25,920	1.117

Some observations from the table of median incomes five years after study are:

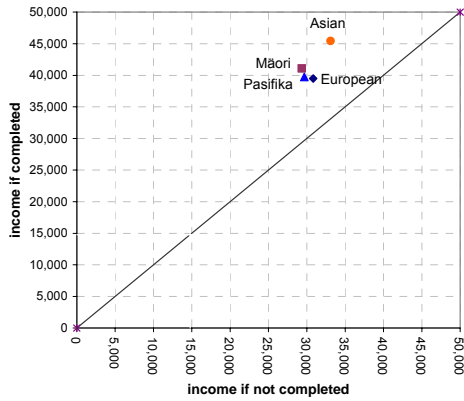
- The benefits to completion for Māori are more significant than the benefits for other ethnic groups at the certificate level, and stronger still at the bachelors level, with a 40 percent premium for completion. This means that completion of a bachelors degree or a certificate reduces income disparities between Māori and others.
- Five years after finishing study, there is greater relative benefit to men who completed at the bachelors level compared with women - 37 percent for males, 29 percent for females. At this level, completion of a qualification does not appear to reduce the income disparities between men and women.
- By contrast, for those who studied at the certificate level there are greater relative benefits for women who completed (30 percent) than men (10 percent).
- However at both levels of study, the median income from salary and wages is greater for men than women. At the bachelors level, the male median income is 15 percent higher than that of women if the students completed and 8 percent higher if they did not.
- There is a very low median earned income of \$18,000 among female borrowers who studied for a certificate but didn't complete.

¹³ There were insufficient Pasifika who had completed a bachelors degree and Asian people who had not completed to enable a comparison to be made for those ethnic groups.

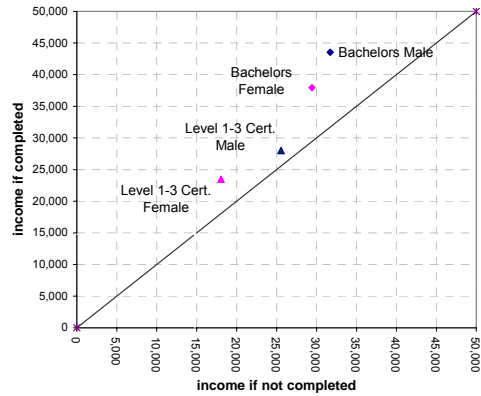
The graphs below display the data pictorially. In these graphs, the median earned income of those who have taken a qualification and completed successfully is plotted against the same statistic for those who left study at the same time without completing. A point above the diagonal line shows that the median income of those who were successful in completing is higher than the median income of those who didn't complete. The distance of the point above the line is a measure of the premium the labour market is paying for successful completion for that group.

Figure 1: Median earned income in 2002 of former students who last studied in 1997, by level of study, ethnic group and gender

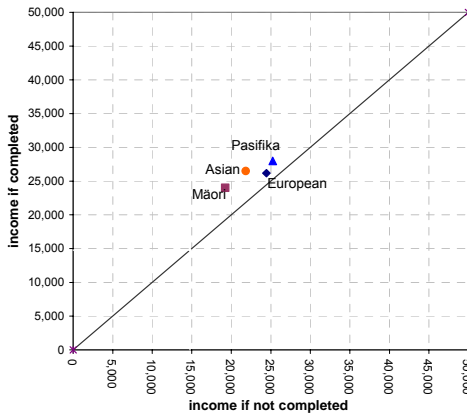
a: Benefits accruing to completion at the bachelor level by ethnicity, Median income (1)



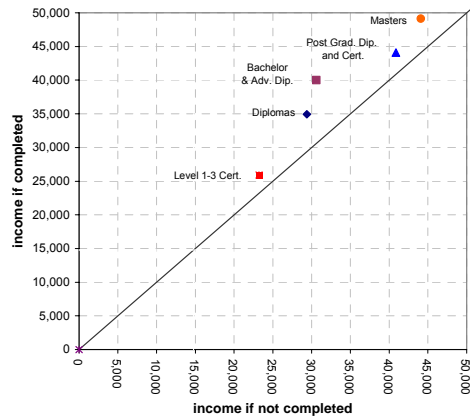
b: Benefits accruing to completion by gender for specific levels, Median income



c: Benefits accruing to completion at the certificate level by ethnicity, Median income



d: Benefits accruing to completion at each qualification level, Median income



Note: In part a of the figure, benefits by ethnicity at bachelors level, the income shown for Asian and Pasifika are means not medians. This is because the number in the dataset is insufficient for publication of median values within Statistics New Zealand's confidentiality protocols.

Source: Statistics New Zealand, Integrated Dataset on Student Loan Scheme Borrowers

5 The 1997 leavers – median income in 2000 compared with median income in 2002

This section compares the earnings of the 1997 cohort in 2000 and in 2002. It traces how people's earnings have moved over that time, that is, between the third and the fifth years post study.

How the premium for completion changes over time

Table 4 draws data from Tables 1 and 3 and looks at the change in the premium for completion of a qualification between the third and fifth year post study.

Table 4: Median earned income in 2000 and in 2002 of former students who last studied in 1997

	income in 2000 of those who last studied in 1997			income in 2002 of those who last studied in 1997		
	not completed	completed	ratio – completed: not completed	not completed	completed	ratio – completed: not completed
By level of study						
Masters	37,670	40,970	1.088	44,080	49,130	1.115
Honours / Postgraduate certificate/diploma	37,010	39,450	1.066	40,880	44,110	1.079
Bachelors	27,340	35,630	1.303	30,600	40,000	1.307
Diplomas	24,970	31,230	1.251	29,390	34,930	1.188
Level 1-3 Certificate	18,850	21,270	1.128	23,210	25,920	1.117

Of those who last studied at the masters level in 1997, the median income in 2000 of those who were successful in completing the degree was 1.088 times the median income of those who studied for a masters degree but left study in 1997 without having completed the degree. Five years after leaving study, that ratio in that group of 1997 leavers was higher - 1.115. At the honours level, there has also been an increase in the margin between those who were successful and those who were not; in 2000, the ratio was 1.066, while by 2002, this had grown to 1.079.

While the premium enjoyed by those 1997 leavers who were successful at the postgraduate level rose between 2000 and 2002, at the bachelors level, the premium was static at around 30 percent. Of those who last studied at the bachelors level in 1997, the median income in 2002 of those who were successful in completing the degree was 1.307 times the median income of those who studied at that level but who left in 1997 without completing. The corresponding ratio in 2000 was 1.303.

Lower levels of study show a decline in earnings premium: diplomas from 1.251 in 2000 to 1.188 in 2002, and certificates from 1.128 in 2000 to 1.117 in 2002.

From this finding, it is possible to infer that, in occupations that are largely filled by those who have studied at the sub-degree level, the labour market values experience to a significant extent. That is, having a qualification gives those entering the workforce at that level something of a 'jump-start' in their careers. Over time, however, that advantage is somewhat eroded as those with no qualifications gain experience¹⁴. By contrast, at the postgraduate level, the advantage enjoyed by those successful in gaining a qualification builds over time, implying that the skills, attitudes and competencies

¹⁴ Data from the New Zealand Income Survey imply however, that over the longer term, the incomes of those with non-degree tertiary qualifications don't rise with experience as much as do the incomes of degree holders.

associated with completion at that level are increasingly valued in the labour market as time goes on.

Another factor affecting returns to the completion of a certificate is unemployment rates. The disparities in the unemployment rate of those with no qualifications and those with other tertiary qualifications narrowed significantly between 2000 and 2002. This means there was a tightening of the demand in the labour market for those who didn't complete a certificate qualification. This would have the effect of reducing premiums somewhat for the 1997 leaving cohort who had certificate level qualifications. This effect would be expected to be less marked at higher levels – such as for bachelors qualifications. While there was also a reduction in the unemployment rate over that time of those with school qualifications – the group that includes people who studied a bachelors degree but didn't complete – the fall was much less.¹⁵

Ethnic and Gender Findings

While the premium has increased overall at the postgraduate level and reduced at the sub-degree level, there are interesting variations when the results are disaggregated along gender lines or by different ethnic groups.

At the bachelors level, Māori who were successful in completing had a 40 percent premium over non-completing Māori in 2000. Two years later, in 2002, the premium remained at around 40 percent. For Europeans too, the ratio has remained almost static at around 28.5 percent between 2000 and 2002.

Among certificate students, there were differences between ethnic groups in the benefit of completion between 2000 and 2002, ie three and five years following study. Māori and Asian have had decreases in the benefit of completion, European have remained static while Pasifika have shown a slight increase.

Gender differences are also interesting. Among bachelors students who left in 1997, the premium for completion for men was around 37 percent in 2002 and for women around 29 percent. These figures are broadly unchanged between the three and five year marks; the premium for men in 2000 was 36 percent and for women, 28.5 percent.

The finding for 1997 finishers who studied at the certificate level was different; the completion premium for men decreased by 3 percentage points (from 13 percent in 2000 to 10 percent in 2002), but that for women increased by 8 percentage points (from 22 percent in 2000 to 30 percent in 2002). The low and falling premium for completion by men at the certificate level suggests that at this level, the relative premium paid by the labour market for experience (compared with qualifications) applies especially to men, rather than to women. Presumably, it is the nature of the occupations typically followed by men who have studied at the certificate level that lead to the trend observed here.

Comparing the income of the 1997 cohort in 2000 and 2002 – value of earnings

Here, we look at the shift in median earnings of the 1997 cohort between the third and fifth year post-study. Table 5 presents data on earnings drawn from tables 1 and 3, but adjusts the 2002 earnings data, using the Labour Cost Index, to discount for the changes that in overall earnings levels in New Zealand between 2000 and 2002¹⁶.

¹⁵ From 6.2 percent to 5.4 percent, whereas for those with no qualifications – the group including those who studied but didn't finish a certificate – the fall was from 10.4 percent to 7.8 percent.

¹⁶ The Labour Cost Index (LCI) measures wage growth for a fixed quantity and quality of labour and excludes increases that are due to performance or experience. A movement in earnings below the movement in the LCI would

Table 5: Median earned income in 2000 and 2002 of former students who last studied in 1997, adjusted for movements in the Labour Cost Index

	income in 2000 of those who last studied in 1997		income in 2002 of those who last studied in 1997 (in 2000 dollars)		percentage gain	
	not completed	completed	not completed	completed	not completed	completed
	By level of study					
Masters Honours / Postgraduate certificate/diploma	37,670	40,970	42,263	47,105	12.2%	15.0%
Bachelors	37,010	39,450	39,195	42,292	5.9%	7.2%
Diplomas	27,340	35,630	29,339	38,351	7.3%	7.6%
Level 1-3 Certificate	24,970	31,230	28,179	33,490	12.9%	7.2%
	18,850	21,270	22,253	24,852	18.1%	16.8%

The greatest gains between 2000 and 2002 were experienced by those who had studied at the certificate level. For those who studied at that level without completing, median earnings rose well ahead of the general shift in earnings in the economy - by 18 percent. The increase for those who completed a certificate was only slightly less. This shift is consistent with the observation, made in section 3 above when comparing the incomes three years post-study of the 1997 and 1999 cohorts, of improved incomes in 2002 for those who had studied at lower levels. It reflects the tightening labour market and the consequent reduction in the returns to higher levels of education. The fact that the greater rise at the certificate and diploma levels is experienced by the not completed group (rather than the completed group) reflects the drop in the premium paid in the labour market for completion shown in Table 4 above. That fall too, can be attributed in part to a tightening labour market.

The other level at which a substantial shift has occurred is at the masters level – the earnings of those who succeeded in study at the masters level rose 15 percent above the Labour Cost Index. In this segment of the labour market, the dynamics are different. It is likely that we are observing two effects here. The first is a general tightening of the labour market that may have caused salaries to have been ‘bid up’. Further, it is possible to conclude that the advantage enjoyed by those successful in gaining a masters degree increases over time, because the holders of those qualifications become progressively more productive over time.

6 Conclusion

This study analyses the earnings of those who used the Student Loan Scheme and who left study in 1997 and in 1999. It compares the earnings of those who left study having been successful in completing a qualification with the earnings of those who studied at the same level but who left without completing. Comparisons are made between the earnings three years post-study for the two leaving cohorts and between the earnings three years post-study and five years post-study for those who left study in 1997.

One key finding is that higher levels of study show increasing premiums for completion between the third and fifth years post-study, while at sub-degree levels of study, completion of a qualification carries a decreasing premium. In part, these trends reflect

indicate a loss of earnings in real terms. All groups in the workforce – especially young, recently qualified workers – would be expected to receive an increase in earnings in real terms over two years.

the decrease in unemployment between 2000 and 2002. Further, it is reasonable to infer that the skills acquired during study at higher levels are valued more highly over time.

Secondly, as would be expected among people who are recently qualified in the early stages of their careers, the earnings of all groups in the 1997 cohort rose between 2000 and 2002 in real terms. The largest increases were experienced by those who had studied at the certificate level – reflecting the strengthening of the labour market over that time – and at the masters level, where graduates appear to be more highly valued by the labour market over time.

There are some limitations to this study. This study looks only at two cohorts and only over a relatively short time period. It will be important to repeat the study over different time-frames and for different cohorts once the dataset used for the analysis is extended. Finally, the study has focussed on level of study and hasn't looked at some other study-related variables – such as field of study. Subsequent analyses of the integrated dataset will look at those variables.

Despite these limitations, this analysis provides new and useful information on how the labour market values different types of qualifications.

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Appendix A – Tables

Table A1: Median earned income in 2000 of former students who last studied in 1997

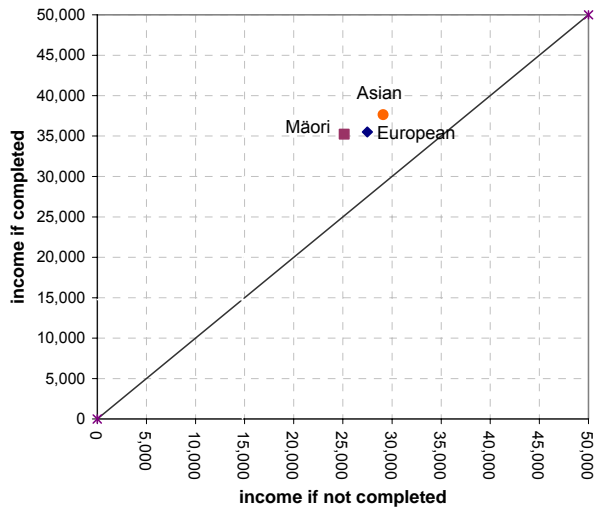
	Doctorates	Masters	Honours / Postgraduate cert/diploma	Bachelors	Diplomas	Level 4 Cert.	Level 1-3 Cert.	Level Unknown	All
Completed students									
Male		42,050	42,690	37,370	32,020		22,730		30,360
Female		39,640	38,280	34,790	30,540		19,990		28,780
European		39,650	39,400	35,510	31,270		21,580		29,680
Māori				35,230	30,450		19,980		26,660
Pasifika							22,610		28,560
Asian				37,650			22,150		32,920
All completed		40,970	39,450	35,630	31,230		21,270		29,360
Students who did not complete									
Male		39,210	36,380	27,500	27,230	25,010	20,190	21,820	23,820
Female		36,180	38,110	27,080	21,010		16,420	20,480	21,390
European		36,330	38,660	27,490	26,350	23,620	20,050		24,550
Māori				25,140	20,030		13,890		18,900
Pasifika				28,650	23,960		21,160		23,850
Asian				29,110			15,900		23,730
All not complete		37,670	37,010	27,340	24,970	23,790	18,850	21,130	22,710
Ratio									
Male		1.072	1.173	1.359	1.176		1.126		1.275
Female		1.096	1.004	1.285	1.454		1.217		1.345
European		1.091	1.019	1.292	1.187		1.076		1.209
Māori				1.401	1.520		1.438		1.411
Pasifika							1.069		1.197
Asian				1.293			1.393		1.387
All		1.088	1.066	1.303	1.251		1.128		1.293

Source: Statistics New Zealand, Integrated Dataset on Student Loan Scheme Borrowers.

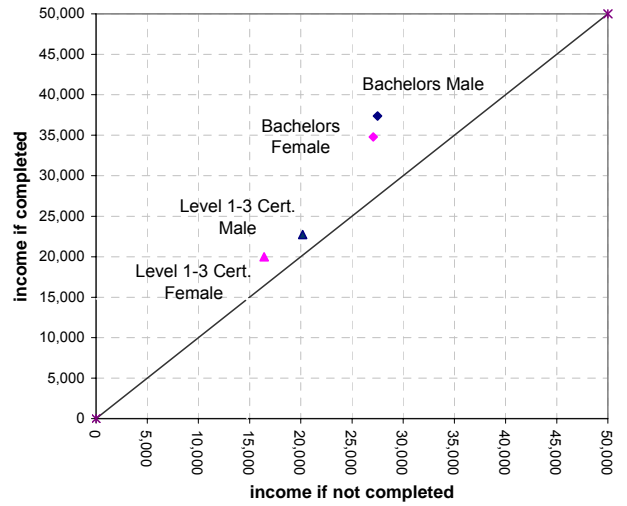
Note: Blank cells indicate that the number in the dataset is low and not large enough for publication within Statistics New Zealand's confidentiality protocols.

Figure A1: Median earned income in 2000 of former students who last studied in 1997

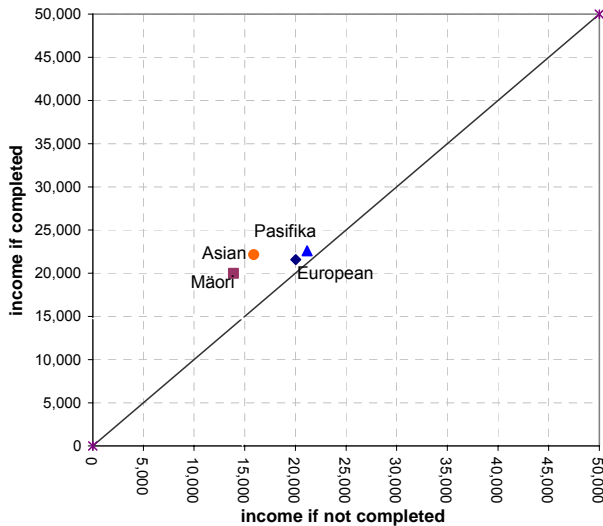
a: Benefits accruing to completion at the bachelor level by ethnicity, Median income



b: Benefits accruing to completion by gender for specific levels, Median income



c: Benefits accruing to completion at the certificate level by ethnicity, Median income



d: Benefits accruing to completion at each qualification level, Median income

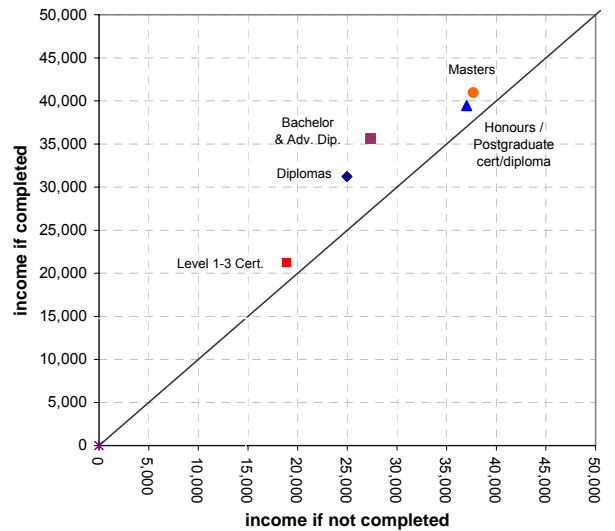


Table A2: Median earned income in 2002 of former students who last studied in 1999

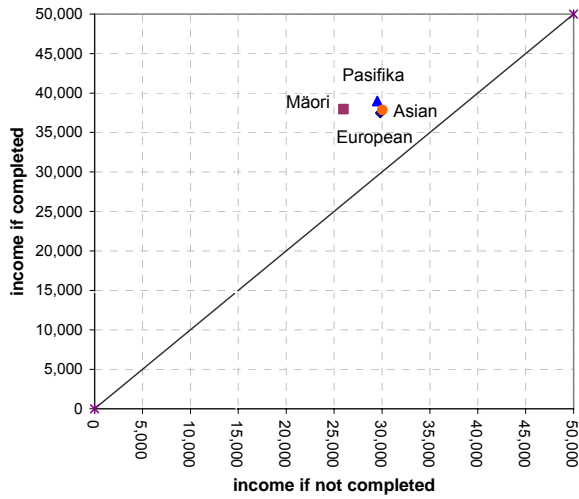
	Doctorates	Masters	Honours / Postgraduate cert/diploma	Bachelors	Diplomas	Level 4 Cert.	Level 1-3 Cert.	Level Unknown	All
Completed students									
Male		44,920	42,500	39,320	31,670		25,250		32,620
Female		41,340	39,800	37,000	29,310		20,980		31,190
European		41,540	40,710	37,470	29,840	24,040	24,030		32,420
Māori				37,960	30,760		19,670		28,100
Pasifika				39,000			23,560		29,960
Asian				37,860			21,700		34,550
All completed		42,950	40,580	37,630	29,920	23,450	23,020		31,760
Students who did not complete									
Male		40,150	39,550	30,170	28,000	26,550	22,510	25,500	26,000
Female		35,810	38,360	27,530	23,930	20,040	16,850	20,500	22,140
European		38,540	39,190	29,820	26,750	26,000	21,970	28,400	26,520
Māori				25,990	22,650		16,370	21,910	20,800
Pasifika				29,510	28,600		21,020	25,590	25,470
Asian				30,050	26,030		14,680		25,850
All not complete		38,540	38,530	28,970	26,000	24,490	20,300	22,780	24,370
Ratio									
Male		1.119	1.075	1.303	1.131		1.122		1.255
Female		1.154	1.038	1.344	1.225		1.245		1.409
European		1.078	1.039	1.257	1.116	0.925	1.094		1.222
Māori				1.461	1.358		1.202		1.351
Pasifika				1.322			1.121		1.176
Asian				1.260			1.478		1.337
All		1.114	1.053	1.299	1.151	0.958	1.134		1.303

Source: Statistics New Zealand, Integrated Dataset on Student Loan Scheme Borrowers.

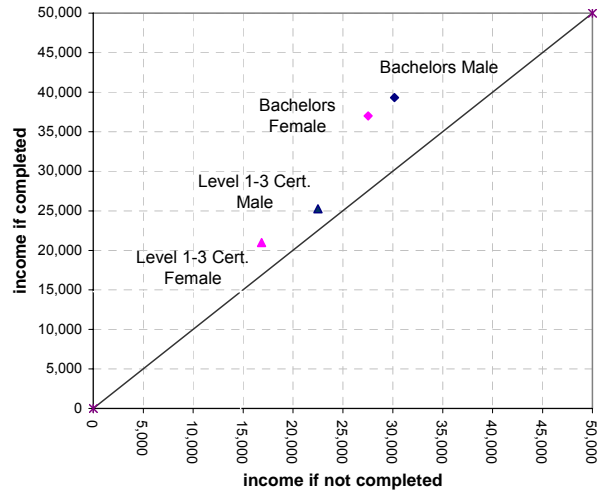
Note: Blank cells indicate that the number in the dataset is low and not large enough for publication within Statistics New Zealand's confidentiality protocols.

Figure A2: Median earned income in 2002 of former students who last studied in 1999

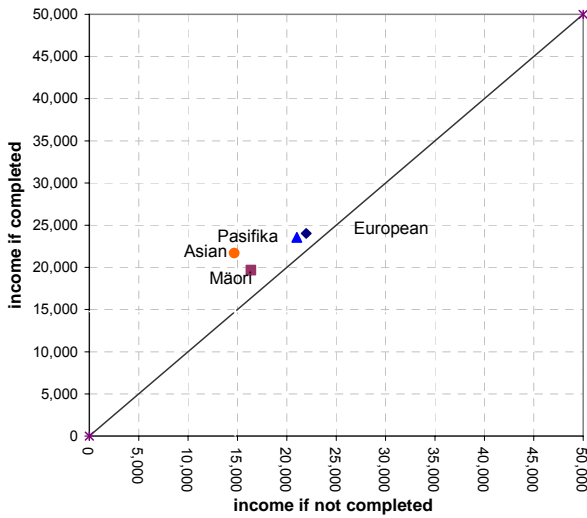
a: Benefits accruing to completion at the bachelor level by ethnicity, Median income



b: Benefits accruing to completion by gender for specific levels, Median income



c: Benefits accruing to completion at the certificate level by ethnicity, Median income



d: Benefits accruing to completion at each qualification level, Median income

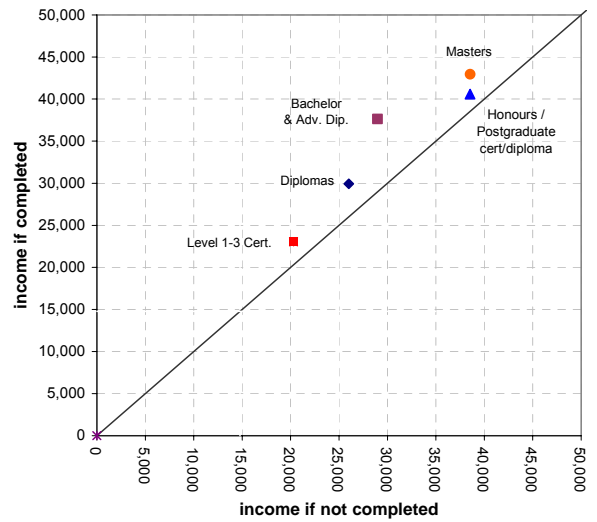


Table A3: Median earned income in 2002 of former students who last studied in 1997

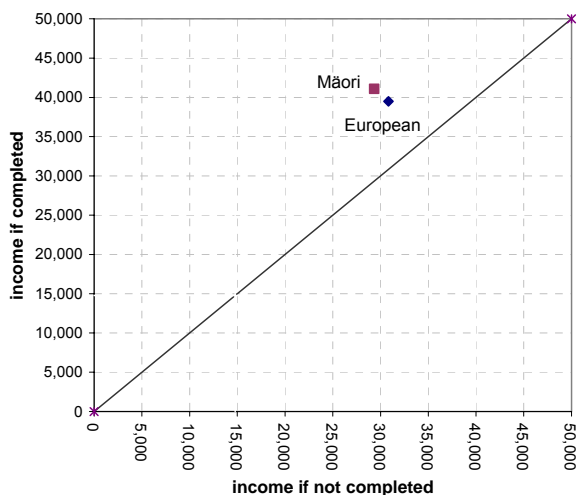
	Doctorates	Masters	Honours / Postgraduate cert/diploma	Bachelors	Diplomas	Level 4 Cert.	Level 1-3 Cert.	Level Unknown	All
Completed students									
Male			47,400	43,530	36,310		27,990		34,990
Female			41,990	37,950	33,760		23,480		31,340
European		47,580	44,930	39,490	34,670		26,180		33,040
Māori				41,090	35,220		24,010		30,410
Pasifika							28,000		32,990
Asian				43,990			26,480		37,730
All completed		49,130	44,110	40,000	34,930		25,920		32,900
Students who did not complete									
Male		44,910	42,170	31,720	31,980	29,590	25,560	26,360	28,400
Female		42,920	39,690	29,440	24,730		18,040	23,420	24,350
European		43,510	41,440	30,820	30,630	28,000	24,440		28,760
Māori				29,340	23,980		19,250		23,420
Pasifika				31,110	29,790		25,230		27,790
Asian							21,840		27,400
All not complete		44,080	40,880	30,600	29,390	28,200	23,210	24,770	26,600
Ratio									
Male			1.124	1.372	1.135		1.095		1.232
Female			1.058	1.289	1.365		1.302		1.287
European		1.094	1.084	1.281	1.132		1.071		1.149
Māori				1.400	1.469		1.247		1.298
Pasifika							1.110		1.187
Asian							1.212		1.377
All		1.115	1.079	1.307	1.188		1.117		1.237

Source: Statistics New Zealand, Integrated Dataset on Student Loan Scheme Borrowers.

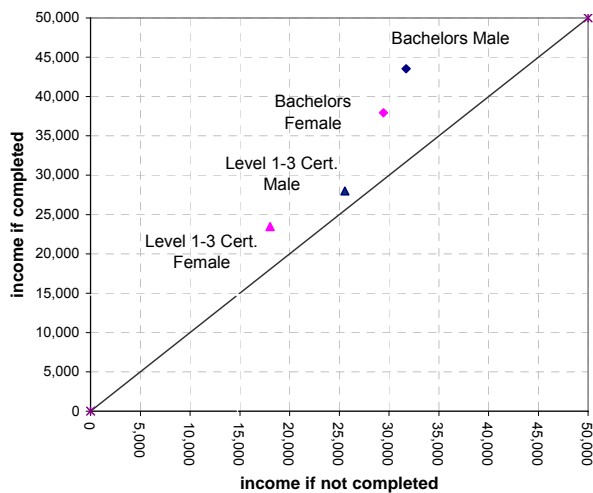
Note: Blank cells indicate that the number in the dataset is low and not large enough for publication within Statistics New Zealand's confidentiality protocols.

Figure A3: Median earned income in 2002 of former students who last studied in 1997

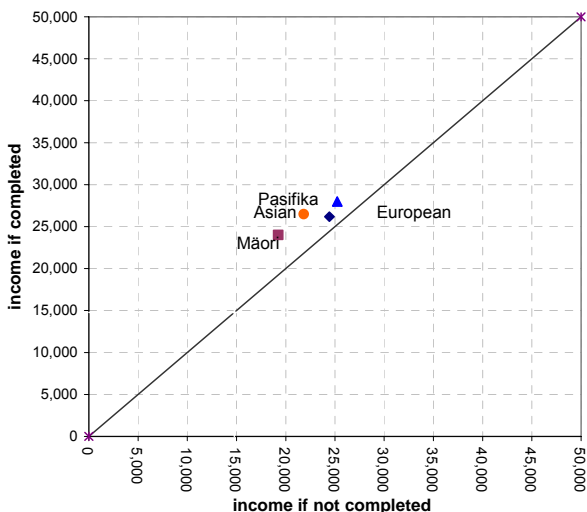
a: Benefits accruing to completion at the bachelor level by ethnicity, Median income



b: Benefits accruing to completion by gender for specific levels, Median income



c: Benefits accruing to completion at the certificate level by ethnicity, Median income



d: Benefits accruing to completion at each qualification level, Median income

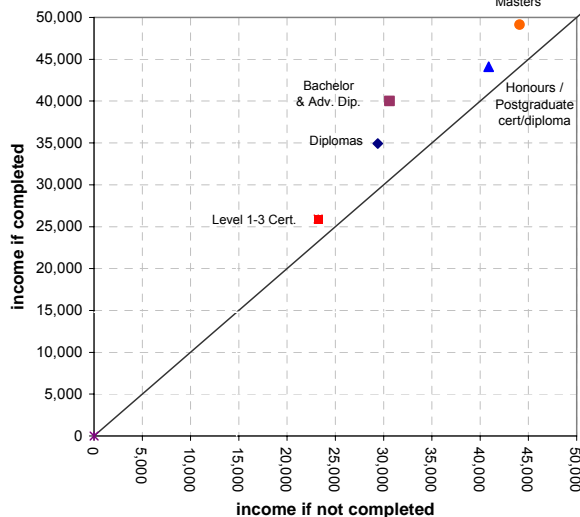


Table A4: Mean earned income in 2000 of former students who last studied in 1997

	Doctorates	Masters	Honours / Postgraduate cert/diploma	Bachelors	Diplomas	Level 4 Cert.	Level 1-3 Cert.	Level Unknown	All
Completed students									
Male		42,680	41,320	36,770	29,640	21,040	23,020		31,190
Female		38,510	37,190	31,730	27,730		19,070		27,380
European		38,810	39,350	33,450	28,560	20,320	20,980		29,310
Māori				33,490	27,400		20,150		26,310
Pasifika				33,760	27,900		20,960		27,210
Asian			38,110	38,590	29,000		22,910		32,300
All completed		40,580	39,310	33,780	28,390	20,450	20,890		29,000
Students who did not complete									
Male		42,330	36,780	28,500	26,390	25,360	19,530	22,880	24,590
Female		33,710	37,360	26,100	21,320	22,400	16,760	20,380	21,950
European		36,930	38,960	28,030	25,420	23,600	19,610		25,510
Māori			34,310	24,700	20,550	19,920	15,440		20,130
Pasifika				26,150	23,580		19,360		22,420
Asian				28,350	25,250		18,300		25,310
All not complete		37,950	37,080	27,390	24,340	24,520	18,450	21,420	23,340
Ratio									
Male		1.008	1.123	1.290	1.123	0.830	1.179		1.268
Female		1.142	0.995	1.216	1.301		1.138		1.247
European		1.051	1.010	1.193	1.124	0.861	1.070		1.149
Māori				1.356	1.333		1.305		1.307
Pasifika				1.291	1.183		1.083		1.214
Asian				1.361	1.149		1.252		1.276
All		1.069	1.060	1.233	1.166	0.834	1.132		1.243

Source: Statistics New Zealand, Integrated Dataset on Student Loan Scheme Borrowers.

Note: Blank cells indicate that the number in the dataset is low and not large enough for publication within Statistics New Zealand's confidentiality protocols.

Table A5: Mean earned income in 2002 of former students who last studied in 1999

	Doctorates	Masters	Honours / Postgraduate cert/diploma	Bachelors	Diplomas	Level 4 Cert.	Level 1-3 Cert.	Level Unknown	All
Completed students									
Male		47,650	40,730	38,480	31,100	23,800	24,730		33,310
Female		41,500	38,270	33,850	27,180	19,810	20,500		29,560
European		44,980	39,560	35,000	28,540	21,880	23,390	36,910	31,740
Māori			40,270	35,870	28,630		19,780		27,710
Pasifika				38,320	26,780		22,850		29,280
Asian		39,860	40,990	37,800	32,180		22,720		33,540
All completed		44,630	39,390	35,470	28,560	21,830	22,370	35,900	31,040
Students who did not complete									
Male		39,720	41,350	30,480	27,920	24,600	21,640	25,370	26,390
Female		37,570	37,710	26,430	23,140	19,500	17,350	20,530	22,470
European		39,070	40,220	29,320	26,290	24,030	21,300	28,940	27,030
Māori		37,570	38,760	24,770	22,610	16,870	17,230	22,100	21,160
Pasifika				28,420	28,500		20,510	25,180	24,810
Asian			35,330	28,860	25,970		18,200	26,490	26,070
All not complete	40,650	38,610	39,410	28,370	25,760	22,590	19,840	22,690	24,460
Ratio									
Male		1.200	0.985	1.262	1.114	0.967	1.143		1.262
Female		1.105	1.015	1.281	1.175	1.016	1.182		1.316
European		1.151	0.984	1.194	1.086	0.911	1.098	1.275	1.174
Māori			1.039	1.448	1.266		1.148		1.310
Pasifika				1.348	0.940		1.114		1.180
Asian			1.160	1.310	1.239		1.248		1.287
All		1.156	0.999	1.250	1.109	0.966	1.128	1.582	1.269

Source: Statistics New Zealand, Integrated Dataset on Student Loan Scheme Borrowers.

Note: Blank cells indicate that the number in the dataset is low and not large enough for publication within Statistics New Zealand's confidentiality protocols.

Table A6: Mean earned income in 2002 of former students who last studied in 1997

	Doctorates	Masters	Honours / Postgraduate cert/diploma	Bachelors	Diplomas	Level 4 Cert.	Level 1-3 Cert.	Level Unknown	All
Completed students									
Male		54,920	48,540	43,840	33,760	28,650	28,140		36,970
Female		47,270	42,310	35,260	30,490		22,340		30,730
European		47,810	46,130	38,100	31,420	26,020	25,270		33,620
Māori				38,600	32,520		22,870		29,910
Pasifika				39,730	30,770		25,000		31,630
Asian				45,440	34,370		30,780		39,300
All completed		51,240	45,410	38,680	31,680	26,870	25,030		33,390
Students who did not complete									
Male		49,160	45,310	33,350	31,050	30,100	24,460	26,600	29,180
Female		41,110	42,830	28,860	24,820	24,760	19,570	23,640	25,080
European		44,910	44,930	31,950	29,650	27,700	23,660		29,710
Māori			38,880	28,800	24,650		19,640		24,190
Pasifika				29,680	28,010		22,920		26,090
Asian				33,100	30,160		24,620		31,180
All not complete		44,960	44,000	31,200	28,480	28,680	22,500	24,860	27,210
Ratio									
Male		1.117	1.071	1.315	1.087	0.952	1.150		1.267
Female		1.150	0.988	1.222	1.228		1.142		1.225
European		1.065	1.027	1.192	1.060	0.939	1.068		1.132
Māori				1.340	1.319		1.164		1.236
Pasifika				1.339	1.099		1.091		1.212
Asian				1.373	1.140		1.250		1.260
All		1.140	1.032	1.240	1.112	0.937	1.112		1.227

Source: Statistics New Zealand, Integrated Dataset on Student Loan Scheme Borrowers.

Note: Blank cells indicate that the number in the dataset is low and not large enough for publication within Statistics New Zealand's confidentiality protocols.

Appendix B – Distributions of earnings three years post study

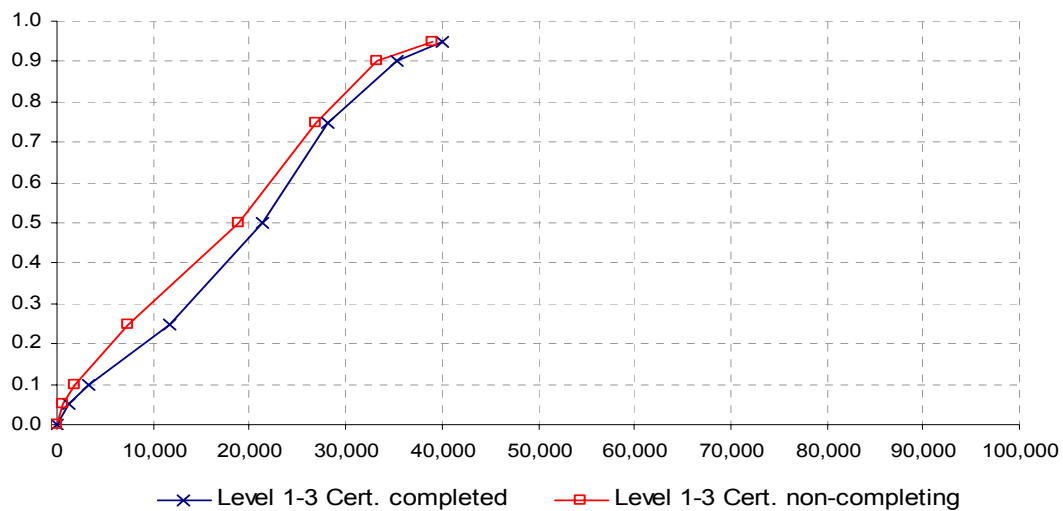
This appendix examines in more detail the differences in the distribution of earned income between 2000 and 2002, by controlling for the level of study and fixing the duration since study at three years.

It extends on the work done in section 3 of this paper where we looked at two distinct cohorts of tertiary leavers, 1997 and 1999 and their earned income three years post study. Section 3 focused on the median income, while in this section, we present the cumulative distribution of earned incomes to give a fuller picture of the income spectrum. The graphs plot the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles of earnings of those in each group of borrowers.

In the graphs in this appendix, the cumulative distribution of the completed students' incomes is to the right of the incomplete distribution, showing that earnings are higher for those who complete. The size 'gap' between the two curves is a measure of the premium paid by the labour market at each level in the distribution.

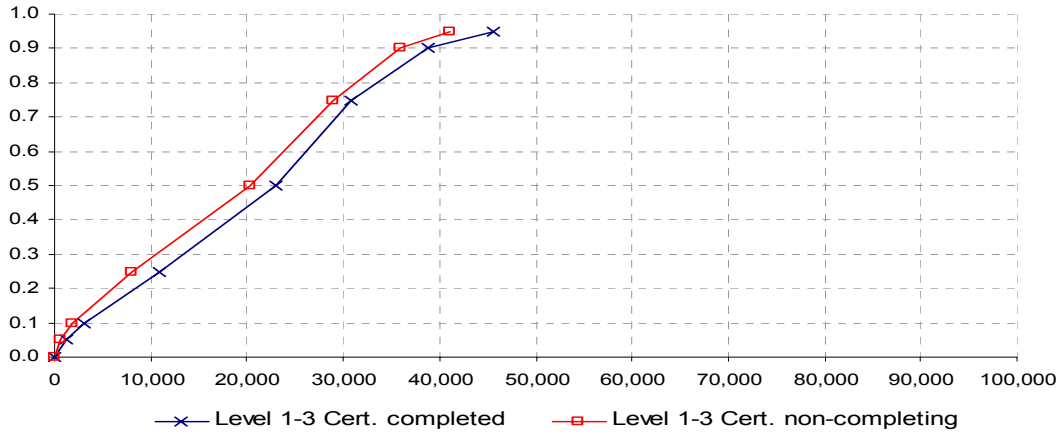
As before, we analyse the distribution by level of study and completion status.

Figure B1: Earned income in 2000 of those who last studied in 1997 for a level 1-3 certificate



The largest premium for completion in this group is between the 25th and 50th percentiles. Among the highest income earners, there is little difference between those who do and those who don't complete.

Figure B2: Earned income in 2002 of those who last studied in 1999 for a level 1-3 certificate



For the 1999 cohort, the premium for those below or at the median income is smaller than for the 1997 cohort – consistent with the observation in section 3. However, for those earning between the 75th and 90th percentiles, the gap between completed and not completed has grown.

The ‘flatter’ distribution graphs for bachelors students reflects the higher earnings of this group.

Figure B3: Earned income in 2000 of those who last studied in 1997 for a bachelors degree

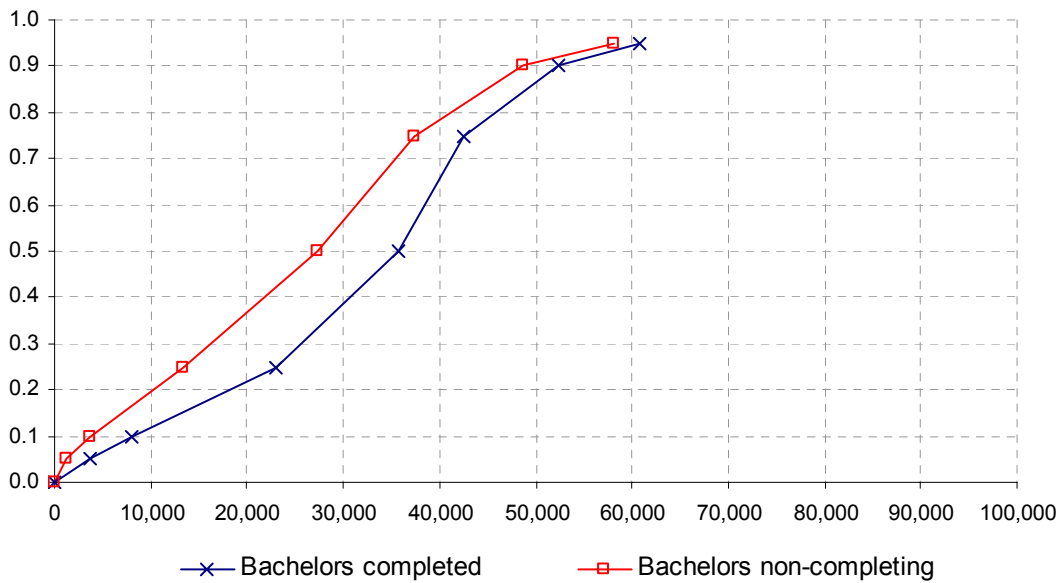
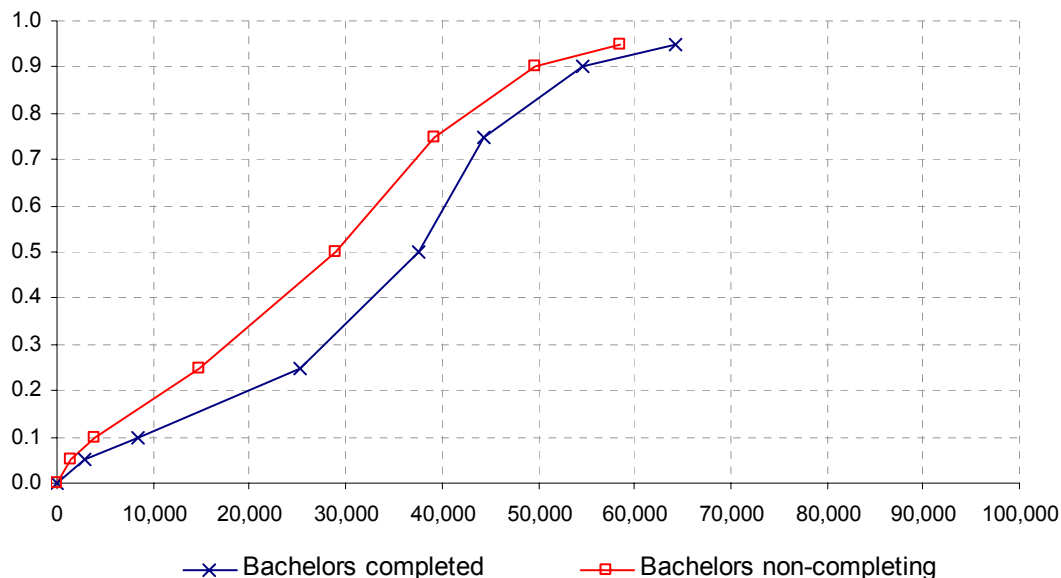


Figure B4: Earned income in 2002 of those who last studied in 1999 for a bachelors degree



The premium paid for completion of a bachelors degree is much greater than a certificate. In both cohorts, the distribution of the earnings of the completed bachelors students is relatively curved, whereas for those who do not complete, the curve is much straighter. What this means is that there is a very large premium for completion in the middle of the income distribution. This was observed in section 3 above as a very high difference between the median earnings of those who complete and those who don't complete. The premium is very strong among the second quartile of earners. However, the difference narrows at the upper ends of the distribution; there is a group of people who didn't complete who still earn high incomes.

Figure B5: Earned income in 2000 of those who last studied in 1997 for a masters degree

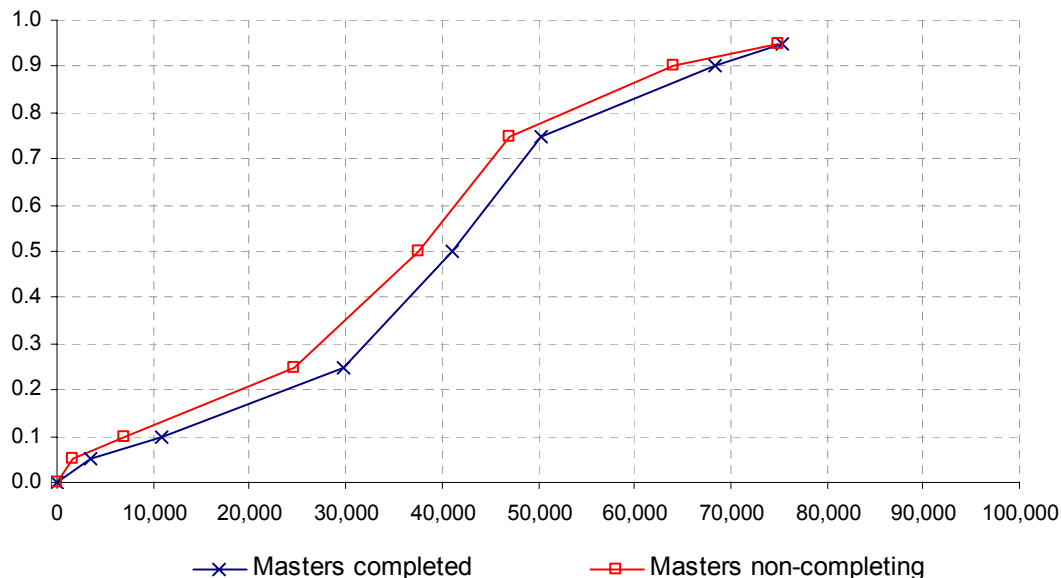
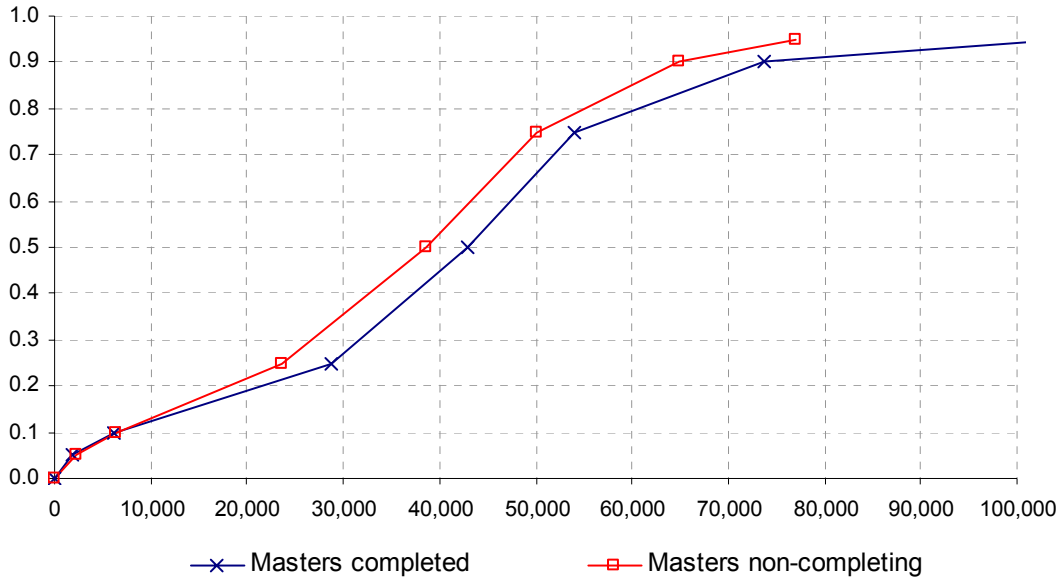


Figure B6: Earned income in 2002 of those who last studied in 1999 for a masters degree



Among those who studied at the masters level, there were much higher earnings offered to the most successful 20 percent in 2002, compared with 2000.

Appendix C – Earnings distribution time series

This appendix presents a five year time series of cumulative distributions of earned income for three levels of study: masters, bachelors and certificate. Each set presents the income distribution of those who last studied in 1997 over each of the first five years post-study.

As in appendix 2, these cumulative distribution graphs show the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles of earnings for each group of borrowers in each of the first five years post study.

Note that the composition of a cohort will change over time as people enter and leave the workforce and, especially, as they enter and leave New Zealand. So the graphs below do not represent a precise time series that tracks the experience of a fixed group of people.

In these graphs, we see the rising earnings over the first five years post study reflected both in the movement of the curve to the right in each year and also in the flattening of the curve from the first to the fifth year following study. The curve for those who have completed the qualification is to the right of the curve for non-completers, reflecting the fact that those who are successful in completing earn more than those who don't.

There are some interesting observations to be made from this data.

Masters borrowers

- In the first two years post study, those students who did *not* complete the qualification have higher earnings than those who did complete their course of study. It suggests that some students who abandon study perhaps half way through, are making short term gains in the employment market. This reflects the fact that those engaged in masters level study will already have a tertiary qualification. Many who abandon will be people who are already in employment and studying part-time or else people who abandon study in response to a favourable job offer.
- From the third year post study however, the completers are clearly better off across the whole income spectrum.
- Among the completers the top half of earners are continuing to enjoy large increases in remuneration through the fourth and fifth year. The gains made by the top non-completing earners are more modest, especially in the fifth year. Therefore, the gap between the highest earners of the completed and the non-completed the groups is widening so that after five years, the 90th percentile of earnings is \$92,000 for those who completed and \$73,000 for those who did not.
- These observations reinforce the inference, discussed above, that the competencies and skills people acquire in the course of doing a masters degree are rewarded in work over a longer period of time.
- The curves for masters students are relatively flat – and become flatter as time goes on. This reflects increasing earnings differences over time between the higher and the lower income earners from this group.

Bachelors borrowers

- Completed bachelors students exhibit the greatest curvature in the ogive, whereas for those who do not complete, the curve is much straighter. For instance, with non-completing bachelors students in their first post study year, between the 10th and 90th percentile the curve is almost linear – revealing an almost uniform distribution of earners between \$7,000 and \$37,000.

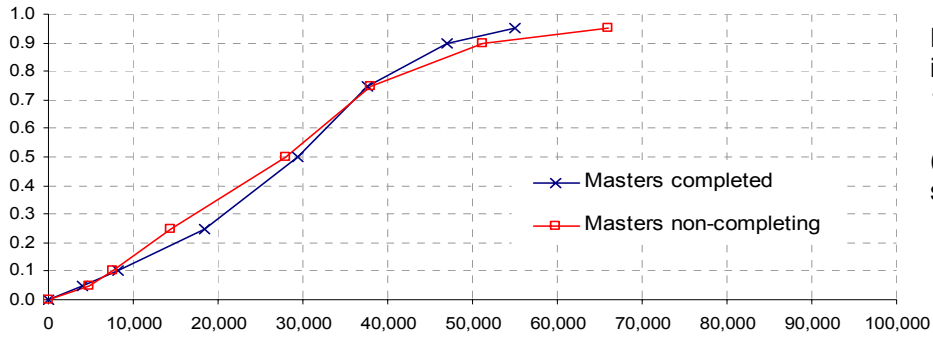
How do graduates' earnings change over time

- What this means is that there is a very large premium for completion in the middle of the income distribution. This was observed in section 3 above as a very high difference between the median earnings of those who complete and those who don't complete. The premium is very strong among the second quartile of earners.
- The curves for bachelors students become much flatter as time goes on – the curve showing the distribution in the fifth year post study is much flatter, for instance, than the curve two years post study. At this level, too, differences in earnings between the higher and the lower earners grow over time.

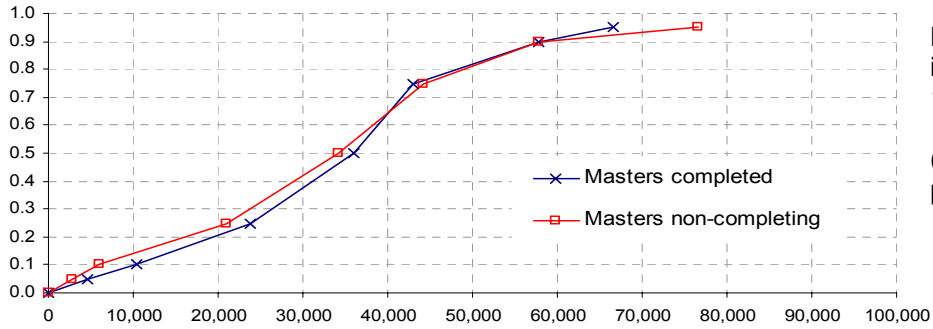
Certificate borrowers

- Compared with masters and bachelors students, the income distributions of those who studied at the certificate level are less flat. The steeper gradients reflect the fact that the differences in earnings between the higher and lower earners in this group are smaller. For instance, the difference between the 90th and 10th percentiles of earnings in the fifth year post study for those who completed a certificate is about \$43,000, compared with more than \$70,000 for bachelors and masters completers.
- The fact that the completed and non-completed distribution curves among those who studied at the certificate level are close to each other reflects the fact that the relatively lower premium for completion observed above applies at all levels in the earnings distribution.

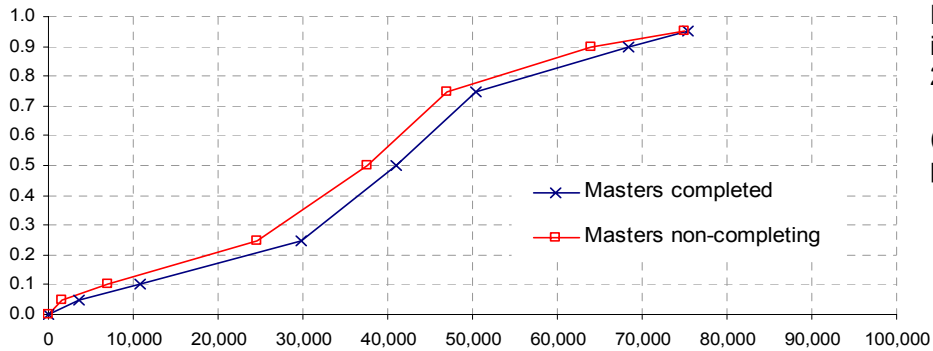
Figure C1: Cumulative distribution of earned income of students who last studied in 1997 at masters level



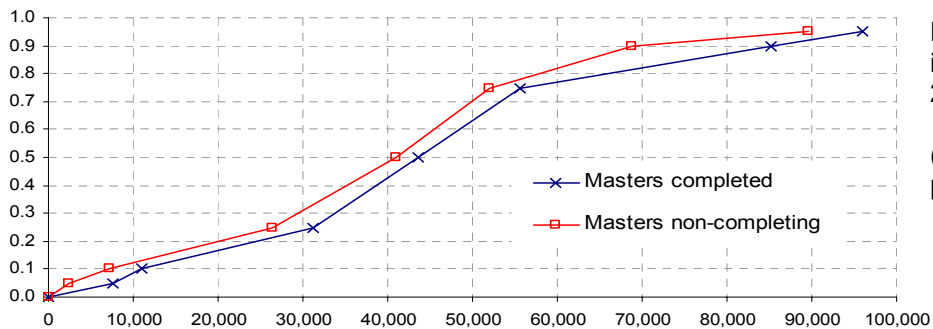
Earned income in 1998
(first year post study)



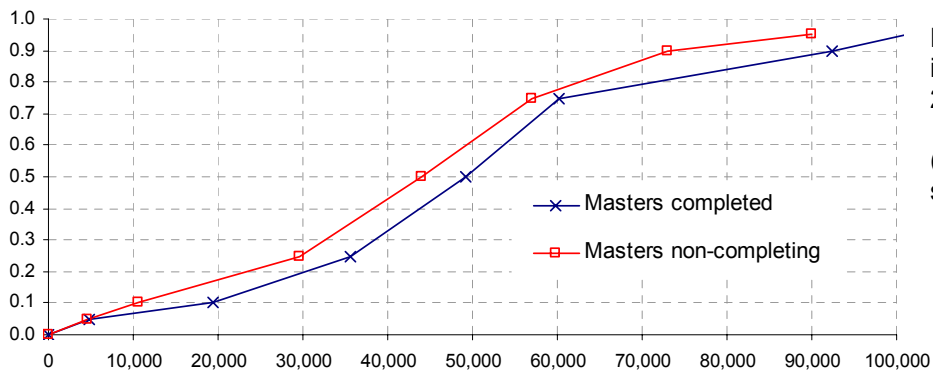
Earned income in 1999
(second year post study)



Earned income in 2000
(third year post study)

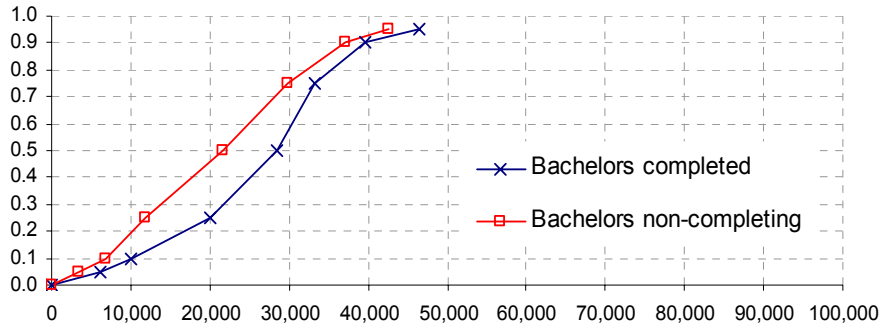


Earned income in 2001
(fourth year post study)

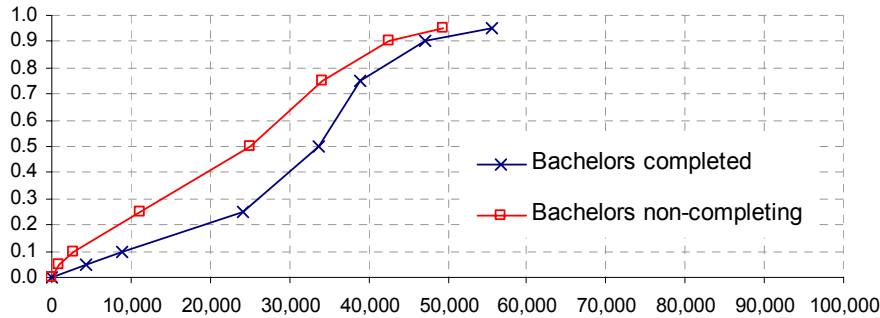


Earned income in 2002
(fifth year post study)

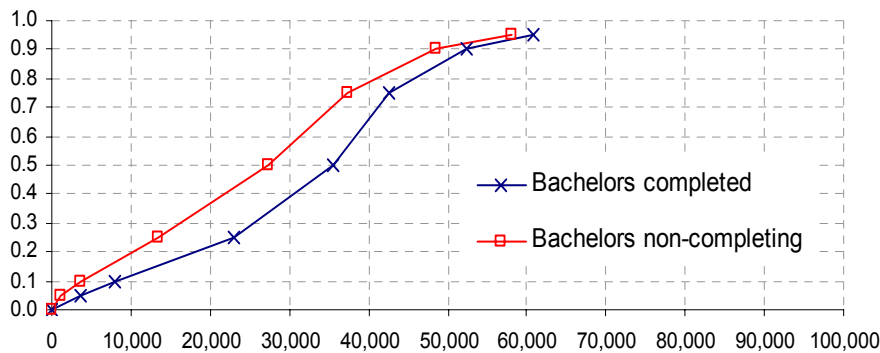
Figure C2: Cumulative distribution of earned income of students who last studied in 1997 at bachelors level



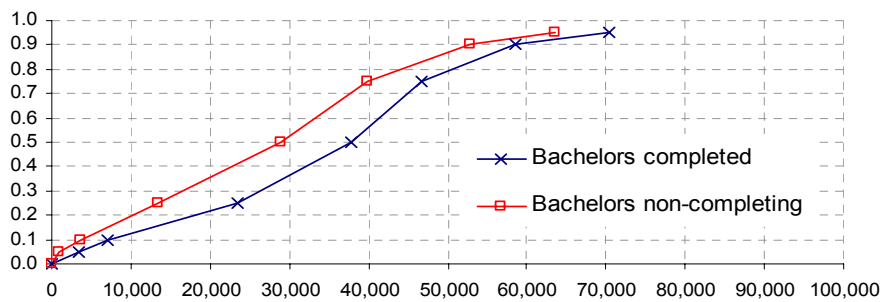
Earned income in 1998
(first year post study)



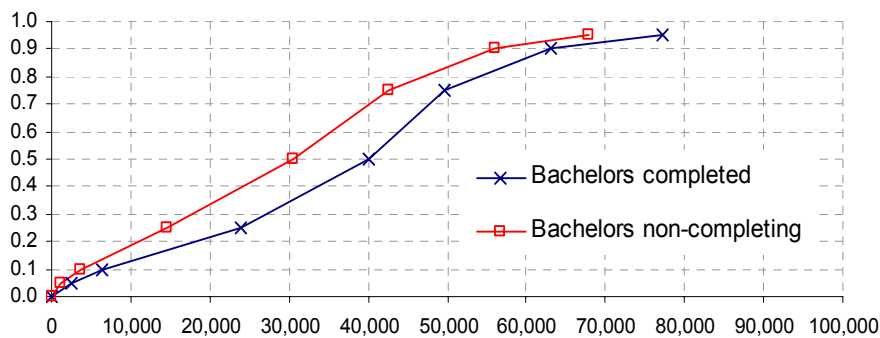
Earned income in 1999
(second year post study)



Earned income in 2000
(third year post study)

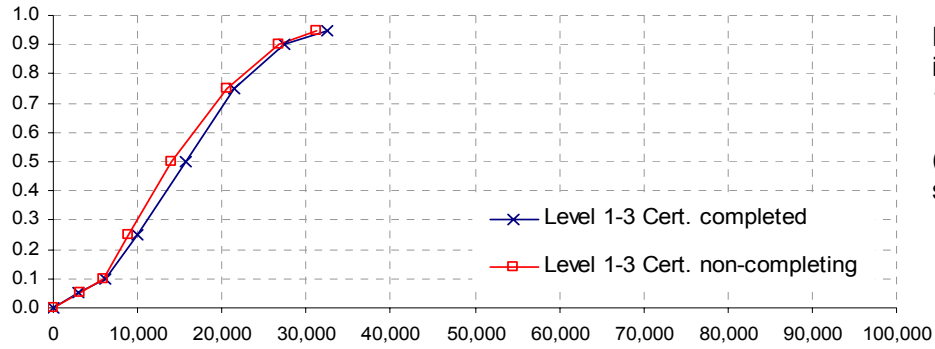


Earned income in 2001
(fourth year post study)

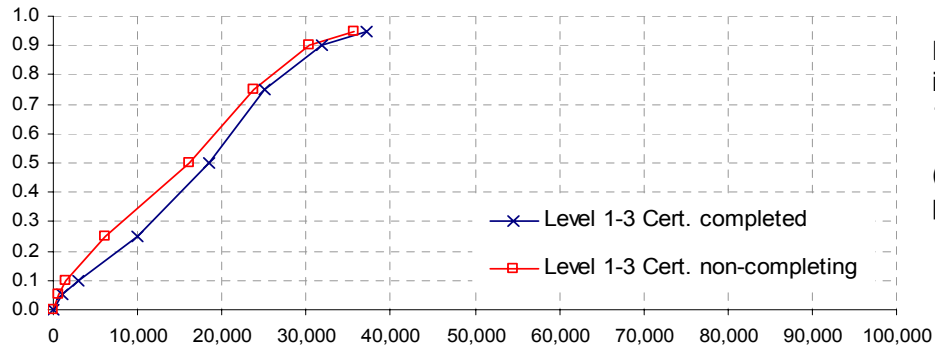


Earned income in 2002
(fifth year post study)

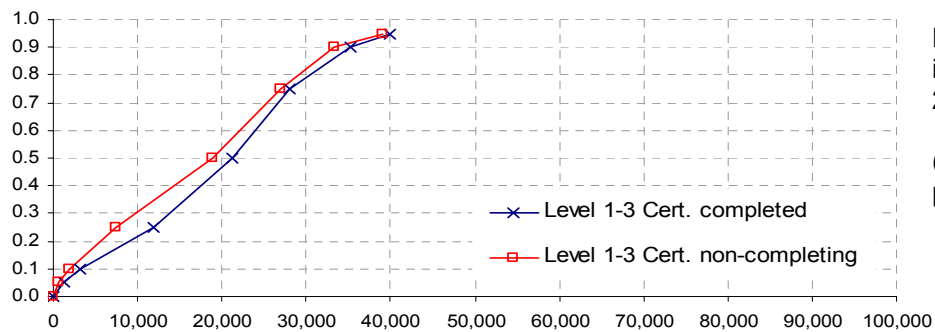
Figure C3: Cumulative distribution of earned income of students who last studied in 1997 at certificate level



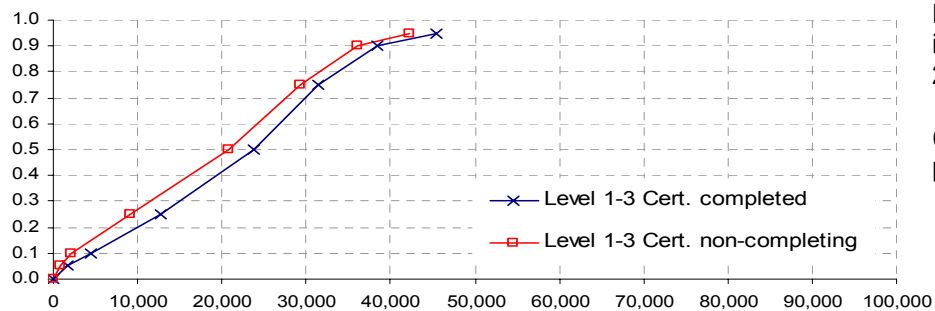
Earned income in 1998
(first year post study)



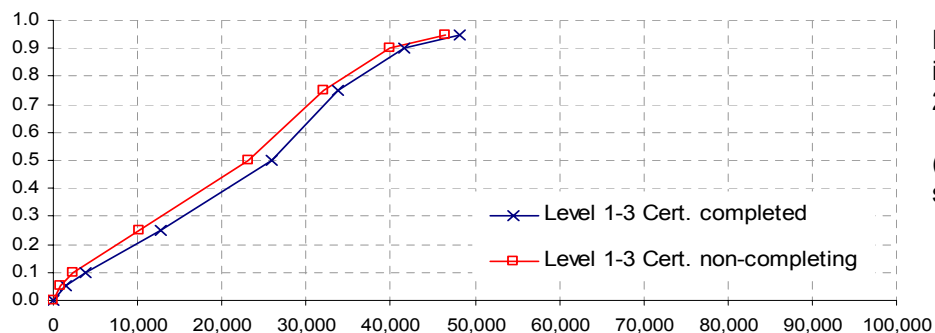
Earned income in 1999
(second year post study)



Earned income in 2000
(third year post study)



Earned income in 2001
(fourth year post study)



Earned income in 2002
(fifth year post study)