



RESEARCH INNOVATION AND EXPANSION FUND

Returns from education: an occupational status approach

JUNG-SOOK LEE

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Australian Government

**Department of Education, Employment
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ISBN 978 1 921809 37 8 web edition

TD/TNC 102.20

Published by NCVER

ABN 87 007 967 311

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About the research



Returns from education: an occupational status approach

A report funded through the LSAY Research Innovation and Expansion Fund Research Fellowship scheme

Jung-Sook Lee

Having a higher level of education affords individuals many opportunities and benefits such as higher income, increased employment choices and greater job security. Beyond the individual, an increasing level of education contributes to the economic growth and wellbeing of society.

Typically, the returns from education are measured by earnings. However, earnings for young people may be a poor indicator of the longer-term returns from various education choices. An alternative approach is to focus on the occupations in which young people find themselves. Specifically, the occupation's status (or prestige) is likely to capture many of the future benefits that an individual could reasonably expect.

Using data from the 1995 cohort of the Longitudinal Surveys of Australian Youth (LSAY), which followed a cohort of young people who were in Year 9 in 1995 for 12 years to 2006, Lee looks at individual returns from education for young people aged 16 to 26 years. The study investigates how growth in occupational prestige is related to the level of education achieved and whether the effect of education on the growth in occupational prestige differs by gender as well as by individual characteristics and family backgrounds. Lee finds that, not surprisingly, occupational prestige grows steadily from the ages 16 to 26 years. She also finds that those with degrees tend to be in higher-status jobs, particularly by age 26 years.

Key messages

- ✧ The gaps in occupational prestige among young people with different educational attainment become larger as time passes.
- ✧ At age 21, females tend to have higher occupational prestige than males, with the difference particularly notable among young people who did not complete Year 12.
- ✧ Family background characteristics continue to influence young people's occupational prestige above and beyond the influence of their educational attainment.

This analysis brings home the labour market advantage that a degree brings in a way that a straight comparison of young people's earnings does not.

Tom Karmel
Managing Director, NCVER

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Executive summary

The individual and social returns from education are extensively researched and well documented in the literature. It is reported that an increased level of education contributes to the economic growth and wellbeing of a society (for example, Canton 2007; Sianesi & Van Reenen 2003). Higher levels of education are also associated with higher income, increased opportunities for employment, and greater job security for individuals (ABS 2008a).

This study focuses on occupational prestige as a measure of the individual return from education for young people aged 16 to 26 years. The main objectives of the study were to investigate whether a rise in occupational prestige is predicted by the level of education and whether the effect of education on the rise in occupational prestige differs by individual characteristics and family backgrounds. This study also examined whether there are gender differences in the trajectories of occupational prestige.

The study used the 1995 cohort of the Longitudinal Surveys of Australian Youth (LSAY).¹ The 1995 cohort comprises a nationally representative sample of young people who were in Year 9 in 1995.

Occupational prestige is measured using the ANU3 scale.² Lower scores indicate lower prestige and higher scores indicate higher occupational prestige (for example, 0.8 for railway labourers and 99.2 for specialist medical practitioners). The educational attainment variables were measured as the highest qualification attained each year. This study used a multilevel quadratic growth model to examine the change in young people's occupational prestige over 11 waves of the LSAY data. The key results are as follow.

- ✧ There was a steady growth in the average occupational prestige among young people aged between 16 and 26 years. The estimated mean occupational prestige is comparable with messengers at age 16, general clerks at age 21 and associate professionals at age 26. Nonetheless, growth in occupational prestige varies by individuals.
- ✧ The level of occupational prestige and rate of change were predicted by an individual's educational attainment. In particular, the level of occupational prestige at age 21 and the rate of growth were highest for young people with a bachelor or higher degree and lowest for individuals without Year 12 or equivalent. By age 26, the average occupational prestige of individuals without Year 12 or equivalent corresponds to that of stonemasons and the average occupational prestige of individuals with a bachelor or higher is equivalent to financial brokers.
- ✧ The gaps in occupational prestige among young people with different educational attainment get larger as time goes by. The growth curve has an inverted U-shape. Young people with higher occupational prestige at age 21 tend to have a higher rate of linear growth in their occupational prestige. Moreover, they also tend to have less-curved growth lines than individuals with lower occupational prestige at age 21. Given the rates of linear growth and acceleration, the gap

¹ LSAY is a research program that focuses on young people's transition from school to further education, work, or other destinations (NCVER 2009).

² The ANU3 scale provides continuous scores of occupational prestige and the scale lies between 0 and 100 (McMillan & Jones 2000; Jones 1989). Two different versions of the ANU3 scale were used for the 1995 cohort data; the ANU3_1 was used from 1996 to 1999 and the ANU3_2 was used from 2000 to 2006. ANU scales are based on the Australian Standard Classification of Occupations (ASCO) produced by the Australian Bureau of Statistics (ABS). The ABS released the 2nd edition of ASCO in 1996, with the ANU3_2 scale developed in 2000.

between young people with higher and lower occupational prestige at age 21 increases by the age of 26.

- ✧ The effects of educational attainment on the growth of occupational prestige differ by individual characteristics. Females tend to have higher occupational prestige and the difference between males and females was larger for young people without Year 12 or equivalent. Academic achievement in Year 9 was also a significant predictor of occupational prestige; however, the difference varies by the educational level.
- ✧ Family background was associated with occupational prestige above and beyond the effect of young people's educational attainment. Children of parents with an upper-middle or higher occupational level and children of parents with a bachelor or higher degree have higher occupational prestige.
- ✧ Males and females generally have similar growth patterns in occupational prestige, although there are some notable differences. For both genders, the level of occupational prestige and rate of growth were highest for individuals with a bachelor or higher degree and lowest for individuals without Year 12 or equivalent. However, occupational prestige showed little difference for females by types of vocational education and training (VET) qualifications, whereas they were quite divergent for males. For both males and females, the level and growth rate in occupational prestige differs by academic achievement in Year 9 and the gap was much larger for males.

The findings suggest that effort needs to continue to increase young people's completion of Year 12, or in the case of early school leavers, the completion of VET qualifications. Given the larger occupational returns from a bachelor or higher degree, it is necessary to expand opportunities for young people to enable them to pursue higher education to achieve the potential of education for aiding social mobility.

Introduction

Using the Longitudinal Surveys of Australian Youth from 1995, this study examines growth in occupational prestige among young people. The main purpose of the study is to investigate whether growth in occupational prestige is predicted by the level of education achieved and whether the effect of education on growth in occupational prestige differs by individual characteristics and family backgrounds. This study also examines whether males and females have different trajectories of occupational prestige.

As the 2008 Melbourne Declaration on Educational Goals for Young Australians noted, education is highly valued in Australian society because it ‘equips young people with the knowledge, understanding, skills and values to take advantage of opportunity and to face the challenges of this era with confidence’ (Ministerial Council on Education, Employment, Training and Youth Affairs 2008, p.4). As was acknowledged in the declaration, globalisation and technological change increase demand for workers with adequate skills and knowledge, which means that individuals with university or VET qualifications are in a much better position in the labour market than school leavers.

In Australia, there has been an increase in school completion rates and in the attainment of tertiary education. In 2006, among individuals who left school, 72% had completed Year 12 or equivalent (ABS 2008a). The proportion of individuals with non-school qualifications is also increasing. For example, between 1997 and 2007, the proportion of individuals aged 25 to 64 years with a bachelor or higher degree increased from 16% to 24% (ABS 2008b).

The literature suggests that education and training yield returns to individuals and society (for example, Borland et al. 2000; Leigh & Ryan 2008; Miller, Mulvey & Martin 2006) and that increased levels of education contribute to the economic growth and wellbeing of society (for example, Canton 2007; Sianesi & Van Reenen 2003). Based on data from 31 countries, Canton (2007) concluded that a one-year increase in the average education level increased labour productivity by 7–10 % in the short run and by 11–15% in the long run. In Australia, Borland et al. (2000) estimated that the social rate of return from higher education is 16.5%.

The individual returns from education are well documented in the literature (for example, Leigh & Ryan 2008; Miller, Mulvey & Martin 2006). Higher levels of education are associated with higher income, increased opportunities for employment, and better job security (ABS 2008a). On the other hand, school leavers face challenges in the labour market and financial insecurity (ABS 2008a). For example, the private rate of returns from education is 5–10% of lifetime earnings in Australia (Leigh & Ryan 2008; Miller, Mulvey & Martin 2006). Leigh and Ryan (2008) estimated that a person who left school at age 15 and worked until age 64 will earn \$1 166 003, while a person who left at age 16 and worked until age 64 will earn \$1 285 263 (in 2003 dollars), a difference of \$119 260 in lifetime earnings.

Two dominant theories regarding the labour market returns from education are human capital theory and signalling theory (or screening theory) (Frazis 2002). Human capital theory proposes that education increases human capital, which leads to the increased income. However, according to signalling theory, education signals a worker’s ability, which is not directly observable to employers. Thus, education functions as a sorting mechanism. Whether it is a way of increasing

human capital or of signalling unobservable ability, the empirical evidence highlights the benefits of education in the labour market.

This study focuses on the occupational prestige realised by individuals as a consequence of their education. Many studies have examined wage differences in relation to individuals' returns from education (for example, Leigh & Ryan 2008; Miller, Mulvey & Martin 2006); however, the current study examines occupational prestige as a measure of social status. Occupational prestige was chosen as an indicator of individual returns from education in the current study because of the particular characteristics of the sample. The sample was followed from age 16 to 26 years. At the end of the study period, some individuals might just have finished their education, and the length of time after graduation may have been insufficient to demonstrate the effect of education on their income, since income is influenced by both work experience and level of education. It is possible that young people who entered the workforce six years earlier with lower qualifications earn more money than young people who have just completed higher qualifications. However, the income of the former might have reached its highest point, while that of the latter might have been at the starting point.

Other aspects of employment are also reflected in occupational prestige. McMillan and Jones (2000) claimed that ANU3³—an occupational prestige scale used in the current study—'reflects aggregate differences in job entry requirements, economic rewards, power, occupational prestige, and privilege' (p.195). Compared with a young person who entered the workforce six years earlier with a lower qualification, a young person who has just entered the workforce with a higher degree may have a similar current income, due to the lack of work experience. However, it is likely that the latter has more job security, autonomy, and better prospects for future income growth. It is expected that occupational prestige captures these aspects of employment along with wages.

Interestingly, timing of entry into the workforce seems to be related to an individual's background. Mark, Hillman and Beavis (2003, cited in Penman 2004) found that young people who have parents with higher socioeconomic status enter the workforce later. Jobs require qualifications which have varying lengths and have different entry requirements. Occupations with higher prestige (such as a judge or medical doctor) often require longer periods of study; they also sometimes have regulatory restrictions which delay an individual's entry. It is possible that young people with disadvantaged backgrounds cannot afford to delay their entry into the workforce, even when this means choosing occupations with limited prospects of long-term income growth. Given the influence of work experience on income, individual returns to education for young people may be downward biased if the timing of entry into the workforce is not considered as a factor.

Another complicating factor is that the timing of returns also seems to differ by the type of education and training qualifications attained. For example, Marks and Fleming (1998 as cited in Penman 2004) found that the effects of a higher degree on hourly earnings increased as the degree holder aged, whereas the importance of TAFE (technical and further education) certificate and diploma effects decreased with age. It is therefore important to examine longitudinal trajectories to capture the change in returns.

The current study also examined the growth of occupational prestige by gender. It is possible that males and females have different trajectories in the growth of occupational prestige. In young adulthood, child bearing and child rearing may influence the growth of occupational prestige for some females. It is also possible that females and males may encounter different circumstances in the labour market.

LSAY provides a unique opportunity to examine growth in occupational prestige, in that it holds rich information that covers a wide range of topics relating to young people, including details on their education, employment, and social wellbeing. The current study used information from the

³ Further information about ANU3 is provided in the methodology section.

1995 cohort data, spanning 11 waves, to estimate the growth trajectories in occupational prestige among young people.

The specific research questions addressed in this report are:

- ✧ What are the mean growth curves of occupational prestige among young people and the extent of individual variation around it?
- ✧ Are the extent of occupational prestige at age 21 and the growth rate of that prestige predicted by levels of education?
- ✧ Does the relationship between education and occupational prestige differ by individual characteristics and family backgrounds?
- ✧ Are the growth curves of occupational prestige predicted by individual and family backgrounds above and beyond the effects of individual education attainment?
- ✧ Do males and females have similar growth patterns of occupational prestige?

Methodology

Data

This study used data from the 1995 cohort of the Longitudinal Surveys of Australian Youth. The surveys used a nationally stratified sample of students: a two-stage probability sample with a random selection of schools and classes within schools (NCVER 2009). About 13 000 Year 9 students, randomly selected from 300 schools, were surveyed in 1995 and subsequently interviewed annually until 2006. The surveys collected information on various aspects of youth transitions, such as educational attainment, employment, measures of engagement in study and work, and social outcomes. In determining occupational prestige, only waves two to 12 (1996–2000) were used, as individuals were not asked enough information about their jobs in wave 1 (1995). Relevant background characteristics were determined using wave 1 data.

Measures

The outcome variable is occupational prestige, which is based on the ANU3 scale. The ANU3 scale provides continuous scores of occupational prestige and lies between 0 and 100 (McMillan & Jones 2000; Jones 1989). Lower scores indicate lower prestige and higher scores indicate higher occupational prestige (for example, 0.8 for railway labourers and 99.2 for specialist medical practitioners). The ANU scales are based on the Australian Standard Classification of Occupations (ASCO) developed by the ABS. In 1996 the second edition of ASCO was released, with the ANU3_2 scale subsequently developed in 2000. Hence, two different versions of the ANU3 scale were used for the 1995 cohort data: ANU3_1 was used from 1996 to 1999 and ANU3_2 was used from 2000 to 2006.⁴ A dummy variable (ANU_R) was used to flag the change. (Refer to McMillan & Jones [2000] and Jones [1989] for additional detail on ANU3 scales.)

The educational attainment variable changed over time and was measured as the highest qualification attained each year. Dummy variables were created to indicate the educational level: no Year 12; Year 12 only; certificate I or II; certificate III or IV; unknown certificate level; diploma/advanced diploma/associate degree; and bachelor or higher degree. The variable ‘Year’ (indicating year of survey) has been mean-centred around 2001. This implies that any model intercept will be interpreted for the year 2001. A further variable of year-squared has been derived to capture quadratic growth over time.

Individual background variables include gender (male as 1 and female as 0), Indigenous status (Indigenous as 1 and non-Indigenous as 0), and academic achievement in Year 9 (dummy variables with the lowest quartile as a reference group). Family background variables are parental occupational status and parental education. Dummy variables were used to indicate four groups of parental occupational status (low, lower-middle, upper-middle, and upper), and parental education was simplified to specify parents with a bachelor or higher degree and others. Time-varying covariates are: study status (full-time, part-time, and not studying/unknown); work status (full-time,

⁴ In ANU3_2, some categories were newly added or more refined, while other categories were removed. Among them, occupational prestige scores of 211 categories with exactly the same names were compared. The result shows that ANU3_1 and ANU3_2 are highly correlated ($r = .996, p < .001$).

part-time, and not working/unknown); work position (permanent, casual, and not working/unknown); and the spell of unemployment in the previous year (spell and no spell).

Sample

The sample size of this study is 9907 individuals and 52 672 observations. Due to sample attrition, a large proportion of students did not appear in the later years. Thus, the sample size in 2006 was 3914, whereas the sample size was 13 613 in 1995. Individuals with disadvantaged backgrounds were more likely to drop out of the study. For example, the percentage of Indigenous youth was 2.8 in 1995 and 1.6 in 2006; the percentage of youth born in non-English speaking countries was 10.7 in 1995 and 8.5 in 2006; and the percentage of youth with lower academic achievement in Year 9 was 24.1 in 1995 and 13.9 in 2006. One advantage of the growth curve model is that individuals with partial information can be included in the analysis. Thus, subjects with data on even one wave among 11 waves are a part of the study sample. Furthermore, these demographic variables were included as covariates, with their inclusion greatly reducing the potential bias due to the attrition.

Analysis

This study used a multilevel quadratic growth model to determine the change in occupational prestige over 11 waves. In the multilevel framework, the multiple observations are seen as nested within individuals. At the level-1 model, each individual has a growth trajectory of occupational prestige based on a set of parameters, with the parameters regressed on the level-2 predictors (Raudenbush & Bryk 2002). It is assumed that the growth parameters vary across individuals. In analyses of longitudinal data, attrition and missing data are often problematic. However, multilevel growth models can use all observations, even when the number and spacing between observations varies (Raudenbush & Bryk 2002).

First, to obtain the mean growth curve of occupational prestige and the variation, a baseline model with the linear growth, acceleration, and ANU3_R was examined. Second, in a full quadratic growth model, level-1 predictors (highest education attained and other time-varying covariates), level-2 predictors (family and individual background), and interaction terms were added to examine the effects of educational attainment on the growth of occupational prestige. Third, models for males and females were investigated separately. Although it is possible to include interaction terms for gender differences, it requires three-way interactions. Thus, for simplicity of modelling and subsequent interpretation, models for males and females were separately examined and compared.

The full quadratic growth model is specified as a two-level model. Level-1 model is:

$$Y_{ti} = \pi_{0i} + \pi_{1i}a_{ti} + \pi_{2i}a_{ti}^2 + \sum_{p=1}^P \pi_{(p+2)i}X_{pti} + r_{ti} \quad (1)$$

where Y_{ti} is occupational prestige of a person i at time t ; $t = 1, \dots, n_t$ observations for individual i and $i = 1, \dots, 9905$ individuals. The intercept π_{0i} represents the conditional occupational prestige of a person i in 2001; π_{1i} is the instantaneous growth rate for person i in 2001; a_{ti} is year of survey centred around 2001; π_{2i} indicates the curvature of acceleration in each growth trajectory; a_{ti}^2 is year-squared; $\pi_{(p+2)i}$ represents coefficients of level-1 predictors (X_{pti}) where $p = 1, 2, 3 \dots P$; and r_{ti} indicates residuals assuming $r_{ti} \sim N(0, \sigma^2)$. Different error structures were used in each year. The over-time dependency was modelled as random slopes rather than auto-correlated residuals.

Level-2 model is:

$$\pi_{qi} = \beta_{q0} + \sum_{s=1}^{S_q} \beta_{qs}W_{si} + u_{qi} \quad (2)$$

At level 2, we have a separate equation for each π_{qi} where $q = 0, 1, 2, 3 \dots P+2$. β_{qs} represents coefficients of level-2 predictors (W_{si}) where $s = 1, 2, 3 \dots S$ and u_{qi} indicates random effects assuming $u_{qi} \sim$ independently $N(0, \tau_{00})$.

One per cent of observations with large residuals was removed from the study. Few cases have apparent self-reporting errors on their occupational prestige (for example, university teacher at age 17). However, it was not always possible to determine whether an error exists. Thus, removing observations with large residuals was chosen as an alternative. The sensitivity tests assured that results did not differ largely. Weights were not used in the current study due to the complexity of the longitudinal data structure. Observations through 11 waves are included in a model and there are different weights each year. While the inferences regarding relationships between variables are valid, caution needs to be observed when extending the results to the population of 15-year-olds in 1995. However, given the background variables included in the model, any biases resulting from attrition would be minimal.

Results

Sample characteristics

Over the 11 waves of LSAY, the percentage of individuals with post-school qualifications was consistently growing, with the largest increase observed since 2001 for individuals with a bachelor or higher degree. As to be expected over this period, the percentage of individuals undertaking full-time study decreased, while the percentage of individuals with full-time work status and permanent positions increased. Figure A1 in appendix A shows the change of study and work status based on the total sample from 1996 to 2006.

Table 1 Individual and family characteristics

Variables	Mean (SE)/percentage
Age in Year 9	14.7 (0.5)
Gender	
Female	52.0
Male	48.0
Indigenous status	
Non-Indigenous	92.3
Indigenous	1.9
Unknown	5.8
Country of origin	
Australia	88.0
English speaking country	3.4
Non-English speaking country	5.4
Unknown	3.3
Parental occupation	
Lower	23.3
Lower middle	34.5
Upper middle	20.9
Upper	12.2
Unknown	9.2
Parental education	
No degree holder	80.1
Degree holder	19.9
Achievement in Year 9 (Quartile)	
Low	19.8
Medium low	24.5
Medium high	26.1
High	29.6

Notes: $n_i = 9907$, unweighted; SE = standard error.

Source: LSAY 1995 cohort data.

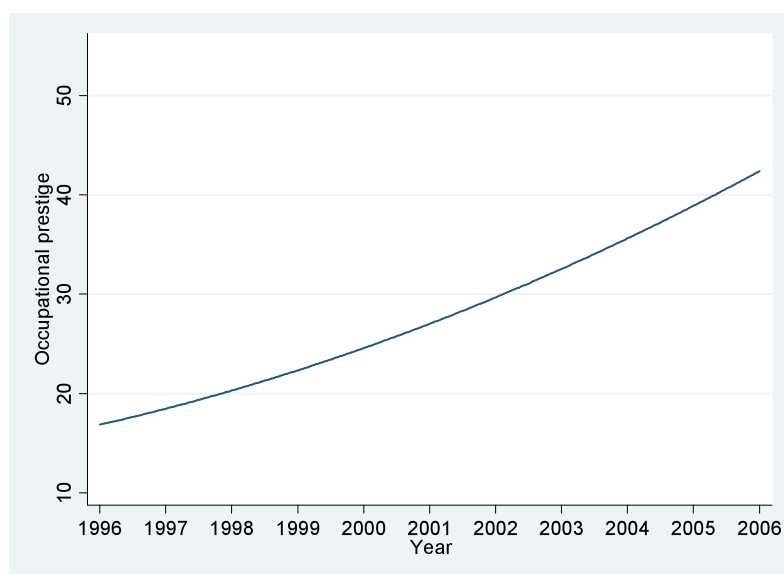
As we are interested in occupational prestige, the sample was limited to young people who were working each year. This sample includes all individuals who provided information on their occupational prestige in at least one wave. Table 1 presents the unweighted characteristics of the study sample.

Quadratic growth model results

Baseline model

To obtain the mean growth curve of occupational prestige and the variation, a baseline model with the linear growth, acceleration, and ANU3_R (a dummy variable to flag the change of version of ANU3 scale) was examined. The estimated mean occupational prestige at age 21 is 27.02 (SE = 0.17, $p < .001$), the mean growth rate is 2.55 (SE = 0.04, $p < .001$), and the mean acceleration rate is 0.10 (SE = 0.01, $p < .001$). In other words, the estimated mean occupational prestige is comparable with messengers at age 16, general clerks at age 21, and associate professionals at age 26. Figure 1 shows the estimated mean occupational prestige of the study sample over the 11 waves. The figure shows a steady growth of the average occupational prestige among young people. Nonetheless, the growth parameters vary among individuals. The variation of the level of occupational prestige at age 21 is 67.69 (SE = 1.72, $p < .001$), the variation of the growth rate is 3.97 (SE = 0.11, $p < .001$), and the variation of the acceleration is 0.17 (SE = 0.01, $p < .001$). Table B1 in appendix B shows the baseline model.

Figure 1 Estimated mean occupational prestige among young people, 1996–2006



Full quadratic growth model

When the baseline model is extended to include education attainment and the other covariates, the picture becomes slightly different. As shown in table 2, the occupational prestige at age 21 and the rate of change were significantly predicted by an individual's educational attainment. In particular, a large positive effect was found for a bachelor or higher degree on the level of occupational prestige at age 21 and the linear growth of occupational prestige. On the other hand, individuals without Year 12 or equivalent had the lowest level of occupational prestige at age 21 as well as the lowest rate of growth. For example, when other things are equal, compared with individuals who had completed Year 12, individuals with a bachelor or higher degree have 8.65 higher occupational prestige points at age 21 and 1.63 higher rate of linear growth, while individuals without Year 12 or equivalent have 1.93 lower occupational prestige at age 21 and 0.84 lower rate of change. There was

a gradient effect of VET qualifications on occupational prestige. The relative standing of occupational prestige was associate degree/advanced diploma, certificate III or IV, and certificate I or II, in that order. Table C1 in appendix C shows the full quadratic growth model with time-varying predictors of educational attainment and other covariates.

Table 2 Estimated effects of educational attainment on the growth of occupational prestige

Variables	Estimate	SE
Intercept	24.81***	0.38
ANU3-R	-1.12***	0.19
Year-growth rate	1.71***	0.07
Year2-acceleration	-0.09***	0.01
Educational attainment (completed Year 12 only)		
No Year 12	-1.93***	0.30
Certificate I or II completed	-1.26**	0.43
Certificate III or IV completed	0.44	0.37
Unknown certificate level	-1.11***	0.33
Diploma/advanced diploma/associate degree	1.03*	0.44
Bachelor degree or higher	8.65***	0.62
Interactions		
Year*No Year 12	-0.84***	0.10
Year*Certificate I or II completed	-0.61***	0.18
Year*Certificate III or IV completed	-0.38**	0.14
Year*Unknown certificate level	-0.54***	0.12
Year*Bachelor degree	1.63***	0.14

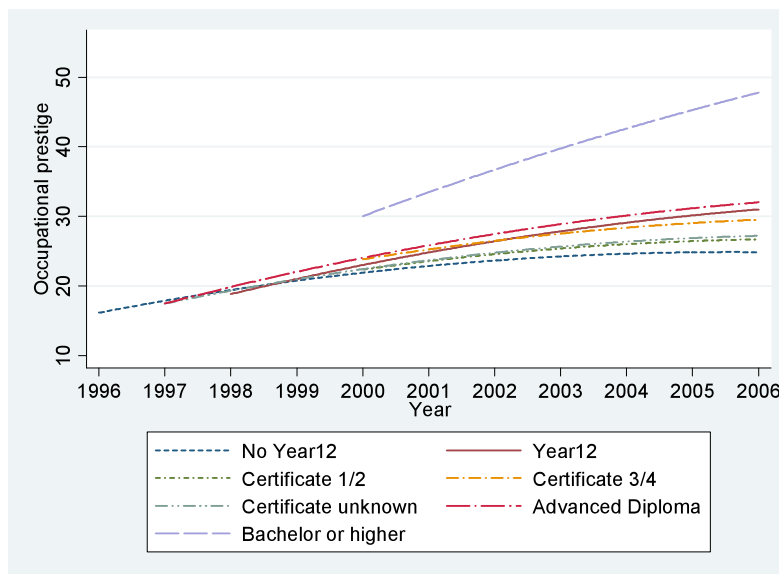
Notes: $n_t = 52\,672$, $n_i = 9\,907$. Other covariates are omitted in the table. The effects of educational attainment presented here are only for reference groups because interactions effects are not considered. Reference groups are in the parentheses. SE is standard error. * Significant at the 5% level, ** Significant at the 1% level, *** Significant at the 0.1% level.

Source: Estimated from LSAY 1995 cohort data.

At the end of the study period for the reference groups the average gap between young people with a bachelor or higher degree and young people without Year 12 or equivalent becomes about 23 points. This means that, by the age 26, the average occupational prestige of individuals without Year 12 or equivalent corresponds to stonemasons or sales assistants (25.1) and the average occupational prestige of individuals with a bachelor or higher is equivalent to financial brokers or artists (47.9). Figure 2 presents the predicted growth of occupational prestige by the level of educational attainment without interaction effects between educational attainment and individual background variables.

The correlation between the intercept and the rate of change indicates that the gap between young people with higher and lower occupational prestige at age 21 becomes larger by the age of 26. The correlation between the occupational prestige at age 21 and the linear growth is 0.40. This means that young people with higher occupational prestige at age 21 tend to have a higher rate of linear growth in their occupational prestige. The correlation between occupational prestige at age 21 and acceleration rate was -0.47. This means that individuals with higher occupational prestige at age 21 tend to have less-curved growth lines than individuals with lower occupational prestige at age 21. Given the inverted U-shape of the growth curve and both correlations, the gaps in occupational prestige will become larger as time goes by if the patterns observed continue beyond the age of 26. Table C2 in appendix C shows the correlations among random coefficients.

Figure 2 Predicted growth of occupational prestige by the highest educational qualification attained



The effects of educational attainment on the growth of occupational prestige differ by individual characteristics. Females tend to have higher occupational prestige and the difference between males and females was larger for young people without Year 12 or equivalent (figure 3). Academic achievement in Year 9 was also a significant predictor of occupational prestige at age 21; however, the difference varies by educational level (figure 4). The gap was minimal for young people without Year 12 or equivalent, whereas the difference between the highest quartile of academic achievement and others was larger for young people with a bachelor or higher degree.

Family background was associated with occupational prestige above and beyond the effect of young people's educational attainment. After controlling for other covariates, children of parents with an upper-middle or upper-level occupation and children of parents with a bachelor or higher degree have higher occupational prestige than their counterparts. However, there were no significant interaction effects between educational attainment and family background.

Figure 3 Predicted prestige by gender and education

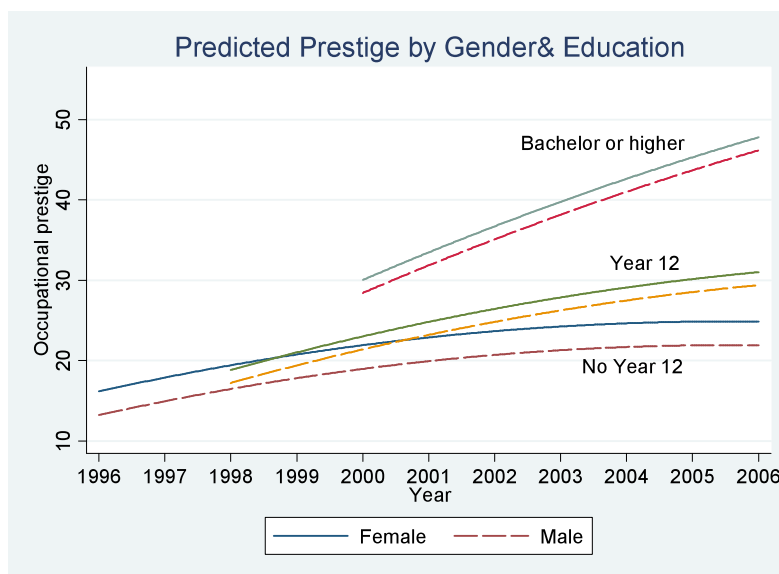
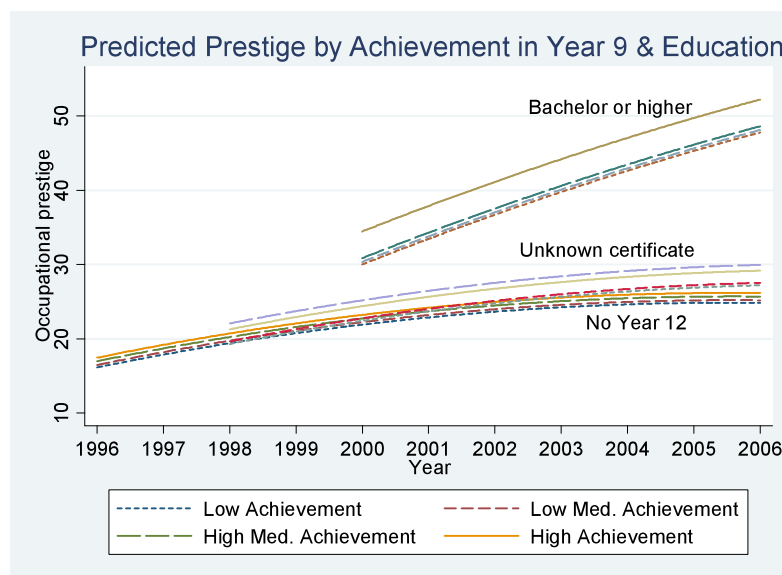


Figure 4 Predicted prestige by achievement in Year 9 and education



Models by gender

Separate models were fitted for males and females due to the different circumstances they may experience in their young adulthood (for example, differences in the labour market, marriage and child bearing, caring for sick family members). Although the general patterns are similar, there are some differences, as shown in table 3. For both males and females, the level and rate of growth was highest for individuals with a bachelor or higher degree and lowest for individuals without Year 12 or equivalent. However, occupational prestige showed little difference for females with varying levels of certificates or associate degree/advanced diploma, whereas they were quite divergent for males. This means that males benefited more from VET qualifications than females. Figure 5 shows predicted occupational prestige by educational attainment for males and for females separately. Further details of the models are presented in table D1 in appendix D.

Males and females share the same pattern in the context of effects of individual and family background. The major difference is that effects were stronger for males. For both males and females, the level of occupational prestige at age 21 differs by academic achievement in Year 9. Individuals who were at the highest quartile of achievement in Year 9 generally had higher occupational prestige than individuals who were at the lowest quartile. However, the gap was much bigger for males, especially for males with a bachelor or higher degree. Regardless of gender, the occupational prestige of young people without Year 12 or equivalent did not differ by academic achievement in Year 9. The interaction effects are presented in appendix E.

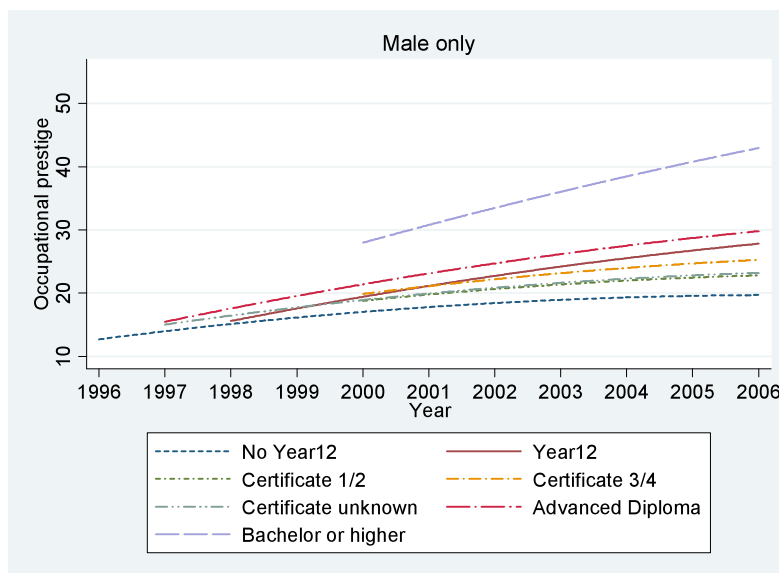
The effects of family background were also stronger for males. Males who had parents with an upper-middle or upper-level occupation had significantly higher occupational prestige at age 21, while only females who had parents with upper-level occupation had significantly higher occupational prestige than their counterparts. At age 21, males who had parents with a degree had 1.14 points higher occupational prestige than their counterparts, whereas the difference was only 0.61 points for females.

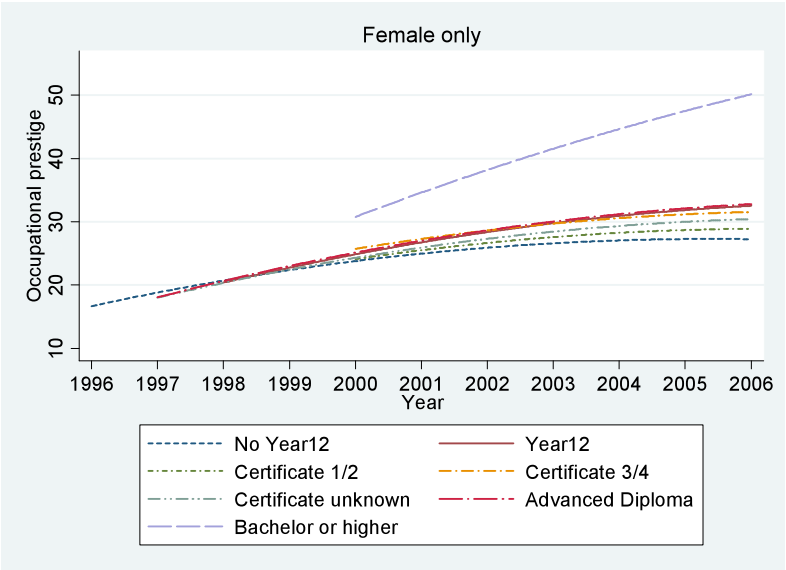
Table 3 Estimated effects of educational attainment on the growth of occupational prestige by gender

Variables	Male		Female	
	Estimate	SE	Estimate	SE
Intercept	21.14***	0.57	26.73***	0.48
ANU3-R	-0.39	0.29	-1.74***	0.26
Year-growth rate	1.66***	0.10	1.76***	0.09
Year2-acceleration	-0.06***	0.02	-0.12***	0.02
Educational attainment (completed Year 12 only)				
No Year 12	-3.34***	0.42	-1.77***	0.38
Certificate I or II completed	-1.36*	0.65	-1.23*	0.56
Certificate III or IV completed	-0.03	0.64	0.58	0.44
Unknown certificate level	-1.19*	0.48	-0.81	0.44
Diploma/advanced diploma/associate degree	1.98**	0.75	0.27	0.53
Bachelor degree or higher	9.65***	1.12	7.86***	0.74
Interactions				
Year*No Year 12	-0.96***	0.14	-0.70***	0.14
Year*Certificate I or II completed	-0.73**	0.27	-0.48	0.25
Year*Certificate III or IV completed	-0.50*	0.24	-0.31	0.18
Year*Unknown certificate level	-0.68***	0.16	-0.26	0.18
Year*Bachelor degree	1.09***	0.23	1.95***	0.18

Notes: n_i of male = 4754, n_i of female = 5153. Other covariates are omitted in the above table. The effects of educational attainment presented here are only for reference groups because interactions effects are not considered. Reference groups are in the parentheses. SE is standard error. * Significant at the 5% level, ** Significant at the 1% level, *** Significant at the 0.1% level.

Source: Estimated from LSAY 1995 cohort data.

Figure 5 Predicted growth of occupational prestige by the highest educational qualification attained (based on the male-only and female-only models)



Discussion

Potential of education for social mobility

The findings of this study suggest the potential of education for aiding social mobility. In general, there was a gradient effect of education on occupational prestige. The more educated a young person is, the higher his or her occupational prestige. An occupational return from education was especially strong for young people with a bachelor or higher degree. An individual with a bachelor or higher degree had not only a higher status at age 21 but also a higher growth rate in occupational prestige. This means that the gap between young people with and without a degree grows larger over time. Although a different outcome was examined, the result of this study is consistent with the high income returns from a bachelor or higher degree found in the literature (for example, Leigh & Ryan 2008; Miller, Mulvey & Martin 2006; Grubb 1993). Grubb (1993) argued that there is a fundamental difference between the labour market for university graduates and the sub-baccalaureate labour market. The author speculated that the difference is a consequence of the different skills required, the scope of the labour market (local vs regional/national), and the strength of the signalling value. Whether these are true or not, it seems that higher returns are realised from a bachelor or higher degree.

The results also showed that there are benefits in obtaining VET qualifications, albeit smaller than for a degree. By the age of 26, individuals with higher-level VET qualifications had higher occupational prestige than individuals with lower-level VET qualifications. This is congruent with the gradient wage effects of VET qualifications found by Ryan (2002), who reported that people with associate diplomas are paid more than people with basic or skilled vocational qualifications.

The occupational prestige of individuals with Year 12 completion only was about the same as that of individuals with the associate degree/advanced diploma. This may be partly due to the fact that some young people with Year 12 completion only were university students at the time. Future studies differentiating these two groups (studying vs not studying) may address this issue. As we expect, young people without Year 12 or equivalent occupied the lowest jobs on the continuum of occupational prestige. By age 26, the growth of occupational prestige plateaus, with no further increase shown. It is possible that there exists a plateau for higher-level qualifications, but the LSAY data do not extend far enough into the future to determine this.

The results suggest that females have higher occupational prestige than do males. There may be several possible explanations for the gender difference. One possible explanation is that the study sample only includes young people who are in the labour force. If females with lower educational levels are out of labour market for various reasons (for example, child bearing and rearing, caring for sick family members), this may raise the relative occupational prestige of those females who are in the labour force. Another possibility is that females are more likely to work in white-collar jobs than males. Jones (1989) argued that the relatively higher occupation prestige of females reflects a shift in female employment towards a greater concentration in white-collar work. White-collar jobs may have higher occupational prestige even though they do not offer higher salaries than blue-collar jobs. Interestingly, Magnusson (2008) with a Swedish sample found that work generally done by women does not have lower prestige in society but women receive lower wages than men for their occupational prestige. Further research examining gender differences on both occupational prestige and wages would provide a clearer picture.

The occupational prestige gaps according to educational attainment were, however, greater for males than for females. Males without Year 12 or equivalent especially had lower occupational prestige than females with similar educational attainment. The occupational prestige of males with various VET qualifications differs noticeably, whereas such differences are not as apparent for females. This indicates that males have relatively larger occupational returns for their investment in VET qualifications. Although different outcomes were examined, this result is somewhat consistent with Ryan (2002), in that males had larger returns—wages—for their VET qualifications than females. It is not clear whether the concentration of females in white-collar jobs may partly explain this phenomenon. The other reason may be the tendency for VET to be undertaken by males through apprenticeships.

Academic achievement in Year 9 was also an important predictor of occupational prestige at age 21 and the effect was stronger for males. The gap between the highest quartile and others in occupational prestige was minimal for young people without Year 12 or equivalent, whereas the gap was larger for young people with a bachelor or higher degree. This may be due to the fact that there are limits to the jobs available for individuals without Year 12 completion or equivalent. Regardless of their academic achievement, there may be limited opportunities for further occupational growth when young people do not finish Year 12 or equivalent.

The effects of family background on occupational prestige exist above and beyond the effects of educational attainment. Children of parents with upper-middle and upper levels of occupation and children of parents with a bachelor or higher degree have higher occupational prestige than their counterparts. Again, the effects of family background were stronger for males.

Accumulation of educational credentials has been a major route to upward social mobility. Although the effects of individual and family backgrounds on occupational prestige exist above and beyond the effect of educational attainment, the findings of this study suggest that if young people obtain higher qualifications they may have higher occupational prestige than their counterparts, even when they are from disadvantaged backgrounds.

In order for higher education to function as a mechanism for social mobility, however, young people should be given equal opportunities for higher education. The literature suggests that, for a variety of reasons, individuals from disadvantaged backgrounds do not have equal opportunities for higher education and this contributes to the intergenerational transmission of disadvantage. For example, Haveman and Smeeding (2006) reported that: the rate of Year 12 completion differs by the socioeconomic status of family; individuals from low-income families are clustered around vocational training; and many students from low-income families aspire to go to higher education but do not enter or cannot finish even when they enter.

Families have varying access to resources. Parents with higher income are generally able to provide greater financial resources, parental time and support to ensure their children's academic success. By contrast, parents whose socioeconomic status is far lower generally consider the higher education pathway for their children later and possess fewer resources and limited information (Haveman & Smeeding 2006). For example, compared with parents in the tenth percentile of the income distribution, parents in the ninetieth percentile had, on average, over five times more financial resources for supporting each child (Haveman & Smeeding 2006).

The influence of differing investment appears in various forms. Studies have reported that academic achievement is related to family background, as is educational attainment (Considine & Zappalà 2002; Forsyth & Furlong 2003; Haveman & Smeeding 2006; Marks et al. 2000). In fact, 'ability, motivation, and preparedness are all linked to the economic position of the children's families' (Haveman & Smeeding 2006, p.129). As a consequence, young people from low-income families not only struggle academically, but they are also often psychologically and culturally unprepared for higher education. Given the positive effect of educational attainment on occupational prestige and its potential for social mobility, it is imperative to ensure that every young person is given equal opportunity for higher education.

Limitations

As in other longitudinal studies, attrition is a great concern in this study. In particular, high attrition was observed among males, the Indigenous group, individuals born in non-English speaking countries, and young people with lower academic achievement in Year 9. Because more disadvantaged people tend to drop out, there is a possibility of upward bias for the occupational prestige of these groups. Unfortunately, weights were not used for the current study due to the complexity of the longitudinal data structure. Thus, a caution should be offered in interpreting the findings of this study. However, by including these variables (males, the Indigenous group, individuals born in non-English speaking countries, and young people with lower academic achievement in Year 9) in the model, this bias is likely to be greatly reduced and inferences of relationships become valid.

The outcome variable of the current study is occupational prestige using the ANU3 scale. The ANU3 scale is based on the Australian Standard Classification of Occupations, which is 'skill-based and reflects the different educational and training requirements of jobs' (Jones 1989, p.188). Thus when ANU3 is used it is reasonable to assume that educational attainment is predicting occupational prestige. However, it is argued that the ANU3 scale has a clear socioeconomic basis in contemporary Australian society, and a high-prestige rating on the scale goes with high income, full-time work, and high rates of self-employment. Nevertheless, as acknowledged by McMillan and Jones (2000), the ANU3 scale 'does not exhaust the socially relevant dimensions of occupational differences' (p.68). Further research examining other aspects of occupational differentiation (for example, wage differences, firm size, working conditions, and fringe benefits) will provide additional information about returns from education.

Another limitation is the discontinuity of the ANU3 scale. A new version of ANU3 was adopted in the middle of the study period (the year 2001). As a result, the relative rankings of occupations and subsequent continuous scores on the scale might have changed. It is possible that an individual's score on the scale increased or decreased even when he or she did not change his or her job. Although a dummy variable was used to flag the change of versions, this may not capture all the differences.

Educational attainment is measured as the highest qualification achieved. However, this does not differentiate between an individual currently undertaking courses towards a qualification and one who is not. For example, a university student and a person who completed Year 12 only may face different employment conditions although both have Year 12 completion as the highest qualification attained. This may be part of the reason why young people with Year 12 completion have relatively higher occupational prestige than individuals with other VET qualifications.

Lastly, the data are based on a self-report system. Few cases seemed to have apparent errors in their occupational prestige (for example, university teacher at age 17). However, it was not always possible to determine whether an error was present or not. Thus, 1% of observations with large residuals were removed from the study.

Implications

The findings of the current study suggest that further efforts to increase the completion of Year 12 are needed. Without Year 12 completion or its equivalent, the opportunities for employment seem to be very limited. Various efforts from the early school years to reduce the achievement gap and to increase school engagement may prevent school dropout in later years. Furthermore, given the occupational advantages of VET qualifications found in the current study, support for early school leavers to pursue VET qualifications may increase their opportunities for better jobs in the future.

Most importantly, it is necessary to expand the opportunities for young people to pursue higher education. In particular, further assistance to increase enrolment in and completion of higher

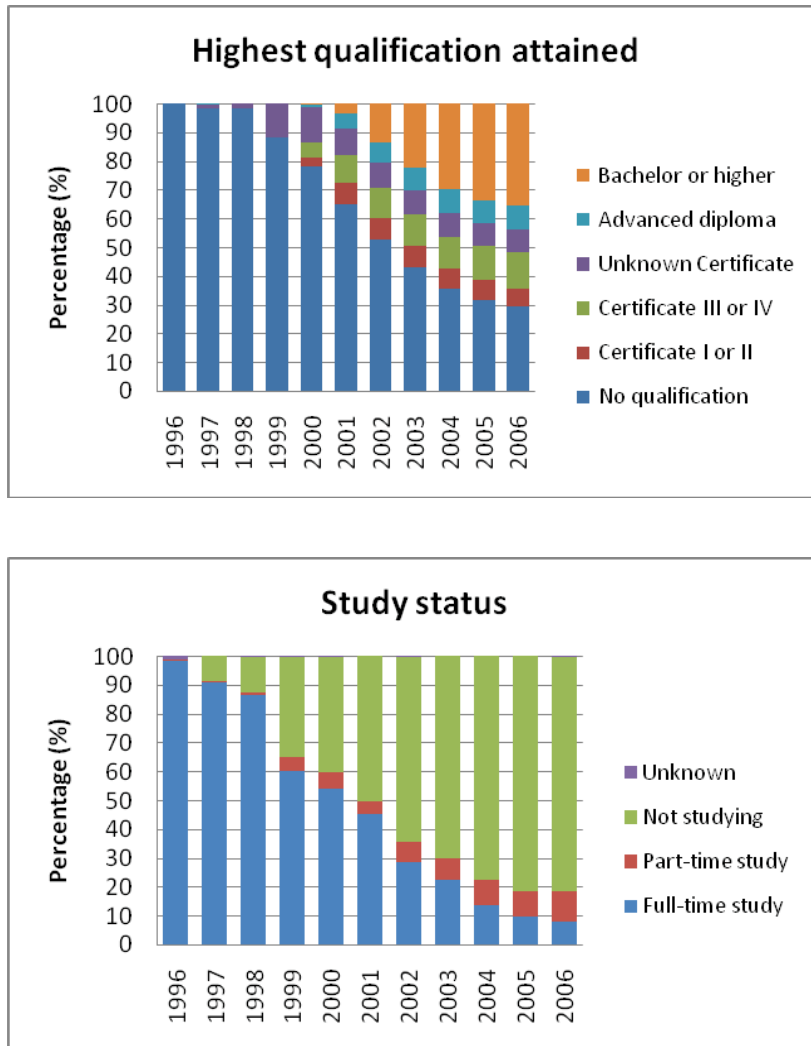
education for individuals from disadvantaged backgrounds is crucial. In Australian society, differences in income or occupational prestige based on individuals' abilities, qualifications, and skills are generally justified and socially accepted. However, if there is inequality in accessing and completing qualifications or obtaining skills, social difference then becomes legitimised as educational difference (Brennan & Naidoo 2008). Given the larger occupational returns from a bachelor or higher degree, if opportunities for higher education are unequally distributed, as many studies claim, the education system will fail to promote social mobility and the current social status of individuals will continue without change. Some may argue that young people from disadvantaged backgrounds have a similar chance as more advantaged young people for higher education if they strive. However, as claimed by Vincent Tinto, 'access without support does not ensure equality of opportunity' (cited in Haveman & Smeeding 2006, p.140).

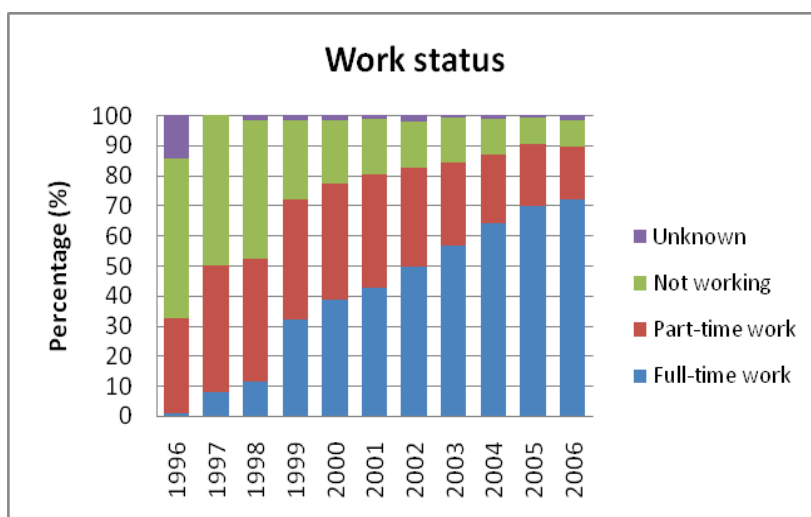
References

- ABS (Australian Bureau of Statistics) 2008a, *Australian social trends, 2008*, viewed 14 December 2009, <<http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Chapter6002008>>.
- 2008b, *Measures of Australia's progress: summary indicators, 2008* (edition 1), viewed 14 December 2009, <[http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/1383.0.55.001Main%20Features42008%20\(Edition%201\)?opendocument&tabname=Summary&prodno=1383.0.55.001&issue=2008%20\(Edition%201\)&num=&view=>](http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/1383.0.55.001Main%20Features42008%20(Edition%201)?opendocument&tabname=Summary&prodno=1383.0.55.001&issue=2008%20(Edition%201)&num=&view=>)>.
- Borland, J, Dawkins, P, Johnson, D & Williams, R 2000, *Returns to investment in higher education*, Melbourne Economics of Higher Education Research Program report no.1, University of Melbourne.
- Brennan, J & Naidoo, R 2008, 'Higher education and the achievement (and/or prevention) of equity and social justice', *Higher Education*, vol.56, pp.287–302.
- Canton, E 2007, 'Social returns to education: macro-evidence', *De Economist*, vol.155, pp.449–68.
- Considine, G & Zappalà, G 2002, 'The influence of social and economic disadvantage in the academic performance of school students in Australia', *Journal of Sociology*, vol.38, pp.129–48.
- Forsyth, A & Furlong, A 2003, 'Access to higher education and disadvantaged young people', *British Educational Research Journal*, vol.29, pp.205–25.
- Frazis, H 2002, 'Human capital, signalling, and the pattern of returns to education', *Oxford Economic Papers*, vol.54, pp.298–320.
- Grubb, W 1993, 'The varied economic returns to postsecondary education: new evidence from the class of 1972', *The Journal of Human Resources*, vol.18, pp.365–82.
- Haveman, R & Smeeding, T 2006, 'The role of higher education in social mobility', *The Future of Children*, vol.16, pp.125–50.
- Jones, F 1989, 'Occupational prestige in Australia: a new scale', *Australian and New Zealand Journal of Sociology*, vol.25, pp.187–97.
- Leigh, A & Ryan, C 2008, 'Estimating returns to education using different natural experiment techniques', *Economics of Education Review*, vol.27, pp.149–60.
- Magnusson, C 2008, 'Gender, occupational prestige, and wages: a test of devaluation theory', *European Sociological Review*, vol.25, pp.87–101.
- Marks, G, Fleming, N, Long, M & McMillan, J 2000, *Patterns of participation in Year 12 and higher education in Australia: trends and issues*, LSAY research report no.17, Australian Council for Educational Research, Melbourne.
- McMillan, J & Jones, F 2000, 'The ANU3_2 scale: a revised occupational status scale for Australia', *Journal of Sociology*, vol.36, pp.64–80.
- Miller, P, Mulvey, C & Martin, N 2006, 'The returns to schooling: estimates from a sample of young Australian twins', *Labour Economics*, vol.13, pp.571–87.
- Ministerial Council on Education, Employment, Training and Youth Affairs 2008, *Melbourne Declaration on Educational Goals for Young Australians*, MCEETYA, Canberra.
- NCVER (National Centre for Vocational Education Research) 2009, *Longitudinal Surveys of Australian Youth (LSAY) Y95 cohort: user guide*, Technical report no. 49, NCVER, Adelaide.
- Penman, R 2004, *What do we know about the experiences of Australian youth? An easy reference guide to Longitudinal Surveys of Australian Youth research reports, 1996–2003*, Australian Council for Educational Research, Melbourne.
- Raudenbush, SW & Bryk, AS 2002, *Hierarchical linear models: applications and data analysis methods*, 2nd edn, Sage, Thousand Oaks, CA.
- Ryan, C 2002, *Individual returns to vocational education and training qualifications: their implications for lifelong learning*, NCVER, Adelaide.
- Sianesi, B & Van Reenen, J 2003, 'The returns to education: macroeconomics', *Journal of Economic Surveys*, vol.17, pp.157–200.

Appendix A: Sample characteristics

Figure A1 Study and work status, 1996–2006





Note: Figures are based on descriptive statistics on the LSAY website (LSAY 1995 cohort data).

Appendix B: Baseline model

Table B1 Baseline model of occupational prestige among young people

Fixed effects	Estimate	SE
Intercept	27.02***	0.17
ANU3-R	-0.79***	0.17
Year-growth rate	2.55***	0.04
Year2-acceleration	0.10***	0.01
Random effects		
Intercept	67.69***	1.72
Year-growth rate	3.97***	0.11
Year2-acceleration	0.17***	0.01
Level 1 residuals		
1996	33.18***	1.87
1997	56.02***	1.47
1998	61.71***	1.51
1999	82.43***	1.81
2000	92.48***	2.09
2001	101.93***	2.42
2002	127.88***	3.07
2003	152.42***	3.80
2004	142.39***	3.92
2005	103.30***	3.56
2006	91.96***	5.08
Deviance	407 282.7	

Notes: $n_t = 52\,672$, $n_i = 9907$. SE is standard error. *** Significant at the 0.1% level.

Source: Estimated from LSAY 1995 cohort data.

Appendix C:

Full quadratic growth model

Table C1 Full quadratic growth model of occupational prestige among young people

Fixed effects	Estimate	SE
Intercept	24.81***	0.38
ANU3-R	-1.12***	0.19
Year-growth rate	1.71***	0.07
Year2-acceleration	-0.09***	0.01
Male (female)	-1.62***	0.21
Indigenous status (non-Indigenous)		
Indigenous	-0.06	0.55
Unknown	0.25	0.39
Country of origin (Australia)		
English speaking country	-0.44	0.39
Non-English speaking country	0.49*	0.34
Unknown	-0.64	0.55
Parental occupation (lower)		
Lower middle	0.14	0.19
Upper middle	0.78***	0.22
Upper	1.74***	0.26
Unknown	-0.06	0.33
Parental education – degree holder (no degree)	0.81***	0.19
Academic achievement (low)		
Medium low	0.33	0.22
Medium high	0.83***	0.22
High	1.96***	0.28
Educational attainment (completed Year 12 only)		
No Year 12	-1.93***	0.30
Certificate I or II completed	-1.26**	0.43
Certificate III or IV completed	0.44	0.37
Unknown certificate level	-1.11***	0.33
Diploma/advanced diploma/associate degree	1.03*	0.44
Bachelor degree or higher	8.65***	0.62
Study status (part-time study)		
Full-time study	0.43**	0.15
Not studying or unknown	-1.08	1.28
Work status (part-time work)		
Full-time work	5.73***	0.16
Unknown	0.28	0.27

Fixed effects	Estimate	SE
Work position (casual)		
Permanent	-1.40***	0.18
Unknown	0.29	0.20
Spell of unemployment (no spell)	-1.32***	0.14
Interactions		
Year*No Year 12	-0.84***	0.10
Year*Certificate I or II completed	-0.61***	0.18
Year*Certificate III or IV completed	-0.38**	0.14
Year*Unknown certificate level	-0.54***	0.12
Year*Bachelor degree	1.63***	0.14
Male*No Year 12	-1.34***	0.24
Medium high achievement*Unknown certificate	1.92**	0.59
High achievement*No Year 12	-0.65*	0.26
High achievement*Bachelor degree	2.46***	0.68
Random effects		
Intercept	54.54***	2.60
Year-growth rate	1.72***	0.09
Year2-acceleration	0.09***	0.01
Bachelor degree or higher	233.21***	13.94
Full-time study	14.62***	2.42
Full-time work	59.52***	3.16
Level 1 residuals		
1996	35.24***	1.85
1997	50.57***	1.40
1998	52.90***	1.42
1999	70.27***	1.71
2000	79.21***	1.92
2001	83.02***	2.15
2002	92.87***	2.53
2003	94.70***	2.70
2004	92.82***	2.80
2005	85.52***	2.88
2006	89.45***	3.89
Deviance	413 342.1	

Notes: $n_t = 52\,672$, $n_i = 9907$. Reference groups are in the parentheses. SE is standard error.

* Significant at the 5% level, ** Significant at the 1% level, *** Significant at the 0.1% level.

Source: Estimated from LSAY 1995 cohort data.

Table C2 Correlations among random coefficients in the full quadratic growth model

	Intercept	Year	Year2	Bachelor or higher	Full-time study	Full-time work
Intercept	1.00					
Year-growth rate	0.40	1.00				
Year ² -acceleration	-0.47	0.10	1.00			
Bachelor or higher	-0.21	-0.31	-0.14	1.00		
Full-time study	-0.15	0.22	-0.14	0.21	1.00	
Full-time work	-0.30	-0.04	0.19	-0.25	-0.19	1.00

Appendix D: Models by gender

Table D1 Quadratic growth model of occupational prestige by gender

Fixed effects	Male		Female	
	Estimate	SE	Estimate	SE
Intercept	21.14***	0.57	26.73***	0.48
ANU3-R	-0.39	0.29	-1.74***	0.26
Year-growth rate	1.66***	0.10	1.76***	0.09
Year2-acceleration	-0.06***	0.02	-0.12***	0.02
Indigenous status (non-Indigenous)				
Indigenous	-0.61	0.92	0.28	0.66
Unknown	0.61	0.54	-0.37	0.56
Country of origin (Australia)				
English speaking country	-0.15	0.65	-0.66	0.48
Non-English speaking country	0.67	0.57	0.45	0.42
Unknown	-0.88	0.79	-0.32	0.78
Parental occupation (lower)				
Lower middle	0.21	0.31	0.11	0.23
Upper middle	1.12**	0.35	0.51	0.27
Upper	2.06***	0.42	1.52***	0.32
Unknown	-0.04	0.50	-0.03	0.42
Parental education – degree holder (no degree)	1.14***	0.30	0.61**	0.23
Academic achievement (low)				
Medium low	0.51	0.35	0.13	0.28
Medium high	1.21***	0.36	0.5	0.28
High	2.90***	0.43	1.10**	0.35
Educational attainment (completed Year 12 only)				
No Year 12	-3.34***	0.42	-1.77***	0.38
Certificate I or II completed	-1.36*	0.65	-1.23*	0.56
Certificate III or IV completed	-0.03	0.64	0.58	0.44
Unknown certificate level	-1.19*	0.48	-0.81	0.44
Diploma/advanced diploma/associate degree	1.98**	0.75	0.27	0.53
Bachelor degree or higher	9.65***	1.12	7.86***	0.74
Study status (part-time study)				
Full-time study	1.20***	0.21	-0.32	0.20
Not studying or unknown	-0.12	1.76	-1.99	1.87
Work status (part-time work)				
Full-time work	5.59***	0.24	5.94***	0.22
Unknown	-0.03	0.42	0.51	0.35
Work position (casual)				
Permanent	-0.96***	0.26	-1.94***	0.26
Unknown	-0.17	0.32	0.75**	0.26
Spell of unemployment (no spell)	-1.25***	0.22	-1.38***	0.18

Fixed effects	Male		Female	
	Estimate	SE	Estimate	SE
Interactions				
Year*No Year 12	-0.96***	0.14	-0.70***	0.14
Year*Certificate I or II completed	-0.73**	0.27	-0.48	0.25
Year*Certificate III or IV completed	-0.50*	0.24	-0.31	0.18
Year*Unknown certificate level	-0.68***	0.16	-0.26	0.18
Year*Bachelor degree	1.09***	0.23	1.95***	0.18
Medium high achievement*Unknown certificate	2.22*	0.91	1.63*	0.76
High achievement*No Year 12	-1.25**	0.41	-0.23	0.33
High achievement*Bachelor degree	3.07**	1.13	2.15*	0.85
Random effects				
Intercept	76.04***	4.82	39.52***	2.85
Year-growth rate	1.89***	0.15	1.56***	0.12
Year2-acceleration	0.10***	0.01	0.07***	0.01
Bachelor degree or higher	254.62***	24.01	208.88***	16.24
Full-time study	10.81**	3.63	17.21***	3.16
Full-time work	62.96***	4.83	55.18***	4.20
Level 1 residuals				
1996	40.02***	3.22	32.82***	2.19
1997	61.30***	2.48	41.83***	1.60
1998	60.15***	2.39	47.03***	1.70
1999	77.04***	2.75	64.01***	2.12
2000	86.09***	3.06	73.36***	2.41
2001	90.05***	3.42	78.03***	2.74
2002	92.97***	3.77	93.26***	3.41
2003	101.52***	4.19	88.47***	3.48
2004	98.28***	4.31	87.86***	3.64
2005	92.31***	4.53	78.62***	3.64
2006	101.30***	6.21	79.44***	4.90
Deviance	188 497.5		210 587.8	

Notes: n_i of male = 4754, n_i of female = 5153. Reference groups are in the parentheses. SE is standard error. * Significant at the 5% level, ** Significant at the 1% level, *** Significant at the 0.1% level.

Source: Estimated from LSAY 1995 cohort data.

Appendix E: Interaction effects by gender

Figure E1 Predicted prestige by achievement in Year 9 and education, male only

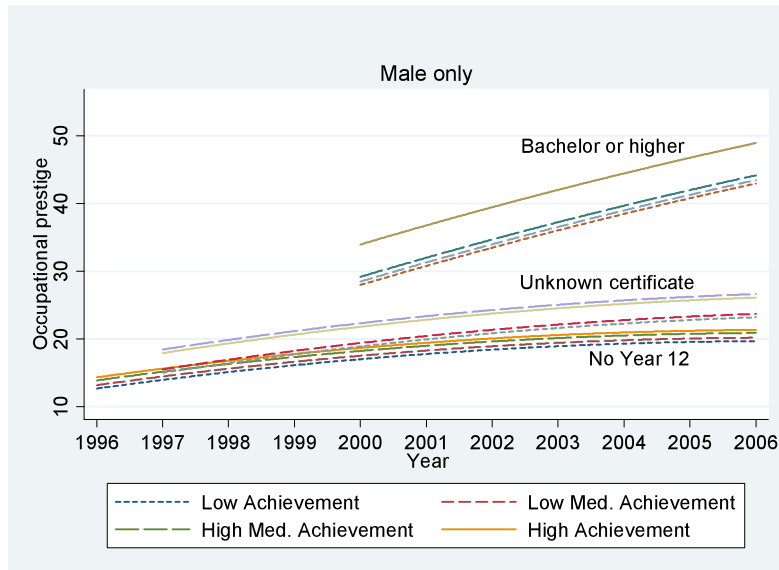
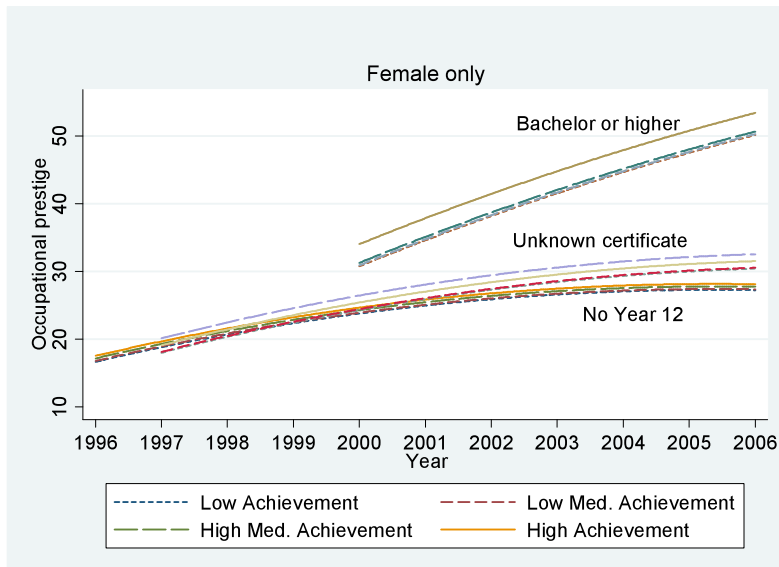


Figure E2 Predicted prestige by achievement in Year 9 and education, female only





Australian Government
Department of Education, Employment
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