Final Report

The education and employment outcomes of youth in school-to-work transition

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0. Executive Summary

The research examines the effects of macroeconomic conditions and a range of individual characteristics on the education and employment outcomes of youth, and how these outcomes change with age. In addition, the project examines the extent that educational qualifications protect against the impact of macroeconomic conditions. Based on the Longitudinal Surveys of Australian Youth (LSAY) and the Youth in Transition surveys (YIT), the project jointly studies education and work to capture the whole picture of young people's school-to-work transition. The aim is to answer the following research questions:

i) What are the determinants of education and employment outcomes of youth?

ii) To what extent are macroeconomic conditions affecting their study-work decisions?

iii) Do these effects depend on the education level?

0.1 Data

Macroeconomic conditions are measured by economic growth and unemployment rates. Two indicators – state-level annual Gross Domestic Product (GDP) growth rate and state-level monthly unemployment rate by gender – are linked to LSAY and YIT surveys. LSAY 1995 and LSAY 1998 follow a group of young people who were in Year 9 in 1995 and 1998 respectively. The YIT project data are based on longitudinal surveys of three groups of young people born in 1965, 1970 and 1975 respectively. By pooling data from all waves of these surveys, the final dataset covers the period between 1985 and 2006. The focus is on young people over 18 years of age who have left secondary school either before or after completing Year 12. The final dataset consists of 43,124 observations for males and 53,719 observations for females.

0.2 Methodology

The dependent variable comprises seven employment and education outcomes: not in the labour force, unemployed, part-time work, full-time work, full-time study, part-time study, and two combination statuses (full-time student and part-time work, full-time work and part-time student). Jointly considering education and employment decisions provides a better framework to understand school-to-work transitions than simply focusing on employment outcomes. Indeed, education and employment outcomes are often closely related. For instance, a longer time in full-time study necessarily delays labour market entrance. A multinomial logit model is used to evaluate the effects of individual characteristics and the

prevailing macroeconomic conditions on the probabilities of being in each of these seven states

0.3 Main findings

The descriptive analyses using simple cross tabulations show that there is a positive relationship between the proportion of young people unemployed and state-level unemployment rates. This relationship is stronger for males than for females. For females, higher unemployment rates are also correlated with higher probabilities of being out of the labour force (and not studying). By contrast, males are less likely to be out of the labour force (and not studying) when unemployment rates are very high (above eight per cent).

These relationships are further examined with multivariate analyses controlling for individuals' education, family background and other demographic characteristics. The main findings of the multivariate analyses are that both the unemployment and economic growth rates have an impact on youth's education and employment outcomes.

Economic growth, measured by annual GDP growth rate, has a significant impact among males and females with low education levels (less than Year 10). When GDP growth is low or negative, these two groups of young adults are less likely to be working and more likely to be studying. Moreover, the results clearly show higher unemployment probabilities for young males with an education level below Year 10 when GDP growth is low or negative, while other education groups are not affected. This indicates that the least educated are the most likely to be affected by poor economic circumstances.

Overall, the effects of the unemployment rate are more important than that of economic growth. High unemployment rates lead to higher unemployment probabilities for both males and females, particularly for those who have not completed high school. In addition, high unemployment rates have a negative effect on the probability of working full-time, especially for males who have not completed high school and males with a TAFE certificate. The results also show that high unemployment rates encourage further study. In particular, increases in the unemployment rate are associated with higher probabilities of study for young people with a university degree**.**

1. Introduction

This research project examines the effects of macroeconomic conditions and a range of individual characteristics on the education-employment outcomes of youth, and how these outcomes change with age. In addition, the project examines the extent that educational qualifications protect against the impact of macroeconomic conditions.

The school-to-work transition has far-reaching affects on young people's future labour market attainments. Indeed, it is argued that the time spent in economic inactivity or in unemployment during this transition may often lead to a depreciation of human capital and produce 'stigma' or 'scarring' effects. The project captures the whole picture of young people's school-to-work transition by jointly studying education and work. The aim is to answer the following research questions:

i) What are the determinants of education and employment outcomes of youth?

ii) To what extent are macroeconomic conditions affecting their study-work decisions?

iii) Do these effects depend on the education level?

Although international and Australian studies have emphasised the importance of initial-labour market outcomes, no recent study has examined the effects of macro-economic conditions on school-to-work transitions in Australia. The project aims to fill this gap. The analysis is carried out on data collected over a period long enough to control explicitly for both poor and positive macroeconomic conditions.

The report is structured in the following way. Following the introduction in Section 1, Section 2 provides a brief review of the approaches used in the international and Australian literature and their main findings. The data is described in Section 3. The findings from the descriptive statistics are reported in Section 4. The model used for the multivariate regression analyses is discussed in Section 5. The findings from the multivariate analyses are discussed in Section 6. Section 7 concludes.

2. Background literature

This project is motivated by findings in the literature arguing that poor starts in the labour market such as, unemployment have deleterious effects on subsequent labour market outcomes. In a multi-country study, which includes Australia, the OECD (1998) found that "starting off in the labour market as unemployed, regardless of ones' level of education,

almost guarantees employment problems in the future". In addition, this study shows that "the job prospects of new school leavers are […] highly sensitive to the overall state of the labour market". The study defines recent school leavers as individuals who were in initial education one year before data collection. OECD (1998) emphasizes the role of economic conditions on the likelihood of employment and unemployment of recent school leavers. Based on European data, the study finds that young men were more affected than young women by the recession of the early 1990s, which thus led to a narrowing of the male-female differential in labour market prospects. However, the OECD (1998) report did not consider if the impact of economic conditions on the labour market prospects differs according to education level.

This aspect is considered in a recent study by Oreopoulos et al. (2008). The authors examine the short- and long-term effects of graduating in a recession. The analysis is based on Canadian data and shows that "young graduates entering the labour market in a recession suffer significant initial earnings losses that, on average, eventually fade after 8 to 10 years." In addition, the study shows that high-skilled graduates suffer less from entry in a recession. High-skilled graduates suffer lower and less persistent earnings losses than low-skilled graduates. In a study focusing on German low- and medium-skilled male workers, Stevens (2007) reaches similar conclusions. That is, "wages are adversely affected in the first years in the labour market: entering the labour market in a recession (9% versus 5% unemployment) implies 3-4% lower wages in the first four years of the career, but these negative effects fade out completely over the next three years". Moreover, the study finds that higher unemployment rates have also a negative impact on the probability of being employed. This effect also fades out over the next few years.

For Australia, McMillan and Marks (2003) examine the process of school leaving and the transition from school to post-school education, training and the labour market with a special emphasis on young people who do not stay on to school to complete Year 12. The study is based on data from LSAY 1995, which follows a group of young people who were in Year 9 in 1995. The authors find that school non-completers fare better than school completers that did not enter higher education in some regards: they are more likely to be in full-time employment, receive higher hourly earnings, display greater job stability, and report being in the type of job they would like as a career. However, on other counts non-completers experience less successful transitions from school than those of completers: compared with completers not in higher education, male non-completers are more likely to be unemployed, and female non-completers are more likely to be outside the labour force. Nevertheless, after

controlling for a range of social background and educational factors, the direct effect of school completion on unemployment became less clear. The odds of completers being unemployed were not significantly different from those of early school leavers, other things being equal. The study also finds that literacy and numeracy skills are strong influences on school non-completion and also have effects on subsequent labour market outcomes. Young people who scored higher on the literacy and numeracy tests were much less likely to leave school before Year 12 and less likely to be unemployed.

Marks, Hillman and Beavis (2003) followed the experiences of a cohort of young people over five years during their early to mid-twenties, between 1996 and 2000. These young people were born in 1975 and participated in the Youth in Transition (YIT) longitudinal study between 1989 and 2002. Multivariate analyses were carried out to examine the main influences on the proportion of time in full-time work, unemployment and in other marginal activities (part-time work and not in the labour force). Prior experiences of full-time work and, to a lesser extent qualifications, have a positive impact on subsequent labour market outcomes. Completion of Year 12 has also a positive effect. Even after controlling for prior experience of full-time work, the completion of Year 12 increased the time spent in full-time work and reduced the time spent looking for work. Of the qualifications examined, a university degree had the strongest effect on subsequent time spent in full-time work, but afforded little protection against unemployment or participation in marginal activities (that is part-time work, not in the labour force or unemployed). The report emphasizes the benefits of gaining full-time employment early in the school-to-work transition and shows that unemployment has a scarring effect because it increases the probability of subsequent unemployment.

Marks (2005) examines the school-to-work transitions in Australia focusing on a more recent cohort: young people in Year 9 in 1995. The study was limited to young people who did not go to university. Although no attempt was made to formally assess the role of macroeconomic conditions, the author argues that “there is little doubt that during, and subsequent to, the 1991/93 recession the school-to-work transition was problematic for many young people”. A major finding of the study is that school-to-work transitions appear to have since become less problematic for most young people.

Some of the international literature emphasises the role of macroeconomic conditions. More than 15 years ago, Baker (1992) pointed out the negative effects of the recessions of the 1980s on the duration of unemployment spells for most demographic and economic groups.

Likewise, a study by Blanchflower and Freeman (1996) on youth labour markets in OECD countries in the 1980s and 1990s concludes that "the most likely cause for the adverse labour market experiences of youths is the high overall rate of unemployment".

Marks and Fleming (1998a) is the most recent Australian study to examine the employment outcomes of youth entering the labour market in Australia, while controlling explicitly for macroeconomic conditions as well as individual characteristics. The authors examine the factors influencing youth unemployment in Australia between 1980 and 1994. Consistent with the international literature, Marks and Fleming (1998a) also find effects for the prevailing economic conditions. They find an elasticity greater than one for the odds of being unemployed with respect to the overall national unemployment rate. In other words, youth unemployment is more sensitive to increases in unemployment than the general labour market. In a second report, Marks and Fleming (1998b) show an even stronger effect of the overall unemployment rate on the hourly earnings of youth.

Lamb, Dwyer and Wyn (2000) focus on young people who do not complete Year12 using data from the Australian Longitudinal Survey (ALS) and the Australian Youth Survey (AYS). The AYS is a longitudinal survey program based on annual interviews with a cohort of young people aged 16-19 in 1989, with a new sample of 16 year olds added each year from 1990-1994. The report notes that school non-completion rates fell from about 60 per cent in the early 1980s to 24 percent in the early 1990s but then increased by about 6 percentage points during the 1990s. The report reveals that the labour market outcomes of non-completers were highly affected by the downturn in teenage employment during the 1980s and early 1990s. Between the early 1980s and the mid-1990s, the number of unemployed non-completers increased substantially despite the decline in the number of non-completers. There was also a large increase in the number of female non-completers not in the labour force. Participation in vocational education and training also increased significantly among non-completers, and particularly among males.

Lamb and McKenzie (2001) examine the transitions from school to work for those who did not obtain a university or TAFE associate diploma or above and who were not enrolled for such qualifications in the seventh post-school year. Post-school education, training and employment experiences are examined also using data from the Australian Youth Survey (AYS). Although there is a great diversity of pathways, the results reveal relatively smooth transitions for the majority of these young people. About two thirds obtain a full-time job on leaving school (20 per cent), after apprenticeship or traineeship (13 per cent), after further

study (11 per cent) or after a short period of unemployment (24 per cent). However, school-to-work transitions are not smooth for the remaining one-third. Seven per cent experience long-term unemployment while another five percent remain in part-time work[1] and a further seven per cent never really enter the labour market. In addition, a large group (13 per cent) experience extended periods of unemployment (up to four years) before full-time work is achieved. Among the young people who experience difficulty in the school-to-work transition many are low school achievers and many did not complete Year 12. The number of years of schooling reduces the likelihood of experiencing long-term unemployment or of not being able to secure full-time work. The study also shows that negative experiences in the first post-school year have lasting adverse effect. The relationship between initial activities and long-term outcomes applies to all young people, independent of the success in the transitions from school to full-time work. The report reveals that "less than two-fifths of young men whose main first year activity is somewhat problematic experience a successful pathway over the next six years." By contrast, 95 per cent of young men whose principal activity in the first post-school year is an apprenticeship or traineeship subsequently experience a successful pathway characterized by lasting full-time employment.

A companion report focuses on young people who obtained a university degree or TAFE diploma or who were enrolled for such qualifications in the seventh post-school year (Lamb 2001).The report shows that the transitions to full-time work are relatively smooth for graduates. The main results are summarized as follows: (i) 45 per cent obtained a full-time job after graduation and remained in full-time work; (ii) 9 per cent deferred study, entered the workforce then after graduation re-entered the workforce; (iii) 7 per cent studied part-time while working and remained in work during the seven years; (iv) 16 per cent were still in study in the seventh post-school year; and (v) 17 per cent experienced a brief interruption in the transition to work with periods of unemployment or not looking for work after graduation, though this was less than 12 months and these graduates were in stable full-time work by their mid-20s. The transitions to stable full-time work were found to be problematic for only about six per cent of graduates.

Complementing Lamb (2001), in a recent multi-country study, OECD (2008) describes Australia as a country in which school-to-work transitions are relatively easy for young

[1] However, the study also supports the view that part-time work can be a stepping-stone to full-time employment for young people.

people. However, the study also notes that finding a stable job is more problematic and that "some low-qualified youth find themselves trapped in low-paid or temporary jobs".

From the literature review, it is apparent that only one study (Marks and Fleming, 1998a) has systematically examined the impact of macroeconomic conditions on the youth's early labour market outcomes in Australia. However, this study was completed some time ago and did not consider differences in macroeconomic conditions by state. This report uses the most recent data on youth labour market outcomes and takes into account state and territory (hereafter state) differences in the prevailing macroeconomic conditions. Most importantly, we compare the responses to changes of macroeconomic conditions among youth with different levels of education.

3. The Data

3.1 The macroeconomic data

Table 1 gives the GDP growth rates by state between 1985 and 2006. Macroeconomic conditions are expected to affect the education and employment choices of youth who have left school. In this report, macroeconomic conditions are measured by annual GDP growth rates and monthly unemployment rates. Table 1 shows that GDP growth rates varied greatly over time and across states. For instance, Queensland and Western Australia have been experiencing economic growth rates much higher than the national average since 2002. This emphasises the need to control for differences in macroeconomic conditions by state in the multivariate analysis. Unfortunately, GDP growth rates are not available at the state level prior to 1991, and national statistics are used instead for the 1985-1990 period.

Unemployment rates are available by gender and state from 1985 to 2006. Although monthly unemployment rates are used in this research, only annual average rates are presented in the appendix in order to limit the number of tables (see Table A.1 in the Appendix). As shown in Figure 1, there is great variation in the national unemployment and economic growth rates between 1985 and 2006. During this period, the Australian economy experienced one recession and several years of strong economic growth (over four per cent). The 1991-92 recession resulted in high unemployment levels. Unemployment remained high until the mid-1990s, even though strong economic growth occurred between 1993 and 1996. Recent years have been marked by low unemployment and high economic growth. It is beneficial to this study to include periods of strong economic growth associated with high and low levels of

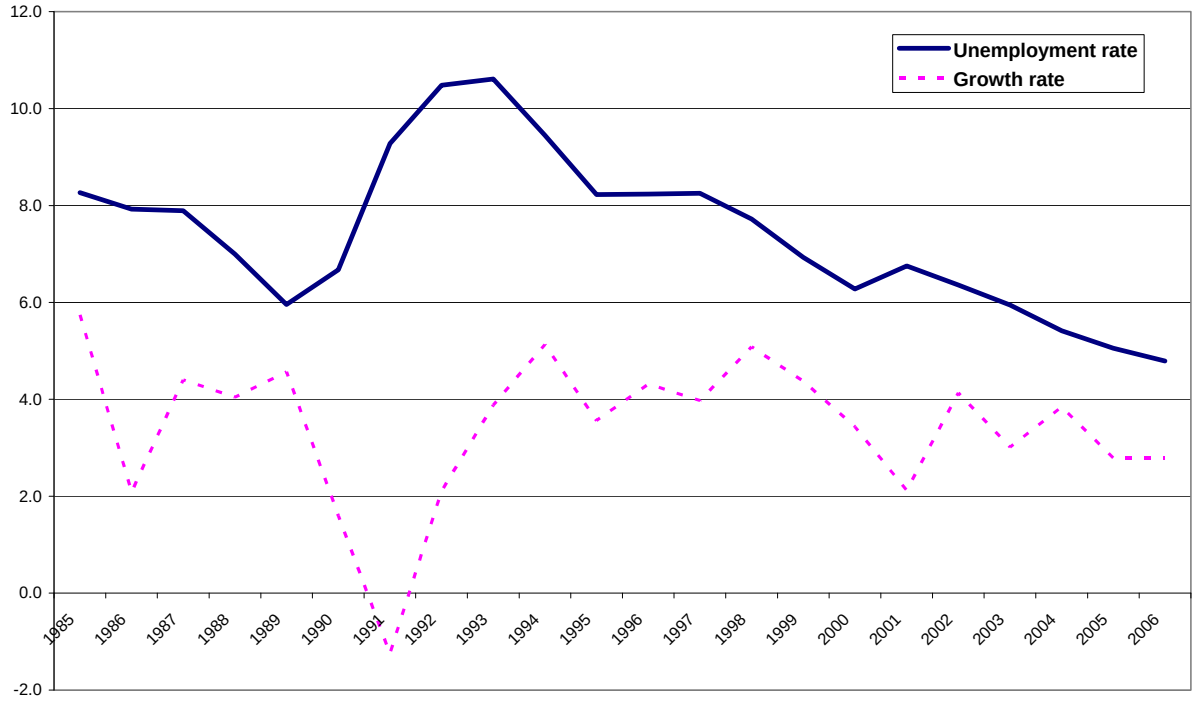
unemployment in order to distinguish the independent effects of economic growth and unemployment.

Table 1 Economic growth rates by State 1985-2006 (in percentage)

	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	National
1985	-	-	-	-	-	-	-	-	5.7
1986	-	-	-	-	-	-	-	-	2.1
1987	-	-	-	-	-	-	-	-	4.4
1988	-	-	-	-	-	-	-	-	4.0
1989	-	-	-	-	-	-	-	-	4.6
1990	-	-	-	-	-	-	-	-	1.6
1991	0.0	-2.7	0.2	-1.2	1.1	-0.2	2.5	2.0	-1.3
1992	-0.3	-1.7	2.5	-2.2	3.3	0.3	-2.1	-0.2	2.1
1993	2.7	3.9	6.4	2.5	3.8	3.1	-0.2	3.1	3.9
1994	3.2	3.7	4.6	3.2	6.5	2.3	-0.1	4.0	5.1
1995	4.3	3.9	5.9	2.1	6.4	3.3	4.3	4.7	3.6
1996	4.3	4.1	3.6	5.2	5.7	4.3	6.8	0.0	4.3
1997	4.4	3.2	4.2	1.9	3.3	0.2	1.4	1.5	4.0
1998	4.5	5.1	4.5	4.4	5.1	4.4	3.5	3.5	5.1
1999	5.0	6.0	6.1	3.1	3.9	3.8	6.2	6.9	4.4
2000	4.4	3.9	5.5	2.0	3.0	0.1	7.3	3.9	3.4
2001	2.4	1.5	2.2	3.6	-0.5	-0.9	5.5	2.9	2.1
2002	2.2	3.4	5.4	4.3	7.3	4.2	1.7	2.9	4.1
2003	3.0	2.7	4.8	1.4	4.2	2.6	0.6	3.5	3.0
2004	2.1	4.4	6.4	4.3	6.4	4.7	2.0	1.8	3.8
2005	1.8	2.4	4.6	1.2	4.0	3.2	5.5	2.4	2.8
2006	2.1	2.5	3.6	2.4	4.8	2.8	5.5	3.4	2.8

Source: (1) State information from ABS 5220.0 Australian National Accounts: State Accounts, Table 1. Gross State Product, Chain volume measures and current prices; (2) National information from ABS 5206.0 Australian National Accounts: National Income, Expenditure and Product (series A2304402X).

Figure 1 National unemployment and economic growth rates (1985-2006, in %)



Source: ABS

3.2 The microeconomic data

The data for the project is from the Longitudinal Surveys of Australian Youth (LSAY) and the Youth in Transition surveys (YIT). LSAY95 and LSAY98 follow a group of young people who were in Year 9 in 1995 and 1998 respectively. The YIT survey data used here are based on longitudinal surveys of three groups of young people born in 1965, 1970 and 1975 respectively.

The project focuses on the period between 1985 and 2006. For each year, the number of valid observations from each survey is presented in Table 2. Although the potential size of the data over the relevant period is greater than 250,000 person-years, the data used for the analysis is much smaller since it focuses on young people over 18 years of age who have left high school (either before or after completion). In other words, data from students while they were at school full-time were not included. In addition, 2,291 cases were excluded because employment or education status was missing. The final dataset consists of 96,843 observations comprising 43,124 observations for males and 53,719 observations for females.

Table 2 shows that although there are more than 1,400 observations for each year, the number of observations increases after 1999. This is because LSAY surveys have much larger sample sizes than the YIT surveys. As all individuals interviewed the same year faced the same macroeconomic conditions within their state, observations from all waves of both YIT and

LSAY cohorts are pooled. Thus, individuals have multiple observations at different ages, which should be taken into account when age effects on education and employment outcomes are interpreted.

Table 2 Sample sizes of YIT and LSAY cohorts over time

	Youth in Transition			LSAY		
Year	**65**	**70**	**75**	**95**	**98**	Total
1985	1,780	0	0	0	0	1,780
1986	1,457	0	0	0	0	1,457
1987	1,826	0	0	0	0	1,826
1988	1,609	1,438	0	0	0	3,047
1989	1,457	1,483	0	0	0	2,940
1990	1,327	1,319	0	0	0	2,646
1991	1,458	1,450	316	0	0	3,224
1992	1,344	1,311	2,386	0	0	5,041
1993	1,332	1,146	2,795	0	0	5,273
1994	1,076	1,041	2,322	0	0	4,439
1995	1,119	0	2,011	0	0	3,130
1996	0	0	1,932	0	0	1,932
1997	0	0	1,855	10	0	1,865
1998	0	0	1,545	478	0	2,023
1999	0	0	1,405	5,123	0	6,528
2000	0	0	1,172	4,210	27	5,409
2001	0	0	1,034	3,298	594	4,926
2002	0	0	0	3,404	4,791	8,195
2003	0	0	0	3,149	5,398	8,547
2004	0	0	0	2,976	5,058	8,034
2005	0	0	0	3,010	5,146	8,156
2006	0	0	0	2,412	4,013	6,425
Total	15,785	9,188	18,773	28,070	25,027	96,843

Note: Sample size numbers do not include secondary school students and respondents under 18 years of age.

Table 3 shows the gender distribution of the sample as well as the average age for each year between 1985 and 2006. There are slightly more females than males which could be explained by lower attrition rates for females. The average age of the youths in the sample fluctuates over the years essentially because the sample is based on five overlapping cohorts. The average age tends to decline in the years in which a new younger cohort is included, as in 1988, 1992, 1999 and 2002. As expected, males and females in the sample are of similar age.

Table 3 Gender distribution and age

	Gender distribution (shares in per cent)		Average age	
Year	**Male**	**Female**	**Male**	**Female**
1985	45	55	20.0	20.0
1986	45	55	21.0	21.0
1987	46	54	22.0	22.0
1988	45	55	20.7	20.6
1989	45	55	21.5	21.5
1990	45	55	22.5	22.5
1991	44	56	22.9	23.0
1992	42	58	21.7	21.5
1993	42	58	22.4	22.2
1994	43	57	23.6	23.0
1995	40	60	24.6	24.2
1996	37	63	22.2	22.2
1997	38	62	23.2	23.2
1998	43	57	22.1	23.3
1999	44	56	19.7	20.1
2000	41	59	20.7	21.0
2001	43	57	21.2	21.9
2002	46	54	19.7	19.7
2003	47	53	20.4	20.4
2004	47	53	21.4	21.4
2005	48	52	22.4	22.4
2006	48	52	23.5	23.6
All	45	55	21.6	21.7

4. Summary statistics

4.1 Labour market and education outcomes

The current employment and education status is the variable of central interest in this report. In the YIT surveys, the current labour market status refers to the reference month of October. In LSAY surveys, the current labour market status refers to the month of the interview, which is September or October in most cases, but can also be any month from August to February of the next year. Only post-secondary students are classified as students since secondary school students are excluded.[2] For each respondent-year, cases were allocated into the following seven mutually exclusive categories:

1. Studying and working full-time
2. Studying and working part-time

[2] Most trainees and apprentices are classified as students working either full-time or part-time. Unfortunately, a clear distinction between trainees and apprentices and other students could not be made consistently in the dataset due to the poor quality of the information available in this regard in YIT surveys.

3. Studying and not working
4. Working full-time (and not studying)
5. Working part-time (and not studying)
6. Unemployed (and not studying)
7. Not in the labour force (and not studying)

Tables 4 and 5 present the distributions across these seven categories by year for males and females respectively.

Table 4 Education and labour force status (males, in per cent)

	Studying			Working and not studying				
	Working							
Year	**Full-time**	**Part-time**	**Not in the labour force**	**Full-time**	**Part-time**	**Unem-ployed**	**Not in the labour force (and not studying)**	**No. of obser-vations**
1985	15.2	12.1	15.8	48.8	3.6	3.2	1.2	808
1986	14.0	7.9	14.2	54.1	3.1	4.8	2.0	649
1987	13.6	2.4	6.6	67.6	2.8	1.9	5.1	836
1988	19.8	8.6	11.6	52.3	2.3	3.3	2.0	1,366
1989	17.5	9.8	11.3	54.1	2.6	2.3	2.4	1,328
1990	15.4	9.2	10.6	57.2	2.6	3.6	1.3	1,179
1991	13.9	8.0	10.9	56.1	3.7	5.7	1.8	1,433
1992	16.2	12.9	14.8	42.9	5.5	5.6	2.0	2,124
1993	17.2	12.4	13.0	45.8	5.6	4.5	1.5	2,220
1994	15.4	12.6	9.5	54.5	4.4	2.5	1.1	1,915
1995	14.7	12.2	10.1	52.3	4.8	3.1	2.7	1,243
1996	12.0	14.5	10.9	49.2	6.4	4.8	2.1	722
1997	10.8	17.3	0.4	56.8	10.6	3.9	0.1	716
1998	9.6	6.3	4.3	65.1	6.8	2.2	5.7	877
1999	16.2	23.4	16.5	32.3	6.1	1.3	4.1	2,861
2000	8.1	27.3	15.2	37.5	6.3	1.8	3.9	2,222
2001	8.7	22.1	10.4	44.1	8.1	2.0	4.7	2,104
2002	7.3	29.1	16.1	32.9	7.9	2.2	4.5	3,737
2003	6.3	24.2	12.5	44.4	6.9	2.8	3.0	4,027
2004	9.4	19.2	7.4	52.2	6.9	1.4	3.6	3,791
2005	9.2	14.6	6.3	60.0	5.8	1.2	2.8	3,898
2006	8.9	12.0	5.7	64.4	5.2	0.5	3.4	3,068
All	11.6	17.0	11.0	49.1	5.8	2.5	3.0	43,124

Note: Row percentages sum to 100.

Table 5 Education and labour force status (females, in per cent)

Year	Studying			Working and not studying		Unem-ployed	Not in the labour force (and not studying)	No. of obser-vations
	Working							
	Full-time	Part-time	Not in the labour force	Full-time	Part-time			
1985	13.2	11.9	13.1	48.0	5.7	2.5	5.7	972
1986	10.4	11.1	10.4	53.0	5.3	2.7	7.1	808
1987	11.5	4.0	5.4	60.4	5.3	2.7	10.7	990
1988	10.4	10.8	11.4	48.9	6.7	4.2	7.6	1,681
1989	11.8	12.7	11.4	46.3	6.9	3.3	7.7	1,612
1990	9.8	12.3	10.0	47.3	6.9	3.1	10.6	1,467
1991	9.5	10.7	10.3	44.9	9.9	3.6	11.1	1,791
1992	8.9	17.3	16.5	33.9	10.8	3.9	8.7	2,917
1993	9.2	19.8	12.6	34.9	10.5	3.8	9.2	3,053
1994	9.5	20.8	10.0	39.9	12.9	2.7	4.3	2,524
1995	7.2	19.8	8.3	36.0	15.7	2.9	10.2	1,887
1996	11.1	18.2	8.6	43.1	10.9	3.1	5.0	1,210
1997	10.8	16.3	0.9	50.2	20.1	1.7	0.0	1,149
1998	11.0	8.1	4.1	54.0	11.4	2.7	8.6	1,146
1999	10.9	31.1	15.1	28.0	8.7	1.0	5.2	3,667
2000	7.9	33.2	12.2	31.6	8.5	1.0	5.6	3,187
2001	8.1	27.9	8.8	34.4	11.8	1.5	7.4	2,822
2002	6.6	36.7	14.3	23.9	11.5	1.7	5.2	4,458
2003	6.8	32.9	10.2	33.2	9.5	2.4	4.9	4,520
2004	9.7	24.3	6.5	41.1	11.0	1.5	5.8	4,243
2005	10.5	18.9	5.7	48.0	10.4	1.0	5.5	4,258
2006	10.2	14.9	5.4	54.2	8.8	0.5	6.1	3,357
Total	9.3	22.3	10.0	39.4	10.2	2.2	6.6	53,719

Note: Row percentages sum to 100.

Substantial variations in education-employment states occur over time. It is clear that not all these changes can be attributed to changes in macroeconomic conditions. Indeed, these large changes emphasize the need to control for changes in the activities of respondents as they age or when new respondents are added to the pooled data. In particular, the analysis should take into account the fact that the education and age distributions change over time.

As shown in Tables 4 and 5, the proportion in post-secondary education is higher among females than among males. The proportion of young people working full-time or part-time varies greatly over time, reflecting the changing structure of the group. Overall, females are less likely than males to work full-time and more likely to work part-time. In addition, females are more likely than males to withdraw from the labour force.

Peaks in unemployment occur in the mid-1980s and early 1990s, which is consistent with the macro-indicator of unemployment rate presented in the previous section. This is preliminary evidence that the youth labour market is sensitive to macroeconomic conditions. For both males and females, the data show a peak in the number of students working part-time in the late 1990s and early 2000s. This peak corresponds to a low in the number of full-time workers (not studying) and may simply be a reflection of changes in the age structure of the data. As shown in Table 3, these periods correspond to a low point for the average age.

4.2 Education

Table 6 shows the distribution of the sample by education level year by year.

Table 6 Education Attainment

Year	< Year 10	Year 10 or 11	Year 12	Certificate	Diploma	University	No. of observations
1985	3	41	52	3	1	0	1,780
1986	2	40	55	2	1	0	1,457
1987	3	45	50	1	1	0	1,826
1988	2	35	36	24	2	0	3,047
1989	2	31	34	30	3	1	2,940
1990	2	28	33	28	5	5	2,646
1991	2	31	31	23	6	8	3,224
1992	2	22	44	21	5	7	5,041
1993	1	20	51	17	4	7	5,273
1994	1	19	52	17	4	8	4,439
1995	1	20	54	13	5	7	3,130
1996	0	9	56	19	6	9	1,932
1997	0	8	56	19	7	10	1,865
1998	1	20	21	17	8	34	2,023
1999	0	8	66	12	3	10	6,528
2000	0	6	63	16	4	11	5,409
2001	0	13	49	16	7	15	4,926
2002	0	6	69	16	3	6	8,195
2003	0	8	63	16	3	10	8,547
2004	0	8	59	16	3	14	8,034
2005	0	8	57	16	4	15	8,156
2006	0	7	57	16	4	16	6,425
Total	1	15	54	17	4	10	96,843

Note: Row percentages sum to 100.

After 2000, there are few individuals with an education level below Year 10. Although this may reflect an historical trend, it is likely to be explained to a large extent by the design of LSAY surveys, which follow a cohort from Year 9 onwards. More generally, Table 6 shows that the average education level of the sample is not constant over the years. Again, this may

capture some historical trends in education levels but the structure of the pooled data also contributes to these changes. Due to increases in school retention (see Lamb, Dwyer and Wyn, 2000), in the LSAY surveys there are less individuals with education level below Year 12 than in the YIT surveys. Similarly, the share of young people with a university degree is much higher in the LSAY surveys. In other words, the demographic composition of the data is not homogenous over time, which does not allow for an unambiguous comparison of education levels over time. For instance, the peak in the proportion of degree holders in 1998 is essentially due to the peak in the average age of the sample for this particular year (see Table 3).

The labour force and education status of young people by education levels are presented in Table 7. Male and female secondary school graduates have a much lower probability of being unemployed than those who have not completed Year 12. Young males with education level below Year 12 show the highest proportions of worker, unemployed and youths not in the labour force. By contrast, this group exhibits the lowest proportion of students. Young females with education level below Year 12 exhibit a similar pattern, although they are less likely to be working and more likely to be out of the labour force than their male counterparts.

As one would expect, a great proportion of secondary school completers choose to pursue post-secondary education. As this group is likely to contain many university students, only a relatively small proportion of this group is working (and not studying) or looking for a job. Post-secondary education is correlated with a lower incidence of unemployment and a higher incidence of full-time work. As expected, the share of people out of the labour force is higher among females than among males and this proportion decreases with the level of education.

4.3 Unemployment rates, labour force status and education level

Table 8 presents the distributions of young people across the seven categories of employment and education statuses by state unemployment level. As expected, there seems to be a positive relationship between the proportion of young people being unemployed and state unemployment rates, which is stronger for males than for females. This is consistent with the Australian study by Marks and Fleming (1998a) who find that youth unemployment is sensitive to the national unemployment rate. Table 8 also reveals that, for females, higher unemployment rates are correlated with higher probabilities of being out of the labour force (and not studying). On the contrary, males are more likely to be unemployed but less likely to be out of the labour force (and not studying) when unemployment rates are very high (above eight per cent).

Table 7 Labour force and education status by education level and gender (in per cent)

Education	Studying: Working: Full-time	Studying: Working: Part-time	Studying: Not in the labour force	Working & not studying: Full-time	Working & not studying: Part-time	Unem-ployed	Not in the labour force (& not studying)	No. of obser-vations
Males								
< Year 10	3.7	0.6	4.0	71.1	4.8	9.9	5.9	353
Year 10 or 11	10.5	1.5	1.9	72.6	4.6	4.7	4.1	7,694
Year 12	11.7	25.7	15.4	37.3	5.6	1.6	2.7	23,341
Certificate	12.8	10.5	8.6	56.4	5.9	2.9	2.8	7,106
Diploma	11.9	10.6	6.2	58.2	8.3	2.5	2.3	1,215
University	11.7	10.0	8.1	55.8	8.8	2.0	3.6	3,415
All men	11.6	17.0	11.0	49.1	5.8	2.5	3.0	43,124
Females								
< Year 10	2.3	5.0	4.0	36.1	16.6	8.6	27.5	302
Year 10 or 11	6.1	3.1	3.0	51.0	15.3	4.4	17.1	6,858
Year 12	9.5	33.0	13.7	29.5	8.4	1.4	4.6	28,959
Certificate	10.4	13.8	8.4	46.8	11.2	3.2	6.2	9,043
Diploma	9.7	12.2	5.5	52.1	12.2	1.9	6.5	2,582
University	10.5	10.3	5.2	58.2	10.5	1.5	3.9	5,975
All women	9.3	22.3	10.0	39.4	10.2	2.2	6.6	53,719

Note: Row percentages sum to 100.

Table 8 Labour force and education status by level of state unemployment rate (in per cent)

Unemployment rate	Studying: Working: Full-time	Studying: Working: Part-time	Studying: Not in the labour force	Working & not studying: Full-time	Working & not studying: Part-time	Unem-ployed	Not in the labour force (& not studying)	Total	No. of obser-vations
Males									
<4%	9.0	13.6	7.1	59.4	6.2	1.3	3.4	100	2,995
Between 4% and 6%	10.4	18.9	9.9	49.8	5.9	2.0	3.1	100	13,475
Between 6% and 8%	11.6	18.9	11.9	46.3	5.9	2.0	3.4	100	14,382
>8%	13.6	13.5	12.0	49.0	5.4	4.0	2.5	100	12,272
All men	11.6	17.0	11.0	49.1	5.8	2.5	3.0	100	43,124
Females									
<4%	10.6	17.5	8.1	46.0	10.0	1.0	6.8	100	2,914
Between 4% and 6%	9.4	25.5	9.0	39.2	9.8	1.7	5.4	100	19,442
Between 6% and 8%	9.2	22.6	10.5	38.7	10.3	2.1	6.4	100	18,947
>8%	8.9	17.8	11.3	39.3	10.7	3.2	8.8	100	12,416
All women	9.3	22.3	10.0	39.4	10.2	2.2	6.6	100	53,719

Table 8 also reveals a negative relationship between the proportion of young people working and state-level unemployment rates. Moreover, the proportion in study is at its lowest when the unemployment rate is low (below four per cent) for both males and females. When the unemployment rate is between four and eight per cent, young people are more likely to be studying (and not working part-time). The proportion studying declines when the unemployment rate is above eight per cent. However, these results may be due to the higher

proportions studying in the younger cohorts, which were observed when unemployment was high.

4.4 Control variables

Tables 9 and 10 present the means of the control variables used in the modelling of labour force and education outcomes for males and females. All variables are nominal or categorical except for age.

Young males who attended a government secondary school are more likely to be unemployed or working full-time and less likely to be studying than other young males. Indeed, Table 9 shows that although 65 per cent of the males in the dataset attended a government school, they represent 78 per cent of all unemployed in the data and 72 per cent of all those working full-time (and not studying). In addition, males who went to Catholic or independent secondary schools show higher proportions in study (either working part-time or not working at all) than those who went to government schools.

Young females who did not go to government schools are also more likely to be studying. Although those who went to Catholic schools are more likely to be working while studying (either part-time or full-time), those who went to independent schools are more likely to be studying without working or to combine studies and part-time work, which could indicate higher financial capacities of the parents. In addition to a high probability of unemployment, females who went to government schools also show a higher probability of being out of the labour force (and not studying). Overall, young people who attended Catholic or independent high schools seem to have better labour market outcomes than those who went to government high schools.

The means for achievement in reading and mathematic are presented by quintile. The construction of quintiles for each cohort enables comparisons to be made across cohorts[3]. The first quintile is the lowest scoring quintile and quintile five is the highest scoring quintile. Young people in the top quintile are much more likely to be studying. In contrast, young people in the lowest quintile are more likely to be unemployed or not in the labour force (and not studying).

[3] Each cohort of YIT and LSAY surveys undertook the test at age 14 or in Year 9 respectively, and the quintiles are compiled with the entire sample of each cohort. Since this research focuses on young people over 18 years of age who have left secondary school, only a subsample of these cohorts is used here. Therefore, individuals in the dataset in used are not equally spread over the five quintiles.

Table 9 Sample statistics for males[(a)]

	Studying			Working and not studying		Unem-ployed	Not in the labour force (and not studying)	ALL
	Working		Not in the labour force					
	Full-time	Part-time		Full-time	Part-time			
< Year 10	0.00	0.00	0.00	0.01	0.01	0.03	0.02	0.01
Year 10 or 11	0.16	0.02	0.03	0.26	0.14	0.33	0.24	0.18
Year 12	0.54	0.82	0.76	0.41	0.52	0.35	0.48	0.54
Certificate	0.18	0.10	0.13	0.19	0.17	0.19	0.15	0.16
Diploma	0.03	0.02	0.02	0.03	0.04	0.03	0.02	0.03
University	0.08	0.05	0.06	0.09	0.12	0.06	0.09	0.08
Public secondary school	0.65	0.47	0.58	0.72	0.64	0.78	0.66	0.65
Catholic secondary school	0.21	0.27	0.22	0.18	0.21	0.15	0.20	0.20
Independent secondary school	0.14	0.26	0.21	0.11	0.15	0.07	0.14	0.15
Reading score: Quintile 1	0.12	0.05	0.07	0.15	0.14	0.24	0.18	0.12
Quintile 2	0.15	0.11	0.12	0.18	0.15	0.18	0.19	0.16
Quintile 3	0.19	0.15	0.16	0.20	0.18	0.19	0.18	0.19
Quintile 4	0.22	0.24	0.23	0.19	0.20	0.17	0.19	0.21
Quintile 5	0.33	0.45	0.41	0.27	0.32	0.22	0.26	0.33
Math score: Quintile 1	0.08	0.04	0.05	0.11	0.12	0.23	0.16	0.09
Quintile 2	0.14	0.08	0.10	0.18	0.17	0.19	0.19	0.15
Quintile 3	0.14	0.11	0.10	0.16	0.14	0.14	0.15	0.14
Quintile 4	0.24	0.22	0.24	0.23	0.23	0.20	0.21	0.23
Quintile 5	0.40	0.55	0.51	0.32	0.34	0.24	0.28	0.39
Age (Mean)	21.4	20.4	20.3	22.5	21.3	21.3	21.1	21.6
English speaking migrant	0.03	0.04	0.03	0.03	0.03	0.05	0.04	0.03
Non-English speaking migrant	0.04	0.08	0.12	0.03	0.04	0.05	0.05	0.05
Couple with no children	0.10	0.03	0.03	0.15	0.07	0.06	0.06	0.10
Couple with one child	0.02	0.00	0.01	0.04	0.02	0.03	0.01	0.03
Couple with two or more children	0.05	0.01	0.01	0.08	0.04	0.05	0.04	0.05
Single with no children	0.80	0.95	0.93	0.70	0.85	0.80	0.87	0.79
Single with one children	0.02	0.01	0.02	0.03	0.01	0.03	0.02	0.02
Single with two or more children	0.01	0.00	0.01	0.01	0.00	0.02	0.01	0.01
No sibling	0.05	0.04	0.05	0.05	0.05	0.08	0.06	0.05
One sibling	0.33	0.37	0.36	0.31	0.34	0.28	0.30	0.33
Two siblings	0.34	0.34	0.32	0.33	0.34	0.31	0.35	0.33
Three or more siblings	0.28	0.25	0.26	0.31	0.28	0.33	0.29	0.29
Live with at least one parent	0.60	0.76	0.63	0.51	0.68	0.65	0.65	0.60
Post-secondary education (parents)								
Both parents	0.19	0.29	0.24	0.17	0.22	0.14	0.20	0.20
One parent only	0.35	0.44	0.41	0.32	0.38	0.28	0.39	0.36
None	0.46	0.27	0.35	0.51	0.40	0.59	0.40	0.44
Both parents employed	0.75	0.83	0.74	0.72	0.78	0.67	0.73	0.74
One parent employed	0.23	0.16	0.24	0.25	0.20	0.28	0.24	0.23
Both parents not employed	0.02	0.01	0.02	0.03	0.02	0.05	0.03	0.03

Note: (a) Males over 18 who have left secondary school. Column Proportions.

Table 10 Sample statistics for females[(a)]

		Studying			Working and not studying				
		Working		Not in the labour force			Unem-ployed	Not in the labour force (and not studying)	ALL
		Full-time	Part-time		Full-time	Part-time			
< Year 10		0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.01
Year 10 or 11		0.08	0.02	0.04	0.16	0.19	0.26	0.33	0.13
Year 12		0.55	0.80	0.73	0.40	0.44	0.36	0.37	0.54
Certificate		0.19	0.10	0.14	0.20	0.18	0.25	0.16	0.17
Diploma		0.05	0.03	0.03	0.06	0.06	0.04	0.05	0.05
University		0.13	0.05	0.06	0.16	0.11	0.07	0.07	0.11
Public secondary school		0.63	0.52	0.62	0.69	0.70	0.79	0.76	0.65
Catholic secondary school		0.25	0.28	0.20	0.21	0.20	0.14	0.16	0.22
Independent secondary school		0.12	0.20	0.18	0.10	0.10	0.07	0.08	0.13
Reading score:	Quintile 1	0.06	0.04	0.07	0.08	0.11	0.19	0.12	0.08
	Quintile 2	0.13	0.10	0.12	0.16	0.17	0.18	0.20	0.14
	Quintile 3	0.20	0.17	0.17	0.21	0.22	0.21	0.21	0.20
	Quintile 4	0.21	0.25	0.22	0.22	0.21	0.20	0.19	0.22
	Quintile 5	0.39	0.44	0.41	0.33	0.29	0.23	0.28	0.36
Math score:	Quintile 1	0.09	0.05	0.08	0.10	0.15	0.22	0.17	0.10
	Quintile 2	0.17	0.14	0.16	0.20	0.23	0.25	0.24	0.19
	Quintile 3	0.15	0.14	0.15	0.17	0.15	0.17	0.17	0.16
	Quintile 4	0.27	0.28	0.26	0.26	0.25	0.20	0.23	0.26
	Quintile 5	0.32	0.38	0.36	0.26	0.22	0.16	0.19	0.29
Age (Mean)		21.9	20.3	20.1	22.4	22.2	21.3	22.8	21.7
English speaking migrant		0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03
Non-English speaking migrant		0.05	0.08	0.12	0.04	0.04	0.04	0.03	0.05
Couple with no children		0.18	0.05	0.05	0.23	0.14	0.13	0.10	0.15
Couple with one child		0.02	0.01	0.01	0.04	0.09	0.06	0.21	0.05
Couple with two or more children		0.07	0.02	0.02	0.09	0.14	0.08	0.28	0.08
Single with no children		0.69	0.90	0.88	0.60	0.58	0.64	0.30	0.68
Single with one children		0.02	0.01	0.03	0.03	0.04	0.06	0.09	0.03
Single with two or more children		0.01	0.00	0.01	0.01	0.01	0.02	0.03	0.01
No sibling		0.05	0.04	0.04	0.05	0.05	0.04	0.07	0.05
One sibling		0.34	0.36	0.33	0.32	0.31	0.31	0.24	0.32
Two siblings		0.33	0.35	0.34	0.33	0.34	0.31	0.32	0.34
Three or more siblings		0.28	0.25	0.29	0.30	0.31	0.34	0.38	0.29
Live with at least one parent		0.50	0.69	0.53	0.44	0.48	0.51	0.26	0.50
Post-secondary education (parents)									
Both parents		0.21	0.27	0.25	0.16	0.17	0.12	0.14	0.20
One parent only		0.33	0.41	0.37	0.31	0.30	0.24	0.26	0.34
None		0.46	0.32	0.39	0.52	0.52	0.64	0.61	0.47
Both parents employed		0.76	0.82	0.75	0.73	0.72	0.63	0.66	0.75
One parent employed		0.22	0.17	0.23	0.24	0.25	0.31	0.26	0.23
Both parents not employed		0.02	0.01	0.02	0.03	0.03	0.06	0.08	0.03

Note: (a) Females over 18 who have left secondary school. Column Proportions.

Age is associated with higher proportions working full-time or part-time and not studying. Younger age is associated with study and part-time work.

Young migrants are more likely to be studying than other young people. This is particularly true for those from a non-English-speaking country. Male migrants from English-speaking countries are also overrepresented among the unemployed.

A very large proportion of the young people in the data are single.[4] This proportion is above 80 per cent for males while it is about 70 per cent for females, essentially because women marry or are in de facto relationship at younger ages than men. The highest proportions of students are found among singles with no children. Single males (with no children) are also more likely to be out of the labour force (and not studying), whereas the opposite is true for females. That is, single females (with no children) are less likely to be out of the labour force (and not studying) than other young females.

Most young people in these data have at least one sibling. Young people with three or more siblings are less likely to be studying and marginally more likely to be unemployed than other young people.

As expected, young people who are still living with at least one of their parents are more likely to be studying and less likely to be working full-time than young people not living with their parents.

Young persons with at least one of the parents holding post-secondary education show a greater proportion studying and a lower incidence of unemployment. Moreover, the proportion of females not in the labour force is lower if at least one parent has a post-secondary education.

About three quarters of the young people in the data have both their parents working. Young people whose both parents are not working are more likely to be unemployed and less likely to be studying. In addition, females with both parents not working are more likely to be out of the labour force. This finding suggests that there is some intergenerational reproduction of labour market outcomes for this disadvantaged group. When both parents are working, the young people are more likely to be in study and in particular, more likely to combine study and part-time work.

[4] More precisely, “single” here does not mean that the individual does not have a partner. Instead, it means that the individual is not living with a partner.

5. The model

The purpose of the multivariate analysis is to examine the effects of individual characteristics and the prevailing macroeconomic conditions on youth's education and labour market outcomes. Jointly considering education and employment decisions provides a better framework to understand school-to-work transitions than a simple framework focusing on labour market outcomes only.

The outcome variable comprises seven employment and education outcomes: not in the labour force, unemployed, part-time work, full-time work, full-time study, part-time study, and two combination statuses (full-time student and part-time work,[5] full-time work and part-time student). A multinomial logit model is used to address the following questions:

i) How individual characteristics and macroeconomic conditions affect the young adults' education and employment choices?

ii) Do macroeconomic effects differ by level of education?

iii) What are the different transition paths for the youth with different levels of education?

The multinomial logit model approach is widely employed in modelling discrete multiple choices in the literature. Assume that the indirect utility function for a young individual *i* having education and labour market status *j* is given by

$$U^*_{ji} = \alpha_j X_i + \xi_{ji}$$

$$\text{where } j = \begin{cases} 0 \text{ working full-time (and not studying)} \\ 1 \text{ studying and working full-time} \\ 2 \text{ studying and working part-time} \\ 3 \text{ studying and not working} \\ 4 \text{ working part-time (and not studying)} \\ 5 \text{ unemployed (and not studying)} \\ 6 \text{ not in labour force (and not studying)} \end{cases} \qquad (0.1)$$

$i = 1, ..., n.$

Where, X_i is a vector of explanatory variables for individual *i*, and α_j is the corresponding vector of coefficients for alternative *j*. Education and labour market choices are based on

[5] A small group of individuals is recorded as being part-time working and part-time studying, or they are studying and working at the same time but the mode of study or work is not specified. Cramer and Ridder (1991) tests have been conducted to justify the inclusion of this group into the category "studying and working full-time".

utility maximisation. A category must be chosen to be the reference (base) alternative. In our case, full-time work is the reference group. The utility associated with the base category is normalised to zero. The model estimates the difference between the utilities associated with the other alternatives and the reference alternative:

$$\begin{aligned} V_{ji}^{*} = U_{ji}^{*} - U_{k0}^{*} &= (\alpha_{\mathrm{j}} - \alpha_0) X_i + (\xi_{ji} - \xi_{0i}) \\ &= \beta_{\mathrm{j}} X_i + \varepsilon_{ji} \end{aligned} \tag{0.2}$$

Assuming ε_{ji} *i.i.d*. Type 1 Extreme Value distribution leads to a multinomial logit model. In this model, the probability of individual *i* choosing alternative 0 is given by:

$$\Pr_{0i} = \frac{1}{1 + \sum_{k=1}^{6} \exp(X_i^{'} \beta_k)} \tag{0.3}$$

And the probability of individual *i* choosing alternative *j* (with *j*=1,…,6) is given by:

$$\Pr_{ji} = \frac{\exp(X_i^{'} \beta_j)}{1 + \sum_{k=1}^{6} \exp(X_i^{'} \beta_k)} \tag{0.4}$$

Denote the parameters to be estimated $(\beta_1, \ \ldots, \beta_6)$ as θ, the log-likelihood function for the sample is:

$$L(\theta) = \sum_{i=1}^{N} \sum_{j=1}^{6} d_{ij} \ln \Pr_{ji}(\theta) \tag{0.5}$$

Where d_{ij} is an indicator equal to 1 if individual *i* chooses alternative *j* and 0 otherwise. The multinomial logit model is estimated by maximum likelihood. Two separate models are estimated for males and females to allow the explanatory variables to affect their education and labour market choices in different ways.

Macroeconomic conditions are measured by economic growth and unemployment rates relevant to the times young people make employment and education decisions (see Section 3.1). Two indicators of macroeconomic conditions – annual GDP growth rate by State and monthly unemployment rate by State and gender – are linked to each observation via the year and month related to the reported labour force and education status. Education is interacted

with GDP growth and unemployment rates to test if the effects of macroeconomic conditions differ by education level.

Given that youth with different levels of education are likely to follow different pathways of study and work, interactions between age and education are included in the model. Age squared is also included to capture the potential non-linearity of the relationship between age and labour market and education outcomes.

Other variables usually found in the literature are controlled for in the model. They include family background (country-of-origin, parents' education, parents' employment status, number of siblings), family structure (partner, children, living arrangements), and human capital endowments (level of education, type of school, literacy and numeracy scores). The previous section presented some summary statistics for these variables.

6. Estimation results

The estimated coefficients of the model are presented in Tables 11 and 12 for males and females respectively.[6] Note that some variables, such as numeracy and literacy, have been decomposed into dummy variables, to allow for non-linearity. For all these variables, a reference category had to be chosen. The reference groups are as follows:

- Education: Year 12
- Type of secondary school: government school
- Reading and mathematic test quintiles: the first quintile (with the lowest scores)
- Family structure: single with no children
- Number of siblings: no sibling
- Parental post-secondary education: neither of the parents has post-secondary education
- Parental employment status: neither parent is employed
- Living arrangement: not living with parent(s)

As shown in Tables 11 and 12, all the independent variables or their cross-terms are significant for some or all of the categories. However, a direct interpretation of these coefficients is difficult because they indicate the effect on the probability of being in a specific category compared to the probability of being in the base category, which is full-time work. Hence, a negative coefficient implies that the variable increases the relative probability

[6] In Tables 11 and 12, significance is indicated by *** at the 1 per cent level, ** at the 5 per cent level and * at the 10 per cent level. The same notation is also used in Tables 13 and 14 for the marginal effects. The corresponding standard errors are in brackets.

of being a full-time worker versus being in the category considered. Therefore, the coefficient does not indicate the overall effect on the probability of being in the category considered, as it ignores the effect on the probabilities of being in the non-base categories. These overall effects are obtained by computing the marginal effects reported in Table 13 and 14 and discussed below.

A few comments can be made about the model's coefficients before moving to the marginal effects. Higher economic growth has a negative effect on the probability of being a non-working student for both males and females. The results also indicate that university degree holders are more likely to keep on studying as unemployment rises.

Although the coefficients associated with education are significant, they are hardly interpretable because education is also interacted with other variables, such as age and macroeconomic conditions, so that only the marginal effects allow a meaningful interpretation. The same comment applies to age.

Reading and mathematic scores show highly significant coefficients in both models. In accordance with the summary statistics (see previous section), higher scores have a positive effect on the probability of studying and a negative effect on the probability of being unemployed, out of the labour force or part-time worker (and not studying).

The coefficients associated with being a non-English speaking migrant are all positive (and most of them are significant), which indicates a lower probability of being in the base category, that is being a full-time worker. Family structure also has a significant effect on employment and education outcomes. The negative and significant coefficients for couples with no children indicate that they are more likely to work full-time than singles with no children (the reference group for this variable). Again, the mix of positive and negative coefficients associated with the other types of family structure means that marginal effects are needed for a meaningful interpretation. Likewise, there are some significant effects for living arrangements, parental education and employment status but only the marginal effects can allow for a clear assessment of the direction of these effects.

Table 11 Estimated coefficients of the multinomial logit model for males' labour force and education outcomes (standard errors in brackets)

	Studying			Part-time working and not studying	Unem-ployed	Not in the labour force (and not studying)
	Working		Not in the labour force			
	Full-time	Part-time				
Education (reference is Year 12)						
< Year 10	3.504	-9.733	-7.027***	-4.336**	-1.168	-4.916***
	(3.1887)	(6.6986)	(2.5218)	(1.9863)	(1.7398)	(1.7732)
Year 10 or 11	-0.087	-5.743***	-4.700***	-2.649***	-2.784***	-0.77
	(0.3653)	(1.0009)	(0.8188)	(0.5234)	(0.7351)	(0.6235)
Certificate	0.727	-2.497***	-0.768	-2.656***	0.356	-2.412***
	(0.4936)	(0.5706)	(0.6398)	(0.6661)	(1.0305)	(0.9331)
Diploma	-4.485***	-5.059***	-1.203	-0.327	-1.203	-4.849**
	(1.1751)	(1.3074)	(1.5992)	(1.3823)	(2.4427)	(2.4160)
University	-2.645***	-3.264***	1.683	5.644***	2.442	6.268***
	(0.9266)	(1.0612)	(1.1248)	(1.0889)	(1.9981)	(1.5240)
GDP growth	0.015	0.037***	0.049***	0.014	-0.064**	0.029
	(0.0125)	(0.0107)	(0.0121)	(0.0172)	(0.0287)	(0.0243)
GDP growth interacted with						
< Year 10	-0.061	0.065	-0.310**	-0.004	-0.176*	0.032
	(0.1460)	(0.3495)	(0.1367)	(0.1305)	(0.0927)	(0.1216)
Year 10 or 11	0.005	0.026	-0.109**	-0.095***	0.072*	-0.041
	(0.0230)	(0.0499)	(0.0434)	(0.0318)	(0.0395)	(0.0384)
Certificate	0.007	-0.03	-0.068**	0.045	0.075	0.061
	(0.0236)	(0.0256)	(0.0274)	(0.0334)	(0.0472)	(0.0480)
Diploma	0.04	-0.02	-0.059	0.142**	0.127	0.088
	(0.0520)	(0.0555)	(0.0685)	(0.0648)	(0.1034)	(0.1132)
University	0.01	-0.104***	-0.066*	0.014	0.054	-0.023
	(0.0344)	(0.0356)	(0.0388)	(0.0405)	(0.0731)	(0.0594)
Unemployment rate	0.053***	0.020**	0.082***	0.014	0.091***	-0.079***
	(0.0114)	(0.0101)	(0.0113)	(0.0159)	(0.0259)	(0.0234)
Unemployment rate interacted with						
< Year 10	0.171	0.462	0.406***	0.072	0.029	0.411***
	(0.1475)	(0.3507)	(0.1547)	(0.1294)	(0.0991)	(0.1199)
Year 10 or 11	0.080***	0.068	-0.015	0.057*	0.137***	0.058
	(0.0212)	(0.0472)	(0.0432)	(0.0301)	(0.0354)	(0.0368)
Certificate	0.109***	0.02	0.048*	0.009	0.049	0.122***
	(0.0213)	(0.0234)	(0.0252)	(0.0300)	(0.0426)	(0.0438)
Diploma	0.090*	0.097*	-0.002	0.053	0.139	0.155
	(0.0461)	(0.0512)	(0.0661)	(0.0587)	(0.0938)	(0.1012)
University	0.073**	0.073**	0.055	-0.077**	0.043	0.002
	(0.0287)	(0.0307)	(0.0336)	(0.0368)	(0.0620)	(0.0554)
Independent secondary school	0.211***	0.708***	0.469***	0.180***	-0.335***	0.204**
	(0.0500)	(0.0421)	(0.0492)	(0.0650)	(0.1280)	(0.0890)
Catholic secondary school	0.165***	0.461***	0.180***	0.114**	-0.135	0.086
	(0.0414)	(0.0382)	(0.0449)	(0.0550)	(0.0894)	(0.0750)
Reading score: Quintile 2	-0.03	0.354***	0.210***	-0.092	-0.147	0.006
	(0.0633)	(0.0754)	(0.0800)	(0.0808)	(0.1030)	(0.0980)
Quintile 3	0.022	0.423***	0.273***	-0.013	-0.073	-0.112
	(0.0627)	(0.0743)	(0.0790)	(0.0811)	(0.1062)	(0.1042)
Quintile 4	0.1	0.680***	0.464***	0.048	-0.005	0.001
	(0.0639)	(0.0730)	(0.0779)	(0.0831)	(0.1143)	(0.1066)
Quintile 5	0.149**	0.927***	0.655***	0.271***	-0.026	0.088
	(0.0632)	(0.0722)	(0.0769)	(0.0817)	(0.1150)	(0.1063)

Table 11 Continued

	Studying			Part-time working and not studying	Unemployed	Not in the labour force (and not studying)
	Working		Not in the labour force			
	Full-time	Part-time				
Age (divided by 10)	-8.943***	-2.304*	-8.923***	-7.364***	2.707	-14.802***
	(0.8946)	(1.2829)	(1.3073)	(1.2845)	(1.8863)	(1.5798)
Age squared	1.679***	-0.253	1.147***	1.233***	-1.014**	2.894***
	(0.1934)	(0.2975)	(0.3000)	(0.2848)	(0.4207)	(0.3458)
Age interacted with						
< Year 10	-3.025**	1.111	1.315	1.461*	1.008	0.807
	(1.3688)	(2.6199)	(0.9573)	(0.7565)	(0.6934)	(0.6456)
Year 10 or 11	-0.574***	1.142***	1.357***	0.838***	0.767**	0.138
	(0.1518)	(0.4345)	(0.3529)	(0.2197)	(0.3044)	(0.2590)
Certificate	-0.849***	0.708***	-0.058	1.011***	-0.444	0.504
	(0.2078)	(0.2444)	(0.2819)	(0.2694)	(0.4370)	(0.3768)
Diploma	1.556***	1.675***	0.255	-0.148	-0.101	1.434
	(0.4361)	(0.5157)	(0.6466)	(0.5332)	(0.9905)	(0.8884)
University	0.838**	1.091***	-0.890**	-1.966***	-1.096	-2.435***
	(0.3465)	(0.4168)	(0.4499)	(0.4189)	(0.7917)	(0.5808)
English speaking migrant	0.081	0.317***	0.230**	0.107	0.459***	0.322**
	(0.0894)	(0.0841)	(0.0982)	(0.1208)	(0.1498)	(0.1494)
Non-English speaking migrant	0.195**	0.827***	1.382***	0.152	0.591***	0.327**
	(0.0836)	(0.0671)	(0.0674)	(0.1084)	(0.1460)	(0.1388)
Couple with no child	-0.133**	-0.914***	-1.218***	-0.329***	-0.616***	-0.738***
	(0.0592)	(0.0836)	(0.0990)	(0.0887)	(0.1383)	(0.1310)
Couple with one child	-0.284**	-1.532***	-1.292***	-0.389**	-0.228	-0.874***
	(0.1112)	(0.2464)	(0.2129)	(0.1695)	(0.1854)	(0.2567)
Couple with two or more children	-0.067	-0.383***	-0.742***	-0.093	0.156	-0.237
	(0.0872)	(0.1283)	(0.1619)	(0.1223)	(0.1655)	(0.1717)
Single with one child	0.244**	-0.595***	0.489***	-0.471**	-0.028	-0.072
	(0.1078)	(0.1523)	(0.1181)	(0.1962)	(0.1913)	(0.2171)
Single with two or more children	0.018	-1.635***	-0.686***	-0.760**	0.25	-0.205
	(0.1579)	(0.2969)	(0.2283)	(0.3124)	(0.2607)	(0.3288)
One sibling	-0.208***	0.087	-0.216**	-0.026	-0.312**	-0.286**
	(0.0761)	(0.0828)	(0.0856)	(0.1071)	(0.1345)	(0.1317)
Two siblings	-0.178**	0.118	-0.282***	-0.021	-0.273**	-0.156
	(0.0757)	(0.0831)	(0.0860)	(0.1070)	(0.1324)	(0.1298)
Three or more siblings	-0.251***	0.008	-0.336***	-0.043	-0.179	-0.230*
	(0.0766)	(0.0846)	(0.0873)	(0.1082)	(0.1312)	(0.1316)
Post-secondary education (parents)						
Both parents	0.025	0.441***	0.208***	0.179***	-0.129	0.241***
	(0.0466)	(0.0430)	(0.0493)	(0.0608)	(0.0995)	(0.0829)
One parent only	0.010	0.354***	0.197***	0.146***	-0.164**	0.285***
	(0.0377)	(0.0374)	(0.0416)	(0.0507)	(0.0758)	(0.0675)
Parental employment status						
Both parents employed	0.018	0.291**	-0.754***	-0.13	-0.592***	-0.403**
	(0.1111)	(0.1445)	(0.1174)	(0.1434)	(0.1534)	(0.1670)
One parent employed	0.004	0.086	-0.542***	-0.296**	-0.470***	-0.362**
	(0.1133)	(0.1472)	(0.1199)	(0.1476)	(0.1578)	(0.1719)
Live with at least one parent	0.045	0.397***	-0.347***	0.351***	0.169**	0.024
	(0.0379)	(0.0369)	(0.0394)	(0.0521)	(0.0753)	(0.0676)
Constant	9.595***	3.281**	12.188***	8.102***	-3.075	16.835***
	(1.0687)	(1.4089)	(1.4508)	(1.4958)	(2.1862)	(1.8735)

Table 12 Estimated coefficients of the multinomial logit model for females' labour force and education outcomes (standard errors in brackets)

	Studying			Part-time working and not studying	Unemployed	Not in the labour force (and not studying)
	Working		Not in the labour force			
	Full-time	Part-time				
Education (reference is Year 12)						
< Year 10	-1.172	3.745	-4.987**	-1.957	0.418	-0.219
	(4.7589)	(3.6815)	(2.2858)	(1.5215)	(2.2581)	(1.4507)
Year 10 or 11	-1.442***	-8.096***	-4.824***	-2.717***	0.989	-1.330***
	(0.4470)	(0.5856)	(0.6064)	(0.3272)	(0.7244)	(0.3805)
Certificate	0.122	-3.927***	-2.350***	-1.477***	-0.909	0.011
	(0.4665)	(0.4402)	(0.5525)	(0.4238)	(0.8646)	(0.5444)
Diploma	-3.164***	-3.696***	-2.820***	-0.467	-0.044	-0.032
	(0.8594)	(0.8083)	(1.0902)	(0.7446)	(1.8087)	(1.0198)
University	-3.185***	-1.863**	3.414***	9.778***	7.493***	13.326***
	(0.7414)	(0.7589)	(0.9546)	(0.6864)	(1.6958)	(0.9454)
GDP growth	0.002	0.009	0.015	0.01	-0.021	0.002
	(0.0118)	(0.0088)	(0.0108)	(0.0124)	(0.0258)	(0.0164)
GDP growth interacted with						
< Year 10	-0.001	-0.219**	-0.347***	0.019	0.086	0.011
	(0.1588)	(0.1090)	(0.1259)	(0.0810)	(0.1110)	(0.0793)
Year 10 or 11	-0.001	-0.054	-0.084**	-0.040*	-0.074**	-0.044*
	(0.0268)	(0.0342)	(0.0343)	(0.0209)	(0.0374)	(0.0243)
Certificate	-0.050**	-0.035*	-0.068***	0.001	-0.016	-0.047
	(0.0214)	(0.0189)	(0.0227)	(0.0220)	(0.0391)	(0.0289)
Diploma	0.037	-0.046	-0.081*	-0.046	-0.102	-0.07
	(0.0375)	(0.0328)	(0.0432)	(0.0336)	(0.0719)	(0.0454)
University	-0.01	-0.055**	-0.206***	-0.059**	-0.063	-0.227***
	(0.0270)	(0.0257)	(0.0325)	(0.0268)	(0.0606)	(0.0389)
Unemployment rate	0.00	0.011	0.074***	-0.011	0.167***	-0.004
	(0.0131)	(0.0100)	(0.0124)	(0.0138)	(0.0296)	(0.0178)
Unemployment rate interacted with						
< Year 10	0.644**	0.052	-0.206	0.067	-0.053	-0.001
	(0.3231)	(0.1737)	(0.1898)	(0.1217)	(0.1510)	(0.1103)
Year 10 or 11	-0.007	-0.156***	-0.190***	-0.023	-0.145***	0.013
	(0.0331)	(0.0413)	(0.0427)	(0.0252)	(0.0459)	(0.0280)
Certificate	0.010	-0.004	0.026	0.001	0.006	0.010
	(0.0245)	(0.0220)	(0.0268)	(0.0245)	(0.0456)	(0.0318)
Diploma	0.000	-0.071*	0.046	0.016	-0.110	-0.040
	(0.0423)	(0.0402)	(0.0576)	(0.0401)	(0.0926)	(0.0531)
University	0.098***	0.105***	-0.007	-0.046	-0.094	-0.084*
	(0.0298)	(0.0298)	(0.0400)	(0.0310)	(0.0733)	(0.0444)
Independent secondary school	0.113**	0.528***	0.417***	0.101*	-0.091	0.179**
	(0.0519)	(0.0387)	(0.0487)	(0.0536)	(0.1194)	(0.0740)
Catholic secondary school	0.156***	0.325***	-0.063	-0.058	-0.425***	-0.092*
	(0.0387)	(0.0314)	(0.0420)	(0.0399)	(0.0889)	(0.0534)
Reading score: Quintile 2	0.068	0.072	-0.127*	-0.206***	-0.540***	-0.201***
	(0.0775)	(0.0676)	(0.0773)	(0.0629)	(0.1052)	(0.0761)
Quintile 3	0.169**	0.171***	-0.141*	-0.212***	-0.521***	-0.326***
	(0.0752)	(0.0653)	(0.0755)	(0.0622)	(0.1049)	(0.0772)
Quintile 4	0.080	0.323***	-0.098	-0.216***	-0.479***	-0.261***
	(0.0763)	(0.0648)	(0.0752)	(0.0638)	(0.1095)	(0.0794)
Quintile 5	0.265***	0.514***	0.106	-0.251***	-0.582***	-0.271***
	(0.0753)	(0.0644)	(0.0744)	(0.0639)	(0.1129)	(0.0792)

Table 12 Continued

	Studying			Part-time working and not studying	Unem-ployed	Not in the labour force (and not studying)
	Working		Not in the labour force			
	Full-time	Part-time				
Age (divided by 10)	-6.281***	-7.665***	-16.625***	-13.455***	-2.679	-15.033***
	(0.8854)	(0.9278)	(1.0935)	(0.7802)	(1.8419)	(0.9721)
Age squared	1.224***	0.962***	2.816***	2.713***	0.165	2.900***
	(0.1906)	(0.2122)	(0.2494)	(0.1664)	(0.4063)	(0.2040)
Age interacted with						
< Year 10	-2.579	-2.472	2.986***	0.778	0.337	0.515
	(1.7206)	(1.8203)	(1.0271)	(0.5375)	(0.8678)	(0.5322)
Year 10 or 11	0.292	3.321***	2.213***	1.283***	0.2	0.687***
	(0.1839)	(0.2542)	(0.2703)	(0.1322)	(0.3073)	(0.1530)
Certificate	-0.165	1.402***	0.726***	0.560***	0.479	-0.118
	(0.1920)	(0.1880)	(0.2425)	(0.1684)	(0.3566)	(0.2142)
Diploma	1.171***	1.541***	0.825*	0.125	0.339	-0.004
	(0.3213)	(0.3200)	(0.4382)	(0.2748)	(0.6891)	(0.3695)
University	0.900***	0.128	-1.499***	-4.043***	-2.897***	-5.399***
	(0.2764)	(0.2965)	(0.3778)	(0.2636)	(0.6651)	(0.3656)
English speaking migrant	-0.029	0.139*	0.088	0.039	-0.054	-0.069
	(0.0909)	(0.0726)	(0.0932)	(0.0858)	(0.1810)	(0.1117)
Non-English speaking migrant	0.250***	0.668***	1.285***	0.145*	0.172	0.281**
	(0.0764)	(0.0570)	(0.0629)	(0.0798)	(0.1566)	(0.1100)
Couple with no child	-0.219***	-1.060***	-1.471***	-0.138***	-0.379***	0.004
	(0.0474)	(0.0503)	(0.0718)	(0.0500)	(0.1013)	(0.0711)
Couple with one child	-0.469***	-0.562***	-0.422***	1.210***	0.542***	2.599***
	(0.1083)	(0.1077)	(0.1259)	(0.0683)	(0.1471)	(0.0739)
Couple with two or more children	-0.064	-0.133	0.025	1.180***	0.801***	2.746***
	(0.0752)	(0.0851)	(0.1119)	(0.0622)	(0.1365)	(0.0738)
Single with one child	0.026	-0.391***	0.555***	0.631***	0.689***	2.008***
	(0.1050)	(0.1036)	(0.0996)	(0.0869)	(0.1407)	(0.0853)
Single with two or more children	-0.163	-0.894***	-0.095	0.539***	0.784***	1.918***
	(0.1647)	(0.1784)	(0.1747)	(0.1377)	(0.2083)	(0.1284)
One sibling	0.053	0.193***	-0.066	0.159**	0.372**	-0.226**
	(0.0799)	(0.0700)	(0.0847)	(0.0782)	(0.1643)	(0.0891)
Two siblings	-0.037	0.146**	-0.073	0.180**	0.286*	-0.038
	(0.0799)	(0.0699)	(0.0845)	(0.0777)	(0.1640)	(0.0872)
Three or more siblings	-0.035	0.007	-0.106	0.162**	0.353**	0.03
	(0.0804)	(0.0710)	(0.0853)	(0.0779)	(0.1628)	(0.0861)
Post-secondary education (parents)						
Both parents	0.183***	0.508***	0.407***	0.221***	-0.095	0.307***
	(0.0452)	(0.0363)	(0.0458)	(0.0461)	(0.1000)	(0.0613)
One parent only	0.021	0.340***	0.168***	0.061	-0.248***	0.02
	(0.0375)	(0.0308)	(0.0390)	(0.0368)	(0.0752)	(0.0478)
Parental employment status						
Both parents employed	0.153	0.306***	-0.270**	0.038	-0.766***	-0.537***
	(0.1146)	(0.1131)	(0.1181)	(0.0951)	(0.1393)	(0.0907)
One parent employed	0.117	0.118	-0.127	0.053	-0.501***	-0.609***
	(0.1168)	(0.1154)	(0.1204)	(0.0970)	(0.1424)	(0.0940)
Live with at least one parent	0.005	0.237***	-0.594***	0.130***	-0.081	-0.497***
	(0.0376)	(0.0301)	(0.0367)	(0.0380)	(0.0726)	(0.0517)
Constant	6.277***	10.206***	21.322***	15.060***	2.487	17.723***
	(1.0541)	(1.0344)	(1.2212)	(0.9391)	(2.1359)	(1.1784)

The marginal effects of individual characteristics on education and employment choices together with the corresponding standard errors are given in Tables 13 and 14 for males and females, respectively. Marginal effects are measured as the difference between the averaged predicted probabilities. They can be interpreted as percentage changes in the probability of being in each category resulting from a marginal change in one variable while keeping other variables constant. For instance, the first marginal effect in Table 13 (i.e. -0.0703) indicates that all else being equal, an education level below Year 10 (rather than Year 12, as in the reference group) reduces the probability of studying and working full-time by 7.03 percentage points.

The marginal effects of the continuous variables, age, GDP growth and unemployment rates, are generally not linear since they differ according to the value of the predictor variable. Thus, average predicted probabilities for ten value points within the actual range of these three variables are calculated. As these variables are interacted with education dummies, for each point, the predicted probabilities are average probabilities over the full sample by setting the values of the education dummies to represent different levels of education. These predicted probabilities are presented in Figures 2, 3 and 4. The age effects shown in Figure 2 reveal the different employment and education outcomes by levels of education. Figures 3 and 4 show the extent to which the effects of macroeconomics conditions (GDP growth rate and unemployment rate, respectively) vary by education levels after controlling for other individual characteristics.

6.1 Family background and family structure

Young migrants from non-English speaking countries are 14 and 11 per cent (males and females, respectively) less likely to be working full-time (and not studying) and 12 and 11 per cent (males and females, respectively) more likely to be studying (and not working) than Australian born people. These findings are consistent with the US study by Nguyen and Taylor (2003), and the British studies of Leslie and Drinkwatr (1999) and Rice (2000). They find that youth from ethnic minority backgrounds are more likely to proceed to post-secondary education.[7] They argue that youth from ethnic minorities may try to overcome the disadvantage of being discriminated against in the labour market by further investment in education.

[7] Ethnic minorities in Nguyen & Taylor (2003) refer to blacks, Asians and Hispanics. In the British studies of Leslie and Drinkwatr (1999) and Rice (2000), it refers to black Caribbeans, other blacks, Asians and other non-white.

Table 13 Average marginal effects of dummy variables on males' labour force and education outcomes (standard errors in brackets)

	Studying			Working and not studying			
	Working		Not in the labour force			Unem-ployed	Not in the labour force (and not studying)
	Full-time	Part-time		Full-time	Part-time		
Education (reference is Year 12)							
< Year 10	-0.0703***	-0.2013***	-0.0899***	0.2991***	-0.0038	0.0459**	0.0203*
	(0.0139)	(0.0098)	(0.0135)	(0.0259)	(0.0142)	(0.0126)	(0.0116)
Year 10 or 11	-0.0051	-0.1839***	-0.1063***	0.2706***	-0.0079**	0.0182***	0.0143***
	(0.0047)	(0.0037)	(0.0032)	(0.0067)	(0.0032)	(0.0024)	(0.0028)
Certificate	0.0076	-0.0951***	-0.0407***	0.1189***	0.0020	0.0067***	0.0005
	(0.0047)	(0.0047)	(0.0042)	(0.0065)	(0.0033)	(0.0021)	(0.0023)
Diploma	-0.0025	-0.0943***	-0.0492***	0.0967***	0.0452***	0.007	-0.0029
	(0.0097)	(0.0114)	(0.0107)	(0.0158)	(0.0113)	(0.0056)	(0.0051)
University	-0.0276***	-0.1244***	0.0001	-0.0144	0.1004***	0.0127**	0.0533***
	(0.0066)	(0.0084)	(0.0129)	(0.0124)	(0.0148)	(0.0063)	(0.0128)
Independent secondary school	-0.0003	0.0671***	0.0178***	-0.0718***	-0.0022	-0.0108***	0.0002
	(0.0047)	(0.0048)	(0.0042)	(0.0066)	(0.0033)	(0.0022)	(0.0026)
Catholic secondary school	0.0049	0.0456***	0.0002	-0.0434***	-0.0007	-0.0057***	-0.0009
	(0.0040)	(0.0042)	(0.0036)	(0.0056)	(0.0029)	(0.0020)	(0.0021)
Reading score: Quintile 2	-0.0105	0.0325***	0.0107	-0.0177*	-0.0086*	-0.0048	-0.0015
	(0.0064)	(0.0069)	(0.0060)	(0.0087)	(0.0043)	(0.0026)	(0.0031)
Quintile 3	-0.0075	0.0373***	0.0135*	-0.0280***	-0.0058	-0.0035	-0.0059
	(0.0064)	(0.0068)	(0.0059)	(0.0087)	(0.0044)	(0.0028)	(0.0032)
Quintile 4	-0.0080	0.0594***	0.0215***	-0.0575***	-0.0070	-0.0035	-0.0049
	(0.0065)	(0.0067)	(0.0059)	(0.0089)	(0.0045)	(0.0030)	(0.0033)
Quintile 5	-0.0125	0.0810***	0.0292***	-0.0878***	0.0008	-0.0057*	-0.0049
	(0.0064)	(0.0067)	(0.0058)	(0.0088)	(0.0046)	(0.0029)	(0.0033)
Math score: Quintile 2	0.0081	-0.0118	-0.0027	0.0483***	-0.0139*	-0.0183***	-0.0097*
	(0.0062)	(0.0079)	(0.0065)	(0.0095)	(0.0058)	(0.0037)	(0.0040)
Quintile 3	0.0156*	0.0151	-0.0032	0.0307***	-0.0238***	-0.0216***	-0.0128***
	(0.0065)	(0.0081)	(0.0066)	(0.0098)	(0.0059)	(0.0039)	(0.0042)
Quintile 4	0.0210***	0.0299***	0.0192***	-0.0003	-0.0281***	-0.0243***	-0.0174***
	(0.0062)	(0.0077)	(0.0064)	(0.0094)	(0.0057)	(0.0038)	(0.0040)
Quintile 5	0.0277***	0.0641***	0.0347***	-0.0433***	-0.0340***	-0.0271***	-0.0220***
	(0.0063)	(0.0077)	(0.0065)	(0.0094)	(0.0057)	(0.0039)	(0.0041)
English speaking migrant	-0.0040	0.0253**	0.0074	-0.0439***	-0.0009	0.0095*	0.0067
	(0.0082)	(0.0092)	(0.0078)	(0.0120)	(0.0065)	(0.0044)	(0.0051)
Non-English speaking migrant	-0.0210***	0.0506***	0.1232***	-0.1443***	-0.0163***	0.0095*	-0.0017
	(0.0066)	(0.0075)	(0.0080)	(0.0096)	(0.0045)	(0.0042)	(0.0037)
Couple with no children	0.0276***	-0.0699***	-0.0694***	0.1356***	0.0014	-0.0052***	-0.0200
	(0.0085)	(0.0199)	(0.0134)	(0.0108)	(0.0048)	(0.0020)	(0.0143)
Couple with one children	0.0210	-0.1178***	-0.0655***	0.1775***	0.0037	0.0030	-0.0218
	(0.0133)	(0.0387)	(0.0181)	(0.0205)	(0.0095)	(0.0040)	(0.0216)
Couple with two or more children	0.0123	-0.027**	-0.0524***	0.0591***	0.0045	0.0065*	-0.0029
	(0.0094)	(0.0176)	(0.0146)	(0.0142)	(0.0069)	(0.0039)	(0.0108)
Single with one children	0.0294**	-0.0855***	0.0810***	0.0011	-0.0204***	-0.0006	-0.0049
	(0.0127)	(0.0289)	(0.0191)	(0.0182)	(0.007)	(0.0033)	(0.0174)
Single with two or more children	0.0451**	-0.1354***	-0.0287	0.1170***	-0.0193	0.0126*	0.0085
	(0.0203)	(0.0477)	(0.0220)	(0.0301)	(0.0112)	(0.0076)	(0.0270)

Table 13 Continued

	Studying			Working and not studying			
	Working		Not in the labour force			Unem-ployed	Not in the labour force (and not studying)
	Full-time	Part-time		Full-time	Part-time		
One sibling	-0.0182*	0.0227**	-0.0182*	0.0255*	0.0019	-0.0065**	-0.0070
	(0.0080)	(0.0082)	(0.0079)	(0.0106)	(0.0054)	(0.0036)	(0.0042)
Two siblings	-0.0155	0.0269***	-0.0259***	0.0220*	0.0017	-0.0058	-0.0034
	(0.0080)	(0.0083)	(0.0079)	(0.0105)	(0.0054)	(0.0036)	(0.0042)
Three or more siblings	-0.0546***	0.0475	-0.0680***	0.0913***	0.0052	-0.0083	-0.0131
	(0.0181)	(0.0281)	(0.0167)	(0.0319)	(0.0174)	(0.0089)	(0.0096)
Live with at least one parent	-0.0007	0.0513***	-0.0477***	-0.0217***	0.0165***	0.0032	-0.0008
	(0.0036)	(0.0037)	(0.0036)	(0.0051)	(0.0025)	(0.0017)	(0.0019)
Post-secondary education (parents)							
Both parents	-0.0104*	0.0431***	0.0042	-0.0391***	0.0036	-0.0054*	0.0040
	(0.0044)	(0.0046)	(0.0040)	(0.0062)	(0.0032)	(0.0023)	(0.0024)
One parent only	-0.0098**	0.0331***	0.0062	-0.0324***	0.0029	-0.0059***	0.0060***
	(0.0036)	(0.0039)	(0.0034)	(0.0051)	(0.0027)	(0.0018)	(0.0020)
Parental employment status							
Both parents employed	0.0136	0.0594***	-0.0856***	0.0390**	-0.0015	-0.0148**	-0.0101
	(0.0099)	(0.0128)	(0.0143)	(0.0143)	(0.0080)	(0.0053)	(0.0061)
One parent employed	0.0136	0.0310*	-0.0592***	0.0443***	-0.0097	-0.0114*	-0.0085
	(0.0101)	(0.0131)	(0.0145)	(0.0146)	(0.0081)	(0.0054)	(0.0062)

Table 14 Average marginal effects of dummy variables on females' labour force and education outcomes (standard errors in brackets)

	Studying			Working and not studying			
	Working		Not in the labour force			Unem-ployed	Not in the labour force (and not studying)
	Full-time	Part-time		Full-time	Part-time		
Education (reference is Year 12)							
< Year 10	-0.0737***	-0.1686***	-0.058***	0.0994***	0.0577**	0.0448***	0.0984***
	(0.0095)	(0.0281)	(0.0208)	(0.0369)	(0.0257)	(0.0144)	(0.0207)
Year 10 or 11	-0.0203***	-0.2177***	-0.0728***	0.2155***	0.0375***	0.0188***	0.039***
	(0.0044)	(0.0049)	(0.0038)	(0.0075)	(0.0049)	(0.0024)	(0.0037)
Certificate	0.0075**	-0.1293***	-0.0349***	0.1336***	0.0152***	0.0106***	-0.0027
	(0.0039)	(0.0045)	(0.0034)	(0.0060)	(0.0040)	(0.0019)	(0.0030)
Diploma	-0.0018**	-0.1143	-0.0437***	0.1498***	0.0199***	0.0006	-0.0104**
	(0.0065)	(0.0098)	(0.0073)	(0.0112)	(0.0072)	(0.0029)	(0.0047)
University	-0.0264***	-0.1716***	-0.0300***	0.0745***	0.1101***	0.0117**	0.0318***
	(0.0039)	(0.0071)	(0.0081)	(0.0083)	(0.0117)	(0.0049)	(0.0096)
Independent secondary school	-0.0071	0.0587***	0.0160***	-0.0572***	-0.0065	-0.0057*	0.0019
	(0.0038)	(0.0051)	(0.0040)	(0.0063)	(0.0042)	(0.0024)	(0.0032)
Catholic secondary school	0.0085**	0.0494***	-0.0155***	-0.0181***	-0.0096***	-0.0097***	-0.0051*
	(0.0032)	(0.0042)	(0.0030)	(0.0049)	(0.0031)	(0.0016)	(0.0021)
Reading score: Quintile 2	0.0092	0.0191*	-0.0097	0.0182*	-0.0165***	-0.0135***	-0.0068
	(0.0058)	(0.0082)	(0.0064)	(0.0090)	(0.0057)	(0.0030)	(0.0036)
Quintile 3	0.0166***	0.0321***	-0.0145*	0.0109	-0.0186***	-0.0134***	-0.0132***
	(0.0056)	(0.0079)	(0.0062)	(0.0088)	(0.0057)	(0.0030)	(0.0036)
Quintile 4	0.0052	0.0543***	-0.0153*	0.0018	-0.0217***	-0.0130***	-0.0112***
	(0.0056)	(0.0079)	(0.0062)	(0.0089)	(0.0058)	(0.0031)	(0.0037)
Quintile 5	0.0152**	0.0731***	-0.0059	-0.0215*	-0.0307***	-0.0164***	-0.0138***
	(0.0056)	(0.0078)	(0.0063)	(0.0088)	(0.0057)	(0.0031)	(0.0037)

Table 14 Continued

	Studying			Working and not studying			
	Working		Not in the labour force			Unem-ployed	Not in the labour force (and not studying)
	Full-time	Part-time		Full-time	Part-time		
Math score: Quintile 2	-0.0074	0.0373***	-0.0026	0.0174*	-0.0181***	-0.0108***	-0.0158***
	(0.0051)	(0.0067)	(0.0051)	(0.0079)	(0.0055)	(0.0030)	(0.0037)
Quintile 3	-0.0083	0.0539***	0.0025	0.0299***	-0.0401***	-0.0137***	-0.0243***
	(0.0053)	(0.0070)	(0.0053)	(0.0083)	(0.0056)	(0.0032)	(0.0038)
Quintile 4	0.0006	0.0730***	0.0041	0.0037	-0.0377***	-0.0180***	-0.0257***
	(0.0052)	(0.0067)	(0.0051)	(0.0080)	(0.0055)	(0.0031)	(0.0037)
Quintile 5	0.0056	0.0888***	0.0213***	-0.0141	-0.0471***	-0.0219***	-0.0325***
	(0.0054)	(0.0068)	(0.0054)	(0.0082)	(0.0056)	(0.0031)	(0.0038)
English speaking migrant	-0.0058	0.0176	0.0030	-0.0096	0.0014	-0.0016	-0.0050
	(0.0068)	(0.0093)	(0.0069)	(0.0109)	(0.0073)	(0.0035)	(0.0053)
Non-English speaking migrant	-0.0109*	0.0438***	0.1092***	-0.1054***	-0.0215***	-0.0006	-0.0146***
	(0.0053)	(0.0073)	(0.0072)	(0.0084)	(0.0054)	(0.0031)	(0.0045)
Couple with no children	0.0136***	-0.0975***	-0.0654***	0.1198***	0.0191***	-0.0009	0.0113***
	(0.0051)	(0.0057)	(0.0031)	(0.0070)	(0.0040)	(0.0019)	(0.0022)
Couple with one children	-0.0707**	-0.1216***	-0.0505***	-0.0796***	0.1144***	0.0045	0.2035***
	(0.0245)	(0.0099)	(0.0065)	(0.0095)	(0.0165)	(0.0036)	(0.0195)
Couple with two or more children	-0.0505***	-0.0914***	-0.0343***	-0.1126***	0.0820***	0.0068*	0.2000***
	(0.0191)	(0.0095)	(0.0072)	(0.009)	(0.0118)	(0.0037)	(0.0190)
Single with one children	-0.0229*	-0.1036***	0.0395***	-0.0661***	0.0356***	0.0090**	0.1085***
	(0.0127)	(0.0104)	(0.0103)	(0.0106)	(0.0087)	(0.0041)	(0.0120)
Single with two or more children	-0.0257	-0.1328***	-0.0078	-0.0199	0.0462***	0.0170**	0.1229***
	(0.0180)	(0.0148)	(0.0136)	(0.0171)	(0.0141)	(0.0076)	(0.0164)
One sibling	-0.0002	0.0268***	-0.0143*	-0.0177	0.0105	0.0072*	-0.0124***
	(0.0066)	(0.0089)	(0.0072)	(0.0099)	(0.0057)	(0.0030)	(0.0039)
Two siblings	-0.0072	0.0209*	-0.0131	-0.0145	0.0129*	0.0051	-0.0041
	(0.0065)	(0.0089)	(0.0071)	(0.0098)	(0.0057)	(0.0030)	(0.0039)
Three or more siblings	-0.0137	0.0016	-0.0330	-0.0261	0.0431	0.0293	-0.0013
	(0.0181)	(0.0268)	(0.0182)	(0.0300)	(0.0221)	(0.0172)	(0.0116)
Live with at least one parent	0.0024	0.0571***	-0.0624***	0.0090	0.0164***	-0.0006	-0.0218***
	(0.0029)	(0.0037)	(0.0032)	(0.0046)	(0.0030)	(0.0017)	(0.0022)
Post-secondary education (parents)							
Both parents	-0.0022	0.0507***	0.0135***	-0.0653***	0.0031	-0.0066***	0.0068*
	(0.0036)	(0.0047)	(0.0037)	(0.0057)	(0.0038)	(0.0021)	(0.0028)
One parent only	-0.0069*	0.0428***	0.0028	-0.0281***	-0.0015	-0.0074***	-0.0018
	(0.0030)	(0.0040)	(0.0030)	(0.0047)	(0.0030)	(0.0016)	(0.0020)
Parental employment status							
Both parents employed	0.0130	0.0554***	-0.0323***	0.0071	0.0071	-0.0222***	-0.0280***
	(0.0082)	(0.0138)	(0.0114)	(0.0130)	(0.0072)	(0.0053)	(0.0053)
One parent employed	0.0120	0.0236	-0.0133	0.0138	0.0103	-0.0154***	-0.0310***
	(0.0084)	(0.0141)	(0.0116)	(0.0132)	(0.0074)	(0.0054)	(0.0053)

Our results support the existence of such discrimination in Australia. Indeed, after controlling for education and other characteristics, young males from English-speaking and non-English speaking countries are both about one per cent more likely to be unemployed compared to Australian born people.[8] Migrants from non-English speaking countries are also less likely to work part-time (and not studying). Compared to their Australian born counterparts, young females from English-speaking countries do not exhibit any significant difference in terms of education and employment outcomes. By contrast, males from English-speaking countries are less likely to be working full-time than other young males and more likely to be studying.

Several studies report that parents with high occupational status are more likely to encourage their children to pursue further education and that they are also likely to have more resources available to support the cost of these studies (Averett and Burton 1996, Ordovensky 1995). In the absence of reliable information on parents' income, parents' employment status and education are combined to identify the effects of socioeconomic background. One would expect that educated parents are more likely to invest in their children's education and to provide support as a consequence of their own educational experience. As shown in Tables 13 and 14, youths with both parents with post-secondary education or both parents working, are more likely to be studying, and particularly more likely to combine studies with part-time work. Having both parents employed decreases the probability of being unemployed for both males and females, and it also reduces the probability of being out of the labour force for females. Although having both parents employed has a positive impact on the probability of combining study and part-time work, it has a negative effect on the probability of studying only. For males only, having at least one parent employed has a positive effect on the probability of working full-time (and not studying).

Nguyen and Taylor (2003) suggest that the larger the number of siblings in the family, the harder it will be for the parents to support post-secondary education for their children. The results for males presented in Table 13 are consistent with these findings, although the effects are not significant for females. Young males who have three or more siblings are more likely to be working full-time and less likely to be studying than young males with no siblings. Young males with one sibling are more likely to be studying (and working part-time) and slightly less likely to be unemployed than young males with no siblings. As shown in Table 14, very few significant effects are found for females. The only significant effect indicate that

[8] This is a significant difference given that the probabilities of being unemployed are only 2.5 and 2.2 per cent in our dataset for all young men and women respectively.

females with one sibling are more likely to be studying (and working part-time) and less likely to be unemployed than females with no siblings.

As expected, young males living independently are more likely to be working full-time (and not studying), but the effect is not significant for females. However, both males and females living independently are less likely to work part-time. The results also reveal that young people living with at least one of their parents are more likely to be studying and working part-time or to be working part-time only but less likely to be studying (and not working) than young people who have left the parental home. This somewhat unexpected result is likely to be a mere reflection of the fact that a large majority of students still live with one of their parents (see Tables 9 and 10) and that most students combine work and study (see Tables 4 and 5). In addition, there could be extra incentive for a student in a single parent family to contribute to the family income or to seek income for him or herself by engaging in employment.

Having children has different effects on women and men. Single women with no child (the reference group) are more likely to be studying and less likely to be out of the labour force than all other women. Having children or being in a couple increases the probabilities of being out of the labour force or working part-time for women, while for men it increases the probability of working full-time, regardless of being a student or not. Comparing the mothers, single mothers are more likely to be working full-time, and coupled mothers are more likely to be working part-time or to be out of the labour force.

6.2 Human capital endowments

Human capital theory suggests that individuals with higher ability are more able to reap the benefit from investment in post-school education. Test scores are a powerful predictor of university-going behaviour (Hilmer 1998, 2001; Marks and McMillan 2003, 2007). Accordingly, Tables 13 and 14 show that youth with higher numeracy and literacy scores are more likely to be studying. Moreover, the results reveal that women with higher numeracy and literacy scores and men with higher numeracy scores are less likely to be unemployed, not in the labour force or working part-time (and not studying) than young people in the lowest quintiles. Similar positive influences of numeracy and literacy scores are found in the Australian context by McMillan and Marks (2003). In particular, they found lower unemployment probabilities for those with higher scores. Although, literacy scores' effects seem somewhat less important for men than for women, our results show that being in the top

three literacy quintiles increases the probability of studying and decreases the probability of working full-time for men.

As expected, young people who completed Year 12 (the reference group) are the most likely to be studying, which is shown by negative marginal effects of other education levels on the probability of being a student. Young people who did not complete high school are the most unlikely to be studying and more likely to be working (full-time for men). Also, they are more likely to be unemployed or not in the labour force. Young people with post-secondary school education are more likely to be working full-time (and not studying), with the notable exception of men with a university degree who seem more likely to be working part-time (and not studying). The age profile analysis in the next sub-section reveals that this concerns essentially young graduates.

Youth who attended independent or Catholic secondary schools are more likely to be studying less likely to be working full-time or unemployed compared to those from government schools. These effects seem more pronounced for those from independent schools than for those from Catholic schools.

6.3 Age profile

As shown in Figure 2, the probabilities of being unemployed tend to decrease with age, independent of education levels. The probabilities of being out of the labour force (NILF) and not studying is low and stable across age 18-30 for males of all education levels. The only exception is for those (male or female) who acquired a university degree at a young age. A possible explanation is that this group, males and females alike, may be more likely to have a "study-work break" (for example to travel overseas) before they enter the labour force. Females who did not complete secondary school have relatively high probabilities to be out of the labour-force (and not studying), especially between 18 and 20 years of age.

Regardless of gender and educational attainment, the probability of studying decreases and the probability of working increases with age. Those with post-secondary education have the highest probabilities of studying before 25 years of age. After this age, males reach high probabilities of full-time work which they tend to maintain until their late 20s where a small decline is observed. This inverted U-shape for full-time work probabilities is much more pronounced for women and it is visible at all education levels. Women's probabilities of working full-time reach a peak around 25 and decline afterward (although to a lesser extent for women with a university degree). This decrease in the proportion of full-time workers

among females in their late 20s is matched with an increase in the probabilities of working part-time, which is consistent with the timing of women establishing a family.

Similar to their male counterparts, women with a university degree exhibit a career-oriented behaviour: most of them finish their studies by 25 and are then more likely to work full-time than other women. Diploma and degree holders as well as those who have completed Year 12 are also more likely to take up part-time study while working full-time in their late 20s.

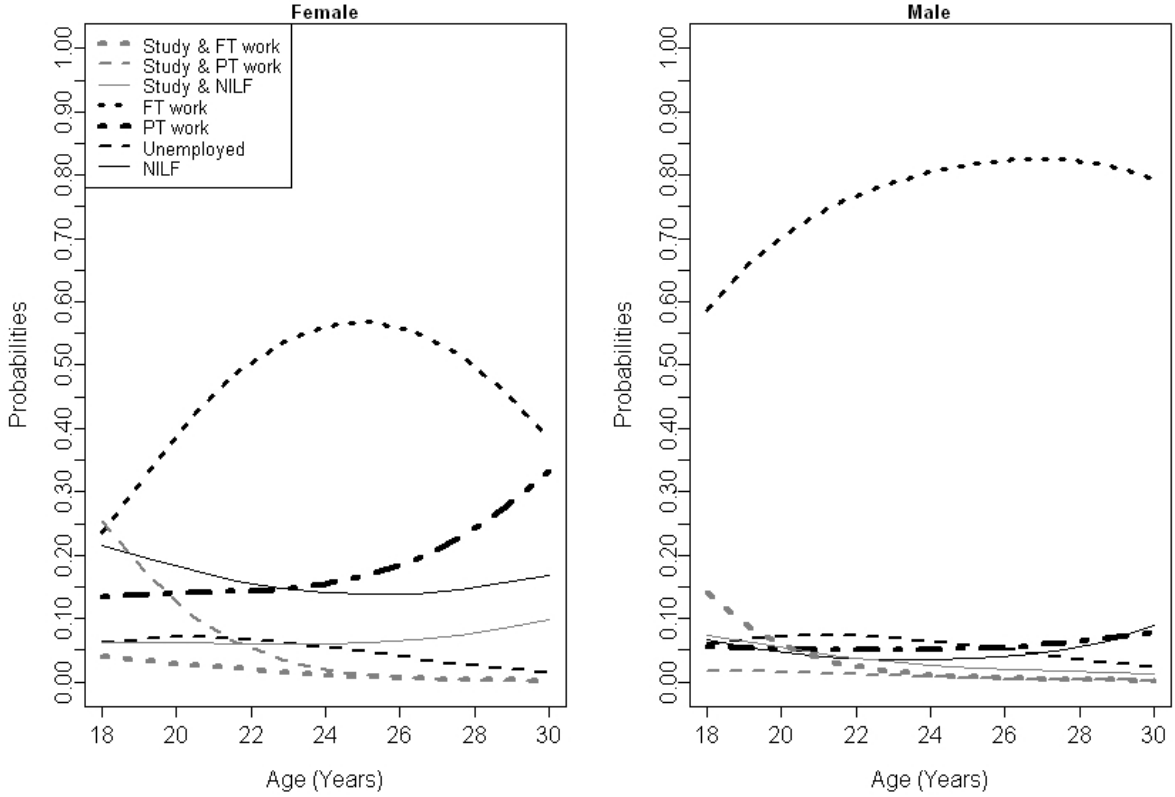
6.4 GDP growth effects

GDP growth reflects the general performance of the domestic economy. The impact of GDP growth on employment and education outcomes are presented by education levels in Figure 3. Most curves are fairly flat which indicates that GDP growth only has a limited impact. Significant effects are found for males and females with low education levels (less than Year 10) and on females with a university degree. When GDP growth is low or negative, the least educated females are less likely to be working (full-time or part-time) and more likely to be studying (females below Year 10 may work part-time at the same time). Moreover, the results show higher unemployment probabilities for young males with the lowest level of education when GDP growth is low or negative, while other education groups remain largely unaffected. This indicates that the least educated are the most likely to be affected by poor economic circumstances.

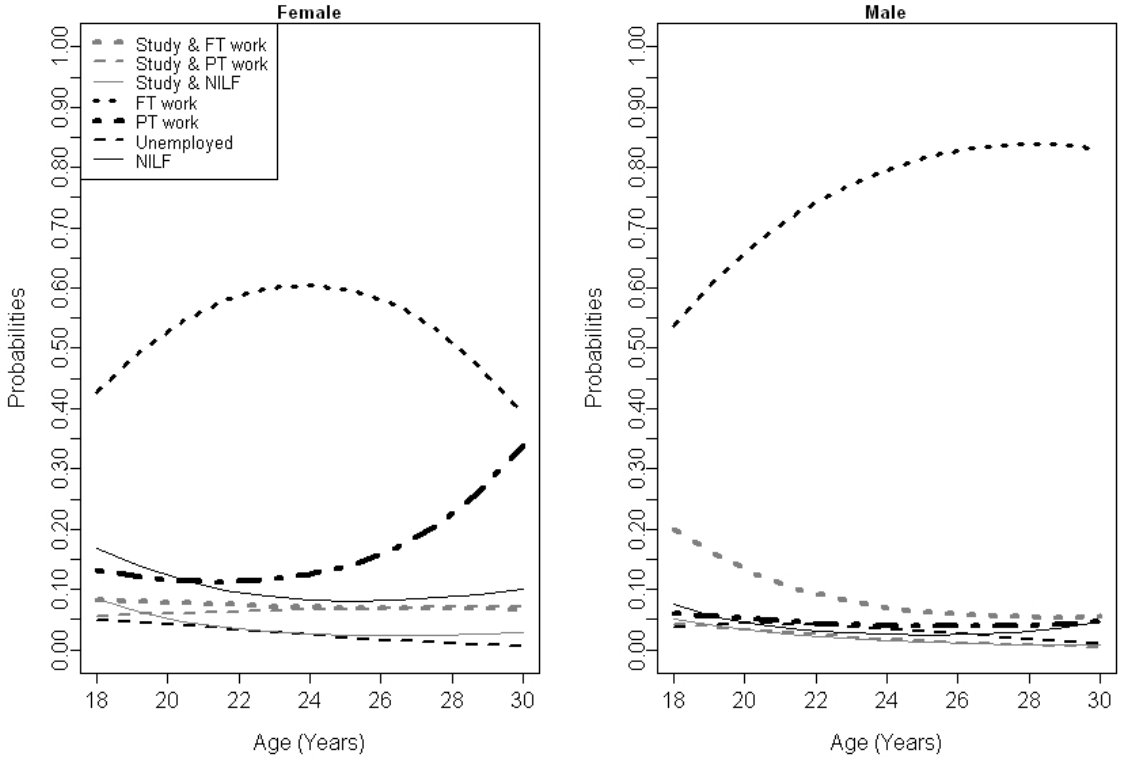
Figure 3 shows that poorly educated females are less likely to be working and more likely to pursue further education in periods of economic slowdown. The finding that females with very poor education (less than Year 10) are more likely to be unemployed when GDP growth is high should be taken with caution since this particular coefficient is estimated on a very small group of cases.[9] The probabilities of working (full-time or part-time) for young women with a university degree are also negatively affected by economic downturns. As for females with low education, the results suggest that they are less likely to be working and more likely to pursue further education in periods of economic slowdown. However, and unlike females with low education, they are also more likely to withdraw from the labour force. One possible explanation is that females with a university degree are more likely to be the second wage earner in the household. In periods of low economic growth, when it is harder to find a job matching their expectations, they would be more inclined to withdraw from the labour force in order to take care of the family.

[9] In the sample used in this study, very few females with an education level below Year 10 were recorded as unemployed between 1985 and 2006 (see Table 7).

Figure 2 Age effects on education-employment choices by level of education

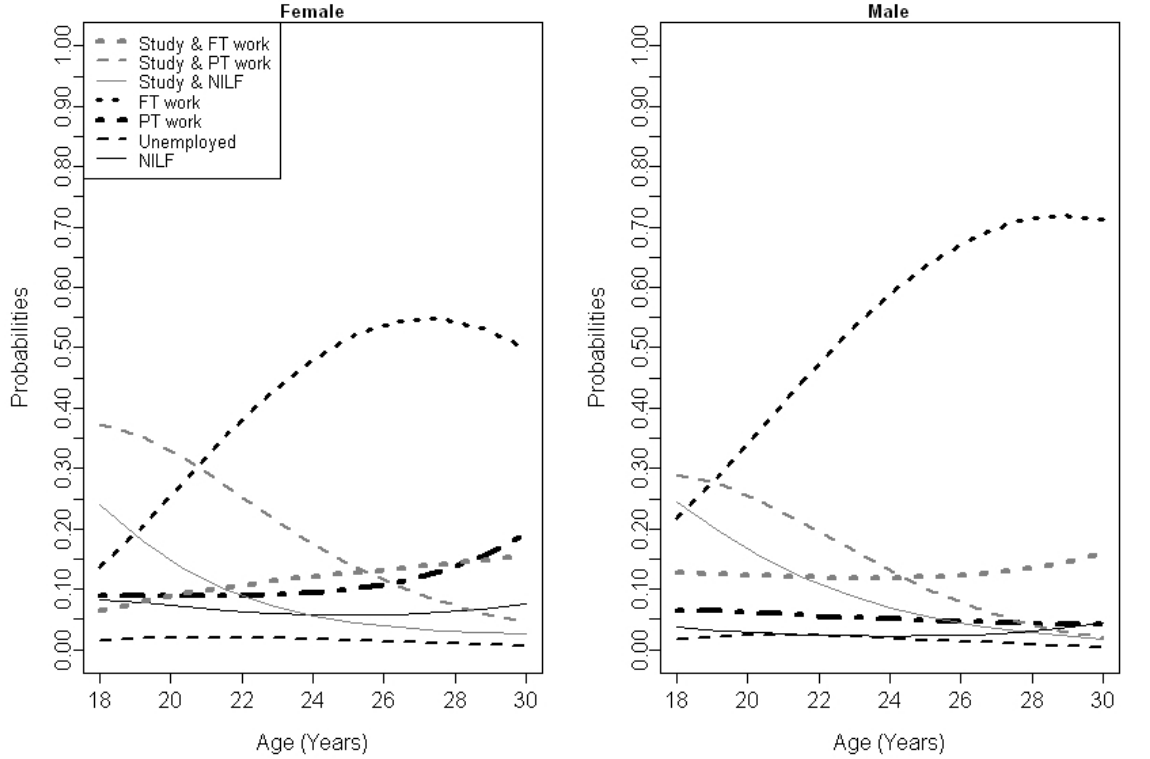


< Year 10

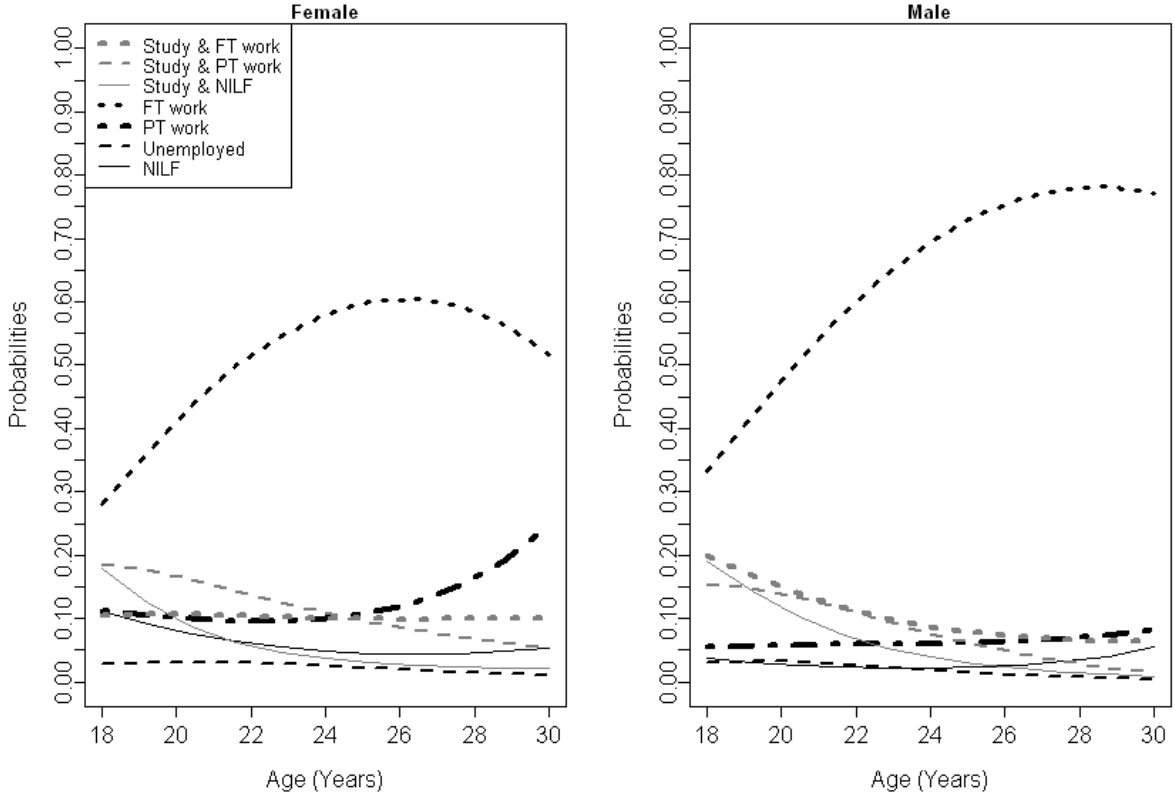


Year 10-11

Figure 2 (continued) Age effects on education-employment choices by level of education

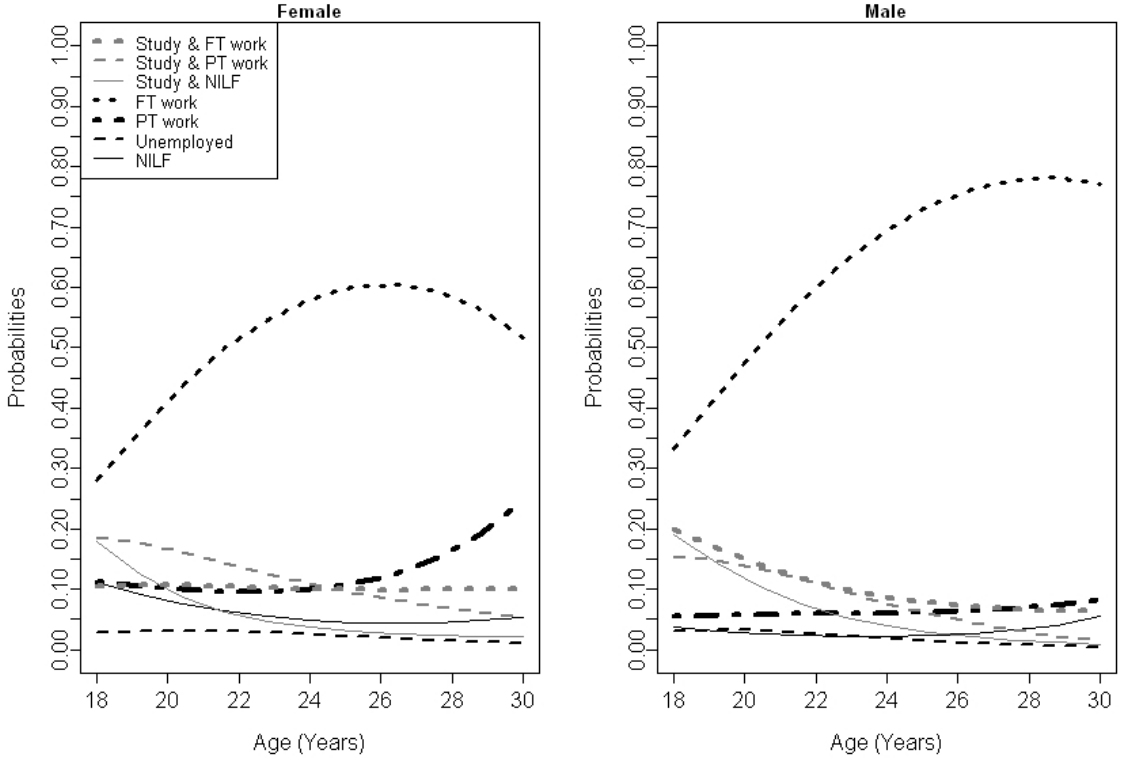


Year 12

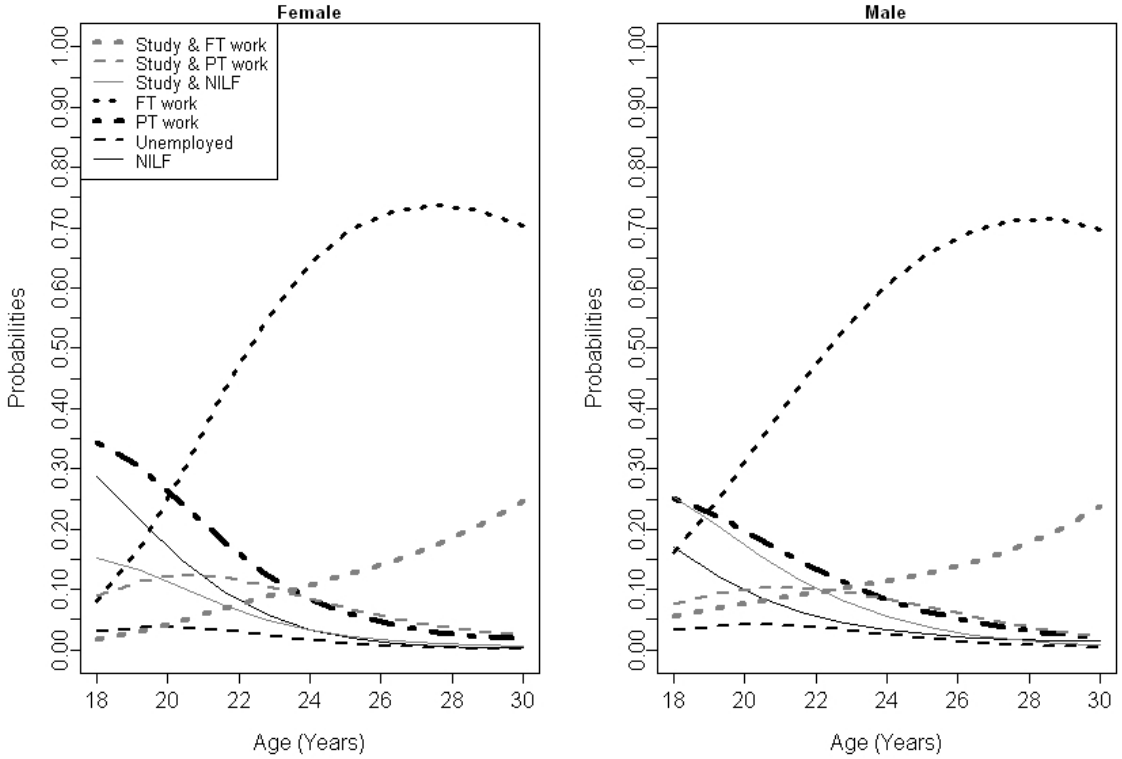


Certificate

Figure 2 (continued) Age effects on education-employment choices by level of education



Diploma



University

6.5 Unemployment rate effects

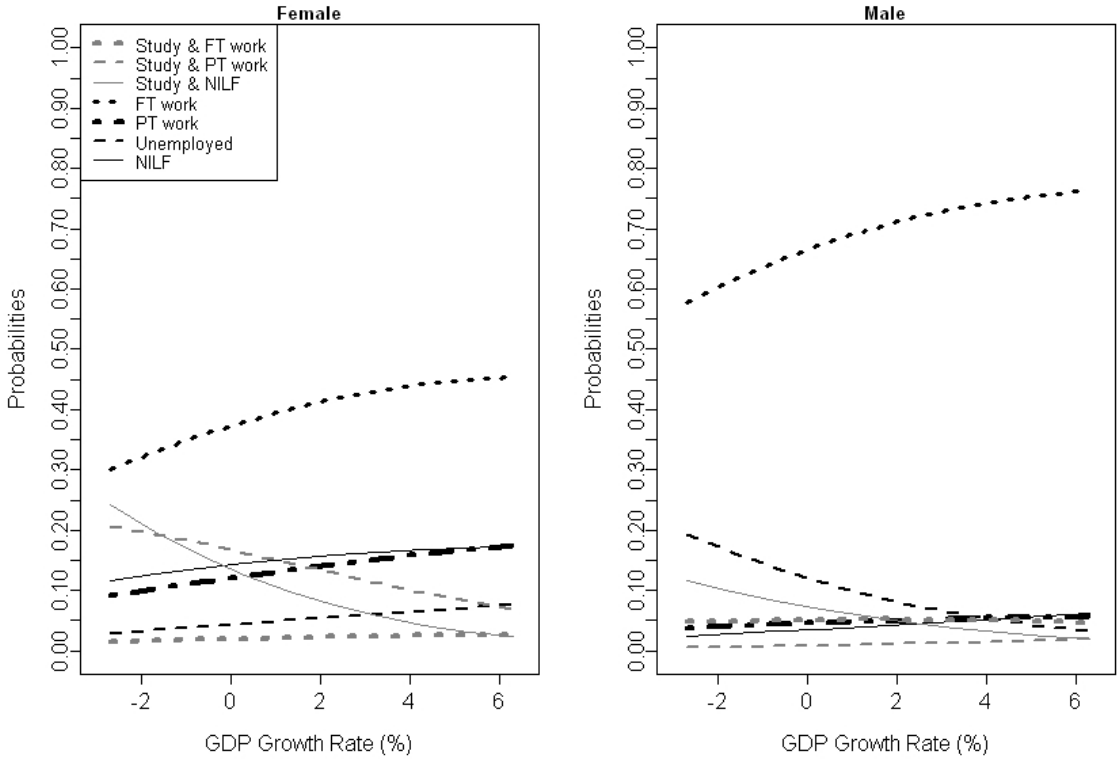
The impact of unemployment rate on education and employment outcomes is presented by education levels in Figure 4. In accordance with the literature and the descriptive statistics, both young males and females tend to suffer increasing unemployment risks as the unemployment rate increases. This effect is stronger for males than for females, which is consistent with the multi-country study of OECD (1998). Moreover, the magnitude of these effects varies greatly depending on education levels. Although females with an education level below Year 10 or a TAFE certificate become more likely to be unemployed as the unemployment rate rises, other females are barely affected. By contrast, all males experience higher unemployment probabilities as unemployment rises, and the most affected are those with an education level of Year 10 or 11.

Compared to females, high unemployment rates seem to have more profound and widespread effects on young males. When unemployment rate is high, young males' probability of working full-time is substantially lower (particularly among those with low education levels), and the probabilities of studying are higher. Rises in the unemployment rate have impacts on employment and unemployment probabilities but also on other education and work outcomes. Young women with a university degree have higher probabilities of studying and a lower probability of being out of the labour force as unemployment increases. Among males and females whose highest level of education was school completion (Year 12) or a TAFE certificate, higher unemployment rates lead to higher probabilities of study and not working, which is consistent with the idea that in periods of high unemployment, it is more difficult for students to find a part-time work. The results for men also show that the probability of studying while working full-time increases in periods of high unemployment rates, independent of education level. A possible explanation is that those already working full-time try to obtain additional job protection in periods of high unemployment by acquiring additional qualifications. However, those who have not completed high school have fewer opportunities to further improve their education.

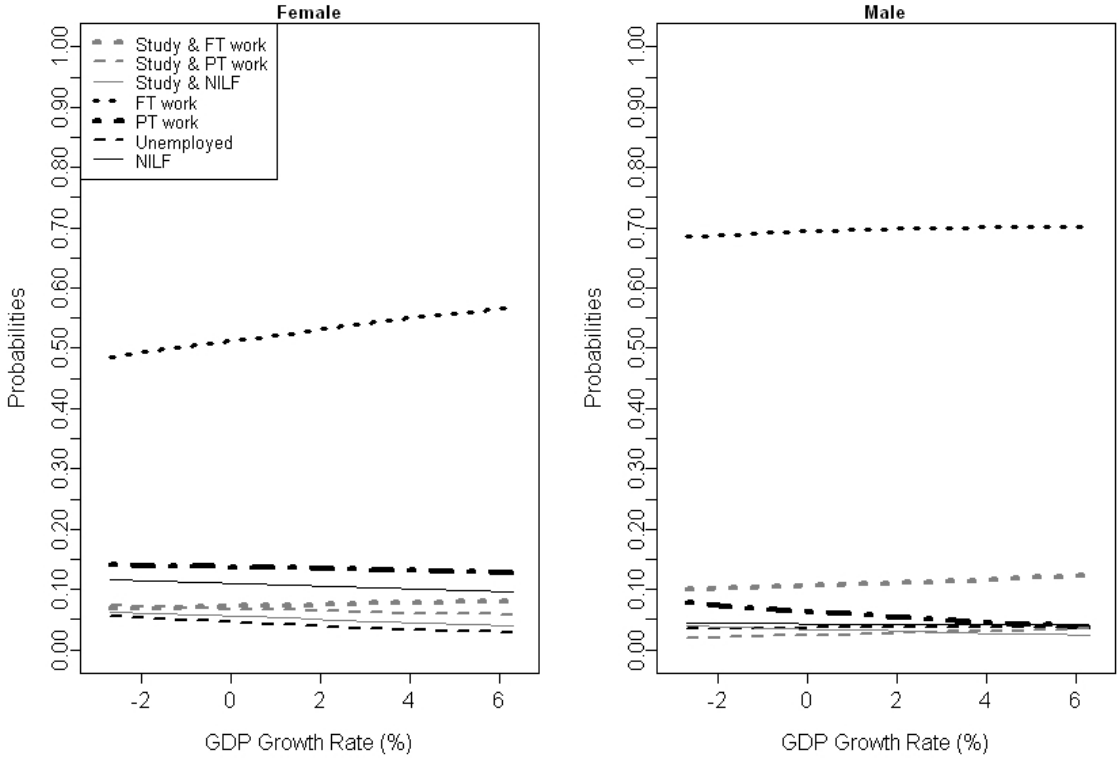
Overall, high unemployment rates lead to higher unemployment probabilities for both males and females, particularly for those who have not completed high school. As expected, high unemployment rates have a negative effect on the probability of working full-time, especially for males who have not completed high school and males with a TAFE certificate. In addition, high unemployment rates seem to encourage further studies, except for females who have not completed Year 12. For the later, higher unemployment rates are associated with lower probabilities of studies and higher probabilities to withdraw from the labour force. This is in

sharp contrast with the impact on young people with a university degree. The later become more likely to study (or to keep on studying) and less likely to be out of the labour force (and not studying) as unemployment rises.

Figure 3 Effects of GDP growth rates on education-employment choices by level of education

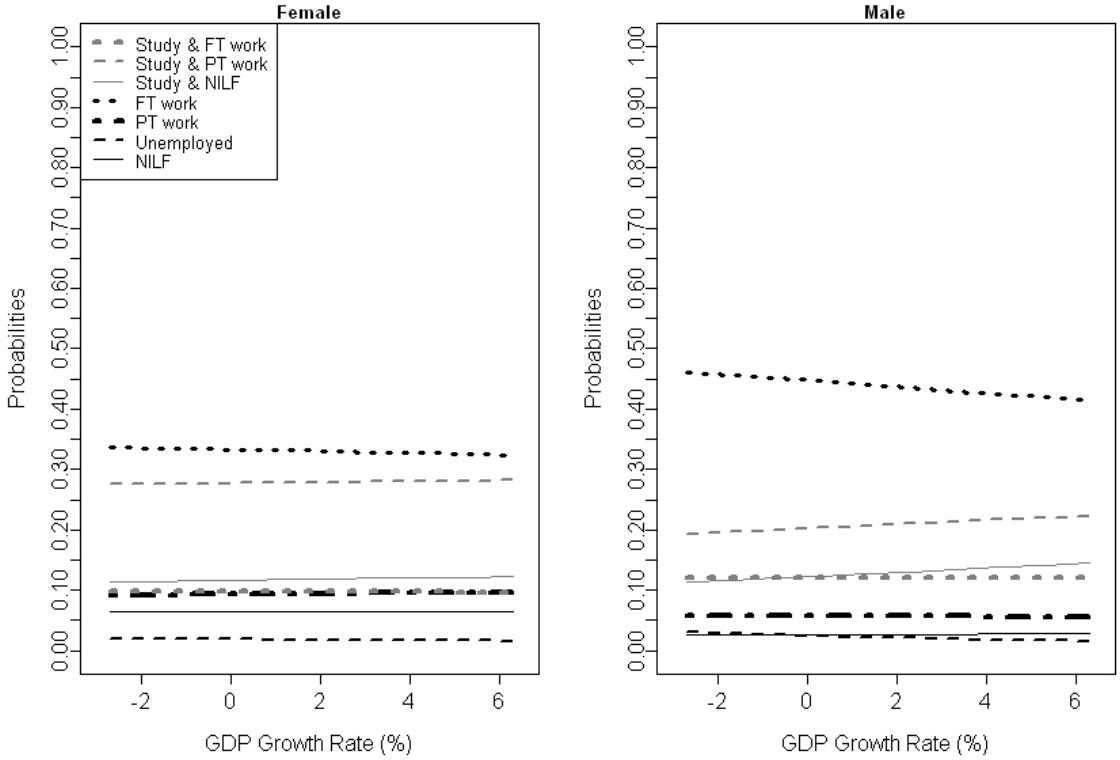


< Year 10

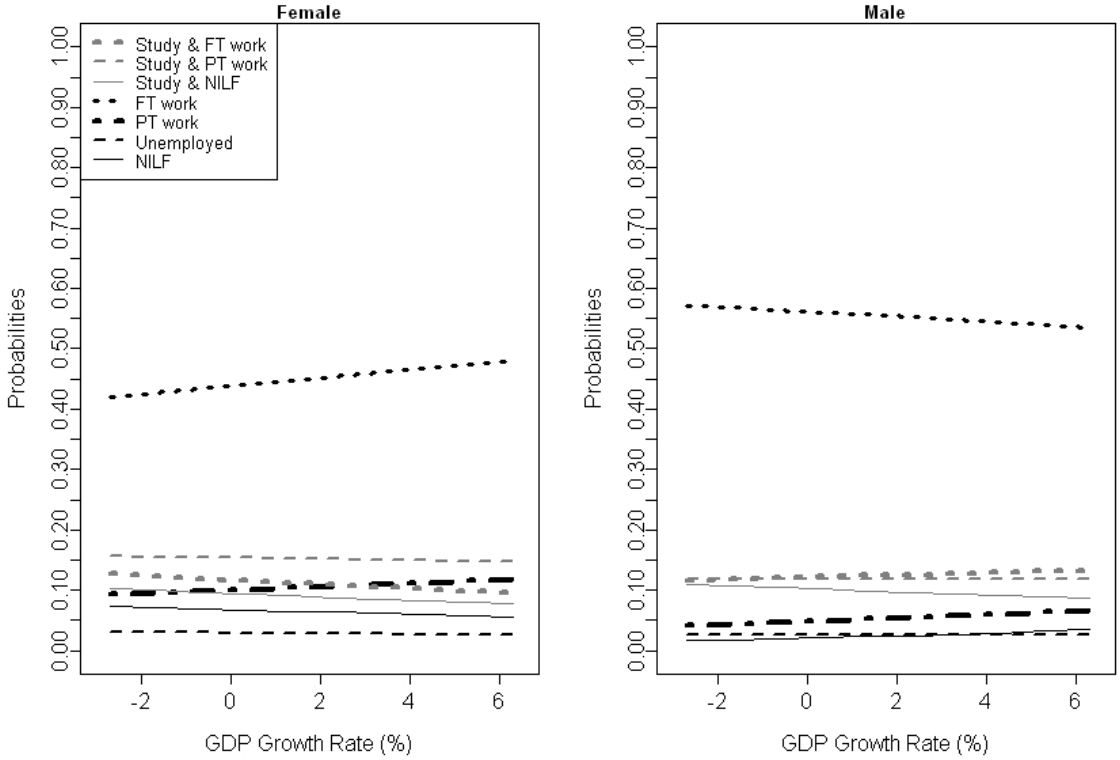


Year 10-11

Figure 3 (continued) Effects of GDP growth rates on education-employment choices by level of education

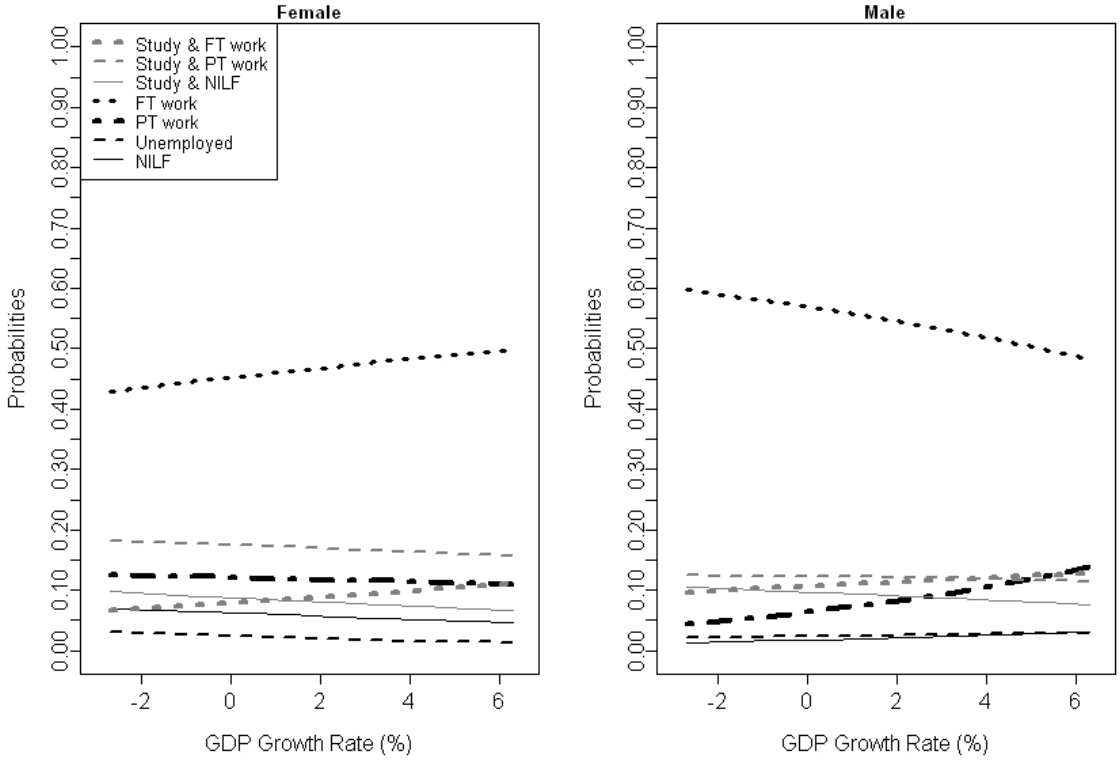


Year 12

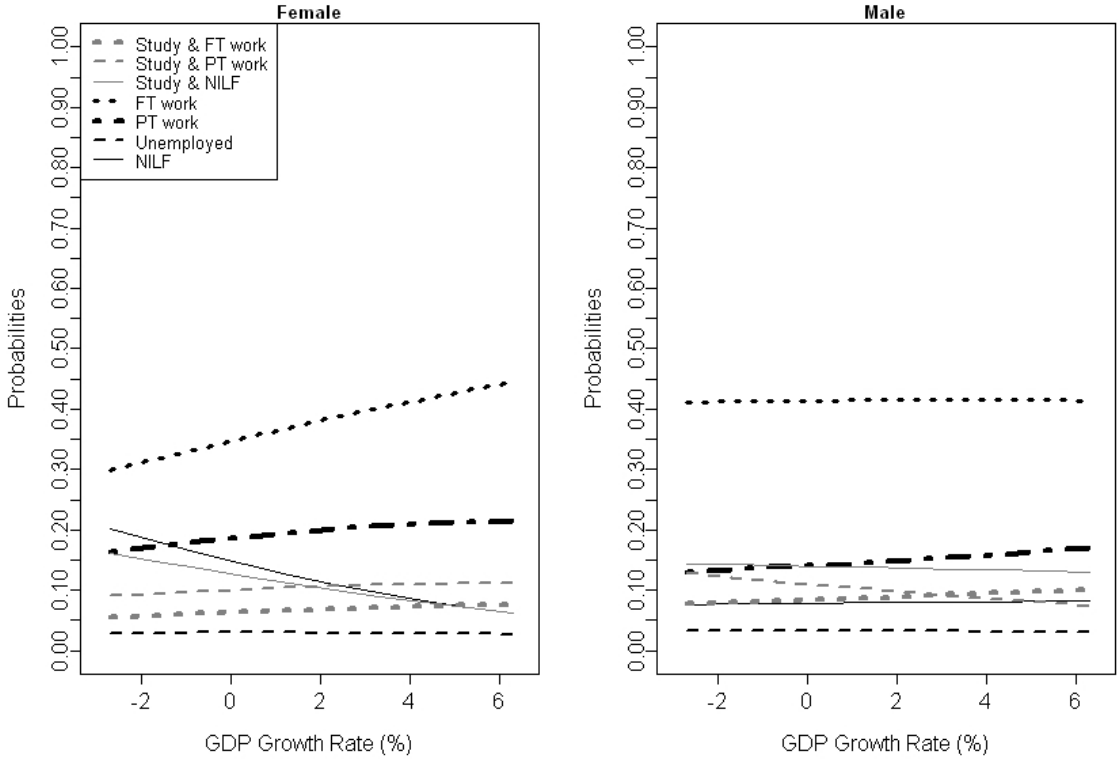


Certificate

Figure 3 Effects of GDP growth rates on education-employment choices by level of education

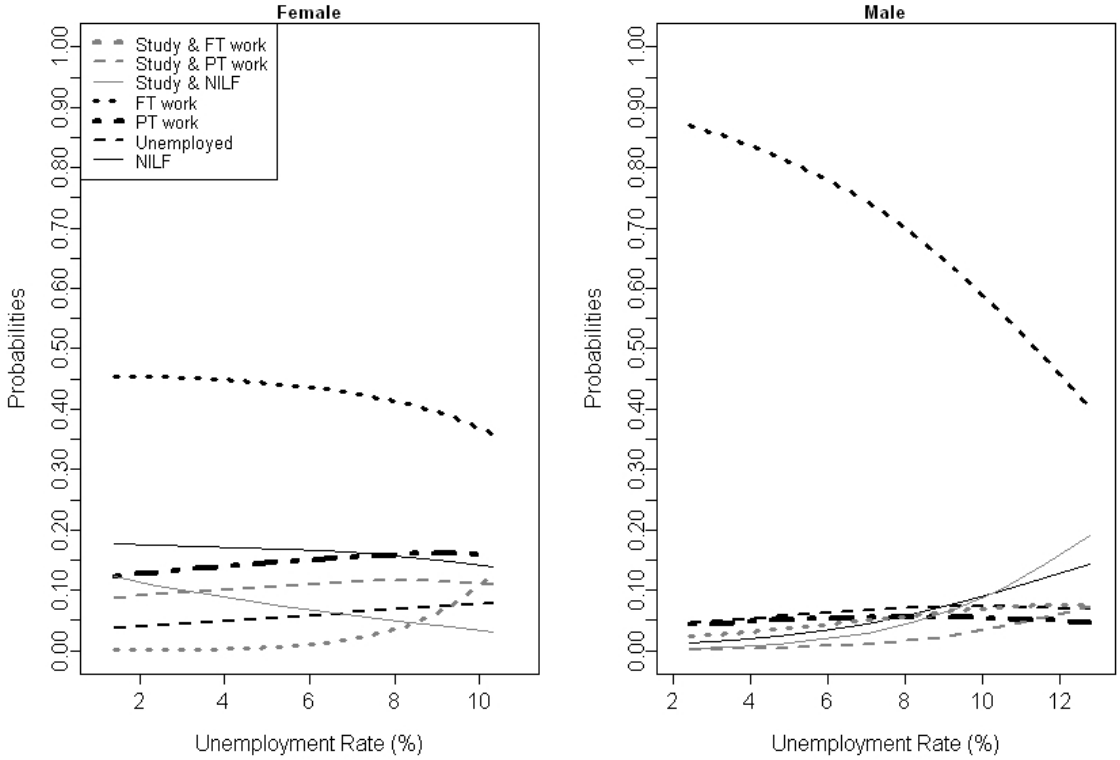


Diploma

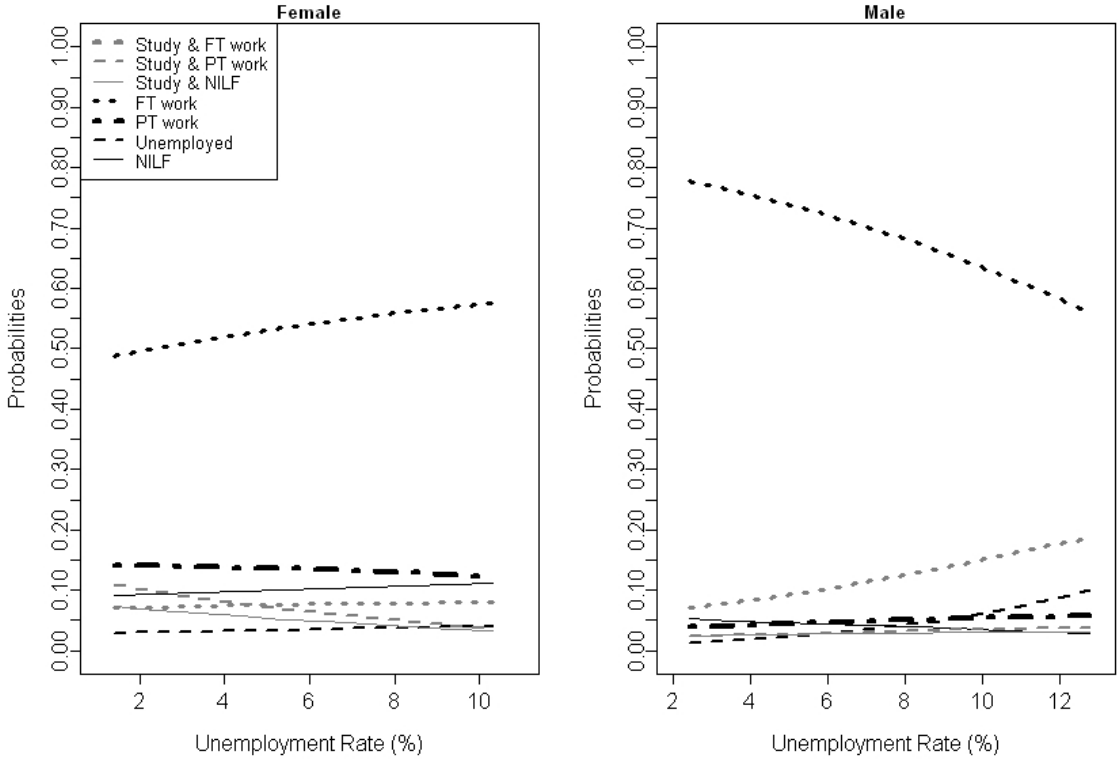


University

Figure 4 Effects of unemployment rates on education-employment choices by levels of education

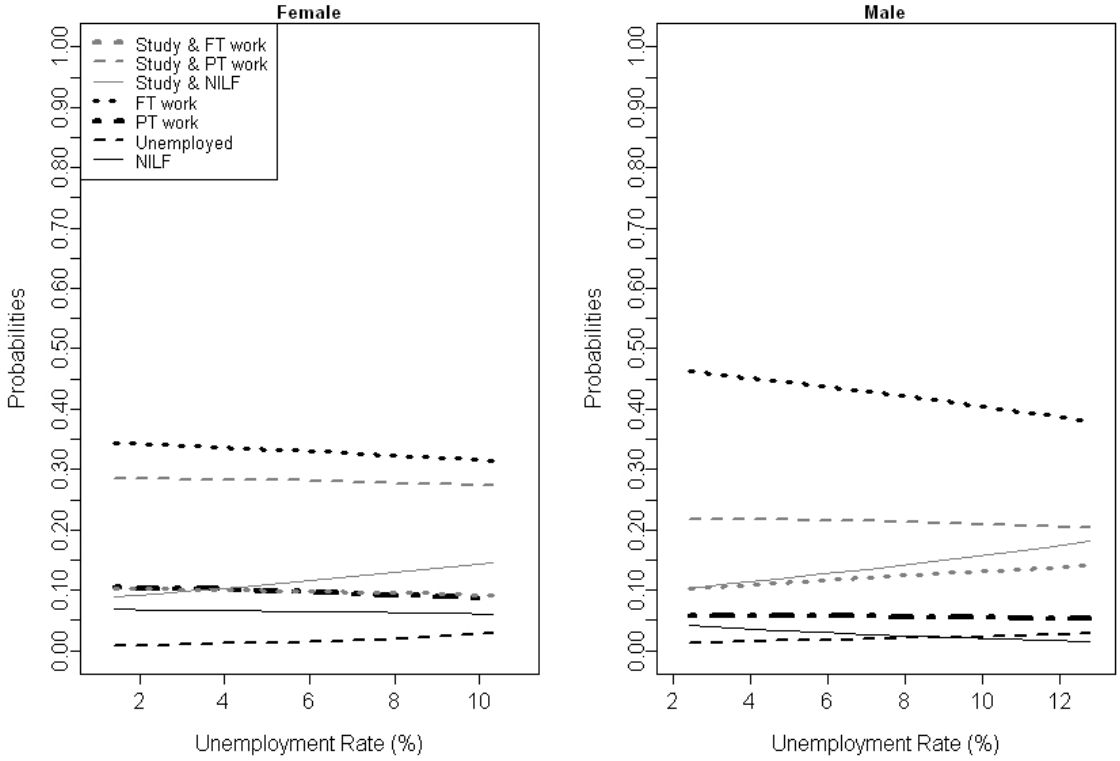


< Year 10

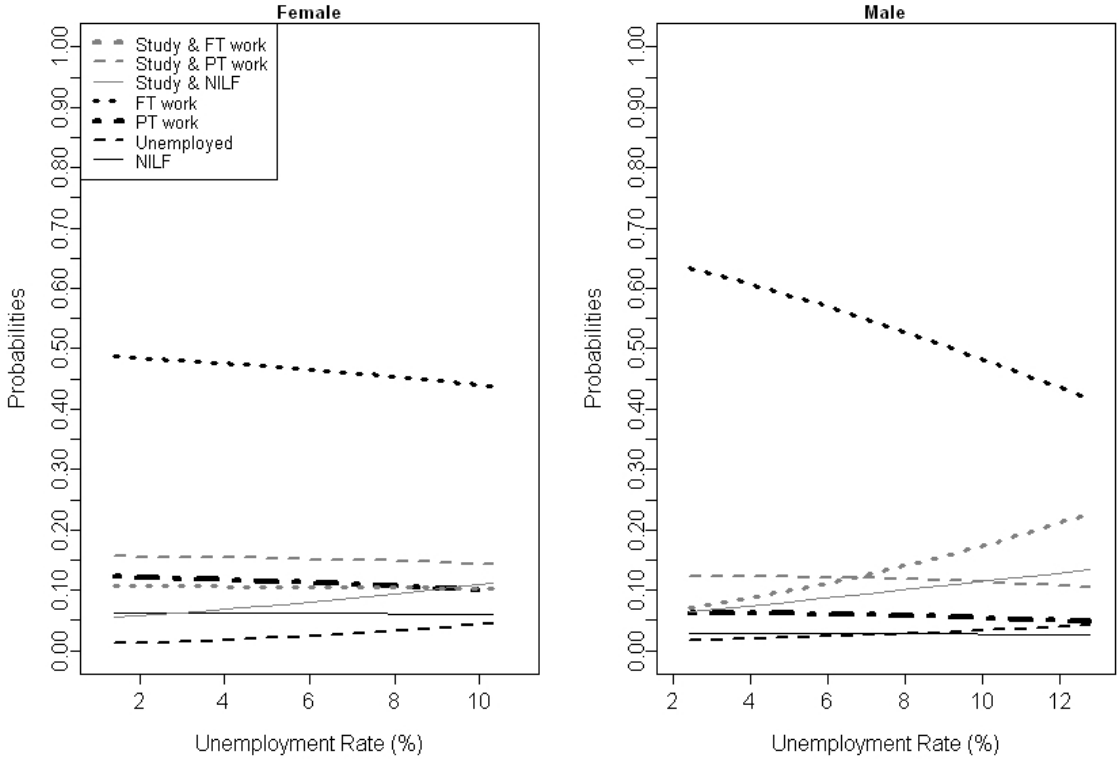


Year 10-11

Figure 4 (continued) Effects of unemployment rates on education-employment choices by levels of education

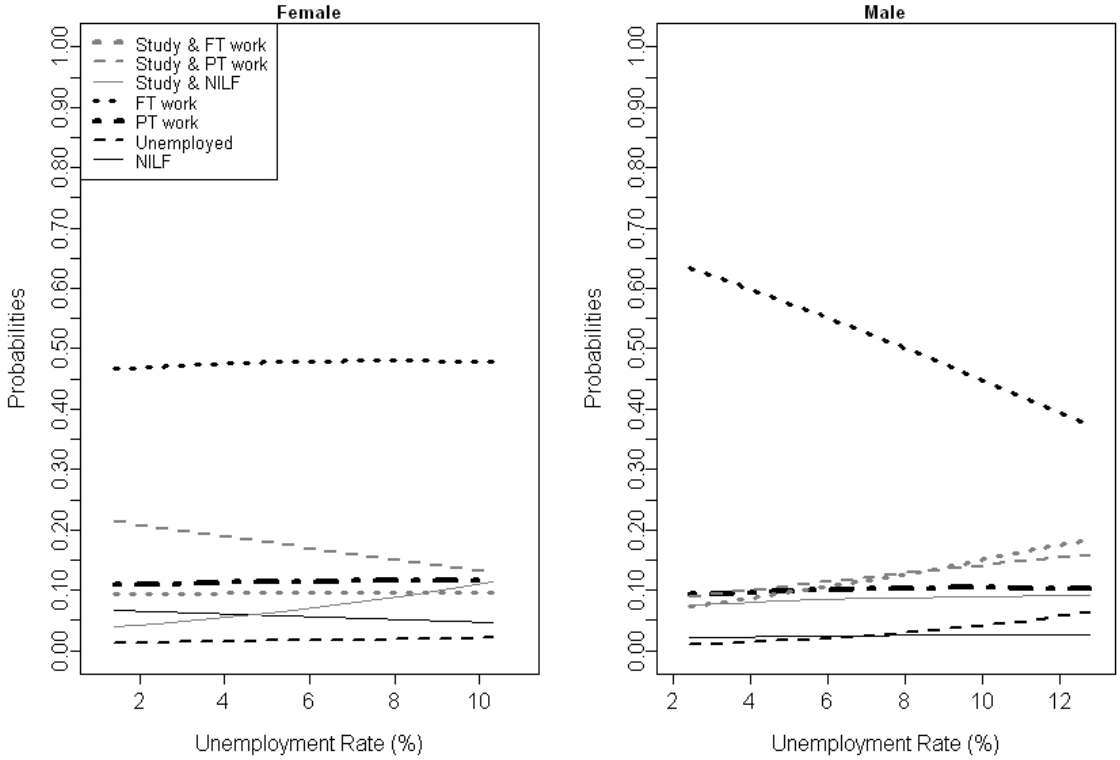


Year 12

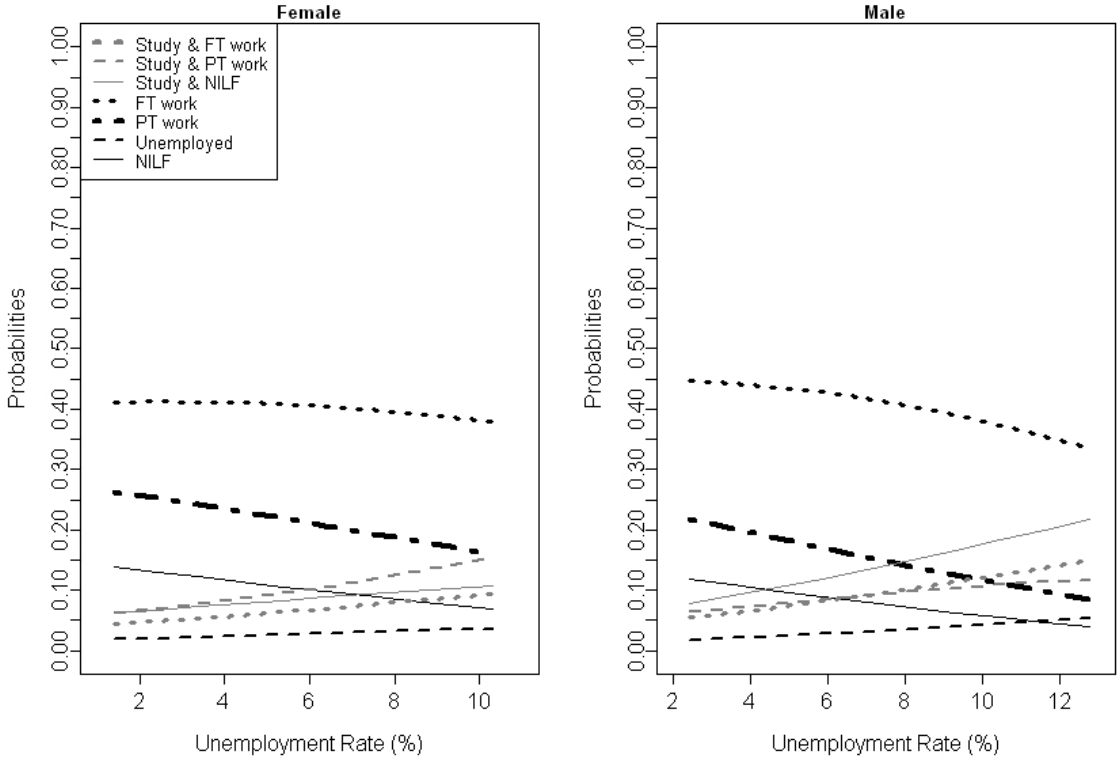


Certificate

Figure 4 (continued) Effects of unemployment rates on education-employment choices by levels of education



Diploma



University

7. Conclusion

This project examines employment and education outcomes of young people after they have left school. The study also investigates the effects of macroeconomic conditions on these outcomes. Family background, family structure and human capital endowments are controlled for in the analytical model. Therefore, inferences can be made on the independent effects that individual characteristics have on the education-employment outcomes.

The results show that young migrants from non-English speaking countries are more likely to invest in further education. In general, youth with higher literacy and numeracy scores and those from non-government schools (independent or Catholic schools) are more likely to participate in post-secondary study than other young people. Young people with more highly educated parents and working parents are more likely to pursue further education. Having three or more siblings decreases young males' chances of studying. Young people with working parents are both more likely to work full-time and to study (and work part-time). For women, having children increases the probabilities to withdraw from the labour force or to work part-time. Among mothers, single mothers are relatively more likely to work full-time than coupled mothers.

As they age, young adults become more likely to have completed post-secondary study and to work full-time. With age labour market outcomes improve. Older young adults are less likely to be unemployed and more likely to be employed full-time rather than part-time. However, females experience an increase in part-time work in their late 20s, which is likely to be due to family reasons – usually a choice rather than a necessity.

Economic growth, measured by the state-level GDP growth rate, has few significant impacts. When GDP growth is low (or negative), youths with low education levels (less than Year 10) are more likely to be studying and less likely to be working. Moreover, the results clearly show higher unemployment probabilities for young males with an education level below Year 10 when GDP growth is low (or negative), while other education groups are not affected.

Overall, however, the effects of the unemployment rate appear more important than the economic growth effects. High unemployment rates lead to higher unemployment probabilities for both males and females, particularly for those who have not completed secondary school. In addition, high unemployment has a negative effect on the probability of working full-time especially for males who have not completed high school and males with a

TAFE certificate. The results also reveal that high unemployment rates encourage further study. In particular, increases in the unemployment rate are associated with higher probabilities of study for young people with a university degree.

Appendix A

Appendix Table A.1 Unemployment rates by gender and State

	NSW		VIC		QLD		SA		WA		TAS		NT		ACT		National		
	Males	Females	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	ALL
1981	4.3	6.7	4.6	7.4	4.6	8.0	7.0	9.1	5.1	7.6	5.7	8.9	3.9	5.9	5.4	6.7	4.8	7.4	5.8
1982	6.5	8.1	5.6	8.3	5.7	8.8	7.5	9.4	6.9	8.9	9.2	10.5	5.4	8.1	6.3	8.1	6.3	8.5	7.2
1983	10.6	10.8	8.4	10.0	9.9	10.5	10.5	10.9	9.8	9.7	10.7	10.4	6.5	7.9	6.8	8.0	9.7	10.4	10.0
1984	9.2	9.7	7.0	8.9	9.6	9.9	9.4	10.0	9.4	9.5	10.1	10.5	6.7	9.4	4.9	6.7	8.7	9.5	9.0
1985	8.6	8.9	6.3	7.9	9.3	10.1	8.5	9.1	7.8	8.5	8.9	9.3	5.7	9.3	4.3	5.6	7.9	8.8	8.3
1986	8.2	8.7	5.9	7.5	8.8	10.2	8.5	8.6	7.5	8.2	8.3	9.3	7.1	6.7	4.6	4.9	7.6	8.5	7.9
1987	8.3	8.7	5.6	6.8	9.3	9.9	8.6	8.8	7.2	8.0	9.0	9.0	7.6	8.1	5.5	5.8	7.6	8.3	7.9
1988	6.9	7.3	5.0	6.7	7.5	8.9	8.3	8.2	6.6	7.8	8.8	9.4	8.5	7.8	4.7	5.2	6.6	7.5	7.0
1989	5.9	6.5	4.1	5.6	6.1	7.6	7.1	6.9	5.3	6.3	8.4	9.8	6.2	6.7	5.1	4.9	5.6	6.5	6.0
1990	6.2	6.4	5.5	6.2	7.6	8.0	7.5	7.0	7.5	7.6	8.8	8.0	6.8	7.3	5.2	5.4	6.6	6.8	6.7
1991	8.9	8.1	10.0	9.0	9.8	9.2	10.4	8.8	10.9	9.4	10.9	9.2	9.9	8.0	6.4	5.9	9.7	8.7	9.3
1992	10.8	9.0	11.8	10.4	10.6	9.5	12.5	9.7	11.2	10.0	12.5	9.2	8.8	6.5	7.5	7.4	11.2	9.5	10.5
1993	11.4	9.3	12.2	11.1	10.8	9.5	11.8	9.2	9.2	9.0	13.5	10.1	8.0	7.2	7.1	7.0	11.3	9.7	10.6
1994	9.8	8.6	10.7	10.1	9.1	8.9	11.0	9.5	8.0	7.9	12.0	9.2	7.4	7.2	7.4	6.5	9.8	9.0	9.5
1995	8.0	7.1	8.9	8.3	9.1	8.2	10.4	8.2	7.2	7.1	10.8	8.2	7.7	6.7	7.3	6.1	8.6	7.7	8.2
1996	8.0	7.0	8.6	8.5	9.1	8.8	9.9	8.1	7.8	6.9	10.8	8.9	5.7	6.2	8.2	7.7	8.5	7.8	8.2
1997	7.9	7.3	8.7	8.4	9.5	8.7	10.2	8.3	6.9	6.9	11.2	9.7	5.5	5.1	7.9	6.8	8.5	7.9	8.3
1998	7.3	6.8	7.9	7.8	8.7	8.0	10.1	8.8	7.2	6.3	11.5	8.3	5.4	3.5	7.6	5.5	8.0	7.4	7.7
1999	6.2	6.2	7.3	6.8	7.8	7.7	8.7	7.7	6.8	6.0	10.6	7.5	3.5	4.3	6.2	4.8	7.1	6.7	6.9
2000	5.6	5.2	6.2	6.1	7.6	7.4	8.0	7.1	6.3	5.6	9.5	7.7	5.2	4.6	5.2	4.0	6.5	6.1	6.3
2001	6.1	5.8	6.4	6.4	8.5	8.0	8.2	6.1	7.3	6.3	10.2	7.3	7.2	5.9	5.7	4.1	7.0	6.4	6.8
2002	6.1	5.8	6.1	5.8	7.5	7.5	7.1	6.3	6.7	5.5	9.5	7.7	5.7	5.5	4.9	3.6	6.5	6.1	6.4
2003	5.7	5.8	5.5	5.7	6.4	7.1	6.5	5.7	6.0	5.8	8.7	6.9	5.5	5.8	4.4	4.1	5.9	6.0	5.9
2004	5.2	5.4	5.5	5.7	5.2	5.8	6.1	5.7	4.7	5.6	7.1	5.7	5.9	5.0	4.1	3.3	5.3	5.6	5.4
2005	5.2	5.1	5.1	5.7	4.4	5.3	5.4	4.8	4.0	4.9	6.4	6.0	5.7	4.8	3.3	3.2	4.9	5.2	5.1
2006	5.2	5.1	4.8	5.3	4.2	5.0	5.1	4.8	3.2	4.1	6.9	5.8	5.2	4.0	3.3	2.8	4.7	4.9	4.8

Source: ABS Series 6202.0.55.001 Labour Force, Australia, Spreadsheets Table 12. Labour force status by Sex - States and Territories.

References

Averett, S. & Burton, M. (1996). College attendance and the college wage premium: Differences by gender, *Economics of Education Review* 15(1), 37--49.

Baker, M., (1992). Unemployment Duration: Compositional Effects and Cyclical Variability, *The American Economic Review*, Vol. 82, No. 1. (Mar., 1992), pp. 313-321.

Blanchflower, D.G. & Freeman, R.B., (1996). Growing Into Work, CESifo Working Paper No. 108, CESifo GmbH.

Greene, W. H. (2003). *Econometric Analysis*, Prentice-Hall Inc..

Hilmer, M. (2001). A comparison of alternative specifications of the college attendance equation with an extension to two-stage selectivity-correction models, *Economics of Education Review* 20(3), 263--278.

Hilmer, M. (1998). Post-secondary fees and the decision to attend a university or a community college, *Journal of Public Economics* 67(3), 329--348.

Keane, M. P. (1992). A Note on Identification in the Multinomial Probit Model, *Journal of Business & Economic Statistics* 10(2), 193--200.

Lamb, S. (2001). The pathways from school to further study and work for Australian graduates. LSAY Research Report 19. Melbourne: ACER.

Lamb, S., Dwyer, P. & Wyn, J. (2000). Non-completion of school in Australia: The changing patterns of participation and outcomes. LSAY Research Report 16. Melbourne: ACER.

Lamb, S. & McKenzie, P. (2001). Patterns of success and failure in the transition from school to work in Australia. LSAY Research Report 18. Melbourne: ACER.

Leslie, D. & Drinkwatr, S. (1999), Staying on in Full-Time Education: Reasons for Higher Participation Rates Among Ethnic Minority Males and Females, *Economica* 66(261), 63--77.

Marks, G.N., (2005). Issues in the school-to-work transition: Evidence from the Longitudinal Surveys of Australian Youth, *Journal of Sociology*, Volume 41(4): 363–385

Marks, G.N. and Fleming, N., (1998a). Factors Influencing Youth Unemployment in Australia: 1980-1994, Research Report Number 7, Australian Council for Educational Research.

Marks, G.N. and Fleming, N., (1998b). Youth Earnings in Australia 1980-1994: A Comparison of Three Youth Cohorts, Research Report Number 8, Australian Council for Educational Research.

Marks, G., Hillman, K. & Beavis, A. (2003). Dynamics of the Australian youth labour market: The 1975 cohort, 1996-2000. LSAY Research Report 34. Melbourne: ACER.

McMillan, J. & Marks, G. (2003). School leavers in Australia: Profiles and pathways. LSAY Research Report 31. Melbourne: ACER.

Marks, Gary N. and McMillan, J. (2003) Declining Inequality? The Changing Impact of Socioeconomic Background and Ability on Education in Australia, *British Journal of Sociology* 54(4):453–471.

Marks, Gary N. and McMillan, J. (2007) ‘hanges in Socioeconomic Inequalities in University Participation in Australia in Shavit, Y., Arum, R. and Gamoran, A. (eds.) *Stratification in Higher Education: A Comparative Study*. Stanford: Stanford University Press.

Nguyen, A. & Taylor, J. (2003). Post-high school choices: New evidence from a multinomial logit model, *Journal of Population Economics* 16(2), 287--306.

OECD, (1998). Getting Started, Settling in: The Transition from Education to the Labour Market, pp. 81–122 in *Employment Outlook*. Paris: Organization for Economic Co-Operation and Development.

OECD, (2008). Employment Outlook 2008. Paris: Organization for Economic Co-Operation and Development.

Ordovensky, J. (1995). Effects of institutional attributes on enrollment choice: Implications for postsecondary vocational education, *Economics of Education Review* 14(4), 335--350.

Oreopoulos P., von Wachter T. and Heisz A. (2008). The Short- and Long-Term Career Effects of Graduating in a Recession: Hysteresis and Heterogeneity in the Market for College Graduates, IZA Discussion Paper No. 3578.

Rice, P. (2000). Participation in Further Education and Training: How Much Do Gender and Race Matter?, Discussion Paper, Department of Economics, University of Southampton.

Stevens, K. (2007). Adverse Economic Conditions at Labour Market Entry: Permanent Scars or Rapid Catch-up?, Department of Economics, University College London, Job Market Paper.

Train, K. E. (2003). *Discrete Choice Models with Simulation*, Cambridge University Press, Cambridge.