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A Longitudinal Analysis of the Young Self-employed in Australia and the United States

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Abstract

This paper examines the pattern of self-employment in Australia and the United States. We particularly focus on the movement of young people in and out of self-employment using comparable longitudinal data from the two countries. We find that the forces that influence whether a person becomes self-employed are broadly similar: in both countries skilled manual workers, males and older workers were particularly likely to move to self-employment. We also find that previous firm size, previous union status and previous earnings are important determinants of transitions to self-employment. The main difference we observe is that additional years of schooling had a positive impact on the probability of being self-employed in the US but were not a significant influence in Australia. However, the factors influencing the probability of leaving self-employment are different across the two countries.

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Section 1. Introduction

While ignored for many years, there has been a resurgent interest in entrepreneurship and self-employment. This paper examines the patterns of self-employment in Australia and the U.S. The comparison of the two countries shows that many common forces are shaping the extent and patterns of entrepreneurship. Although the self-employment rate has historically been higher in Australia, the self-employed in both countries are clustered in the same industries and occupations. Moreover, the historical trends in self-employment rates are similar. For the most part, the same factors tend to increase the tendency of certain individuals to become self-employed. This paper explores some of these similarities and highlights some differences between the two countries.

The resurgence in interest in entrepreneurship is occurring for many reasons. Government interest in self-employment is indicated by the countries that look to self-employment as a route out of poverty or disadvantage. In Britain and France, government programs provide transfer payments to the unemployed while they attempt to start businesses ¹. In the U.S. similar programs are being started for unemployment insurance and welfare recipients ². In Australia a program provides loans to unemployed people with viable business ideas. Both Australia and the U.S. have several government programs to provide loans to small businesses, and both countries have exempted small businesses from certain regulations and taxes ³. Furthermore, many states and municipalities in the U.S. have had programs to encourage minority small businesses.

Probably the greatest interest in entrepreneurship comes from a belief that small businesses are essential to the growth of a capitalist economy. While the view that small businesses are responsible for a disproportionate share of job creation and innovation is

¹ See Bendick and Egan (1987).

² See U.S. Department of Labor (1990), and Fishman and Weinberg (1990).

³ See Terry et al.(1988) for a description of government policies in Australia.

disputed ⁴, this view is a common one. It is often argued that many of the problems of Eastern Europe come from the lack of entrepreneurs.

Academics have been interested in self-employment as a safety valve where the unemployed and victims of discrimination could find jobs ⁵. Interest in self-employment has also been prompted by the belief that they face a different set of economic incentives, and thus could be used to test various theories ⁶.

A few studies have examined self-employment decisions using cross-sectional data⁷. Such studies can help identify the characteristics of people who are self-employed at any point in time. While this is useful, it cannot tell us about the conditions that determine whether an individual becomes self-employed. Analysis of this question requires longitudinal data so that one can observe transitions into self-employment ⁸. If one is considering government policies to encourage new businesses, or if one wants to see if disadvantage encourages self-employment, then this is the process one must examine. Longitudinal analyses also have the advantage of using past values of individuals' characteristics to explain transitions. We can be more confident that past values are a cause rather than a consequence of being self-employed. Similarly, examining transitions out of self-employment will allow us to study business failure rates. Since certain personal or background characteristics may affect entry and exit rates differently, this provides an important addition to cross sectional analyses.

This paper focuses on self-employment among young people in Australia and the U.S. While self-employment rates among the young are lower, there are a number of reasons for focusing on them. First, we are able to find comparable longitudinal data for young people in the two countries. Second, the young are forming views of the labor

⁴ See Brown et. al. (1990) for a critical appraisal of these schemes.

⁵ See Light (1972), Moore (1983) or Sowell (1981).

⁶ See Wolpin (1977), Moore (1983) and Lazear and Moore (1984).

⁷ See Blanchflower and Oswald (1990a, 1990b) and Borjas (1986) and Borjas and Bronars (1989), for example.

⁸ Other studies that use longitudinal data to examine transitions to self-employment include, Fuchs (1982), Meyer (1990), Evans and Leighton (1989) and Evans and Jovanovic (1989).

market that will shape their later choices. It is particularly important to understand early career formation given the evidence that young people with poor labor market records early typically have comparatively poor records later ⁹. And lastly, the dynamics of the labor market are greater for the young as they consider alternative jobs.

Initially we assess the determinants of self-employment in Australia using data from the Australian Longitudinal Surveys (ALS) of 1985-8. We then estimate a similar set of equations for an equivalent group of young people drawn from a comparable, large scale panel study in the US - the Survey of Income and Program Participation (SIPP) of 1983-6. Section 2 compares and contrasts the extent of self-employment in Australia and the U.S.. Section 3 provides results for Australia and Section 4 for the US. Section 5 presents evidence on the probability of individuals remaining in self-employment. Section 6 compares and contrasts the findings. Section 7 provides our conclusions.

Section 2. Self-employment in Australia and the U.S..

Far fewer people live in Australia than in the US (16.25 million and 243.92 million people respectively). GDP per capita is also much higher in the US (\$18,338) than it is in Australia (\$12,612). Over the years 1983-1987 consumer prices in Australia increased by an average of 7% while average earnings grew by an average of 5.7%. This compares to 3.3% and 3.1% for the U.S.. Unemployment in both countries averaged 7.2% between 1978 and 1987 ¹⁰.

Labor force participation rates are much higher in Australia than they are in the US. This is especially so for the young who are more likely to be in college in the US than is true in Australia. As can be seen from Table 1, the US has an overall labor force participation rate of 50% compared to 61% for Australia. 57.5% of young men between 15 and 19 were in the labour force in Australia compared with only 43.3% in the US. Approximately 27% of total employment in the two countries is in manufacturing: the

⁹ See, for example, Ellwood (1982).

¹⁰ Source: Yearbook of Labour Statistics, ILO, Geneva, 1988.

agricultural sector is relatively more important in Australia than it is in the US (5.8% and 3% of total employment in 1987).

The self-employment rate in Australia has historically been higher than that in the U.S.^{11 12}. In 1989 14.9% of paid workers in Australia were self-employed compared with 8.2% in the U.S.. Despite this difference in means, the time series pattern of the Australian and U.S. rates show a degree of similarity. Figure 1 reports self-employment rates for the two countries. Here self-employment is measured across all sectors of the economy including agriculture. The data source used is the ILO Yearbook of Labour Statistics. This source has the advantage that the measures used are broadly comparable across the two countries. An individual is classified as self-employed if they report being an employer or an own-account worker; the incorporated self-employed are classified as wage and salary workers¹³. In both countries the number of self-employed increased during the 1980s but so did the number of wage and salary workers¹⁴. The Australian self-employment rate dropped through the late sixties, bottomed out around 1970, and has generally been flat since then. The rate in 1989 (14.9%) was only one percentage point lower than it was in 1980 (15.9%). Analogously, the U.S. self-employment rate fell through the 1950s and 1960s, hit bottom in the early 1970's, and has changed relatively little since 1970¹⁵. Indeed, the self-employment rate in 1989 was the same as it was in

¹¹ For a discussion see Norris (1986).

¹² Here we define the self-employment rate as the number of self-employed divided by the self-employed plus the employed. This contrasts with the definition used in some other papers such as Blau (1987) where the denominator is the labor force (i.e. employed+self-employed+unemployed).

¹³ Despite some differences in the way self-employment is defined these estimates vary only slightly from those reported in Employment and Earnings and the Monthly Labor Review.

¹⁴ The number of self-employed increased by 19.8% in the case of Australia and 18.2% in the US between 1980 and 1989. The number of wage and salary workers increased by 29.0% in the case of Australia and 18.2% in the US between 1980 and 1989 (Table 1).

¹⁵ See Covick (1984) for a discussion of the probable reason for this trend in Australia and Blau (1987) for an analysis for the U.S..

Table 1. Self-Employment in Australia and the US.

a) Australia

	Employers and own account workers (000's)	Wage and salary earners (000's)	Self-employment Rate (%)
1980	955.0	5,062.0	15.9
1981	973.4	5,397.9	15.3
1982	951.8	5,274.6	15.3
1983	970.2	5,493.3	15.0
1984	995.2	5,557.1	15.2
1985	1,059.4	5,559.1	16.0
1986	1,088.9	5,730.8	16.0
1987	1,091.9	5,921.8	15.6
1988	1,125.0	6,161.9	15.4
1989	1,143.9	6,531.1	14.9

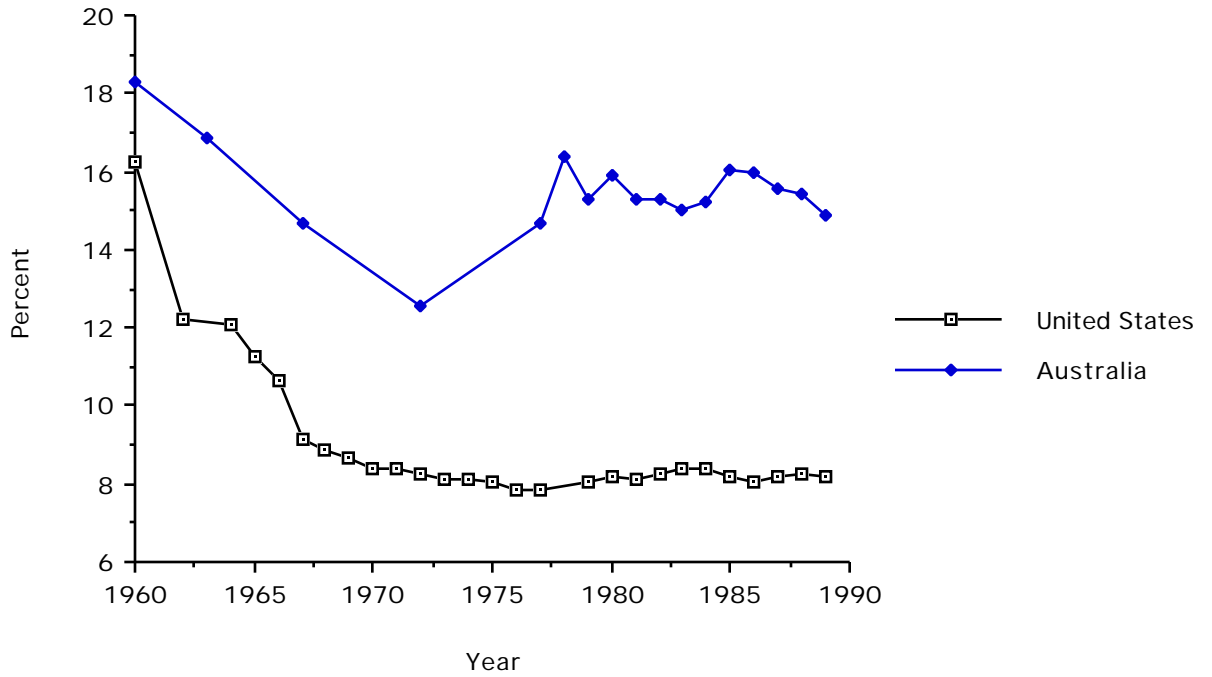
b) USA

	Employers and own account workers (000's)	Wage and salary earners (000's)	Self-employment Rate (%)
1980	8,605	96,662	8.2
1981	8,897	100,277	8.1
1982	9,111	101,421	8.2
1983	9,359	102,025	8.4
1984	9,520	104,052	8.4
1985	9,460	106,186	8.2
1986	9,509	108,572	8.1
1987	9,810	110,453	8.2
1988	10,078	112,070	8.3
1989	10,167	114,228	8.2

Source: Yearbook of Labour Statistics, ILO, Geneva, various issues.

Notes: The self-employment rate is obtained by dividing Column 1 by the sum of Columns 1 and 2.

Figure 1. Self-Employment Rates



Source: Yearbook of Labour Statistics, ILO, various years.

1980 (8.2%).

The industrial distribution of employees in the two countries is also similar. However, there is a much greater difference in the industry distribution of the self-employed. In Australia a higher proportion are found in agriculture (24% and 15% respectively), whereas Community, Social & Personal Service is especially important in the U.S.. In both countries significant numbers of self-employed workers are found in Construction and Wholesale/Retail Distribution and Hotels and Restaurants. The occupational distribution of the employed is also similar across the two countries. However, a higher proportion of the self-employed in the US are service workers (18.5% and 7.6% respectively). Production and related workers are more likely to be self-employed in Australia than they are in the US.

Section 3. Main Empirical Results - Australia

The data are drawn from the Australian Longitudinal Survey (ALS) of 1985-8. The ALS is a panel of young people who were between the ages of 16 and 25 in 1985. It covers the whole of Australia (except for the very sparsely settled areas) and was based on a sample of dwellings. All people in the given age range living in the selected dwellings were included in the sample. The survey started in 1985 with 8998 participants. Subsequent sweeps of the survey achieved 7871 responses in 1986, 7110 in 1987 and 6151 in 1988 ¹⁶. Who are the young self-employed and where do they work?¹⁷ Table 2 provides the evidence. Here we use the first wave of the survey in 1985 to explore the differences between the employed and the self-employed. The young self-employed in Australia are disproportionately male: they are also somewhat older than employees (average age 22.36 years and 20.88 years respectively). The typical young Australian self-employed has a skilled manual occupation and works in either construction or agriculture. Significant

¹⁶ The main source of information on the data file is a special volume of the Australian Journal of Statistics ('Youth Employment and Unemployment' - Special Volume 31a, August 1989) which contains a series of articles which use these data files.

¹⁷ We classify individuals as being self-employed on the basis of responses to the following question: "In your main job do you work for wages or salary with an employer, are you self-employed in your own business, or do you work in some other capacity?"

proportions are also to be found in Wholesale and Retail Trade and Recreation, Personal and Other Services. In comparison to the distribution of the employed across occupations, a relatively high proportion of the young self-employed work in skilled trades. The self-employed are twice as likely to have completed an apprenticeship as the employed.

Table 3 provides information about labour market transitions for the years 1985-6, 1986-7 and 1987-8 respectively. Labour market status is defined at the time of each survey. The raw numbers of individuals in each of three labour market states are reported - 'employment', 'self-employment' and 'other' (whether unemployed or out of the labour force or labour market status not reported). Those leaving the sample are excluded. It is clear from these Tables that there is a considerable amount of dynamics in this labour market. For example, in 1986, 614 individuals who were employees in 1985 were not working in 1986 while 1100 who were not working in 1985 were working as employees in 1986. In an earlier study using these data Dunsmuir, Tweedie, Flack and Mengersen (1989) have modelled transitions between employment states. In this paper we focus on a slightly different issue that they did not touch upon - the transition from employment to self-employment. As can be seen from Table 3, this is the main entry mechanism to self-employment. Over two-thirds of the people entering self-employment are employed the previous year in a wage and salary job rather than unemployed or out of the labor force. In this paper we are interested specifically in the two groups of individuals found in the first two cells of the first row of the matrices.

We estimate probit models for transitions from wage and salary work to self-employment. Table 4 reports the results of estimating a series of probit equations with the dependent variable set to 1 if the individual was employed in the initial period and self-employed in the subsequent period, and zero if he or she was an employee in both periods. Variable definitions are provided in Appendix A. That is to say, our sample is those

Table 2. Distribution of Australian Employment and Other Key Variables- 1985

	wage & salary	self-employed
a) Male (%)	53.0	71.0
b) Occupation (%)		
Managerial and supervisory	4.1	15.5
Professional	7.6	6.2
Para-professional	5.5	0.8
Clerical and related	24.8	2.0
Sales	13.9	6.7
Service occupations	6.6	3.6
Trades/skilled (excl. agr)	17.4	29.5
Skilled agricultural	0.8	16.2
Plant operating	2.1	6.8
Processing/fabricating	5.6	0.2
Basic manual	10.5	7.5
Occupations n.e.c.	0.7	4.8
Military	0.4	0
c) Industry (%)		
Agriculture	2.3	18.4
Mining	0.9	0
Manufacturing	18.6	8.7
Construction	4.8	21.3
Wholesale/Retail Trade	25.3	22.1
Transport/Storage/Communication	5.5	5.3
Finance/Property/Business Services	11.6	3.8
Public Administration/Defence	7.9	0
Community Services	13.1	4.3
Recreation/Personal/Other Services	10.0	16.1
e) Average age (in years)	20.88	22.36
f) Apprenticeship (%)	11.4	23.9
g) Self-employment rate		4.31%

Base: 5472 employees and 247 self-employed (unweighted)

Notes: weights applied to calculate these estimates.

Source: 1985 ALS tape.

Table 3 - Transition Matrix: Australia - 1985/1988.

1986				
1985	Employed	SE	Other	All
Employed	4175 (53.0)	98 (1.2)	614 (7.8)	4887 (62.1)
SE	54 (0.7)	134 (1.7)	23 (0.3)	211 (2.7)
Other	1100 (14.0)	39 (0.5)	1634 (20.8)	2773 (35.2)
All	5329 (67.7)	271 (3.4)	2271 (28.9)	7871 (100.0)

1987				
1986	Employed	SE	Other	All
Employed	4117 (59.4)	87 (1.3)	511 (7.4)	4715 (68.0)
SE	62 (0.9)	161 (2.3)	22 (0.3)	245 (3.5)
Other	714 (10.3)	35 (0.5)	1224 (17.7)	1973 (28.5)
All	4893 (70.6)	283 (4.1)	1757 (25.3)	6933 (100.0)

1988				
1987	Employed	SE	Other	All
Employed	3750 (63.0)	109 (1.8)	361 (6.1)	4220 (70.9)
SE	48 (0.8)	177 (3.0)	14 (0.2)	239 (4.0)
Other	580 (9.7)	37 (0.6)	876 (14.7)	1493 (25.1)
All	4378 (73.6)	323 (5.4)	1251 (21.0)	5952 (100.0)

Notes: Numbers in parentheses are overall probabilities

Table 4. Probit Equations - Australia

	(1)	(2)	(3)	(4)	Variable Mean
<u>Personal Controls</u>					
Male	0.3139 (0.0589)	0.3193 (0.0596)	0.2982 (0.0631)	0.1838 (0.0753)	.544
Age	0.4356 (0.1773)	0.4629 (0.1799)	0.5197 (0.1924)	0.6128 (0.2111)	21.33
Age squared	-0.0082 (0.0039)	-0.0088 (0.0040)	-0.0098 (0.0043)	-0.0116 (0.0047)	463.1
Apprentice			0.2031 (0.0740)	0.1576 (0.0912)	.126
Union			-0.2072 (0.0636)	-0.1375 (0.0690)	.436
Tenure 3 yrs			-0.2575 (0.0691)	-0.2644 (0.0760)	.273
<u>Year dummies</u>					
1986	-0.1748 (0.0697)	-0.1816 (0.0720)	-0.1845 (0.0759)	-0.1864 (0.0829)	.341
1987	-0.0389 (0.0667)	-0.0372 (0.0677)	-0.0363 (0.0709)	-0.0462 (0.0771)	.312
<u>Number of workers</u>					
1 worker			-0.0065 (0.1242)	0.0271 (0.1346)	.085
2-5 workers			-0.3165 (0.1065)	-0.2583 (0.1182)	.407
6-9 workers			-0.5294 (0.1220)	-0.4295 (0.1351)	.210
10-14 workers			-0.5495 (0.1409)	-0.4605 (0.1538)	.119
15-19 workers			-0.6175 (0.1964)	-0.5034 (0.2135)	.048
20 workers			-0.7492 (0.1698)	-0.6774 (0.1939)	.085
<u>Occupation dummies</u>					
Managerial				-0.1431 (0.1364)	.051
Professional				-0.1207 (0.1403)	.095
Para-professional				-0.2352 (0.1867)	.055
Clerical				-0.3696 (0.1322)	.250
Sales				-0.3236 (0.1383)	.123
Service				-0.6248 (0.2037)	.067
Trades/skills				-0.1881 (0.1094)	.184
Skilled agriculture				-0.0677 (0.2832)	.007
Plant operators				-0.1014 (0.2020)	.020
Processing				-0.5760	.050

				(0.2223)	
<u>Industry dummies</u>					
Mining				-0.7025	.011
				(0.4492)	
Food/chem				-0.4456	.109
				(0.1787)	
Metal/elec				-0.4584	.070
				(0.2082)	
Construction/distrib.				-0.1797	.289
				(0.1710)	
Transport				-0.5619	.053
				(0.2580)	
Finance				-0.3382	.129
				(0.1941)	
Public admin.				-0.7986	.080
				(0.2375)	
Community services				-0.6346	.147
				(0.2015)	
Recreation				-0.0927	.089
				(0.1832)	
<u>Region dummies</u>					
Victoria	0.2687	0.2755	0.2708		.248
	(0.0723)	(0.0757)	(0.0812)		
Queensland	0.1661	0.1304	0.1064		.151
	(0.0887)	(0.0956)	(0.1022)		
South Australia	0.1847	0.1869	0.1877		.105
	(0.0961)	(0.0999)	(0.1086)		
Western Australia	0.4195	0.4302	0.4257		.081
	(0.0959)	(0.1001)	(0.0171)		
Tasmania	-0.1448	-0.1541	-0.1637		.037
	(0.1920)	(0.2015)	(0.2628)		
Constant	-7.7234	-8.2080	-8.4777	-9.0558	
	(1.9539)	(1.9781)	(2.1240)	(2.3182)	
Likelihood ratio	104.1553	132.9590	236.9321	318.6206	

Notes: Number of observations = 12,052
 Omitted categories are New South Wales and Tasmania; 0 workers other than the respondent; basic manual occupations and occupations not elsewhere classified; agriculture and 1985-1986 transition.

Standard errors in parentheses.

individuals in the first two cells of the first row of the transition matrices in Table 3. These equations allow us to examine some of the differences suggested by the means of Table 2. Data from the 1985-1986, 1986-1987 and 1987-1988 transitions were pooled to give a total sample size of 12,052 cases¹⁸ after exclusion of observations with missing values. Table 4 also reports the mean of each of the variables. We also examined transitions to self-employment over the two-year periods 1985-1987 and 1986-1988 and the three-year period 1985-1988. The results were very similar to the 1 year transitions obtained here and consequently are not reported.

Specification 1 includes only five variables - sex, age and its square and two (1, 0) year dummies to identify the relevant time period. Age enters in a non-linear way - as in Blanchflower and Oswald (1990b) and Meyer (1990) - older workers were more likely to be self-employed than younger workers. This higher transition rate may reflect the greater knowledge of business opportunities that is available to older workers. Males were more likely to be self-employed than females.

Specification 2 includes a series of state dummies (New South Wales is the excluded category). The probability of being self-employed appears to be highest, *ceteris paribus*, in Western Australia.

Specification 3 includes a range of variables that may be regarded as potentially endogenous: whether he/she had an apprenticeship qualification or was a member of a union, the number of people the respondent worked closely with each day; and a variable to identify individuals who had been employed at least three years in their job in the first period. The first two of these variables worked in the expected way (see Blanchflower and Oswald, 1990a). Individuals with relatively high tenure and/or were union members were less likely to move to self-employment. In addition, the more people the respondent worked closely with, the less likely it is that he or she would move to self-employment in the next period. The probability of moving to self-employment was highest if the individual worked

¹⁸ 4,190 cases from 1985-6, 4,014 from 1986-1987 and 3,758 from 1987-8.

alone or with one other. The higher transition rates for those from the smallest businesses may reflect the fact that these individuals learned the skills needed to run the very small businesses that most self-employed start. Similarly, trade apprenticeships appear to be important in imparting the kind of skills that are particularly suited to self-employment -- electricians, carpenters and plumbers are the obvious examples that come to mind.

Finally, Specification 4 includes a series of industry and occupational dummies. It is encouraging to find how stable the main results are to these changes in specification. Individuals are particularly likely to have moved to self-employment if they were employed in basic manual occupations (the omitted occupation) in the first period. Those in clerical, sales, processing and service occupations were less likely to make such a move. Analogously, individuals employed in farming in the first period were especially likely to move to self-employment in the next. As one might expect, *ceteris paribus*, those working in public administration or community service had lower probabilities of making such a transition. We also included variables for level of education, years of schooling, marital status and race¹⁹ but none of these ever achieved significance, and the coefficients were small and hence were excluded.

The probability of moving to self-employment appears to be higher if the individual was male, older, held an apprenticeship, worked with few others in period 1, lived in Western Australia, had been employed for less than three years, had been in a 'Basic Manual Occupation' or a 'Skilled Agricultural Occupation' and/or had been employed in agriculture.

The probability of moving to self-employment was lower, *ceteris paribus* if the individual was in a clerical occupation, was a union member and/or worked in public administration or mining in period 1.

Section 4 - Main Empirical Results - USA

¹⁹ The categories examined were:- Aborigine; Torres St. Islander; English/European; Asian; Other.

The data file used in this section is the U.S. Survey of Income and Program Participation (SIPP), which is a longitudinal survey conducted by the U.S. Bureau of the Census. We use the 1984 Panel which interviewed approximately 20,000 households (50,000 people of all ages in total) nine times over a three year period. The interviews took place between October 1983 and August 1986.

Each interview asks information about earnings and other income sources during the previous four month period. Detailed information is given about the two most important wage and salary jobs and two most important self-employment jobs that an individual had during those four months. Supplemental surveys provide detailed information about job characteristics and assets.

Even though SIPP includes individuals of all ages, we restrict our analysis to youths to ease comparisons with the Australian results. See Meyer (1990) for an analysis of the entire SIPP sample. We use a slightly older sample in the U.S. because we believe that it will make the individuals more comparable to the Australian sample. As many more young people attend college in the U.S., the two samples will be more comparable in terms of the number of years since leaving school. The sample is those aged 17-28; when we examine transitions from one year to the next, the sample is those 17-28 in the first year.

We classify an individual as working if he or she works at least 5 hours per week. An individual is classified as self-employed if he or she worked the most hours in self-employment ²⁰. The vast majority of those working had self-employment hours or wage and salary hours and not both.

Table 5 reports some differences in mean characteristics between the self-employed and wage and salary workers. The Table uses the 1984 cross-section from Wave IV of SIPP. The self-employed are much more likely to be male, are on average two years older

²⁰ SIPP classifies as self-employed people who work in their own sole-proprietorship, partnership, incorporated business, or farm. It does not include as self-employed people who are unpaid workers in a family business or farm or persons working on commission or for a piece-rate. Overall, about three-quarters of the self-employed are sole-proprietors or partners.

and have one-half a year more of schooling. They are 20 percentage points more likely to be married and less likely to be black. The self-employed are also concentrated in different industries. They are much more likely to be in agriculture, construction, repair businesses, and personal services.

The pattern of the earnings of the self-employed relative to wage and salary workers can also be seen in Table 5. If one examines mean earnings, one sees that the self-employed appear to earn about 25 percent more. However, the picture reverses if one examines the logarithm of earnings. This measure suggests that the earnings of the self-employed are on average about seventy-five percent lower. The reason for this anomaly is that self-employment earnings are much more dispersed. The variance of self employment earnings is over four times as great using either earnings measure. While it is possible that misreporting of self-employment income could lead to the much greater variance of self-employment earnings, it would require a great deal of underreporting especially for those in the middle of the income distribution. It is more likely that the numbers indicate the greater degree of risk in relying on a business for one's livelihood. This supports the view that entrepreneurs are individuals willing to undertake risks ²¹.

Transition matrices for two time periods are reported in Table 6. The first matrix is for Wave I to Wave IV (1983-84) and the second is for Wave IV to Wave VII (1984-85). The matrices give the number of people at two points in time that are in the four states: working wage and salary, working self-employed and other (whether unemployed or out of the labour force or labour market status not reported). The 1983-84 matrix shows about 1.42 percent of the salary workers in 1983 are self-employed one year later if they are still working. The 1984-85 matrix shows a slightly higher transition rate of 1.54 percent. In

²¹ To more fully document the greater riskiness of self-employment one might examine the difference in the variances of self-employment and wage and salary earnings after controlling for individual characteristics and industry. However, our estimates indicate that little of the earnings variance is explained by available controls.

Table 5. Distribution of US Employment and Other Key Variables- 1984

	wage & salary	self-employed	
a) Male (%)	52.7	66.1	
b) Industry (%)			
Agriculture	2.9	16.1	
Mining	1.0	0	
Manufacturing	19.5	3.1	
Construction	5.7	19.2	
Wholesale/Retail Trade	29.8	16.9	
Transport/Storage/Communication	4.9	2.2	
Finance/Insurance/Real Estate	6.5	4.5	
Public Administration/Defence	4.1	0	
Business or Repair Services	5.1	12.9	
Personal Services or Entertainment	5.5	16.1	
Professional Services	14.9	8.5	
c) Married (%)	33.5	55.8	
d) Years of schooling	12.7	13.2	
e) Average age (in years)	22.8	24.8	
f) Black (%)	9.1	1.8	
g) Annual earned income	\$11,217	\$14,054	
h) Natural log annual earned income	\$9.0	\$8.2	
i) Self-employment rate (%)			3.7

Base: 5856 employees and 224 self-employed (unweighted)

Source: Wave IV of the 1984 SIPP Panel.

Table 6. Transition Matrices - USAa) AGE 17-28; 1983-1984

1984

1983	Employed	SE	Other	All
Employed	4706 (63.4)	68 (0.9)	542 (7.3)	5316 (71.6)
SE	71 (1.0)	135 (1.8)	25 (0.3)	231 (3.1)
Other	710 (9.6)	27 (0.4)	1138 (15.3)	1875 (25.3)
All	5487 (73.9)	230 (3.1)	1705 (23.0)	7422 (100.0)

b) AGE 17-28; 1984-1985

1985

1984	Empt.	SE	Other	All
Employed	4411 (65.7)	69 (1.0)	441 (6.6)	4921 (73.3)
SE	60 (0.9)	124 (1.8)	13 (0.2)	197 (2.9)
Other	582 (8.7)	26 (0.4)	984 (14.7)	1592 (23.7)
All	5053 (75.3)	219 (3.3)	1438 (21.4)	6710 (100.0)

Notes: Numbers in parentheses are overall probabilities.

both years, employment is the main entry point to self-employment. As was observed in Australia, more than two-thirds of those entering self-employment were employed in wage and salary jobs the previous year. In both of the transition matrices, the number of people entering self-employment is very close to the number leaving self-employment for a wage and salary job. In the two periods, 137 people enter self-employment while 131 leave. A striking difference between the Australian and U.S. transition matrices, is that they indicate that many more people enter than leave employment and self-employment in Australia, whereas in the U.S. the upper left part of the matrices is much closer to symmetric.

Tables 7 and 8 report a series of probit equations that explain why certain individuals became self-employed²². Table 7 also reports the mean of each of the variables. These equations allow us to examine some of the differences suggested by the means of Table 5. We also look at the relationship between the variables and the decision to become self-employed. This approach has the advantage that the characteristics we examine are measured prior to self-employment, and thus are less likely to be a function of the decision to become self-employed.

The specifications reported here pool the data from the two transitions, 1983-84 and 1984-85 summarized above in Table 6. The sample used is those who are wage and salary workers in the first period, and who remain an employee or become self-employed in the second period. The dependent variable is 1 if an individual becomes self-employed. The first specifications include few variables, but the variables are ones that are less likely to be a reflection of a decision to become self-employed some time in the future. Several effects are apparent in the first few specifications and continue to appear in the equations with more variables. Older, married, more educated, white, male workers are more likely to become self-employed. The coefficients on age and education accord with the idea those with more skills and with more time to recognize business opportunities are more likely to become self-employed. Region of residence and year do not seem to be important. In the

²² Variable definitions are given in Appendix B.

Table 7. Probit Equation USA

	(1)	(2)	(3)
<u>Personal Controls</u>			
Male	0.2776 (0.0717)	0.2832 (0.0720)	0.2962 (0.0728)
Years of schooling			0.0346 (0.0164)
Age	0.0379 (0.0105)	0.0372 (0.0106)	0.0220 (0.0124)
Married			0.1437 (0.0771)
Black			-0.2409 (0.1545)
1984	-0.0311 (0.0679)	-0.0344 (0.0682)	-0.0349 (0.0685)
<u>Region Dummies</u>			
Northeast		-0.1351 (0.1077)	-0.1318 (0.1081)
South		0.0860 (0.0876)	0.1014 (0.0887)
West		0.1180 (0.0981)	0.1112 (0.0987)
Constant	-3.2148 (0.2588)	-3.2289 (0.2638)	-3.3825 (0.3094)

Note: Sample size = 9254

Standard errors in parentheses.

Table 8. Probit Equation USA

	(4)	(5)	(6)	Variable Means
<u>Personal Controls</u>				
Male	0.2355 (0.0859)	0.3261 (0.0750)	0.2638 (0.0872)	.5331
Years of schooling	0.0414 (0.0198)	0.0405 (0.0166)	0.0445 (0.0199)	12.702
Age	0.0254 (0.0131)	0.0347 (0.0130)	0.0350 (0.0135)	22.9391
Married	0.1808 (0.0803)	0.1672 (0.0787)	0.1970 (0.0815)	.0522
Black	-0.1642 (0.1582)	-0.2630 (0.1565)	-0.1822 (0.1597)	.0845
1984	-0.0354 (0.0706)	-0.0550 (0.0693)	-0.0536 (0.0713)	.5159
Log of income		-0.1375 (0.0314)	-0.1184 (0.0337)	8.9572
Log of hours		0.1437 (0.0914)	0.0969 (0.0930)	3.6324
<u>Industry Dummies</u>				
Agriculture	0.7251 (0.3510)		0.6356 (0.3536)	.0273
Mining	0.1493 (0.3527)		0.1615 (0.3552)	.0107
Construction	0.5584 (0.2289)		0.5280 (0.2304)	.0521
Non-durable manufac.	0.0182 (0.2455)		-0.0237 (0.2471)	.0907
Durable manufacturing	0.1063 (0.2371)		-0.1087 (0.2385)	.1093
Transportation, comm.	0.1552 (0.2839)		-0.1496 (0.2847)	.0487
Wholesale trade	0.4518 (0.2371)		0.4352 (0.2387)	.0388
Retail trade	0.2309 (0.2083)		0.1906 (0.2102)	.2597
Finance, insurance, etc.	-0.1974 (0.2892)		-0.2066 (0.2906)	.0674
Business and repair	0.4872 (0.2292)		0.4494 (0.2308)	.0482
Personal services	0.6372 (0.2339)		0.5765 (0.2358)	.0474
Professional services	0.0991 (0.2173)		0.0575 (0.2194)	.1562
<u>Occupation dummies</u>				
Manager	0.2147 (0.1462)		0.2544 (0.1477)	.1437
Technician	0.1307 (0.1278)		0.1545 (0.1289)	.3481
Services	0.1289		0.1233	.1627

Farmer	(0.1466)		(0.1477)	
	-0.0688		-0.0682	.0298
	(0.3220)		(0.3213)	
Production	0.3297		0.3587	.1026
	(0.1272)		(0.1283)	
<u>Region Dummies</u>				
North East	-0.1261	0.1241	-0.1209	.2164
	(0.1110)	(0.1088)	(0.1114)	
South	0.0772	0.0997	0.0724	.3134
	(0.0923)	(0.0894)	(0.0927)	
West	0.0697	0.1146	0.0765	.1859
	(0.1022)	(0.0994)	(0.1027)	
Constant	-3.8882	0.0693	-3.4511	
	(0.4136)	(0.4043)	(0.5012)	

Notes: Sample size = 9254

Variable definitions etc. are in Appendix B.
Standard errors in parentheses.

later specifications it appears that wage and salary workers in agriculture, construction, wholesale trade, repair and personal services are more likely to leave their jobs to become self-employed. These jobs may provide the skills at certain manual trades that make self-employment more attractive. The log income variable in specifications 5 and 6 suggests that people whose earnings have been low in the past are more likely to become self employed. This result fits with the Rees and Shah (1986) idea that comparative advantage should drive the decision to be self-employed. If a person had earned less in wage and salary work in the past, controlling for variables like age and education, then they would be more likely to have relatively higher earnings in self-employment.

Several other probit transition specifications were tried, but are not reported below. The variables net worth, union member, tenure on old job, and workplace size (defined in the Appendix) are only available for the 1984-85 transition. While net worth had the expected positive sign and was significantly different from zero, the other variables were all insignificant in this small sample. We examined transitions to self-employment over a longer 20 month period. The results were very similar to the 12 month transitions reported here.

Section 5. Transitions From Self-Employment

We have also estimated probit equations for the probability of leaving self-employment. In Table 9 we report estimates for the US of the probability of moving from self-employment to employment over a one year period ²³. In all, 428 people are examined, 39 percent of which have left self-employment one year later. Entrepreneurs that are older, white, and males are all significantly more likely to succeed. There is also some tendency for those in agriculture, professional services, finance, insurance and real estate to stay in business. While those in personal services do not tend to succeed.

²³ We do this by pooling those who were self-employed in Wave 1 or Wave 4 of SIPP. We then determine whether the individual was still self-employed or an employee one year later in Wave 4 or Wave 7.

Table 10 reports the results of estimating the probability of leaving self-employment for employment in Australia in period $t+1$, conditional on being self-employed in period t . Out of the 636 cases in Table 3 that made the relevant transition, after excluding those with missing values, we have 527 cases across the three sets of transitions. Of these 144 moved from self-employment to employment (27.3% unweighted) while the remainder stayed in self-employment. Unlike for the US, in Australia the probability of moving out of self-employment is not higher the younger the individual. We find evidence that those with low levels of schooling (10 years) and some of the most qualified (such as those with bachelor or higher degrees) were especially likely to leave self-employment. Workers in service occupations had a higher probability of leaving. We found little evidence of regional effects. We also included variables for industry sector, marital status and race but none were significantly different from zero and hence were omitted. Probably the most interesting finding in Table 10 is that the longer the individual had been self-employed, the less likely he or she was to leave self-employment in the next period. Newer firms are more likely to die than older firms. This mirrors a recent result of Holmes and Schmitz (1991) using US data from the Characteristics of Business Owners Survey of 1982.

Section 6. Comparison of the Australian and US Results

There is a strong similarity between the Australian and U.S. results, but there are some differences. Overall, the Australian data suggests a one-year transition rate to self-employment of 2.38 percent (294 out of 12,336 workers - see Table 3) while the comparable U.S. number is a much lower 1.48 (137 out of 9254 observations - see Table 6). The effect of various explanatory variables in the probit equations is also very similar. In both countries, older, male workers are more likely to become self-employed. Individuals from agriculture and construction industries are also more likely to become self-employed. In Australia apprenticeships seem to lead to entrepreneurship, while in the U.S. more general human capital measured by years of education is associated with entrepreneurship. The self employment transition rate in Australia is best described by a

Table 9. Transitions from Self-Employment in the U.S..

		Variable Means
<u>Personal Controls</u>		
Years of Schooling	0.0186 (0.0347)	12.848
Age	-0.1140 (0.0279)	24.7383
Married	-0.1729 (0.1560)	.6005
Male	-0.2571 (0.1520)	.6402
Black	1.1945 (0.4960)	.0234
<u>Industry dummies</u>		
Agriculture	-0.6044 (0.4940)	.0701
Mining	-0.2230 (0.9223)	.0047
Construction	-0.1599 (0.4624)	.0864
Nondurables	-0.1510 (0.6253)	.0140
Durables	-5.0203 (227.1470)	.0047
Transport	-0.0023 (0.6485)	.0164
Wholesale trade	-0.6186 (0.7424)	.0140
Retail trade	-0.1609 (0.4293)	.0911
Finance, insurance or real estate	-1.1017 (0.7545)	.0187
Business or repair services	-0.2771 (0.4672)	.0630
Personal services or entertainment	-0.0989 (0.4592)	.0841
Professional services	-0.8228 (0.5011)	.0514
<u>Occupation Dummies</u>		
Manager	1.0866 (0.5679)	.0187
Technical occupation	0.2173 (0.4054)	.0374
Service occupation	1.2580 (0.5518)	.0234
Agricultural occupation	5.7235 (323.4090)	.0023
Production occupation	5.4396 (227.5359)	.0047

<u>Region Dummies</u>		
North East	-0.0160 (0.2255)	.1168
South	-0.2069 (0.1700)	.2967
West	0.0127 (0.1758)	.2453
1984 year dummy	-0.1795 (0.3899)	.5397
Constant	2.7875 (0.8079)	

Notes: Sample size = 428

Standard errors in parentheses.

Table 10. Transitions from Self-Employment in Australia

		Variable Means
<u>Highest Qualification</u>		
Male	-.1719 (.1541)	.753
10 years of schooling	0.7330 (0.2495)	.150
11 years of schooling	0.2681 (0.2805)	.140
12 years of schooling	0.3779 (0.2488)	.144
12 years or more repeaters	1.3279 (0.6035)	.011
Bachelor-higher degree	1.1256 (0.3981)	.034
Diploma, Certificate: CAE	1.1027 (0.5506)	.015
Trade, apprenticeship	0.3345 (0.2557)	.254
Business College Cert./Diploma	1.0388 (0.4087)	.027
Diploma, Certificate: TAFE	0.3336 (0.3177)	.074
Adult Education	0.7337 (0.4932)	.017
<u>Occupation Dummies</u>		
Professional Occupations	0.2598 (0.2560)	.076
Para-professional Occupations	-0.3843 (0.4451)	.023
Service Occupations	1.0331 (0.4087)	.013
<u>Regional Dummies</u>		
New South Wales	-0.0600 (0.0375)	.264
Victoria	0.0517 (0.0364)	.319
South Australia	-0.0215 (0.0422)	.114
Year 1987 dummy	1.0896 (1.0793)	.300
Age	0.1542 (0.1597)	22.336
Years of tenure	-0.5369 (0.1170)	2.679
Constant	0.0340 (0.0427)	
N	527	
Likelihood ratio	69.2310	

Notes: standard errors in parentheses.

excluded education category is <10 years of schooling

quadratic in age, while in the U.S. the relationship is linear.

The number of close colleagues, union membership and tenure on old job variables are all important in Australia. In the U.S., these variables always have coefficients with the same sign as Australia, but they were not significantly different from zero. The U.S. results may be partly explained by the much smaller sample for which these variables were available. In the main U.S. SIPP sample of individuals of all ages analyzed by Meyer (1990), these variables have coefficients with the same signs as in the Australian results and are all significantly different from zero. Marital status, race and years of schooling were insignificant in the Australian sample but significant for the US.

Many of the variables in the probit equations are quantitatively important as well as being statistically significant. The effect of changes in a variable can be measured for a "typical" individual by the change in the probability of becoming self-employed implied by the probit model. Table 11 reports predicted probabilities for Australia using the results from Specification 4 in Table 8. Our 'typical' individual is assumed to be male aged 20, with a trade or other skilled occupation, who had been employed for at least three years in his/her job in period 1, worked in construction, worked closely with no other workers, lived in New South Wales, was not a union member, and did not have an apprenticeship. Analogously, Table 12 reports predicted probabilities for the USA using Specification 4 in Table 4. Here the 'typical' individual is assumed to be white, male, age 20, with 13 years of schooling, a production worker, married, working in construction and living in the North East. The probability of being self-employed rises much more rapidly by age in Australia than is true for the US. In both countries there is much more variation in the probability of being self-employed across industry than there is across occupation. Differences in years of schooling have large effects in the US, whilst differences in the number of close colleagues has a large effect in Australia.

Section 7. Conclusions

These results suggest an interesting pattern of similarities and differences between Australian and U.S. youth entrepreneurs. Overall, our judgement would be that the forces that influence whether a young person becomes an entrepreneur are broadly similar in the two countries. Approximately 4.5% of the workers in the Australian sample were self-employed compared with 3.8% in the US sample. We also observed a somewhat higher rate of transition from employment to self-employment in Australia than in the US. The higher Australian transition rate to self employment for youths is unsurprising given the higher overall self employment rate in Australia which in 1984 was 12.4% compared with 7.6% in the US (Source: OECD, 1986). These results suggest that there may be more business opportunities for youths in Australia or that Australians mature earlier. It appears that at least at a broad industry level Australians and Americans start businesses in the same areas - particularly in Agriculture, Construction, Wholesale and Retail Trade and Personal Services. In both countries skilled manual workers, males, older workers in both countries were particularly likely to be self-employed. There were also regional differences in both countries, although these were larger in Australia.

The main difference we observed was that additional years of schooling in the US had a positive impact on the probability of being self-employed: we could find no education effects in Australia. Marital status was significant in the US but not in Australia, although quantitatively its impact was small. Union membership and job tenure were significant influences in Australia but not in the US.

We found few similarities in the factors influencing the probability of leaving self-employment. Australia appeared to have a lower failure rate for the self-employed than was the case for the US. In the US individuals were more likely to succeed if they were white and male whilst in Australia the individual was less likely to leave the longer they had been self-employed.

There are several issues that we would like to study further. The methods of business finance, the importance of beginning by working in a relative's business, and the failure rate of businesses all merit further attention.

Table 11. Predicted Probabilities - Australia (%)

Base Characteristics - male, aged 20, trade or other skilled occupation, tenure 3 years, 0 other workers, in construction, living in New South Wales, no apprenticeship, non-union.

<u>1. Age and Sex</u>			<u>5. Occupation</u>	
Age	Male	Female	Basic manual	4.18
16	0.36	0.21	Managerial	3.07
17	0.70	0.42	Professional	3.22
18	1.22	0.73	Clerical	2.02
19	1.92	1.19	Plant operator	3.36
20	2.81	1.79	Skilled trade	2.81
21	3.75	2.50		
22	4.75	3.22	<u>6. Industry</u>	
23	5.71	3.92	Construction	2.81
24	6.43	4.46	Agriculture	4.18
25	7.08	4.85	Mining	0.73
			Food	1.46
			Metal	1.43
			Transport	1.07
			Finance	1.92
			Public administration	0.57
			Community services	0.89
			Recreation	3.36
<u>2. Tenure</u>			<u>7. Region</u>	
< 3 years	4.95		New South Wales	2.81
3 years	2.81		Victoria	5.05
			Queensland	3.51
			South Australia	4.18
			Western Australia	6.81
			Tasmania	1.88
<u>3. Number of workers close colleagues</u>				
0 workers	2.81			
1 worker	2.94			
2-5 workers	1.50			
6-9 workers	0.96			
10-14 workers	0.89			
15-19 workers	0.78			
20 workers	0.48			
<u>4. Union Membership</u>				
No	2.81			
Yes	2.02			

Notes: the values reported in this Table relate to the probability of moving from being an employee in period 1 to being self-employed in period 2 rather than doing wage work.

Table 12. Predicted Probabilities - USA (%)

Base Characteristics - male, aged 20, production worker, married, white working in construction, living in the North East, 13 years of schooling.

<u>1. Age and Sex</u>			<u>5. Occupation</u>	
Age	Male	Female	Operator	2.33
16	3.92	2.33	Manager	3.84
17	4.18	2.44	Technical	3.14
18	4.36	2.62	Service	3.14
19	4.65	2.81	Agricultural occupation	2.02
20	4.85	2.94	Production	4.85
21	5.16	3.07		
22	5.37	3.29	<u>6. Industry</u>	
23	5.71	3.44	Construction	4.85
24	5.94	3.67	Agriculture	6.81
25	6.30	3.84	Mining	1.92
26	6.55	4.09	Non-durables	1.29
27	6.94	4.27	Durables	1.02
			Wholesale	3.92
			Retail	2.33
<u>2. Race</u>			Transport	0.89
White	4.85		Finance	0.80
Black	3.44		Public administration	1.32
			Business or repair services	4.18
<u>3. Years of Schooling</u>			Personal services	5.71
0	1.39		Professional services	1.70
3	1.92			
6	2.56		<u>7. Region</u>	
9	3.44		North East	4.85
12	4.46		North Central	6.30
15	5.82		South	7.21
18	7.35		West	5.82
<u>4. Marital Status</u>				
Married	4.85			
Single	3.29			

Notes: the values reported in this Table relate to the probability of moving from being an employee in period 1 to being self-employed in period 2 rather than doing wage work.

Appendix A - Variable Definitions - Australia

Age = age in years

Age squared = age squared

Male = 1 if male

1 worker = 1 if worked closely with 1 other worker

2-5 workers = 1 if worked closely with 2-5 other workers

6-9 workers = 1 if worked closely with 6-9 other workers

10-14 workers = 1 if worked closely with 10-14 other workers

15-19 workers = 1 if worked closely with 15-19 other workers

20 workers = 1 if worked closely with 20 other workers

The omitted group worked with no others - 'only me'!

Managerial = 1 if managerial or supervisory (e.g. legislators, supervisors, foremen)

Professional = 1 if professional occupation (e.g. school teachers and natural scientists)

Para-Professional = 1 if para-professional (e.g. nurses and science technicians)

Clerical = 1 if clerical and related occupations

Sales = 1 if sales occupations

Service = 1 if service occupation (e.g. food and beverage preparation and personal service)

Trades/skills = 1 if trade and other skilled occupation excluding agriculture

Skilled agriculture = 1 if skilled agricultural occupation

Plant operators = 1 if plant operating and related occupations

Processing = 1 if processing, fabricating and related occupations

The omitted groups are basic manual occupations and occupations not elsewhere classified

1986 = 1 if transition from employment to self-employment from 1986-1987

1987 = 1 if transition from employment to self-employment from 1987-1988

The omitted group is the transition from employment to self-employment from 1985-1986

Apprentice = 1 if possesses a trade apprenticeship

Union = 1 if a member of a trade union or trade or professional association

Tenure 3 yrs = 1 if employed in job in first period for at least three years

Mining = 1 if in Australian SIC Orders 11-16

Food/chem = 1 if in Australian SIC Orders 21-29

Metal/elec = 1 if in Australian SIC Orders 31-37

Construction/distrib. = 1 if in Australian SIC Orders 41-48

Transport = 1 if in Australian SIC Orders 51-59

Finance = 1 if in Australian SIC Orders 61-63

Public admin. = 1 if in Australian SIC Orders 71-72

Community services = 1 if in Australian SIC Orders 81-84

Recreation = 1 if in Australian SIC Orders 91-99

Omitted group is SIC Orders 01-04 (Agriculture, Forestry, Fishing and Hunting)

Victoria = 1 if living in Victoria in 1985

Queensland = 1 if living in Queensland in 1985

South Australia = 1 if living in South Australia or Northern Territory in 1985

Western Australia = 1 if living in Western Australia in 1985

Tasmania = 1 if living in Tasmania in 1985

The omitted category is New South Wales and A.C.T.

Appendix B - Variable Definitions - USA (in order of appearance):

Age = age in years

Male = 1 if male

1984 = 1 if 1984-85 transition, 0 if 1983-84 transition

REGION DUMMY VARIABLES:

North East = 1 if lives in the North East

West = 1 if the West

South = 1 if lives in the South

(the omitted category is the North Central region)

Years of schooling = number of years of education completed

Married = 1 if currently married with spouse present

Black = 1 if race is Black

Log of income = the natural logarithm of all earnings during period 1.

Log of hours = the natural logarithm of hours worked per week in period 1.

INDUSTRY DUMMY VARIABLES:

Agriculture = 1 if industry is agriculture in period 1.

Mining = 1 if industry is mining.

Construction = 1 if industry is construction.

Non-durable manufac. = 1 if industry is nondurable goods manufacturing.

Durable manufacturing = 1 if industry is durable goods manufacturing.

Transportation, comm. = 1 if industry is transportation or communication.

Wholesale trade = 1 if industry is wholesale trade.

Retail trade = 1 if industry is retail trade.

Finance, insurance, etc. = 1 if industry is finance, insurance or real estate.

Business and repair = 1 if industry is business or repair services.

Personal services = 1 if industry is personal services or entertainment.

Professional services = 1 if industry is professional services (includes doctors and lawyers).

Public administration = 1 if industry public administration (the omitted category)

OCCUPATION DUMMY VARIABLES:

Manager = 1 if occupation is manager in period 1.

Technician = 1 if has a technical occupation.

Services = 1 if has a service occupation.

Farmer = 1 if is a farmer.

Production = 1 if a production worker.

Operator = 1 if occupation is operator or labor (this is the omitted category and includes those in the armed forces)

References

- Bendick, M., and M. L. Egan (1987), 'Transfer Payment Diversion for Small Business Development: British and French Experience', Industrial and Labor Relations Review, 40, pp. 528-542.
- Blanchflower, D.G. & Oswald, A.J. (1990a), 'What Makes a Young Entrepreneur?' NBER Working Paper No. 3252.
- Blanchflower, D.G. & Oswald, A.J. (1990b), 'Self-employment and Mrs Thatcher's Enterprise Culture', in British Social Attitudes: The 7th Report, edited by Jowell, R., Witherspoon, S. and Jowell, R., Gower Press, Aldershot.
- Blau, D. (1987), 'A Time-Series Analysis of Self-Employment in the US', Journal of Political Economy, 95, 3, pp.445-467.
- Borjas, G. (1986), 'The Self-Employment Experience of Immigrants', Journal of Human Resources, pp. 487-506.
- _____ and Bronars, S. (1989), 'Consumer Discrimination and Self-Employment', Journal of Political Economy, pp. 581-605.
- Brown, C., Hamilton, J. and Medoff, J. (1990), Employers Large and Small, Cambridge: Harvard University Press.
- Covick, O. (1984), 'Self Employment Growth in Australia,' in Understanding Labour Markets in Australia, ed. by Richard Blandy and Owen Covick, North Sydney, Australia: George Allen & Unwin.
- Dunsmuir, W., Tweedie, R., Flack L. and Mengersen, K. (1989), 'Modelling of Transitions Between Employment States for Young Australians', Australian Journal of Statistics, Vol. 31A, pp. 165-196.
- Ellwood, D. (1982), 'Teenage Unemployment: Permanent Scars or Temporary Blemishes?', in The Youth Labor Market Problem: Its Nature, Causes and Consequences, edited by R. Freeman and D. Wise, University of Chicago Press and NBER.
- Evans, D. and Jovanovic, B. (1989), 'An Estimated Model of Entrepreneurial Choice Under Liquidity Constraints', Journal of Political Economy, pp. 808-827.
- _____ and Leighton, L. (1989), 'Some Empirical Aspects of Entrepreneurship', American Economic Review, pp. 519-535.
- Fishman, M. E., and D. H. Weinberg (1990), 'The Role of Evaluation in State Welfare Reform 'Waiver' Demonstrations', unpublished.
- Fuchs, V. R. (1982), 'Self-Employment and Labor Force Participation of Older Males', Journal of Human Resources, 17, 339-357.
- Holmes, T.J. and Schmitz, J.A. (1991), 'The Dynamics of the Small Business Sector: Theory and Some Initial Estimates', mimeo, Dartmouth College.

- Lazear, E. P., and R.L. Moore (1984): 'Incentives, Productivity, and Labor Contracts', Quarterly Journal of Economics, pp. 275-296.
- Light, I. (1972): Ethnic Enterprise in America, Berkeley: University of California Press.
- Meyer, B. (1990), 'Why are There So Few Black Entrepreneurs?', NBER Working Paper No. 3537.
- Moore, R.L. (1983): 'Employer Discrimination: Evidence from Self-Employed Workers', Review of Economics and Statistics, 65, pp. 496-501.
- Norris, K. (1986): 'Self-Employment in Australia', in Profession Incomes, ed. by W. J. Merrilees, Canberra: Australian Government Publishing Service.
- OECD (1986), 'Self-Employment in OECD Countries', OECD Employment Outlook, September, pp. 43-63 and pp. 150-153.
- Rees, H. and Shah, A. (1986), 'An Empirical Analysis of Self-Employment in the UK', Journal of Applied Econometrics, 1, pp. 95-108.
- Sowell, T. (1981), Markets and Minorities, New York: Basic Books.
- Terry, C., Jones, R. and Braddock, R. (eds.), (1988), Australian Microeconomic Policies, 3rd Edition, Prentice-Hall, Australia.
- Wolpin, K. (1977), 'Education and Screening', American Economic Review, pp. 949-958.