A LONGITUDINAL ANALYSIS OF YOUNG ENTREPRENEURS
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. The only

similarity is that in both countries younger individuals are more

likely to leave.

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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

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[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.

businesses are responsible for a disproportionate share of job creation and innovation is 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 data[7]. 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

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

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

[6]   See 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), Evans and Leighton (1989) and Evans and Leighton (1989).

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 market that will shape their later choices. 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 of the paper briefly describes theories of entrepreneurship. Section 4 provides results for Australia and Section 5 for the US. Section 6 presents evidence on the probability of individuals remaining in self-employment. Section 7 compares and contrasts the findings. Section 8 provides our conclusions.

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

Although far fewer people live in Australia than in the US (16.25 million and 243.92 million people respectively), both countries are similar in geographic size (8 million sq. km and 9 million sq. km respectively). GDP per capita is 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.. Strikingly, unemployment in both countries averaged 7.2% between 1978 and 1987 [9].

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

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[9]   Source: Yearbook of Labour Statistics, ILO, Geneva, 1988.

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 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. [10] [11]. In 1989 14.9% of paid workers in Australia were self-employed compared with 8.2% in the U.S., (see Table 2). 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 workers [12]. In both countries the number of self-employed increased during the 1980s [13] but so did the number of wage and salary workers [14]. 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

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[10] For a discussion see Norris (1986).

[11] 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).

[12] 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.

[13] The number of self-employed increased by 19.8% in the case of Australia and 18.2% in the US between 1980 and 1989 (Table 2).

[14] 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 2).

Table 1. Economic Activity Rates in Australia and the US (%).

Age	USA			Australia		
	Total	Male	Female	Total	Male	Female
15-19	42.6	43.3	41.9	55.6	57.5	53.7
20-24	75.6	79.6	71.6	82.6	89.5	75.5
25-29	80.7	89.6	71.7	78.2	94.6	61.9
All over 15	49.6	57.1	42.5	61.4	74.9	48.3

Base: population above 15 years of age.
Source: Yearbook of Labour Statistics, ILO, Geneva, 1988.

Table 2. 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: self-employment rate obtained by adding expressing Column 1 as a proportion of the sum of columns 1 and 2.

Figure 1.   Self-Employment Rates
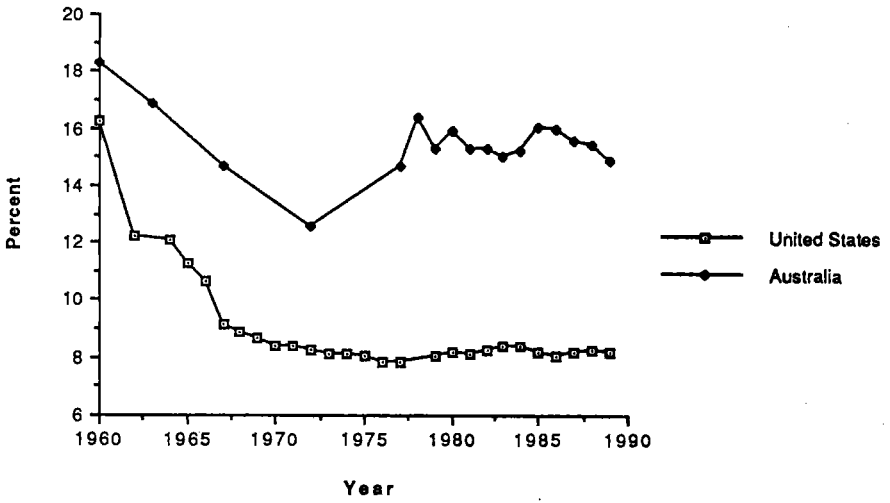
Source: Yearbook of Labour Statistics, ILO, various years.

Table 3. Distribution of Employment by Industry: 1987

a) Australia

	% self-employed in sector	% of all self-employed	% of all employees in sector
1. Agriculture, hunting, forestry and fishing	67.8	23.8	2.1
2. Mining & quarrying	-	-	1.6
3. Manufacturing	0.1	5.4	18.4
4. Electricity, gas & water	-	-	2.0
5. Construction	36.3	16.1	5.2
6. Wholesale/retail trade, restaurants and hotels	18.6	23.9	19.2
7. Transport, storage & communication	12.9	6.0	7.5
8. Financing, insurance, real estate & business services	17.7	10.7	10.9
9. Community, social & personal services	7.3	14.2	33.2
Total	15.6		

b) USA

	% self-employed in sector	% of all self-employed	% of all employees in sector
1. Agriculture, hunting, forestry and fishing	43.3	15.3	1.8
2. Mining & quarrying	3.1	0.3	0.8
3. Manufacturing	1.6	3.7	19.8
4. Electricity, gas & water	0.1	0.1	1.4
5. Construction	17.4	14.6	6.2
6. Wholesale/retail trade, restaurants and hotels	7.5	19.1	20.9
7. Transport, storage & communication	5.1	3.5	5.7
8. Financing, insurance, real estate & business services	10.2	13.5	10.6
9. Community, social & personal services	7.8	30.0	31.3
10. Armed forces	-	-	1.6
Total	8.2		

Source: Yearbook of Labour Statistics, ILO, 1988.
Note: self-employed defined to include 'employers' and 'own-account workers'

Table 4. Distribution of Employment by Occupation: 1986/7

a) Australia - 1986

	% self-employed in occupation	% of all self-employed	% of all employees in occupation
1. Professional, technical & related workers	10.8	10.9	17.2
2. Administrative & managerial workers	40.4	18.1	5.1
3. Clerical & related workers	8.1	9.2	19.8
4. Sales workers	15.2	8.7	9.2
5. Service workers	12.1	7.6	10.5
6. Agric: animal husbandry & forestry workers, fishermen & hunters	34.3	14.8	5.4
7. Prod./related workers, transport equipment operators & labourers	15.1	30.7	32.9

b) USA - 1987

Sector	% employers & self-employed in occupation	% of all self-employed in occupation	% of employees in occupation
1. Professional, technical & related workers	7.8	14.5	15.2
2. Administrative & managerial workers	10.3	14.3	11.1
3. Clerical & related workers	1.5	5.4	16.9
4. Sales workers	12.9	2.9	11.1
5. Service workers	6.6	18.5	13.8
6. Agric: animal husbandry & forestry workers, fishermen & hunters	40.1	12.7	2.0
7. Prod./related workers, transport equipment operators & labourers	7.0	21.5	28.4
8. Armed forces	-	-	1.6

Notes: 'self-employed' defined as 'employers' plus 'own-account workers'.
Source: Yearbook of Labour Statistics, ILO, 1988.

changed relatively little since 1970 [15]. Indeed, the self-employment rate in 1989 was the same as it was in 1980 (8.2%).

The industrial distribution of employees in the two countries is also similar (column 3 of Table 3). 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. Theoretical Foundations of Entrepreneurship

Any economy in which there is a significant private sector relies in the long run upon its ability to generate innovators and entrepreneurs. Economists have traditionally ignored many of the questions which this raises. Little progress has been made since Kirzner (1973) pointed to the "virtual exclusion of the entrepreneurial role from economic theory" (page ix). Likewise, the other social sciences, notably sociology and psychology, have failed to develop any widely recognised systematic theory of entrepreneurship, despite an extensive empirical literature on small firms, leadership and attitudes toward risk.

Economists' writings on entrepreneurship go back at least to Cantillon (1755), who viewed the entrepreneur fundamentally as a bearer of uncertainty who might or might not own capital [16]. This view of the entrepreneur was extended by a number of subsequent authors, most notably Knight (1921). For Knight, responsibility for bearing uncertainty

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[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..

[16] See Johnson (1986), pp. 15-19.

and the exercise of control over business decisions are inseparable. However, Knight gives no straightforward definition of entrepreneurial activity, although he did seem to believe that the entrepreneur was more than an individual with low aversion to risk. He uses the terms (chapter 9) 'courage', 'ability', 'initiative', 'self-confidence' and 'willingness' to describe entrepreneurial qualities. He tells the reader (p. 281) that an individual becmes an entrepreneur if he believes that his own use of productive services can yield more than the price fixed on them by others. He argues that the capacity for forming correct judgements is the principal characteristic of successful businessmen.

The notion of entrepreneurship as akin to, or dependent on innovation is not a clear theme in Knight's writings. In contrast, Schumpeter (1939) defines the entrepreneur as one who carries out innovations. Innovation, which is not synonymous with invention (p.84), includes many activities.

> 'Technological change in the production of commodities already in use, the opening up of new markets or of new sources of supply, Taylorization of work, improved handling of material, the setting up of new business organisations such as department stores - all these are instances of what we shall refer to by the term innovation' (p.84).

Schumpeter concludes that there is an essential difference between the entrepreneur and the manager. The latter is an organiser, the former is creative: he or she perceives unexploited opportunities.

According to Kirzner (1973), the entrepreneurial element in human decison-making is 'an element of alertness to possibly worthwhile goals and to newly available resources' (p. 35). He contrasts this with the mechanical forms of behaviour studied in conventional economic theory, and argues that those who set up their own businesses should not be thought of as maximisers, but as human beings exploiting hitherto unnoticed opportunities. Kirzner appears to treat the entrepreneur both as a kind of innovator and as a risk-bearer. These are not, however, given equal weight. The author views the decision to set-up in business as predominantly the result of a new opportunity observed. This Schumpeterian

theme is not found in most modern models. For exceptions see Blanchflower and Oswald (1990a) and Holmes and Schmitz (1990).

Some of the major recent theoretical work are Kanbur (1979), Kihlstrom and Laffont (1981) and Grossman (1984). This latest generation of analysis differs in form and substance from the bulk of the early literature. Kanbur et al., for example, develop an essentially neoclassical approach in which they make a number of assumptions. First, that productive business opportunities are ex ante feasible for, and visible to, all individuals (most simply choose not to exploit them). Second, that there is an objective probability distribution governing business risk, and everyone knows that distribution. Third, that entrepreneurs receive the same expected utility as their workers, and fourth that the entrepreneur is likely to be someone with unusually low risk-aversion (see especially Khilstrom and Laffont, 1981).

These are different from the main assumptions and arguments of classic sources such as Schumpeter (1939), Knight (1921) and Kirzner (1973). In contrast to modern theory, based upon the four points above, the classic writings about the nature of the entrepreneur stressed the following:

(i) most individuals are not sufficiently alert or innovative to perceive business opportunities,

(ii) there is no objective probability distribution governing business risks,

(iii) an innovative entrepreneur may receive higher expected utility than he or she would as a regular worker,

(iv) attitude to risk is not the central characteristic which determines who becomes an entrepreneur.

Rees and Shah (1986) propose a theory of the choice between self-employment and wage and salary work that is an extension of the simple two-sector model of labor supply that has been used in many contexts. This model predicts that individuals will choose to work in the sector which has the highest expected return. An individual would choose to

become self-employed if he would earn more in his own business than as a wage and salary worker. This model needs to be adjusted for the greater riskiness of self-employment. This modification is probably more warranted in the case of self-employment versus wage and salary work than in other contexts, since the variance of self-employment income is so much higher than that of wage and salary income [17].

The relative return to an individual in self-employment would depend on that individuals' human capital endowments, and the information about opportunities that he had gathered over time. What types of human capital would have a higher return in self-employment is not obvious. However, in the U.S. it seems that most formal education does have a higher return for the self-employed. In U.S. data Meyer (1990) finds that the return to the number of years of education in a log(wage) equation is more than twice as high for the self-employed. It seems plausible that knowledge of specific manual skills as indicated by previous work in industries such as construction, agriculture, or repair services are likely to be associated with self-employment. Similarly, having been an apprentice is also likely to have imparted skills that would be especially useful in self-employment. One might also expect that knowledge of business opportunities might increase over time as an individual aged, making transitions to self-employment more likely by increasing the expected return. The increased information might include the likelihood of success of various business opportunities as well as their presence. Increased knowledge of the likelihood of success of different businesses would reduce the variance of self-employment income and thus make self-employment more attractive.

Section 4. Empirical results - Australia

The data used in this section is 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)

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[17] The much larger variance of self-employment income is documented below for the U.S.

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[18]. Who are the young self-employed and where do they work[19]? Table 5 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 entrepreneur has a skilled manual occupation and works in either construction or agriculture. Significant proportions are also to be found in Wholesale and Retail Trade and Recreation, Personal and Other Services. The distribution of the young self-employed across industries is similar to the overall distributions reported in Tables 3 and 4. In comparison with the overall distribution of self-employed across occupations, a relatively high proportion of the young self-employed worked in manual occupations. The self-employed are twice as likely to have completed an apprenticeship as the employed.

Tables 6, 7 and 8 provide 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 four labour market states are reported - employment, self-employment, not in employment (whether unemployed or out of the labour force or labour market status not reported) and attrition - those who do not respond to the subsequent survey. 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

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[18] 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.

[19] 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?"

Table 5. 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 6 - Transition Matrix: Australia - 1985/1986

1986

1985	Empt.	SE	Not employed	Attrition	All
Empt.	4175	98	614	679	5566
SE	54	134	23	36	247
Not employed	1100	39	1634	412	3185
All	5329	271	2271	1127	8998

Table 7 - Transition Matrix: Australia -1986/1987

1987

1986	Empt.	SE	Not employed	Attrition	All
Empt.	4117	87	511	614	5329
SE	62	161	22	26	271
Not employed	714	35	1224	298	2271
Attrition	118	5	54	950	1127
All	5011	288	1811	1888	8998

Table 8 - Transition Matrix: Australia - 1987/1988

1988

1987	Empt.	SE	Not employed	Attrition	All
Empt.	3750	109	361	791	5011
SE	48	177	14	49	288
Not employed	580	37	876	318	1811
Attrition	142	9	48	1689	1888
All	4520	332	1299	2847	8998

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 Tables 6-8, 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. More formally, a probit model assumes that the underlying tendency to become self employed, y* can be written as a linear function of explanatory variables x and a normally distributed error term:

$$y^* = x\beta + \varepsilon \tag{1}$$

However, we do not observe y*, just whether y* is greater than or equal to zero. In other words, we observe a variable y which equal 1 if $y^* \geq 0$ and a person becomes self-employed. y equals 0 if $y^* < 0$ and a person stays a wage or salary worker. Given that in (1) ε is distributed normally, the probability that a person becomes self-employed is

$$\Phi(x\beta) \equiv \int_{-\infty}^{x\beta} \frac{1}{\sqrt{2\pi}} \exp\{\frac{-u^2}{2}\} du \tag{2}$$

Table 9 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[20]. That is to say, individuals in the first two cells of the first row of the transition matrices in Tables 6-8. These equations allow us to examine some of the differences

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[20] Variable definitions are given in Appendix A.

Table 9. Probit Equations - Australia

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

Processing				-0.5760	.050
				(0.2223)	
Industry dummies					
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)	
Region dummies					
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.

suggested by the means of Table 5. Data from the 1985-1986, 1986-1987 and 1987-1988 transitions were pooled to give a total sample size of 12,052 cases [21] after exclusion of observations with missing values. Table 9 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. The coefficient of the 1986-1987 year variable was significantly negative whilst that for the last transition is insignificant for which we have no explanation.

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). High tenure and union membership probably indicate that the wage and salary opportunities for these individual were quite good, so that it would not maximize expected income for them to become self-employed. The more people the respondent

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[21]   4,190 cases from 1985-6, 4,014 from 1986-1987 and 3,758 from 1987-8.

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 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 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 race [22] 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.

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

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 5 - Empirical Results - USA

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 [23]. The vast majority of those working had self-employment hours or wage and salary hours and not both.

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[23] 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

Table 10 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 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 10. 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 [24].

Transition matrices for two time periods are reported in Table 11. 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, not working, attrition or not answer.

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.

[24] 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.

Table 10. Distribution of US Employment and Other Key Variables- 1983

	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: SIPP tape 1983.

Table 11. Transition Matrices – USA

a) AGE 17-28; 1983-1984

1984

1983	Empt.	SE	Not employed	Attrition	All
Empt.	4706	68	542	2320	7636
SE	71	135	25	89	320
Not employed	710	27	1138	1008	2889
Not answered	84	4	15	153	256
All	5571	234	1720	3570	11095

b) AGE 17-28; 1984-1985

1985

1984	Empt.	SE	Not employed	Attrition	All
Empt.	4411	69	441	935	5856
SE	60	124	13	27	224
Not employed	582	26	984	330	1922
Attrition	148	5	55	1066	1274
All	5201	224	1493	2358	9276

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 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 [25]. 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 3x3 part of the matrices is much closer to symmetric. Tables 12a and 12b report a series of probit equations that explain why certain individuals became self-employed [26]. Table 12b 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 10. Here we can examine the effect of one variable, holding the others constant. 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 10. The sample used is those who are wage and salary workers in the first period, and who are working as an employee or as 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.

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[25] The high attrition in the 1983-1984 transition is largely due to the sample coverage being reduced by 20 percent in the second year to reduce the costs of the survey.

[26] Variable definitions are given in Appendix B.

Table 12a Probit Equation USA

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

Note: Sample size = 9254

Standard errors in parentheses.

Table 12b Probit Equation USA

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

Services	0.1289		0.1233	.1627
	(0.1466)		(0.1477)	
Farmer	-0.0688		-0.0682	.0298
	(0.3220)		(0.3213)	
Production	0.3297		0.3587	.1026
	(0.1272)		(0.1283)	
Region Dummies				
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.

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 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 6. Transitions From Self-Employment

We have also estimated probit equations for the probability of leaving self-employment. In Table 13 we report estimates for the US of the probability of moving from

self-employment to employment over a one year period [27]. 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.

Table 14 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 Tables 6-8 that 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.

As in the case of the US, the probability of moving out of self-employment is higher the younger the individual. We found evidence that those with low levels of schooling (10 years) and the most qualified (with bachelor or higher degrees) were especially likely to leave self-employment. Workers in service and professional occupations had a higher probability of leaving. We also found evidence of regional effects: as we noted above workers in Western Australia had a relatively high probability of entering self-employment. Table 14 suggests that, once in that labour market state, they had a relatively low probability of leaving. Probabilities of leaving self-employment were relatively high in New South Wales, Victoria and South Australia. We also included variables for gender, industry sector, marital status and race but none were significantly different from zero and hence were omitted.

Probably the most interesting finding in Table 14 is that the longer the individual had been self-employed, the less likely he or she was to leave self-employment in the next

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[27] 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 13. Transitions from Self-Employment in the U.S..

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

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

Notes: Sample size = 428

Standard errors in parentheses.

Table 14. Transitions from Self-Employment in Australia

Highest Qualification		Variable Means
10 years of schooling	0.9656	.150
	(0.2389)	
11 years of schooling	0.3857	.140
	(0.2739)	
12 years of schooling	0.4484	.144
	(0.2524)	
12 years or more repeaters	1.1146	.011
	(0.6349)	
Bachelor-higher degree	1.1240	.034
	(0.3819)	
Diploma, Certificate: CAE	1.4077	.015
	(0.5671)	
Trade, apprenticeship	0.3171	.254
	(0.2288)	
Business College Cert./Diploma	1.0770	.027
	(0.4089)	
Diploma, Certificate: TAFE	0.4155	.074
	(0.3180)	
Adult Education	0.8431	.017
	(0.5384)	
Occupation Dummies		
Professional Occupations	0.4584	.076
	(0.2796)	
Para-professional Occupations	-0.5451	.023
	(0.4260)	
Service Occupations	0.9781	.013
	(0.4535)	
Regional Dummies		
New South Wales	0.4360	.264
	(0.1817)	
Victoria	0.5922	.319
	(0.1768)	
South Australia	0.4457	.114
	(0.2298)	
Year 1987 dummy	0.2951	.300
	(0.1427)	
Age	-0.0530	22.336
	(0.0308)	
Years of tenure	-0.1215	2.679
	(0.0293)	
Constant	-0.1569	
	(0.6797)	
N	527	
Likelihood ratio	88.4106	

Notes: standard errors in parentheses.
  excluded education category is <10 years of schooling

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 7. 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 Tables 6-8) while the comparable U.S. number is a much lower 1.48 (137 out of 9254 observations - see Table 11). 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 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 15 reports predicted probabilities for Australia using the results

from Specification 4 in Table 9. 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 16 reports predicted probabilities using Specification 4 in Table 12b. 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 8. 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

Table 15. 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.

1. Age and Sex

Age	Male	Female
16	0.36	0.21
17	0.70	0.42
18	1.22	0.73
19	1.92	1.19
20	2.81	1.79
21	3.75	2.50
22	4.75	3.22
23	5.71	3.92
24	6.43	4.46
25	7.08	4.85

2. Tenure

< 3years	4.95
≥ 3 years	2.81

3. Number of workers close colleagues

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

4. Union Membership

No	2.81
Yes	2.02

5. Occupation

Basic manual	4.18
Managerial	3.07
Professional	3.22
Clerical	2.02
Plant operator	3.36
Skilled trade	2.81

6. Industry

Construction	2.81
Agriculture	4.18
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

7. Region

New South Wales	2.81
Victoria	5.05
Queensland	3.51
South Australia	4.18
Western Australia	6.81
Tasmania	1.88

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 16. Predicted Probabilities - USA (%)

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

1. Age and Sex

Age	Male	Female
16	3.92	2.33
17	4.18	2.44
18	4.36	2.62
19	4.65	2.81
20	4.85	2.94
21	5.16	3.07
22	5.37	3.29
23	5.71	3.44
24	5.94	3.67
25	6.30	3.84
26	6.55	4.09
27	6.94	4.27

2. Race

White	4.85
Black	3.44

3. Years of Schooling

0	1.39
3	1.92
6	2.56
9	3.44
12	4.46
15	5.82
18	7.35

4. Marital Status

Married	4.85
Single	3.29

5. Occupation

Operator	2.33
Manager	3.84
Technical	3.14
Service	3.14
Agricultural occupation	2.02
Production	4.85

6. Industry

Construction	4.85
Agriculture	6.81
Mining	1.92
Non-durables	1.29
Durables	1.02
Wholesale	3.92
Retail	2.33
Transport	0.89
Finance	0.80
Public administration	1.32
Business or repair services	4.18
Personal services	5.71
Professional services	1.70

7. Region

North East	4.85
North Central	6.30
South	7.21
West	5.82

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.

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. In both countries the probability of leaving was higher the younger the individual. 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.

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)

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