Vocational qualifications, employment status and income: 2006 census analysis

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The views and opinions expressed in this document are those of the author/project team and do not necessarily reflect the views of the Australian Government, state and territory governments or NCVER.

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About the research

Vocational qualifications, employment status and income: 2006 census analysis

Anne Daly, Centre for Labour Market Research, University of Canberra

Using a 5% sample taken from the 2006 Census of Population and Housing released by the Australian Bureau of Statistics, this paper explores two aspects of people's employment relating to vocational qualifications: the choice of self-employment compared with waged employment, and the income of the self-employed relative to employees.

Key messages

- Over a quarter of males with vocational qualifications were self-employed. By contrast, the rate for females was around 14%.
- The likelihood of self-employment varies according to demographic characteristics and occupation. Self-employed people with vocational qualifications are more likely to be older, married and to have been born in a non-English speaking country.
- The characteristics of the local labour market also influence the likelihood of self-employment. Higher unemployment rates in an area discourage vocationally qualified people from becoming self-employed. The local industry mix also influences the probability of self-employment.
- Many of the factors that influence the decision on self-employment are also relevant to the incomes of full-time workers, such as being born in a non-English speaking country, occupation and local unemployment rates.
- Employees generally earn more than self-employed workers. This, together with the finding that self-employment is more likely in a buoyant labour market, suggests that the self-employed are willing to sacrifice monetary income for other perceived benefits of self-employment.

This paper is the second publication to come out of a research project investigating the labour market dynamics of workers with vocational qualifications. The first report, *Where tradies work: a regional analysis of the labour market for tradespeople* by Phil Lewis and Michael Corliss, is available from <http://www.ncver.edu.au/publications/2273.html>.

Tom Karmel
Managing Director, NCVER

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Introduction

The market for vocationally qualified workers has received considerable attention over the past decade, as commentators have feared that a skills shortage may become a limit to economic growth in Australia. While the number of tradespersons in employment remained fairly constant between 1986 and 2001, it grew over the first decade of the twenty-first century in line with the growth of aggregate employment, reflecting the expansion of the mining and construction industries (Richardson et al. 2006). The continuing growth of these industries, accompanied by a declining share of the workforce with the relevant qualifications, is likely to add additional pressure to this labour market. This occupational group is a significant part of the vocationally qualified workforce, which constitutes the largest group of Australians with post-school qualifications (see table 1), yet they remain relatively under-researched. An improved understanding of how the labour market for vocationally qualified workers operates is therefore important because of its size and its potential impact on the performance of the Australian economy. The release of the 5% sample of the 2006 Census of Population and Housing provides an opportunity to conduct a more finely grained analysis of their labour market outcomes.

The aim of this paper is to analyse two important features of the labour market for vocational qualifications in Australia: the decisions determining the choice of whether to be self-employed or to be an employee, and the determinants of income for each group. The expanded size of the public use unit record census file in 2006 enables more in-depth research into these areas than has been possible in the past when the sample size was smaller. While alternative Australian Bureau of Statistics (ABS) data sources, such as the Survey of Education and Training and the Survey of Education and Work, have a richer range of variables than the census, the size of the samples of each of these limits the ability to disaggregate the data by type of qualification and location of residence. Each of these factors is likely to have a significant impact on income and type of employment.

The focus of this paper is on those of working age in employment reporting vocational qualifications in the census, either at the level of an advanced diploma or diploma (hereafter referred to as diplomas), or a certificate. Limiting the analysis to those in employment creates a snapshot of the determinants of employment status and income in 2006 but leaves questions about the decision to participate in paid employment and the determinants of unemployment unanswered.

Unfortunately the census does not distinguish between certificate levels. This category therefore includes a wide range of qualifications, from the basic certificate I, taking four to six months to complete, to those at the highest level of certificate IV, which takes 12—18 months to complete (see NCVER 2007 for a fuller description). Table 1 presents the breakdown by level of qualification from the 2006 Survey of Education and Work. Twenty-seven per cent of the working-age population with a certificate qualification held a certificate at level I or II in 2006, with the majority at the two higher levels. The table also highlights the importance of vocational education and training (VET) qualifications in the Australian labour force.

The first set of results reported here considers the decision to become self-employed rather than to work as an employee. In a more competitive economic environment, firms have increased their use of contracting-out for particular skills and there are more casual workers than before. Self-employment has increased in the Australian economy.

Table 1 Persons aged 15–64 with post-school qualifications, civilian population and employed persons, Australia, 2006

	2	3	4	5	6	7
	Population '000	% of population	% of those with quals	Employed persons '000	% of all employed	% of those with quals
Higher education	2 753	21	39	2 354	24	41
VET	4 234	32	61	3 443	35	59
Adv. diploma	628	5	9	502	5	9
Diploma	481	4	7	398	4	7
Certificate IV	371	3	5	304	3	5
Certificate III	1 896	14	27	1 616	16	28
Certificate II	572	4	8	431	4	7
Certificate I	287	2	4	192	2	3
With qualifications	6 988	52	100	5 797	59	100
Without qualifications	6 407	48		4 050	41	
All	**13 395**	**100**		**9 847**	**100**	

Source: Unpublished ABS Survey of Education and Work, 2001–08 (cat.no.6227.0).

Self-employment as defined here follows the ABS definition: to include 'persons who performed some work for profit or family gain, in cash or kind' (ABS 2001). It includes owner—managers of both incorporated and unincorporated businesses in all sectors of the economy including agriculture. The Labour Force Survey shows that there was a growth in the share of the self-employed to 20% of total employment between 1978 and 2005. In 1978 owner—managers of incorporated businesses accounted for 1.8% of total employment, but by 2005 this share had risen to 6.8%. In contrast, the share of total employment accounted for by owner—managers of unincorporated businesses fell over the same period from 14.7% to 13.2% (Chapman, Gregory & Klugman 1998; ABS 2006). The growth in the share of self-employment in total employment in Australia contrasts with declining self-employment rates in most Organisation for Economic Co-operation and Development (OECD) countries (Blanchflower 2000). The role of national tax and benefit systems has been identified as important in explaining international trends.

Self-employment was particularly associated with males with vocational qualifications. While 20% of the working population with post-secondary school qualifications were self-employed, according to the 2006 census, a figure very close to that reported above from the Labour Force Survey, 28% of males with vocational qualifications were self-employed. The share of females with vocational qualifications who were self-employed was below the average for the qualified population at 14%.

The high rate of self-employment for males with vocational qualifications is likely to reflect a number of factors on both the supply and demand sides of the labour market. There have been a number of studies which have considered the decision to become self-employed. Taylor (1996) summarised the motivations under three headings: earnings, independence and unemployment. People become self-employed because they expect to earn higher incomes, they like the independence of being their 'own boss', and in times of high demand for labour, they are willing to risk the security of being an employee for the greater opportunities they see in self-employment. An alternative hypothesis about the effect of macroeconomic variables on the decision to become self-employed is that reduced labour demand and higher unemployment rates, where people see few opportunities for waged employment, promote self-employment. Microeconomic reform and changes in labour market institutions also affect the choice to become self-employed. Self-employment has also been recognised as an important avenue into the labour market for ethnic minorities and immigrants,

especially those with qualifications that are not readily recognised in the Australian labour market (Evans 1989; Evans & Kelley 1991).

There is some evidence that the self-employed are more satisfied with their jobs and healthier than employees, despite the fact that they work longer hours and sometimes for less pay (Sikora & Saha 2009). Given the problems of retaining workers in some of the skilled occupations, understanding the factors associated with self-employment for this group could assist in reducing attrition from these occupations. This research also offers the opportunity to explore the reasons for the gender difference in self-employment rates.

The second research question is focused on the determinants of income for vocationally qualified workers in the Australian labour market. There are numerous studies that use the human capital framework to look at the determinants of income and the returns from additional schooling. The results presented here enable a closer examination of the determinants of income for those with vocational qualifications, using the human capital framework. The effects of occupation and location of residence on income are of particular interest. Differences in the incomes of people with similar levels of qualifications but living in different areas show how income is adjusting to reflect the supply and demand conditions in local labour markets, holding everything else constant. The details of the samples used for each research question are summarised in table 2.

Table 2 Summary of samples used for each research question, males and females aged 15–64 years

Research question	Qualification level	Employment status	Hours worked
1 Determinants of employment status: SE vs employee	Advanced diploma and diploma	All in employment	Reporting working > 0 hours per week
	Certificate	All in employment	Reporting working > 0 hours per week
2 Determinants of income	Advanced diploma and diploma	Self-employed and employees separately	Reporting working 35+ hours per week
	Certificate	Self-employed and employees separately	Reporting working 35+ hours per week

Note: SE = self-employed.

Fifty-six per cent of the employed people aged 16—64 years reporting a post-secondary school qualification at the time of the 2006 census held a vocational qualification either at the diploma (16%) or certificate (39%) level as their highest qualification. The share was particularly high among males, where 13% held a diploma and 49% a certificate. Employed females were more likely to hold a diploma (20%) than males, but less likely to hold a certificate (27%). These differences reflect the qualifications associated with particular occupations and the high level of occupational segregation in the Australian labour market, an issue to be discussed further below.

The results reported in this paper show that the probability of people with vocational qualifications being self-employed varies by demographic characteristics, occupation and location of residence. These are also important determinants of weekly income for those in full-time employment. There is considerable variation in weekly income, depending on occupation, location of residence and employment status (that is, whether a person is an employee or self-employed). Full-time male employees had higher incomes than the self-employed, as reported in the census. Female employees who were diploma holders had the highest weekly incomes and female certificate holders the lowest. Males in each separately identified group — diploma, certificate, employee and self-employed — had higher incomes than females.

The data

The data used in this study were taken from the 5% sample of the 2006 Census of Population and Housing. The sample was first restricted to those who were in employment, who were aged 15 to 64 years and who had a post-school qualification of either a diploma or certificate. Eighty-nine per cent of males and 82% of females were employed in the private sector, with state and territory governments being the largest public sector employers. The largest concentrations of males with vocational qualifications were in two industries — construction services and building and heavy and civil engineering construction — accounting for 19.5% of males in employment. In contrast, female employment was concentrated in preschool and school education and residential care and social assistance services, accounting for 18% of female employment. Occupational segregation is likely to contribute to the gender pay gap between workers with the same level of qualification.

Table 3 summarises weekly income for all employed people with vocational qualifications by area of residence. The highest mean incomes were for males living in Western Australia outside Perth and in the Northern Territory. The lowest mean income was in Tasmania. The pattern was somewhat different for females, with the highest mean incomes reported in Sydney, the Australian Capital Territory and the Northern Territory. Relatively low average incomes were found outside the capital cities in Victoria and South Australia.

Table 3 Mean weekly income for employed diploma and certificate holders, males and females, 2006

	Males	Females
	$ (standard deviations in brackets)	$ (standard deviations in brackets)
Sydney	1151 (694)	798 (510)
Other NSW	985 (591)	647 (392)
Melbourne	1059 (632)	708 (438)
Other Vic.	961 (576)	603 (611)
Brisbane	1073 (611)	687 (418)
Other Qld	1046 (628)	645 (396)
Adelaide	997 (556)	688 (387)
Other SA	965 (559)	603 (369)
Perth	1157 (672)	685 (433)
Other WA	1275 (775)	644 (426)
Tas.	910 (503)	620 (337)
Northern Territory	1232 (692)	785 (459)
ACT	1190 (685)	882 (507)
Total	**1065 (638)**	**694 (434)**

Source: ABS 5% sample of the 2006 Census of Population and Housing.

The analysis of income described below was further restricted to those in full-time employment because of difficulties associated with calculating hourly income from the census data, which is presented in bands for income and individual working hours (discussed in more detail below). The descriptive statistics presented in tables 4 and 5 relate to the income sample of full-time workers. Preliminary exploration of the data showed that there were statistically significant differences in the determinants of income for diploma and certificate holders and for employees compared with the self-employed. The summary data are therefore presented for the four groups for which income regressions were run.

Table 4 presents summary data for the males in the income sample. The highest mean weekly income was for males with a diploma who were employees. The self-employed were on average older than the employees. They were also more likely to be born overseas and to be married or living in a de facto relationship.

Table 4 Mean characteristics of full-time male workers with a diploma and a certificate

Males	Diploma		Certificate	
	Employees	Self-employed	Employees	Self-employed
Weekly income	1347.73	1297.16	1067.136	1023.708
Age	41.0034	45.0965	39.1626	43.4684
Married and de facto	.6976	.7994	.6678	.8129
Area unemployment rate[a]	5.16	5.08	5.35	5.33
Occupation				
Manager	.0807	.2333	.0518	.1440
Specialist manager	.1330	.1190	.0602	.1058
Professional	.2741	.2833	.0519	.0391
Technician	.0267	.0367	.0622	.0677
Engineering ICT	.0873	.0428	.0418	.0181
Automotive	.0227	.0141	.1876	.1116
Construction	.0069	.0400	.0797	.2444
Telecommunications	.0314	.0274	.0809	.0763
Food	.0088	.0085	.0384	.0177
Protective services	.0526	.0012	.0251	.0028
Clerical	.1048	.0323	.0575	.0194
Sales assistant	.0226	.0149	.0255	.0186
Sales worker	.0369	.0500	.0258	.0193
Machinery operator	.0136	.0036	.0346	.0125
Stationery machine operator	.0145	.0020	.0370	.0062
Driver	.0117	.0274	.0376	.0309
Labourer	.0653	.0539	.0928	.0572
Born in an English speaking country	.1320	.1449	.1188	.1164
Born in a non-English speaking country	.1647	.1695	.0841	.0985
Born in Australia	.7033	.6856	.7971	.7851
Location of residence				
Other NSW	.1000	.1166	.1463	.1593
Melbourne	.1907	.1772	.1395	.1452
Other Vic.	.0635	.0755	.0870	.0992
Brisbane	.0941	.0768	.0841	.0788
Other Qld	.0918	.1122	.1382	.1345
Adelaide	.0567	.0496	.0557	.0461
Other SA	.0141	.0161	.0215	.0257
Perth	.0826	.0872	.0752	.0769
Other WA	.0210	.0299	.0377	.0281
Tas.	.0173	.0178	.0241	.0190
NT	.0111	.0065	.0130	.0086
ACT	.0247	.0109	.0125	.0119
Sydney	.2324	.2240	.1652	.1667
No. employees for self-employed				
1–19 employees		.6529		.5806
20+ employees		.0630		.0289
No. employees		.2841		.3905

Note: a The unemployment rate in each of the 64 areas identified in the 5% sample of the census.
Source: ABS 5% sample of the 2006 Census of Population and Housing.

Occupational segregation by gender is important in the Australian labour market. Females are concentrated in service occupations, while a relatively high proportion of males work in skilled manual occupations. In order to maximise the information to be gained from the data, occupations were differentiated by sex where there were at least 2000 observations for one occupation. Where the numbers were smaller, the data were combined to a higher level. For example, those employed in clerical occupations are included in one category for males but disaggregated to office manager, personal assistant, general clerk, receptionist and numerical clerk for females. Similarly for males, the category of technicians and trades workers was disaggregated into engineering and ICT technicians, automotive and engineering trades workers, construction workers, electrotechnology and telecommunications trades workers, and food trades workers, while the components remained aggregated for females.

There were different occupational distributions for the self-employed compared with the employees, reflecting the management role of people running their own businesses. Almost a quarter of the self-employed male certificate holders were occupied in construction, confirming the importance of self-employment in this area of the economy. The locational distribution of this group followed the pattern of the Australian population as a whole, with the largest concentration of males with diploma and certificate qualifications being in Sydney and the majority residing in New South Wales, Victoria and Queensland. About a third of the self-employed had no other employees in their business and most of the others reported between one and 19 employees. Only a small proportion had more than 20 employees. The businesses run by the self-employed were therefore predominantly small.

Table 5 shows many of the same patterns for females as for males. The highest mean income was for employees with a diploma, although it was 29% lower than for their male counterparts. Other studies based on the ABS Survey of Education and Training also show lower incomes for females (Ryan 2002; Long & Shah 2008; Karmel & Nguyen 2006). Self-employed females were older, more likely to be married and had on average more children than female employees. About a third of the self-employed females with a diploma were born overseas, but the share was lower for those with certificates.

All groups of females were more likely to be in white-collar occupations than were males. In common with their male counterparts, the female self-employed were more concentrated in management positions than were employees. Occupations in community and personal service, which includes carers, who are identified separately here, accounted for the largest share of female employees. Other occupations included in this group are health, hospitality and tourism workers and beauty therapists. Like their male counterparts, self-employed females tended to work in small firms, often with no employees apart from themselves.

Table 5 Mean characteristics of full-time female workers with a diploma and a certificate

Females	Diploma		Certificate	
	Employees	Self-employed	Employees	Self-employed
Weekly income	957.98	881.154	748.44	765.33
Age	39.2493	43.8417	35.2413	42.1673
Married and de facto	.5715	.7380	.5209	.7463
Children	1.1458	1.6093	1.0103	1.7233
Area unemployment rate	5.1761	5.1128	5.3380	5.3872
Occupation				
Manager	.0865	.1667	.0407	.1198
Hospitality manager	.0454	.1426	.0551	.1323
Other professional	.0539	.0880	.0183	.0319
Business prof.	.0740	.0741	.0421	.0257
Education prof.	.0993	.0278	.0054	.0070
Health prof.	.0776	.0176	.0205	.0008
Technician	.0415	.0583	.1112	.3089
Community and personal service	.1300	.1287	.1332	.0763
Carer	.0624	.0481	.0917	.0482
Office manager	.0482	.0500	.0562	.0288
Personal assistant	.0449	.0306	.0516	.0381
General clerk	.0473	.0148	.0809	.0179
Receptionist	.0383	.0056	.0702	.0047
Numerical clerk	.0560	.0444	.0647	.0459
Sales assistant	.0283	.0417	.0531	.0342
Sales worker	.0385	.0333	.0408	.0405
Machinery operator	.0079	.0056	.0176	.0132
Labourer	.0201	.0221	.0467	.0258
Born in an English speaking country	.1233	.1361	.0923	.1043
Born in a non-English speaking country	.1459	.2028	.0960	.1230
Born in Australia	.7308	.6611	.8116	.7727
Location of residence				
Other NSW	.1066	.1148	.1450	.1712
Melbourne	.1820	.1685	.1484	.1237
Other Vic.	.0631	.0824	.0689	.0856
Brisbane	.0872	.0639	.0943	.0716
Other Qld	.0982	.1278	.1284	.1549
Adelaide	.0564	.0472	.0573	.0482
Other SA	.0121	.0213	.0179	.0280
Perth	.0781	.0806	.0760	.0553
Other WA	.0167	.0333	.0249	.0319
Tas.	.0195	.0194	.0243	.0202
NT	.0096	.0111	.0134	.0093
ACT	.0209	.0102	.0189	.0140
Sydney	.2494	.2194	.1821	.1860
No. employees for self-employed				
1–19 employees		.6167		.6218
20+ employees		.0343		.0296
No. employees		.3491		.3486

Source: ABS 5% sample of the 2006 Census of Population and Housing.

The determinants of self-employment

The explanatory variables chosen for the estimation reported in this section reflect the arguments about the choice of self-employment and results of earlier studies. People will opt for self-employment rather than waged employment when the expected benefits, including income and non-monetary benefits, exceed the opportunity cost of foregone income from waged employment and associated non-monetary benefits. The choice of variables has been constrained by the availability of data in the census to measure such things as the value individuals place on independence and control over their working environment. Other variables which have also been found to be important determinants in other studies, such as family wealth and inheritance and family history in running a business, were unfortunately unavailable in the census. The explanatory variables used here include demographic variables, occupation and the local labour market, summarised in equation 1.

Probability of self-employment = f(demographics, occupation, location) (1)

Age and its square are included among the demographic determinants of self-employment status, reflecting the fact that self-employment is more prevalent among older and more experienced workers, but it tends to decline towards the end of working life. Evidence from earlier studies shows that people who are either legally married or in a de facto relationship are more likely to be self-employed, so this has also been included as a demographic determinant. This perhaps reflects the benefits of having some support from a partner, either in terms of another source of income or in running the business, before choosing self-employment. Unfortunately the census sample does not include data on the number of children fathered by males, so this variable has only been included in the female equation. The age of the children has also been found to be important in earlier studies.

Self-employment has been shown to be important for migrants entering the labour force of their host country, especially if they come from a country which is culturally very different. This reflects factors such as the difficulty of getting qualifications recognised, the inability to communicate in English, and a lack of familiarity with labour market institutions and practices. Two dummies have been used here to capture this effect, one for people born in an English speaking country and another for people born in a non-English speaking country, the control group being people born in Australia. If immigrants with vocational qualifications face difficulties in getting waged employment, they are more likely to become self-employed.

The choice between self-employment and waged employment also depends on the type of work undertaken and the occupation. For example, there is greater scope for self-employment in construction than in vehicle manufacturing. The census sample includes quite a detailed list of occupations, and individual dummies have been used for each category in which there were more than 2000 observations for each sex taken separately. Smaller occupational groups have been aggregated to reduce the number of occupational dummies, as described earlier. The alternative of using field of qualification to capture differences in the opportunity for self-employment was also tested. The fields of study available were much broader than the occupational classification and the explanatory power of the equations was lower. As field of qualification and occupation were closely correlated, it was decided to use occupation as an indicator of the scope for self-employment in a

particular line of work. Earlier Australian studies show that field of study is an important determinant of income for vocationally qualified workers (Ryan 2002; Long & Shah 2008; Karmel & Nguyen 2006).

The final group of variables relates to location of residence. The unemployment rate for people with vocational qualifications in each of the 64 areas identified in the census was included as a measure of labour demand to test the competing hypotheses of the effect of labour demand on the choice between being an employee and self-employment. The identified areas, however, do not readily translate into the concept of a local labour market. Sydney, for example, is divided into 12 areas, but these areas are unlikely to operate as discrete labour markets. On the other hand, the Northern Territory is included as one area and it includes the urban labour markets of Darwin and Alice Springs and the quite different remote labour markets of Indigenous communities. Tasmania and the Australian Capital Territory are also each included as one area. While the ACT can be thought of as a local labour market, there are likely to be important differences between areas in Tasmania. These data limitations need to be considered when interpreting the results.

The second group of location variables comprises a set of dummies that have been created to go as far as the data allow in distinguishing the urban labour markets of the capital cities from the regional and rural labour markets in each state, except for Tasmania, the Northern Territory and the Australian Capital Territory. These dummies capture any wider effects of location on the decision to become self-employed beyond the effect of unemployment. These may include the industry composition of the area and different opportunities for self-employment in large urban labour markets compared with regional and rural labour markets, where the scope of specialisation is likely to be greater.

Results for the determinants of self-employment

Table 6 presents the estimated marginal effects of the independent variables on the probability of self-employment by sex. The probit regression results are presented in appendix table A.1. The results show that demographic, occupational and locational factors are important determinants of the decision to become self-employed. The probability of being self-employed increased more with age for males than for females. Married or de facto males and females were more likely to be self-employed, and increasing numbers of children raised the probability of self-employment for females.

The results show that, for males, being born in an English speaking country reduces the probability of being self-employed compared with the Australian-born, but there was no significant effect for females. By contrast, being born in a non-English speaking country increases the probability of being self-employed, especially for females. This result confirms earlier studies that show that self-employment is an important vehicle for immigrants moving into a new labour market, especially those who might face barriers to waged employment for the variety of reasons listed earlier.

The probability of self-employment increased for both males and females relative to those occupied as labourers in a number of occupations. The occupation of labourer was chosen as the comparison group because it is the occupation with the lowest skill levels, where entry is likely to be easiest. Males occupied as managers and technicians were more likely to be self-employed than labourers, but it was those employed in construction occupations who had by far the highest probability of being self-employed.

Table 6 Marginal effects for probit equation on the determinants of self-employment

Males	Marginal effects[b,c]	Females	Marginal effects[b,c]
Age	.0277** (.0012)	Age	.0120** (.0011)
Age^2	-.0002** (.0000)	$Age^2/100$	-.0001** (.0000)
Married and de facto	.0615** (.0037)	Married and de facto	.0528** (.0032)
Children		Children	.0158** (.0014)
Area unemployment rate	-.0091** (.0015)	Area unemployment rate	-.0028* (.0014)
Occupation		Occupation	
Manager	.2639** (.0091)	Manager	.1839** (.0156)
Specialist manager	.0860** (.0085)	Hospitality manager	.2250** (.0172)
Professional	-.0083 (.0072)	Other professional	.1603** (.0170)
Technician	.0939** (.0095)	Business prof.	.0230** (.0116)
Engineering ICT	-.1078** (.0076)	Education prof.	-.0533** (.0068)
Automotive	-.0311** (.0066)	Health prof.	-.0893** (.0044)
Construction	.3609** (.0085)	Technician	.1727** (.0140)
Telecommunications	.0533** (.0088)	Community and personal service	.0220** (.0091)
Food	-.0571** (.0106)	Carer	-.0749** (.0053)
Protective services	-.2175** (.0052)	Office manager	.0156 (.0111)
Clerical	-.1363** (.0064)	Personal assistant	.0597** (.0130)
Sales assistant	-.0288* (.0116)	General clerk	-.0258** (.0084)
Sales worker	.0088 (.0115)	Receptionist	-.0905** (.0049)
Machinery operator	-.1037** (.0095)	Numerical clerk	.0800** (.0124)
Stationery machine operator	-.1827** (.0068)	Sales assistant	-.0199* (.0090)
Driver	-.0032 (.0101)	Sales worker	.0062 (.0114)
		Machinery operator	.0058 (.0166)
Born in an English speaking country	-.0303** (.0049)	Born in an English speaking country	-.0042 (.0048)
Born in a non-English speaking country	.0130** (.0057)	Born in a non-English speaking country	.0243** (.0053)
Location of residence		Location of residence	
Other NSW	.0237** (.0068)	Other NSW	.0170** (.0065)
Melbourne	-.0117** (.0057)	Melbourne	-.0039 (.0051)
Other Vic.	.0020 (.0069)	Other Vic.	.0138* (.0070)
Brisbane	-.0336** (.0067)	Brisbane	-.0097 (.0062)
Other Qld	-.0077 (.0061)	Other Qld	.0267** (.0064)

Males	Marginal effects[b,c]	Females	Marginal effects[b,c]
Adelaide	-.0347** (.0078)	Adelaide	-.0132 (.0070)
Other SA	.0150 (.0122)	Other SA	.0533** (.0135)
Perth	-.0149* (.0075)	Perth	-.0132* (.0065)
Other WA	-.0348** (.0097)	Other WA	.0357** (.0120)
Tasmania	-.0264* (.0116)	Tasmania	-.0169 (.0102)
NT	-.0651** (.0145)	NT	-.0169 (.0150)
ACT	-.0628** (.0130)	ACT	-.0478** (.0089)
Number of observations	72 578	Number of observations	42 308
Log-likelihood	-37261.35	Log-likelihood	-15135.176
Pseudo R^2	0.1279	Pseudo R^2	0.1310
Predicted probability at mean[a]	.2446	Predicted probability at mean	.1105

Notes: a The base case is a person who is not married, Australian born, lives in Sydney and is occupied as a labourer.
b * indicates significant at the 5% level; ** significant at the 1% level.
c The marginal effects for dummy variables measure a discrete change in the dummy from 0 to 1.
Source: ABS 5% sample of the 2006 Census of Population and Housing.

Females who were managers, professionals (although not education and health professionals) and technicians were more likely to be self-employed than female labourers. (This category included factory process workers, cleaners and food preparation assistants.) The higher probability of being self-employed for those in the various occupational categories of managers is not surprising, given that this category will cover management of a business in a wide range of activities.

The area unemployment rate had a small effect on the probability of self-employment for females, but an increase in the unemployment rate by one percentage point in the area of residence reduced the probability of self-employment for males by 0.91 percentage points. This result supports the hypothesis that self-employment rates will rise when macroeconomic conditions are favourable. This is consistent with the findings of Blanchflower (2000) and Taylor (1996).

There were other locational determinants of the choice of self-employment. The self-employment rate was higher for males compared with Sydney, in New South Wales outside Sydney and in Melbourne. It was statistically significantly lower in Brisbane, Adelaide, Perth, other Western Australia, Tasmania, the Northern Territory and the Australian Capital Territory than in Sydney, holding everything else constant. There was no statistically significant difference between the probability of self-employment in Sydney, other Victoria and other South Australia. The regional pattern of self-employment for females was somewhat different from that of males. There was significantly more female self-employment than in Sydney in most states outside the capital cities. There was no statistically significant difference in the probability of females being self-employed between the capital cities, apart from a reduced probability for residents of Perth.

These results show that there are characteristics of individuals and the areas they live in that influence the decision to become self-employed rather than to be a wage and salary earner. The self-employed with vocational qualifications are more likely to be older and married and to have been born in a non-English speaking country. Males working in construction occupations had the highest

probability of being self-employed, while among females it was as hospitality managers. These results show that high unemployment is associated with lower rates of self-employment, indicating that a buoyant economy is likely to encourage more people to become self-employed. The characteristics of the surrounding labour market such as the industry mix also influence the probability of self-employment, but the scale of these effects varied by sex.

The determinants of income for full-time workers

This section reports the results on the determinants of income for males and females with vocational qualifications working 35 or more hours per week. This group accounted for 81% of the males with vocational qualifications in employment but only 52% of the females. It was decided to focus on full-time workers for a number of data-related reasons. The census reports income from all categories of sources, so it is not possible to separate out earnings from employment from other sources of income such as rent, dividends and income support. Comparisons with data from surveys show that earnings are by far the major source of income for full-time workers. The income in each category (that is, spans of dollar amounts) has been set at the midpoint of the category. The open-ended category is a weekly income of $A2000 or more. Following earlier studies, the income for people in this category has been set at 1.5 times the lower bound.

In 2006, census respondents were asked to state their actual hours of work rather than select from categories (that is, spans of hours). It was therefore decided not to calculate hourly income as this would have involved dividing a constant weekly income from each income category by varying numbers of hours, which was likely to produce some spurious results for hourly pay. It was decided to restrict the sample to the weekly income of full-time workers to reduce this problem. Those with negative, zero or not stated weekly incomes were excluded from the estimation. The basic model is presented in equation (2)

Ln(weekly income) = f(labour market experience, demographic factors, occupation and location of residence (2)

Self-employed workers are often excluded from the analysis of the determinants of income because of the difficulties in interpreting the results for this group, where income is not only related to education and working experience but to the returns from capital invested in the business and from unobservable factors such as the level of entrepreneurial ability and motivation (Garcia-Mainar & Montuenga-Gomez 2005). The self-employed also emphasise the non-monetary benefits of self-employment, such as autonomy and scope for creativity, which are hard to measure in most datasets (Blanchflower 2000; Taylor 1996). As described above, self-employment is a significant option for those with vocational qualifications in Australia, so it seemed important to include this group in the study. Preliminary regression results showed that the returns from human capital characteristics and other characteristics varied in a statistically significant way between wage and salary workers on the one hand, and the self-employed on the other. They also varied between diploma and certificate holders. The results presented in tables 7 and 8 therefore divide the sample into employees and the self-employed and diploma and certificate holders.

There are a number of reasons why the determinants of earnings may vary between employees and the self-employed. Three models offer possible explanations for any observed differences: the human capital model, the efficiency wage model and the screening hypothesis. In a human capital framework, rising earnings with age reflect the impact of on-the-job training and experience on earnings. Older workers earn more than younger workers because they are more productive. This argument should apply to both employees and the self-employed. Alternatively, rising earnings with age in an efficiency wage model are a result of asymmetric information between employers and employees and reflect

deferred payments by employers to promote effort, reduce labour turnover and discourage employees from shirking for fear of losing their jobs (Borjas 2010). While the self-employed may experience rising incomes with age due to investment in on-the-job training, they do not face the problem identified in the efficiency wage models of asymmetric information about employee effort when dealing with themselves. If the efficiency wage model explains rising age–income profiles among employees, then flatter profiles can be expected among the self-employed.

Another explanation for the positive returns from education in the labour market is based on the screening hypothesis. This hypothesis argues that education does not directly raise the productivity of workers but is used as a screening device by employers. According to this model, the returns from education and training are expected to be lower among the self-employed than among employees because they do not need to use qualification and work experience as a screening device (Lee & Miller 2004). The results presented below will be discussed in terms of these competing models.

The earlier discussion of the choice of demographic variables in the probit model of self-employment offered reasons why marital status and place of birth might influence the decision to become self-employed and these factors have been shown to also influence income and have been included in the models reported here.

Location of residence is another factor that has been shown to determine income. Lewis and Corliss (2010) show that the median income of tradespersons working full-time varies by region, with those working in remote areas earning the relatively highest incomes. Income differences between individuals with the same labour market characteristics but living in different locations reflect a number of factors. In areas of high unemployment, there is likely to be downward pressure on incomes, and where there is a skill shortage, higher incomes are predicted. Incomes will also be influenced by the costs of living in particular locations and any non-monetary benefits or costs associated with particular areas. They are expected to be higher to compensate for the higher cost of living in the major capital cities and in remote locations. Lewis and Corliss (2010) argue that the regional differences in median incomes are an outcome of supply and demand conditions in the local labour markets.

The final group of variables included here relate to occupation, which reflects the human capital skills developed during education and training and any compensating differentials associated with different types of work. Although the focus of this study is on Australian workers with vocational qualifications, there are substantial differences in the incomes of workers with the same level of qualification but working in different fields. This is likely to reflect a number of factors, including the degree to which qualified labour can be substituted by unqualified labour. Some occupations such as mechanical and fabrication engineers and electricians typically require certification, but in other occupations such as those in food and horticulture certification is less important.

An additional variable was added for the self-employed income equations — the number of employees in the owners' firms. The size of firm is expected to increase the income of the self-employed for a number of reasons. Larger firms, measured in terms of employment, are likely to have more physical capital and therefore the owners' income may reflect a return on this capital, and owners of large firms are likely to receive a larger return on their entrepreneurial and management abilities.

Results for the determinants of income

Table 7 compares the results for males with diplomas and certificates who were employees with self-employed males also with diplomas and certificates. The equations for the self-employed had lower

explanatory power than for employees, suggesting that there were additional determinants of income for the self-employed that were not included here. They show that age was a more important determinant of weekly income for employees than for the self-employed. The estimated effect of age on male income shows a much flatter age–income profile for self-employed males than for employees. This result is consistent with the screening hypothesis, or the hypothesis that the delayed financial rewards associated with asymmetric information about employees may explain why the age–income profiles for employees are steeper than for the self-employed. It may also reflect lower levels of on-the-job training among the self-employed. The substantial proportion of males with vocational qualifications who are self-employed may in part explain the flatter age–income profiles identified in earlier studies of people with vocational qualifications (Ryan 2002; Long & Shah 2008).

Table 7 The determinants of income for full-time male workers with a diploma or a certificate, dependent variable = Ln weekly income

	Diploma		Certificate	
Males	Employees[a,b]	Self-employed[c]	Employees[a,b]	Self-employed[c]
Age	.0740**	.0284**	.0585**	.0060
	(.0031)	(.0114)	(.0014)	(.0042)
Age^2	-.0008**	-.0003*	-.0007**	-.0001**
	(.0000)	(.0001)	(.0000)	(.0000)
Married and de facto	.0953**	-.0011	.0961**	-.0169
	(.0101)	(.0125)	(.0050)	(.0048)
Area unemployment rate	-.0315**	-.0434**	-.0306**	-.0319**
	(.0038)	(.0125)	(.0021)	(.0048)
Occupation				
Manager	.4068**	-.0383	.2776**	-.0133
	(.0221)	(.0611)	(.0119)	(.0251)
Specialist manager	.5604**	.1064	.4753**	.2148**
	(.0202)	(.0667)	(.0113)	(.0263)
Professional	.3567**	.2943**	.3830**	.2809**
	(.0182)	(.0593)	(.0182)	(.0336)
Technician	.0862**	-.1287	.0803**	-.0916**
	(.0308)	(.0874)	(.0112)	(.0287)
Engineering ICT	.2842**	.4700**	.4230**	.3748**
	(.0217)	(.0837)	(.0128)	(.0440)
Automotive	.2737**	.1779	.2044**	-.0617*
	(.0327)	(.1239)	(.0085)	(.0258)
Construction	.1173*	.1642	.1537*	.1713**
	(.0541)	(.0856)	(.0104)	(.0230)
Telecommunications	.2358**	.0464	.3396**	.1253**
	(.0290)	(.0963)	(.0103)	(.0279)
Food	.0221	-.3905**	.0237	-.2696**
	(.0486)	(.1559)	(.0131)	(.0445)
Protective services	.3002**	.3683	.2412**	-.0630
	(.0248)	(.3871)	(.0155)	(.1016)
Clerical	.1834**	-.0206	.1713**	.1704**
	(.0209)	(.0915)	(.0115)	(.0429)
Sales assistant	.0457	-.2657*	.0098	-.0785
	(.0327)	(.1213)	(.0153)	(.0436)
Sales worker	.2804**	.2901**	.2215**	.2516**
	(.0276)	(.1213)	(.0153)	(.0430)
Machinery operator	-.0854*	.5031*	.0224	.0672
	(.0401)	(.2280)	(.0136)	(.0511)
Stationery machine operator	.1390**	.0247	.3017**	.0545
	(.0390)	(.3011)	(.0133)	(.0696)
Driver	-.0647	-.1103	.0512**	-.0301
	(.0428)	(.0972)	(.0133)	(.0362)
Born in an English speaking country	-.0140	.0790*	.0205**	.0702**
	(.0130)	(.0397)	(.0071)	(.0170)

	Diploma		Certificate	
Males	Employees[a,b]	Self-employed[c]	Employees[a,b]	Self-employed[c]
Born in a non-English speaking country	-.1749** (.0125)	-.1893** (.0387)	-.0923** (.0083)	-.0698** (.0185)
Location of residence				
Other NSW	-.0580** (.0181)	-.1507** (.0568)	-.0564** (.0086)	-.1284** (.0206)
Melbourne	-.0775** (.0133)	-.0730 (.0427)	-.0834** (.0080)	-.1031** (.0189)
Other Vic.	-.1555 (.0196)	-.1792** (.0574)	-.1376** (.0093)	-.1912** (.0213)
Brisbane	-.1490** (.0171)	.0482 (.0565)	-.1219** (.0096)	-.0251 (.0231)
Other Qld	-.1624** (.0170)	-.2026** (.0499)	-.0729** (.0082)	-.0767** (.0195)
Adelaide	-.1495** (.0202)	-.0562 (.0668)	-.1319** (.0108)	-.0796** (.0276)
Other SA	-.2160** (.0374)	-.1397 (.1094)	-.1392** (.0160)	-.1546** (.0353)
Perth	-.1275** (.0186)	.0234 (.0564)	-.0719** (.0106)	.0077 (.0245)
Other WA	-.0414 (.0315)	-.0653 (.0836)	.1156** (.0131)	-.0945** (.0345)
Tasmania	-.2092** (.0345)	-.1330 (.1079)	-.1697** (.0154)	-.0855* (.0410)
NT	-.1431** (.0421)	-.0770 (.1693)	.0525** (.0202)	.0571 (.0583)
ACT	-.0673* (.0296)	.1564 (.1318)	-.0838* (.0208)	-.0206 (.0505)
1–19 employees		.3438** (.0315)		.1569** (.0113)
20+ employees		.8462** (.0613)		.7098** (.0330)
Constant	5.3330 (.0655)**	6.1685 (.2558)**	5.6337 (.0296)**	6.8110 (.0929)**
Number of observations	9 923	2 478	34 444	11 945
R2	0.2966	0.1997	0.2348	0.1231

Notes: a The base case is a male who is not married, Australian born, lives in Sydney and is occupied as a labourer.

b * indicates significant at the 5% level; ** significant at the 1% level.

c The base case is a male who is not married, Australian born, lives in Sydney, is occupied as a labourer and had no other employees in the business.

Source: ABS 5% sample of the 2006 Census of Population and Housing.

While being married or in a de facto relationship was found earlier to increase the probability of being self-employed, it was not shown to have a statistically significant effect on the income of the self-employed, although it did have a positive effect on the income of employees. Those born in a non-English speaking country had substantially lower earnings than the Australian-born. Males with a certificate and born in an English speaking country had higher incomes than their Australian-born counterparts and this was particularly pronounced for the self-employed.

There was greater variation in income by occupation for employees with a diploma than for the self-employed. Holding everything else constant, the employees with the highest weekly incomes relative to labourers were managers, specialist managers and professionals. The highest incomes among the self-employed were in the professional and engineering ICT occupations; those in the food occupations had incomes substantially lower than those of the average self-employed labourer with a diploma qualification. Male certificate holders who were employed in white-collar occupations had

relatively higher incomes. Once again males in food occupations had substantially lower incomes than the benchmark occupation of labourer.

The area unemployment rate for males with a vocational qualification was inversely related to incomes, indicating a downward pressure on income in areas of high unemployment. Among diploma holders, employee incomes were lower outside Sydney but there were fewer areas where location of residence had a significantly different effect on income for the self-employed by comparison with in Sydney. The story was different for males with a certificate qualification. In Western Australia outside Perth and in the Northern Territory male employees with a certificate had incomes which were significantly higher than incomes in Sydney. This result may reflect the effect of mining activity in these locations, but it did not apply to those working in Queensland outside Brisbane. Queensland is the most decentralised Australian state and any effect of mining activity on incomes outside Brisbane may be diluted by the wider range of economic activities undertaken outside the capital city.

The results presented in table 7 show an important effect of firm size on the incomes of the self-employed. Those males with a diploma who were running businesses with 20 or more employees had incomes that were 84% higher than those in self-employment with no employees; among certificate holders the gap was 71%. This may reflect the return on physical capital in the larger firms or the additional return from the entrepreneurial skills of those running larger businesses.

Many of the broad conclusions for males also applied to females (see table 8), so comments will be restricted here to differences between males and females. For females the effect of cohabitation was different from that of males, having no statistically significant effect on the incomes of female certificate holders and reducing the incomes of female diploma holders who were self-employed. As other income studies have found, children had a negative effect on female incomes except for the self-employed diploma holders. In general, those females born in non-English speaking countries had lower incomes, but those born in English speaking countries did not have significantly higher incomes than Australian-born females.

The estimated effect of age on female income shows flatter age–income profiles for self-employed females with a certificate compared with those who were employees. This was, however, not the case for female diploma holders. In this case the age–income profile was steepest for the self-employed. This may reflect some special characteristics of this group, as it was a relatively small sample. The result requires further investigation.

The effect of occupation was more variable for employees than for the self-employed. Managers and professionals had substantially higher incomes than the benchmark group of labourers. In all employees' locations, except for the Australian Capital Territory, incomes were statistically significantly lower than in Sydney. Incomes did not vary significantly by location for self-employed diploma holders, but there were some negative effects of location on the incomes of self-employed certificate holders, especially outside the capital cities. As for self-employed males, those females running businesses with 20 or more employees had higher incomes than those who had no employees.

Table 8 The determinants of income for full-time female workers with a diploma or a certificate, dependent variable = Ln weekly income

	Diploma		Certificate	
Females	Employees[a,b]	Self-employed[c]	Employees[a,b]	Self-employed[c]
Age	.0624**	.0753**	.0604**	.0363**
	(.0028)	(.0180)	(.0021)	(.0145)
Age^2	-.0007**	-.0008**	-.0007**	-.0004*
	(.0000)	(.0002)	(.0000)	(.0002)
Married and de facto	.0100	-.1075*	.0197**	.0045
	(.0088)	(.0533)	(.0069)	(.0462)
Children	-.0380**	-.0135	-.0435**	-.0429**
	(.0041)	(.0200)	(.0035)	(.0170)
Area unemployment rate	-.0211**	-.0506*	-.0212**	-.0487**
	(.0037)	(.0208)	(.0032)	(.0167)
Occupation				
Manager	.6093**	.3705*	.5171**	.2266
	(.0322)	(.1607)	(.0225)	(.1332)
Hospitality manager	.3339**	.1911	.3126**	-.0070
	(.0348)	(.1622)	(.0208)	(.1307)
Other professional	.4223**	.4345**	.4020**	.0718
	(.0340)	(.1695)	(.0288)	(.1602)
Business prof.	.4898**	.7621**	.4309**	.4275**
	(.0327)	(.1713)	(.0222)	(.1688)
Education prof.	.4710**	.2830	.3428**	-.1066
	(.0321)	(.2006)	(.0473)	(.2549)
Health prof.	.4376**	.4616*	.2039**	.0146
	(.0325)	(.2243)	(.0276)	(.6854)
Technician	.2603**	.1033	.1631**	-.0849
	(.0352)	(.1752)	(.0183)	(.1250)
Community and personal service	.2528**	.2149	.2252**	.0926
	(.0311)	(.1641)	(.0178)	(.1387)
Carer	.0337	.2557	.0429*	.1645
	(.0333)	(.1823)	(.0187)	(.1509)
Office manager	.3174**	.4260*	.3048**	.2844
	(.0344)	(.1814)	(.0206)	(.1642)
Personal assistant	.3361**	.4118*	.3189**	.2943
	(.0350)	(.1985)	(.0212)	(.1548)
General clerk	.1728**	.3210	.2029**	.2634
	(.0345)	(.2346)	(.0192)	(.1853)
Receptionist	.1206**	.0796	.1394**	.3561
	(.0357)	(.3304)	(.0198)	(.3018)
Numerical clerk	.2789**	.3739*	.2704**	.1691
	(.0337)	(.1831)	(.0337)	(.1491)
Sales assistant	.0612	.0643	.0405	.0333
	(.0379)	(.1855)	(.0210)	(.1572)
Sales worker	.3369**	.6083**	.2691**	.5203**
	(.0357)	(.1949)	(.0224)	(.1532)
Machinery operator	.1644**	.0509	.1630**	-.0443
	(.0545)	(.3300)	(.0292)	(.2034)
Born in an English speaking country	.0092	-.0066	-.0053	.1352*
	(.0128)	(.0686)	(.0117)	(.0647)
Born in a non-English speaking country	-.1161**	-.1981**	-.0354**	-.0091
	(.0124)	(.0601)	(.0119)	(.0616)
Location of residence				
Other NSW	-.0507**	-.1026	-.0832**	-.1327
	(.0170)	(.0938)	(.0128)	(.0726)
Melbourne	-.0983**	-.0666	-.0688**	-.1397*
	(.0127)	(.0722)	(.0116)	(.0697)
Other Vic.	-.1980**	-.2541**	-.1258**	-.2087**
	(.0185)	(.0936)	(.0149)	(.0802)
Brisbane	-.1434**	.0463	-.1223**	-.1187
	(.0164)	(.1012)	(.0138)	(.0845)

	Diploma		Certificate	
Females	Employees[a,b]	Self-employed[c]	Employees[a,b]	Self-employed[c]
Other Qld	-.1947**	-.1293	-.1484**	-.2506**
	(.0157)	(.0802)	(.0123)	(.0666)
Adelaide	-.1156**	-.0640	-.0778**	-.0810
	(.0193)	(.1130)	(.0158)	(.0968)
Other SA	-.1422**	-.3059	-.1595**	-.3755**
	(.0382)	(.1596)	(.0260)	(.1237)
Perth	-.1393**	-.0349	-.1299**	-.0928
	(.0177)	(.0959)	(.0156)	(.0975)
Other WA	-.1804**	-.1577	-.1290**	-.1891
	(.0332)	(.1319)	(.0230)	(.1200)
Tas.	-.1684**	.1920	-.1392**	-.2764
	(.0313)	(.1715)	(.0230)	(.1421)
NT	-.1064**	.3145	-.0788**	.0043
	(.0432)	(.2179)	(.0301)	(.2116)
ACT	-.0255	-.1166	.0199	-.1433
	(.0301)	(.2358)	(.0261)	(.1681)
1–19 employees		.2638**		.2538**
		(.0513)		(.0442)
20+ employees		.6662**		.6780**
		(.1279)		(.1181)
Constant	5.3542	4.8018	5.3593**	5.8397**
	(.0634)**	(.4208)**	(.0434)	(.3375)
Number of observations	8 582	1 075	10 884	1 265
R^2	0.2863	0.1696	0.2587	0.1508

Notes: a The base case is a female who is not married, Australian born, lives in Sydney and is occupied as a labourer.

b * indicates significant at the 5% level; ** significant at the 1% level.

c The base case is a female who is not married, Australian born, lives in Sydney, is occupied as a labourer and had no other employees in the business.

Source: ABS 5% sample of the 2006 Census of Population and Housing.

Table 9 presents some illustrative calculations of predicted incomes for males and female sales workers, an occupation that has a substantial number of both males and females. Incomes have been predicted assuming that the person was 40, married, Australian born and lived in Sydney in an area with an unemployment rate of 5.2%. To facilitate comparisons between groups, females have been assumed to have no children and the self-employed to have no other employees. The results show the highest predicted incomes for male employees with a diploma and the lowest for the female self-employed with a diploma. Employees were predicted to earn more than the self-employed, except for female employees with a certificate. The incomes calculated here are gross incomes. Incomes net of tax may rank the outcomes differently. The results, however, suggest that the self-employed are willing to sacrifice money income for the perceived benefits of self-employment and raise the question of whether the returns from entrepreneurial talent and managerial skills are greater in self-employment than from being an employee.

Table 9 Illustrative predicted incomes, sales worker, aged 40, married, Australian born, living in Sydney, area unemployment rate of 5.2%.

	Diploma employee $	Diploma SE $	Certificate employee $	Certificate SE $
Male	1373.20	980.26	1110.07	1053.44
Female	1061.44	872.60	928.77	1015.63

Note: SE = self-employed.

Summary and conclusions

The 5% sample of the Census of Population and Housing offers a rich data source for investigating the position of people with vocational qualifications in the Australian labour market. While it does not include all the detail on qualification levels available in the ABS Survey of Education and Training and there are limitations in the data, described above, it does contain more information on a range of key variables unavailable elsewhere, such as occupation and location of residence, and these are important determinants of income and employment status. The relatively large sample size makes it possible to disaggregate the data further than is possible in most sample surveys.

The results presented here show that the incidence of self-employment varies according to demographic characteristics, occupation and location of residence. Males are more likely to be self-employed if they are older, married and born in a non-English speaking country. Higher unemployment rates in an area discourage both males and females from becoming self-employed. This is consistent with the hypothesis that people are more likely to become self-employed in a buoyant labour market than in response to rising unemployment. There were additional effects of location on the decision to become self-employed. Evidence from other studies suggests that the self-employed are less geographically mobile than employees. According to the 2006 census, the self-employed are more likely to live outside the major capital cities than were employees. Additional incentives may be required to encourage this group to shift their location of residence to areas of higher demand for vocational skills.

It is perhaps not surprising to find that both male and female managers are more likely to be self-employed than were those in other categories of occupation, although there were other occupations where self-employment was important. These included construction occupations for males and hospitality managers for females. These results indicate the importance of incorporating preparation for self-employment and running a business in the training for particular occupations, for example, in construction occupations and hospitality.

Many of the factors that influenced the decision to become self-employed were also relevant to the incomes of full-time workers. As preliminary investigations showed that the size of these effects differed in statistically significant ways for diploma holders compared with certificate holders and the self-employed compared with employees, it was decided to investigate the determinants of full-time income separately for each of these groups for males and females.

The age–income profiles were steeper for employees than for the self-employed, except for females with diplomas. This may reflect greater on-the-job training for employees than for the self-employed, but it may also reflect the effects of asymmetric information in the labour market for employees. Where employers have limited information in the short-term on worker productivity, they may construct pay scales that reflect seniority in order to encourage commitment to the firm. The self-employed do not face this problem as they know their own commitment to the firm and therefore have less incentive to base income on seniority. This is one possible explanation for the flatter income profiles of the self-employed. In addition, the rewards for unmeasured characteristics such as entrepreneurial skills and motivation may be less age-related than the rewards for experience, including managerial skills, as employees are promoted to more senior levels in a firm.

These results show that people from non-English speaking countries had lower incomes on average than the Australian-born. This may reflect a number of factors, including difficulties in getting

qualifications recognised, unfamiliarity with the Australian labour market institutions and possible discrimination. In contrast, those born in English-speaking countries had significantly higher incomes than the Australian-born, according to the coefficients estimated in most of the male but not female regressions.

The income benefits of completing a vocational qualification varied according to the occupation of employment, used here as an indicator of the type of qualification. There was greater variation in full-time income for employees than for the self-employed by occupation. White-collar occupations tended to have higher incomes than blue-collar occupations. Males working in food occupations had substantially lower incomes than other males with vocational qualifications. These differences may reflect variation in the accumulation of the human capital skills used in different occupations and/or the compensating differentials associated with different levels of responsibility and risk in different occupations.

Incomes were lower where unemployment was higher. Other locational factors also influenced income. Incomes were lower for male and female employees outside Sydney but there were fewer statistically significant differences for the self-employed. One interesting result from this study was the significantly higher incomes for male employees with certificates working in Western Australia outside Perth and in the Northern Territory compared with Sydney, holding other things constant. This result was not found for other non-metropolitan areas and may reflect the role of the mining industry in these areas. Some international evidence shows that employees are more geographically mobile than the self-employed (Blanchflower 2000). There may be more real income benefits for an employee to relocate in Australia than a self-employed person, so this finding may also apply in Australia.

People with vocational qualifications represent the largest group of workers with post-school qualifications in the Australian labour market. This paper was a preliminary attempt to investigate two important questions relating to this group: the choice of self-employment compared with waged employment, and the determinants of income.

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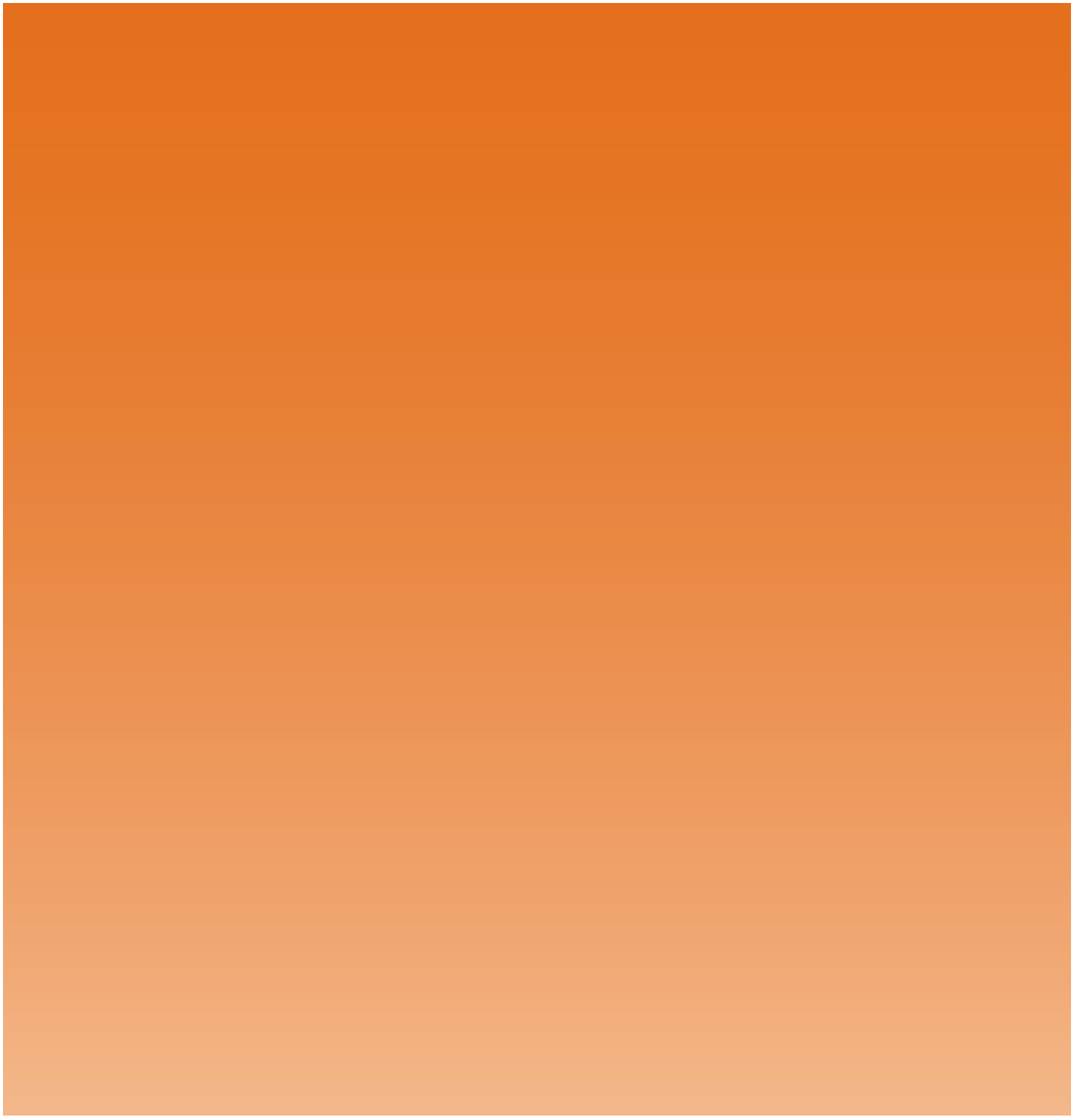
Appendix

Table A.1 Probit equation on the determinants of self-employment

Males	Coefficients[b, c]	Females	Coefficients[b, c]
Age	.0882**	Age	.0584**
	(.0037)		(.0057)
Age^2	-.0008**	$Age^2/100$	-.0005**
	(.0000)		(.0001)
Married and de facto	.2014**	Married and de facto	.2937**
	(.0127)		(.0188)
Children		Children	.0840**
			(.0074)
Area unemployment rate	-.0290**	Area unemployment rate	-.0148*
	(.0049)		(.0075)
Occupation		Occupation	
Manager	.7265**	Manager	.7017**
	(.0233)		(.0470)
Specialist manager	.2561**	Hospitality manager	.8182**
	(.0239)		(.0488)
Professional	-.0266	Other professional	.6233**
	(.0233)		(0526)
Technician	.2774**	Business prof.	.1149**
	(.0265)		(.0544)
Engineering ICT	-.3962**	Education prof.	-.3463**
	(.0333)		(.0552)
Automotive	-.1017**	Health prof.	-.7170**
	(.0223)		(.0607)
Construction	.9810**	Technician	.6786**
	(.0223)		(.0440)
Telecommunications	.1620**	Community and personal Service	.1114**
	(.0256)		(.0437)
Food	-.1946**	Carer	-.5145**
	(.0388)		(.0492)
Protective services	-1.1378**	Office manager	.0793
	(.0624)		(.0541)
Clerical	-.5255**	Personal assistant	.2739**
	(.0316)		(.0525)
Sales assistant	-.0946*	General clerk	-.1488**
	(.0395)		(.0528)
Sales worker	.0279	Receptionist	-.7446**
	(.0359)		(.0725)
Machinery operator	-.3810**	Numerical clerk	.3551**
	(.0415)		(.0474)
Stationery machine operator	-.8176**	Sales assistant	-.0125*
	(.0503)		(.0541)
Driver	-.0102	Sales worker	.0321
	(.0325)		(.0584)
		Machinery operator	.0300
			(.0849)
Born in an English speaking country	-.0991**	Born in an English speaking country	-.0227
	(.0166)		(.0263)
Born in a non-English speaking country	.0408**	Born in a non-English speaking country	.1222**
	(.0176)		(.0254)
Location of residence		Location of residence	
Other NSW	.0740**	Other NSW	.0872**
	(.0208)		(.0321)
Melbourne	-.0376**	Melbourne	-.0210
	(.0185)		(.0278)

Males	Coefficients[b, c]	Females	Coefficients[b, c]
Other Vic.	.0063 (.0219)	Other Vic.	.0706* (.0344)
Brisbane	-.1104** (.0229)	Brisbane	-.0527 (.0345)
Other Qld	-.0248 (.0197)	Other Qld	.1334** (.0299)
Adelaide	-.1148** (.0268)	Adelaide	-.0729 (.0402)
Other SA	.0471 (.0376)	Other SA	.2466** (.0552)
Perth	-.0481* (.0245)	Perth	-.0728* (.0374)
Other WA	-.1152** (.0336)	Other WA	.1721** (.0526)
Tas.	-.0865* (.0392)	Tas.	-.0952 (.0609)
NT	-.2253** (.0552)	NT	-.0904 (.0893)
ACT	-.2163** (.0491)	ACT	-.3067** (.0708)
Constant	-2.9164** (.0806)	Constant	-2.9454** (.1250)
Number of observations	72 578	Number of observations	42 308
Log-likelihood	-37 261.35	Log-likelihood	-15 135.176
Pseudo R^2	0.1279	Pseudo R^2	0.1310
Predicted probability at mean[a]	.2446	Predicted probability at mean	.1105

Notes: a The base case is a person who is not married, Australian born, lives in Sydney and is occupied as a labourer.
b * indicates significant at the 5% level; ** significant at the 1 % level.



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