

Underemployment in Australia: Evidence from the HILDA Survey

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Abstract

Underemployment is generally conceived as excess labour supply associated with employed persons – that is, as a situation where employed persons would like to work more hours at prevailing wage rates. Using information collected by the 2001 Household Income and Labour Dynamics in Australia (HILDA) survey, this study seeks to investigate the *extent* of underemployment, its *effects* on outcomes such as income, welfare dependence and subjective well-being, and the *factors* associated with underemployment.

It is found that over one in six employed persons is underemployed, corresponding to a failure to utilise 5 per cent of hours supplied by employed persons. Underemployment is more frequently associated with part-time employment for females, but for males is in fact more frequently associated with full-time employment.

In terms of effects on outcomes, while unemployment clearly has greater adverse consequences than underemployment, significant detrimental effects of underemployment are nonetheless evident. As might be expected, adverse effects are most pronounced for underemployed *part-time* workers, but negative effects are also evident for underemployed males who are employed full-time.

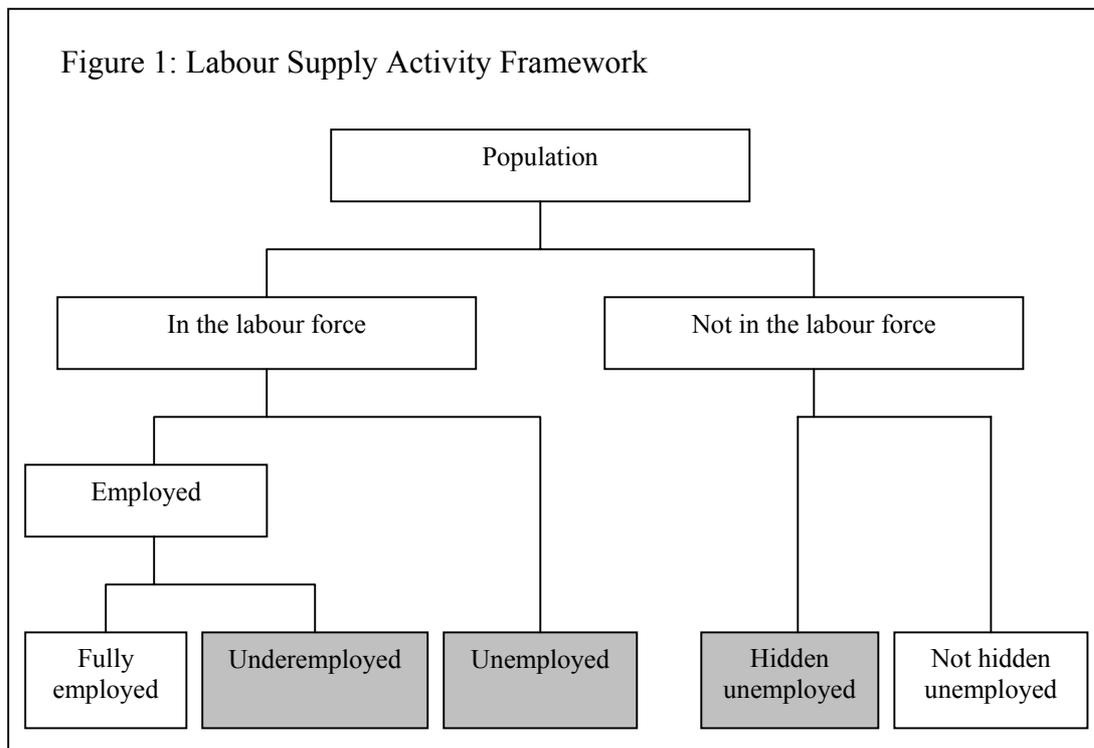
Findings obtained on the factors associated with underemployment show that underemployment has many predictors in common with unemployment. There are, however, two important differences. First, effects on underemployment attributable to family type and number of dependent children are found that do not exist for unemployment. Second, the number of jobs held in the preceding year has a negative effect on the probability of unemployment, but a positive effect on the probability of underemployment – thus, more jobs in the recent past is helpful for avoiding unemployment, but appears to reflect difficulty finding ‘good’ employment.

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1. Introduction and Motivation

It is widely acknowledged that the unemployment rate understates the extent to which labour is ‘underutilised’ (e.g. Ross (1985), Bosworth and Westaway (1987), Bregger and Haugen (1995), Mitchell and Carlson (2001), Denniss (2003)). An important component of underutilisation that is not captured by unemployment statistics is underemployment, which occurs when employed persons would like to work more hours at the prevailing wage rates than they actually work.¹ At a fundamental level, therefore, the study of underemployment is important for its contribution to understanding the true extent of excess supply (or ‘underutilisation’) of labour.

Figure 1 presents a conceptual framework for labour market activity which shows the three main components of (time-related) labour underutilisation: underemployment, unemployment and hidden unemployment. All three groups represent individuals who would like to work more hours at prevailing wage rates. The underemployed are distinguished from the unemployed by the fact that at least some employment is held. Both the underemployed and unemployed are distinguished from the hidden unemployed by the fact that they are in the labour force – the hidden unemployed are not in the labour force because of perceptions that gaining employment is unlikely.



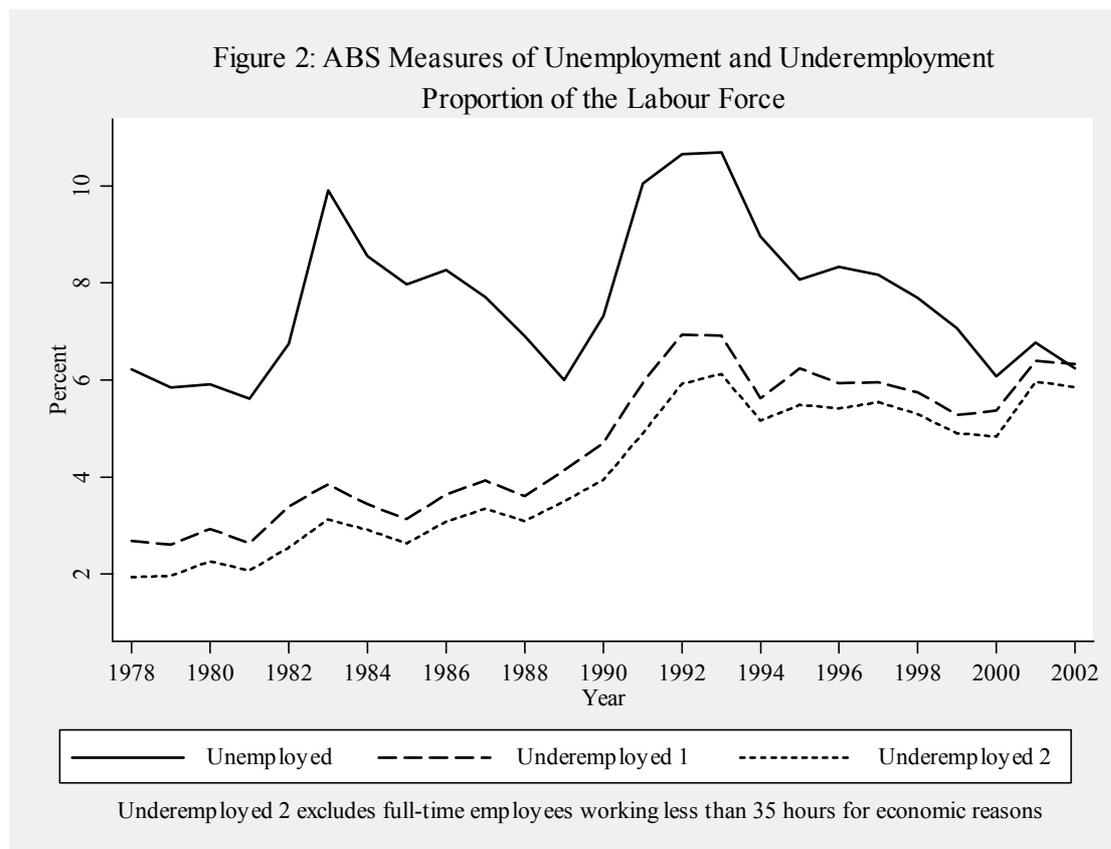
The Australian Bureau of Statistics (ABS) has produced information on the extent of underemployment in each year since 1978 as part of its labour force survey (Catalogue No. 6203.0). The ABS measure includes:

- persons who normally work less than 35 hours per week who would prefer to work more hours (part-time underemployed); and

¹ In this paper the narrow ‘time-related’ definition of underemployment (ILO, 1998) is adopted, excluding, for example, inadequate use of worker skills. See Section 4 for further discussion of this issue.

- persons who normally work 35 or more hours per week but did not work 35 or more hours in the reference week for ‘economic’ reasons, which comprise ‘stood down’, ‘short time’ and ‘insufficient work’ (full-time underemployed).²

Figure 2 presents ABS estimates of the proportion of the labour force unemployed and underemployed in each year from 1978 to 2002 (August each year until 1993, September each year thereafter). It indicates that the proportion underemployed has converged over the period to the proportion unemployed – that is, the number underemployed is now as large as the number unemployed. Thus, underemployment appears to be a growing problem relative to unemployment. Note, however, that the extent of excess supply represented by underemployment is still likely to be smaller than that represented by unemployment, since the shortfall of actual hours of work from desired hours is likely to be greater on average for the unemployed.³



Source: ABS Cat No. 6203.0

² Note that this measure restricts underemployment to those working less than 35 hours per week. Statistics produced by the ABS over the period 1966 to 1977 on ‘reasons for working less than 35 hours per week’ also allow construction of an underemployment measure over this period. This measure is, however, different to the ABS measure that has been applied since 1978. The measure available prior to 1978 is number/proportion of persons who ‘normally work part-time, but prefer to work 35 or more hours’. This therefore excludes part-time workers who prefer more hours, but not as many as 35 hours, and full-time workers who are temporarily working less than 35 hours for ‘economic’ reasons. (The information on the reasons for working less than 35 hours for full-time employees does not permit identification of ‘economic’ reasons.) An irregular publication ‘Underemployed Workers, Australia’ (Cat. No. 6265.0), providing information on the characteristics of underemployed workers, was first published for May 1985 data. The ABS released subsequent issues for May 1988 and May 1991. The publication became a regular (annual) publication in 1996, and has been produced for September of each year from 1996 to 2002.

³ The HILDA 2001 survey shows that it is in fact the case that the shortfall of hours worked is on average greater for the unemployed. See Section 5.

Although the Labour Force Survey suggests underemployment is widespread, an important question is “how concerned should we be about underemployment vis-à-vis unemployment?” The underemployed are clearly very different from the unemployed in that they already have a foothold in the labour market and are earning wage and salary income. But, in other respects, are the underemployed more like the employed or more like the unemployed? The policy significance of underemployment is greater the more it is associated with the low incomes, high rates of welfare receipt and other adverse outcomes that are in evidence for the unemployed. If, on the other hand, the underemployed tend to reside in high income households and experience outcomes more like those experienced by the employed than by the unemployed, policy concern is reduced compared with concern for the unemployed.

Given that underemployment is of at least some policy concern, a further line of inquiry takes on interest, which is the factors associated with underemployment – that is, the predictors of underemployment. This line of inquiry is particularly of interest for whether the factors associated with underemployment differ significantly from those for unemployment, in which case policies to address unemployment may not assist all underemployed persons.

In light of these issues, using information collected by the 2001 Household Income and Labour Dynamics in Australia (HILDA) survey, this study seeks to assess the extent, significance and factors associated with underemployment in Australia. Specifically, the following questions are investigated:

1. What is the *extent* of underemployment? How many people are underemployed, and what is the extent of underemployment of the underemployed?
2. What is the *effect* of underemployment on outcomes? How do outcomes such as incomes, health, life satisfaction, quality of working life and income support use for the underemployed compare with outcomes of the unemployed and the employed?
3. What are the *factors* associated with underemployment? What characteristics are associated with being underemployed? Which groups in the community are most severely affected?

The first two lines of inquiry involve ascertaining the significance of the problem of underemployment by examining, first, its pervasiveness and extent, and second, the outcomes associated with underemployment. The third question addresses who is affected by underemployment by exploring the relationship between characteristics and underemployment. The population examined is restricted to persons aged 15-64 years, interpreted as the workforce-age population. Furthermore, all of the analysis in this study is undertaken for males and females separately, on the basis that the effects of underemployment and the factors associated with underemployment are likely to be quite different for males and females.

The plan of the remainder of the paper is as follows. Section 2 briefly reviews the literature, Section 3 discusses the dataset used, while Section 4 then discusses, in light of the previous literature and available data, the adopted definition (and associated measures) of underemployment. The empirical results are presented in Sections 5 to 7. Descriptive statistics on the extent of underemployment are presented in Section 5. Regression analysis is then undertaken of the effects of underemployment on outcomes (Section 6) and of the factors associated with underemployment (Section 7). Section 8 concludes.

It is found that over one in six employed persons is affected by underemployment, with the majority of these employed part-time. Underemployment is more frequently associated with part-time employment for females, but for males is in fact more frequently associated with full-time employment. In terms of the extent of underemployment among the underemployed, part-time workers who are underemployed on average desire 13 more hours of work per week, while underemployed full-time workers on average desire just over 9 more hours.

Models estimated of the effects on underemployment of measures of income support receipt, income unit income, personal income and life satisfaction show that underemployment for part-time employed females is associated with significant negative effects for all four outcomes, while underemployment of full-time workers is not associated with any significant effects for females. For males, significant negative effects of part-time worker underemployment are evident for income support receipt and life satisfaction, while significant negative effects of full-time worker underemployment are found for life satisfaction and personal income. All negative effects attributable to underemployment are however, generally much smaller than those attributable to unemployment. Outcome models estimated on employed persons also show that part-time underemployment is associated with lower job satisfaction for both males and females.

Models of the factors associated with underemployment show that underemployment and unemployment have many predictors in common. Important differences do arise, however, with respect to income unit type, number of dependent children and number of jobs held in the preceding financial year. Income unit type and number of dependent children do not affect the probability of unemployment, but do affect the probability of underemployment. These effects possibly reflect labour supply preferences associated with family commitments, rather than labour demand constraints. The number of jobs held has a negative effect on the probability of unemployment, but a positive effect on the probability of underemployment – thus, more jobs in the recent past is helpful for avoiding unemployment (or reflects characteristics that help avoidance of unemployment), but appears to reflect difficulty finding ‘good’ employment.

2. Background Discussion

Although underemployment represents excess supply in the labour market which is not identified by standard labour market statistics, the problem of underemployment has long been recognised. The concept was ‘accepted’ by the Sixth International Conference of Labour Statisticians (ICLS) in 1948, and a resolution formally defining underemployment was adopted at the Eleventh ICLS in 1966. Correspondingly, since 1966 the ABS has produced statistics based on the notion that underemployment exists, beginning with identifying part-time workers who would prefer to work full-time in the August 1966 Labour Force Survey.

Research on underemployment Australia in fact has its origins with the ABS (1984), who attempt to document trends in the proportion of the labour force underemployed between 1966 and 1983 based on the information collected in the ABS Labour Force Survey. The ABS estimates show a trend increase between 1966 and 1983 in the proportion of the labour force that is underemployed. Since then, others to have produced estimates of the extent of underemployment in Australia include Ross (1985), Bosworth (1986), Bosworth and Westaway (1987), Wooden (1993, 1996), Denniss (2001) and Mitchell and Carlson (2001). Most of these studies have been primarily concerned with obtaining a more accurate picture of the extent of labour underutilisation than is provided by official unemployment rate statistics. All use ABS published data to measure underemployment, and those that examine trends over time therefore concur with the evidence presented in Figure 1 of a trend increase in underemployment.

In addition to measuring the extent of underemployment, Wooden (1993) also describes the key characteristics of the underemployed using unit record data from the May 1991 Labour Force Survey. He finds the underemployed were, compared with the fully employed, more likely to be female, young (less than 25 years of age), single and a non-English speaking background (NESB) immigrant. The probability of being underemployed was also higher for persons working in less skilled occupations (sales and personal service workers, plant and machine operators, labourers and related workers) and for those working in the recreation and personal services and construction industries. Wooden (1996) builds on Wooden (1993) by looking at *changes* in the characteristics of underemployed workers between 1985 and 1995 using aggregate ABS data (published in 1985 and 1995 as ‘Underemployed Workers, Australia’). He

finds increases in the proportion who are over 45 years of age, NESB immigrants and males. He also estimates the implications of the existence of underemployment and hidden unemployment for the relationship between output growth and the unemployment rate.

International research has, like the Australian research, attempted to document trends in the extent of underemployment (e.g. Bregger and Haugen (1995), Sorrentino (1995)) and examine the factors associated with, or determinants of, underemployment (e.g. Leppel and Clain (1988), Ruiz-Quintanilla and Laes (1996)). Research has also attempted to account for underemployment in models of labour supply in order to accurately infer labour supply elasticities (the responsiveness of labour supply to changes in wage rates) (e.g. Ham (1982), Kahn and Lang (1991), Dickens and Lundberg (1993), Stewart and Swaffield (1997)).

The contribution of this study to existing research derives from using an alternative data source to the ABS Labour Force Survey, the HILDA 2001 survey. First, in addition to examining the extent of underemployment as measured by the ABS, this study also considers a broader notion of underemployment which includes persons working full-time hours. Second, the HILDA survey collects information on a wide range of characteristics and outcomes of respondents, allowing more comprehensive study of both the consequences of underemployment for the underemployed and the factors associated with underemployment than was possible for Wooden (1993, 1996). This study is therefore able to make a significant contribution to our understanding of the significance and nature of the problem of underemployment in Australia.

3. The HILDA Survey Data

The Household, Income and Labour Dynamics in Australia (HILDA) Survey, described in Watson and Wooden (2002), is a nationally representative household panel survey. The first wave, data from which is used in this study, was conducted in 2001, seeking information about all members of sampled households, and specifically seeking personal interviews with all household members who turned 15 years of age prior to 1st July 2001. Completed interviews with all eligible members were obtained for 6,872 households, out of a total of 11,693 households selected for inclusion in the sample. Interviews with at least one eligible household member were obtained for a further 810 households. The result is (at least partial) data on 13,969 persons aged 15 years or more, 11,920 of whom are aged less than 65 years.⁴

The first wave of the HILDA survey collected information on a wide range of personal and household characteristics, including income; sources of income; labour force and employment status; hours of employment; industry and occupation of employment; trade union membership status; tenure with current employer; employer characteristics; labour force history; educational attainment; family circumstances; health; country of birth; and, if born outside Australia, year of arrival in Australia. It also obtained from respondents their views or opinions on a wide range of issues, including satisfaction with life circumstances, satisfaction with employment circumstances and attitudes to work and gender roles, the respondent's job and workplace, and parenting. Importantly for the purposes of this study, the data collected include, in addition to information on actual hours of paid work, information on preferred hours of work, making possible the construction of measures of underemployment.⁵

⁴ There are 5948 enumerated persons for whom no person records are available (non-respondents). Of these, 4317 are aged 0-14 years and are therefore out of scope; the remainder are actual non-respondents. Information on the existence of these individuals was used, however, in generating information about household, family and income unit characteristics.

⁵ The unit record file contains 'responding person population weights' which are set according to external population benchmarks (and discussed in detail in Watson and Fry (2002)). These are used in all of the analysis in this study.

4. The Definition of Underemployment

Given the parallels between underemployment and unemployment – both corresponding to forms of excess labour supply – a logical starting point for a definition of underemployment is one that is consistent with the definition of unemployment:

Underemployment Definition 1: Underemployment occurs when employed persons would like to work more hours at the prevailing wage rates than they actually work, and are available to work those additional hours.

This definition approximately corresponds to what the International Labour Organization (ILO) calls ‘time-related’ underemployment, the measure of underemployment adopted at the Sixteenth ICLS (ILO, 1998).⁶ It is not, however, entirely consistent with the ILO (1998) definition.

According to this definition, persons in time-related underemployment comprise all persons in employment who satisfy the following three criteria during the reference period used to define employment:

1. Willing to work additional hours, i.e. wanted another job (or jobs) in addition to their current job (or jobs) to increase their total hours of work; to replace any of their current jobs with another job (or jobs) with increased hours of work; to increase the hours of work in any of their current jobs; or a combination of the above;
2. Available to work additional hours, i.e. are ready, within a specified subsequent period, to work additional hours;
3. Worked less than a threshold relating to working time, i.e. persons whose hours actually worked in all jobs in the reference period, were below a threshold, to be chosen according to ‘national circumstances’.

This definition does not require that workers desire more hours at prevailing wage rates, although this condition might be considered implicit. Furthermore, the third requirement, that a worker be working less than a chosen threshold, is not implied by *Definition 1* given above. The logic for this requirement appears to be that underemployment is only likely to be associated with the adverse consequences associated with unemployment when hours worked are less than some norm. Defining this norm is a potentially difficult task, but a common approach is to adopt full-time hours (35 or more hours per week) as the threshold (e.g. this is the ABS approach), implying full-time workers cannot be underemployed. For this reason, underemployment is often referred to as ‘involuntary part-time employment’ by researchers in the field (e.g. Bednarzik (1975), Leppel and Clain (1988) and Jacobs (1993)).

The HILDA survey asks all employed persons how many hours they usually work per week in all jobs (usual actual hours), and, furthermore, how many hours per week they would like to work, taking into account the effect this would have on their income (desired hours). Attempting

⁶ The ILO distinguishes underemployment associated with insufficient hours of work (time-related underemployment) from other forms of ‘inadequacy of employment situations’. Inadequate employment situations comprise ‘...situations in the workplace which reduce the capacities and well-being of workers compared to an alternative employment situation’ (ILO (1998)). This is an exceptionally vague notion, although the ILO describes some specific situations that might be considered inadequate employment situations, including: inadequate use of occupational skills; excessive hours of work; inadequate tools, equipment or training for the assigned tasks; travel to work difficulties; inconvenient work schedules; and recurring work stoppages because of delivery failures of raw material or energy. The ILO currently has the position that ‘...the statistical definitions and methods necessary to describe such situations still have to be developed further’ (ILO (1998)). Prior to the ICLS 1998, the ILO definition of underemployment was that adopted by the ICLS 1966. This definition distinguished ‘visible’ underemployment from ‘invisible’ underemployment. ‘Visible’ underemployment approximately corresponds to ‘time-related’ underemployment. ‘Invisible’ underemployment comprises workers employed in jobs not making full use of the skills held by the workers (because the job itself is low skill and/or the worker is idle part of the time), and is therefore a subset of ‘inadequate employment situations’. See ILO (1990) for further details on visible and invisible underemployment.

to remain consistent with the ILO definition where possible, this information makes possible the following definition of underemployment when using the HILDA data:

Underemployment Definition 2: Underemployment occurs when employed persons who usually work less than 35 hours per week would like to work more hours than they currently usually work.

This is broadly consistent with established standards (and also ABS practice), but has several weaknesses:

- It will potentially include people who express a preference for more hours of work, but are not in fact *available* to work more hours. For example, workers who work fewer hours than desired because of ill health or family commitments are not truly underemployed. If an individual would like to work more hours but chooses not to supply them because of reasons such as these, then they are not constrained by inadequate labour demand, which is the principle underpinning the concept of underemployment. The survey does not ask workers if they are available to work additional desired hours of work. Therefore, we are unable to impose this requirement (of both *Definition 1* and the ILO's definition) on a measure of underemployment based on the HILDA data. This is potentially an important weakness.⁷
- It excludes full-time workers who are temporarily working less than 35 hours for economic reasons. This is because the HILDA survey collects information on *usual* hours of work, not hours in the survey week (or, to be consistent with the ILO definition, during the reference period used to define employment). However, as Figure 1 shows, this is a relatively small component of underemployment.
- It potentially includes worker who would like to work more hours, but only at higher wage rates than on offer. For underemployment to represent excess labour supply requires workers to prefer more hours *at prevailing wage rates* (which is not a requirement of the above definition). This is, however, consistent with the usual practice internationally.
- It excludes full-time workers who would like more hours. This is based on the ILO requirement that, for a worker to be regarded as underemployed, actual hours need to be less than the 'normal' duration. In this paper, 'normal' has been assumed to be 35 hours per week. There is, however, no reason in principle to exclude persons working 35 or more hours per week, and the ILO definition therefore does not seem appropriate on this count. If a worker wants more hours, this constitutes a situation of excess supply of labour, and it arguably should not matter what is the 'normal' duration of work. Exclusion appears to be based on a judgement about the relative social welfare costs of underemployed full-time workers vis-à-vis underemployed part-time workers. To some extent, this is assuming the outcome which this study seeks to investigate – the consequences of underemployment. For this reason, underemployment of full-time workers is also investigated in this study.⁸

Two other issues with respect to the definition of underemployment warrant mention. First is that measures of underemployment are likely to be sensitive to the time frame over which underemployment is measured. For example, results will likely differ if the time frame is one week versus one year. The nature of the HILDA survey data creates a somewhat indistinct time frame, since respondents are asked about *usual* weekly hours, and whether they would like to work more hours than this. While usual weekly hours may be a well-defined concept for many workers, it may be ambiguous for respondents with variable hours, and the time frame over which such respondents construct their notions of 'usual' is likely to vary across respondents. A second issue is that Wave 1 of the HILDA survey was conducted in the third and fourth quarters

⁷ Indeed, if we were to apply the same standards to underemployment as applied to unemployment, we would require not only availability to take on additional hours, but also active search for those additional hours.

⁸ Also note that the ILO (1998) does suggest that information should be collected on full-time workers who express a preference and availability for more hours, implying this is in fact of interest to studies of labour underutilisation.

of 2001. We should therefore note the potential for seasonal factors to impact on underemployment measures, and on the outcomes and factors associated with underemployment.

4.1. Measures of Underemployment

There are two main approaches to measuring underemployment:

1. Headcount measures (number of persons underemployed)
2. Volume measures (number of hours of underemployment)

Headcount measures provide information about the *pervasiveness* of underemployment (how many people are affected), while volume measures provide information about the *extent* of underemployment (how many hours of supplied labour are not utilised because of underemployment). Estimation of volume measures are possible using the HILDA survey data, because the unit record file contains data on both actual and preferred working hours of all those in employment (both full-time and part-time employed). Underemployment measures are most informative if expressed as relative measures, which is the approach adopted in this report. For example, the volume measure can be represented as:

$$V = \frac{\sum_{i=1}^n U_i}{\sum_{i=1}^n S_i} \tag{4.1}$$

where U_i is the number of hours of underutilisation of individual i and S_i is the preferred ('supplied') number of hours of work of individual i . The definitions of both U and S can be varied to produce different volume measures, the main constraint being that U should be a subset of S . For example, U could be 'additional hours wanted by part-time workers', and S 'total desired hours of part-time workers' or 'total desired hours of all workers'; or U might be 'additional hours wanted by part-time workers up to a maximum of 35 per week, inclusive of hours already being worked', and S might then be 'hours desired by employed persons, up to a maximum of 35 per week'.⁹

Statistics presented comprise the mean proportion of persons underemployed, the proportion of supplied hours that are not utilised because of underemployment, and the mean, median, standard deviation and inter-quartile range of the number of hours of underemployment (among the underemployed). Distributional features other than the mean are of some interest for volume measures of underemployment. In particular, the degree of dispersion of the extent of underemployment among the underemployed is considered via the standard deviation and inter-quartile range.

5. Descriptive Statistics

5.1. The Extent of Underemployment

Table 5.1 presents statistics on the proportion of individuals who express a desire to work a different number of hours of work than currently being worked (and who are at least marginally attached to the labour force). This is not intended to provide information on the extent of underemployment, but rather provide a context, in terms of preferences over working time, for the measures of underemployment presented. Over 45 per cent of persons aged 15 to 64 years express a preference for working different hours than they are currently working. Females are

⁹ Note that for volume measures, underemployment is set equal to zero for employed persons who desire fewer hours than usually worked (the overemployed).

more likely than males to prefer more hours, while males are more likely than females to prefer fewer hours.¹⁰

Table 5.1: Persons who want more hours and persons who want fewer hours – Workforce age persons – Proportion of the population and proportion of employed persons (%)

	Underutilised		Overemployed	
	Males	Females	Males	Females
<i>Population aged 15-64 years</i>				
<i>All persons</i>	25.1 (0.40)		20.4 (0.37)	
By sex	23.7 (0.56)	26.6 (0.56)	23.7 (0.56)	17.1 (0.48)
<i>Employed persons aged 15-64 years</i>				
<i>All</i>	15.9 (0.55)	17.2 (0.60)	30.6 (0.69)	27.3 (0.71)
By employment type:				
Full-time	9.4 (0.50)	4.9 (0.51)	35.9 (0.83)	43.2 (1.16)
Part-time	38.9 (2.94)	21.4 (1.30)	9.6 (1.77)	13.7 (1.09)
Casual	35.7 (1.73)	34.8 (1.43)	14.8 (1.28)	11.3 (0.95)

Notes: Standard errors in parentheses. *Underutilised*: Persons with a marginal or greater attachment to the labour force wanting more hours of work. *Overemployed*: Employed persons wanting fewer hours of work. A person is marginally attached to the labour force if he or she: (i) is not available to start work in the reference week, but wants to work and is actively looking for work; or (ii) is not actively looking for work, but wants to work and is available to start work within 4 four weeks. Among persons aged 15-64 years, 89.0% of males and 78.3% of females have a marginal or greater attachment to the labour force; and 83.6% of males and 66.6% of females are in the labour force.

Patterns for underutilisation and overemployment among employed persons are similar to those for all persons. The important difference is that the rate of underutilisation is almost 10 percentage points lower, while the rate of overemployment is somewhat higher, reflecting the fact that only employed persons can be overemployed. As might be expected, underutilisation is primarily associated with part-time or casual employment, while overemployment is primarily associated with full-time employment. Significantly, given full-time or part-time employment, males are more likely than females to prefer more hours, while females are more likely than males to prefer fewer hours. Among casual workers, males and females are similar in their propensity to prefer more hours, with more than one third stating they would like to work more hours. Casually employed males are, however, slightly more likely to prefer fewer hours (at 14 per cent of casually employed males, versus 11 per cent for females).

Table 5.2 presents estimates of time-related labour underutilisation of those with a marginal or greater attachment to the labour force, expressed as a proportion of the workforce-age population. Column (A) presents the total number underutilised, and columns (B) to (E) the components of column (A). Column (B) comprises persons marginally attached to the labour force, and column (C) comprises the unemployed. Column (D) approximately corresponds to the ABS (and ILO) definition of underemployment. Column (E) comprises full-time employed

¹⁰ Information gathered on preferred hours of work is different for non-employed persons to that gathered for employed persons. The non-employed are first asked their reservation wage and then asked how many hours they would like to work at that wage. Employed persons are asked their preferred hours of work, taking into account the effect this would have on their income, thereby implicitly obtaining their labour supply at their current wage rate. In general, we would expect the actual wage to exceed the reservation wage for the employed and be less than the reservation wage for the non-employed. If labour supply is increasing in the wage rate, this implies underutilisation is overstated for the non-employed relative to the employed.

persons who prefer to work more hours, and who might therefore be included in a broader notion of underemployment.

Table 5.2: Underutilisation, unemployment and underemployment among the workforce-age (15-64 years) population (%)

	(A) Underutilised	(B) Marginally attached & underutilised	(C) Unemployed	(D) PT & underemployed	(E) FT & underemployed
<i>Headcount measure</i>					
Persons	25.1 (0.40)	8.6 (0.26)	5.0 (0.20)	7.2 (0.24)	4.4 (0.19)
Males	23.7 (0.56)	5.4 (0.30)	6.0 (0.32)	5.5 (0.30)	6.8 (0.33)
Females	26.6 (0.56)	11.8 (0.41)	4.1 (0.25)	8.8 (0.36)	2.0 (0.18)
<i>Volume measure 1: Full-time workers can be underemployed</i>					
Persons	17.2 (0.37)	6.9 (0.25)	5.7 (0.27)	3.3 (0.14)	1.4 (0.08)
Males	14.1 (0.44)	3.9 (0.27)	6.2 (0.35)	2.3 (0.16)	1.8 (0.11)
Females	22.0 (0.59)	11.5 (0.48)	5.0 (0.36)	4.8 (0.24)	0.7 (0.09)
<i>Volume measure 2: Only part-time workers can be underemployed (a)</i>					
Persons	16.9 (0.36)	7.6 (0.28)	6.0 (0.27)	3.2 (0.13)	0
Males	13.2 (0.48)	4.4 (0.28)	6.6 (0.37)	2.2 (0.16)	0
Females	21.9 (0.62)	12.1 (0.48)	5.2 (0.36)	4.6 (0.24)	0
<i>Volume measure 3: Only part-time workers can be underemployed (b)</i>					
Persons	13.5 (0.33)	6.1 (0.22)	4.8 (0.22)	2.6 (0.11)	0
Males	10.1 (0.38)	3.4 (0.23)	5.1 (0.29)	1.7 (0.12)	0
Females	18.8 (0.56)	10.4 (0.44)	4.4 (0.32)	4.0 (0.20)	0

Notes: Standard errors in parentheses. Column (A) is comprised of the components in columns (B) to (E). *Volume measure*: Number of additional hours wanted as a proportion of total hours wanted by underutilised persons plus actual hours worked by other employed persons:

- *Volume measure 1*: Reported weekly preferred and actual hours are used for all persons with a marginal or greater attachment to the labour force.
- *Volume measure 2*: All full-time employees are assigned working time of 35 hours per week, regardless of working hours reported.
- *Volume measure 3*: Preferred weekly hours are at most 35, unless actual hours exceed 35, in which case preferred hours equal actual hours.

Underutilised: All persons who have a marginal or greater attachment to the labour force and want more hours of work; *Marginally attached & underutilised*: Persons who have a marginal attachment to the labour force and want more hours of work; *Unemployed*: Unemployed persons; *PT & underemployed*: All part-time employed persons who want more hours of work; *FT & underemployed*: All full-time employed persons who want more hours of work.

The top panel presents estimates for the headcount measure of underemployment and the lower three panels present estimates for volume measures. The headcount measure tells us the proportion of people who are underutilised (and what proportion is in each category of underutilisation), while the volume measure tells us the proportion of hours being ‘supplied’ that is not being utilised (and disaggregated by type of underutilisation), under the assumption that supply is equal to actual hours of employment for those not underemployed (i.e., there is no overemployment). The headcount measure is important because it tells us how many people are affected by underutilisation, including how many are in each type of underutilisation group. The

volume measures are, however, more informative in terms of the magnitude of underutilisation, and in particular the relative importance of the different types of underutilisation.¹¹

Three alternative volume measures are presented in Table 5.2. The first is a relatively ‘pure’ measure, equal to the difference between desired and actual usual hours for all employed persons who prefer more hours, expressed as a proportion of total desired hours of employed persons. The second and third measures assume only part-time workers can be underemployed, and constrain the extent of an individual’s underemployment to be at most 35 minus actual usual hours. The second measure expresses this part-time underemployment as a proportion of preferred hours of part-time workers plus actual hours of full-time workers, while the third measure expresses it as a proportion of preferred hours of part-time workers plus 35 for each full-time worker.

Volume measures are smaller than headcount measures for all groups other than the unemployed, reflecting the fact that marginally attached persons generally want fewer hours than are on average being worked by employed persons, and underemployed persons are partially employed. Unemployed persons generally want full-time employment, which corresponds to more hours than is on average worked by employed persons; consequently, the volume measure is greater than the headcount measure for the unemployed.

The volume measure estimates show that unemployment is, by a significant margin, the most important source of underutilisation of labour for males. However, it is worth noting that, alone, unemployment accounts for less than half of the underutilisation of male labour. For females, it appears that unemployment is a very poor indicator of the total extent of labour underutilisation, accounting for less than one quarter of the shortfall of actual hours from desired hours of employment. Underemployment among part-time employed females is almost as important as unemployment, while additional hours sought by marginally attached females are over double those sought by unemployed females. Total underutilisation is also over 50 per cent higher among females than males, at 22 per cent compared with 14 per cent.

The important impression from Table 5.2 is, therefore, that labour underutilisation is significantly greater than the unemployment rate leads us to believe, and is significantly greater for females than males. Caution is warranted, however, since we are unable to ascertain the extent to which family and other commitments are constraining hours of work, as opposed to insufficient labour demand. It may be that such constraints are more important for females, and the shortfall of actual hours from desired hours due to such factors does not in fact constitute true underemployment.¹²

Table 5.3 presents measures of underemployment among employed persons. The first two columns provide information on the extent of underemployment among all employed persons. Estimates of underemployment among all employed persons are presented for part-time and full-time workers separately, with the former group representing the closest approximation to the

¹¹ Preferred weekly hours are assumed to be 20 if preferred hours are not recorded (missing) and a person is either marginally attached to the labour force or unemployed and looking for part-time work. Preferred weekly hours are assumed to be 35 if the preferred weekly hours variable is missing and a person is unemployed and looking for full-time work. This affects 95 marginally attached persons and 43 unemployed persons.

¹² The unit record file does contain a variable ‘main reason not full-time employed’ for those employed part-time, which does allow distinguishing supply-related from demand-related reasons for working part-time. However, this variable can only partially identify underemployment among part-time workers that is due to demand constraints. This is because a part-time employee:

- may want more hours, but not full-time employment; or
- may report the *main* reason for not being full-time as a supply-related reason, even though inability to obtain full-time employment is *one* reason (since the main reason need not be the only reason).

ILO definition of underemployment. The third column presents the extent of underemployment among part-time workers only.

Table 5.3: Underemployment among employed persons

	As a proportion of all employed persons		As a proportion of part-time employed persons
	PT & underemp.	FT & underemp.	PT & underemp.
<i>Headcount Measure</i>			
Persons	10.2 (0.33)	6.2 (0.26)	34.9 (0.93)
Males	7.1 (0.39)	8.7 (0.42)	46.0 (1.89)
Females	14.1 (0.55)	3.1 (0.28)	30.3 (1.05)
<i>Volume Measure*</i>			
Persons	3.7 (0.15)	1.6 (0.09)	20.5 (0.64)
Males	2.5 (0.18)	2.0 (0.12)	27.2 (1.27)
Females	5.7 (0.29)	0.9 (0.11)	17.4 (0.72)

Notes: * Only Volume Measure 1 is reported. Standard errors reported in parentheses. *PT & underemp.*: Employed part-time and want more hours of work; *FT & underemp.*: Employed full-time and want more hours of work.

Over one in six employed persons is affected by underemployment, with the majority of these employed part-time. Underemployment is more frequently associated with part-time employment for females, but for males is in fact more frequently associated with full-time employment. The volume measure of underemployment indicates that the number of supplied hours by employed persons that is not utilised is higher for part-time workers, for both males and females. That is, for males, 2.5 per cent of supplied hours are unutilised hours of part-time workers, compared with 2 per cent of supplied hours being unutilised hours of full-time workers. For females, 5.7 per cent of supplied hours are unutilised hours of part-time workers, and 0.9 per cent of supplied hours are unutilised hours supplied by full-time workers.

That underemployment is very common among part-time workers, and is a significant problem for such workers, is evident from the third data column of Table 5.3. Over one third of part-time workers are underemployed, and one fifth of the hours supplied by such workers are not utilised. Underemployment among part-time workers is particularly high for males, with the underutilisation rate at 27.2 per cent, compared with 17.4 per cent for females.

The mean extent of underemployment among the underemployed is presented in Table 5.4, where the extent of underemployment is defined to be the mean difference between desired and actual hours of work (which is, by definition, positive for all underemployed persons). Underemployed part-time workers on average desire 13 more hours of work per week, while full-time workers who are underemployed on average desire just over 9 more hours per week. Thus, although part-time workers desire more additional hours, the additional hours wanted by full-time workers who are underemployed are nonetheless of significant proportions. The bottom panel of Table 5.4 also shows that mean extent of underemployment is higher for males than females, among both part-time and full-time underemployed workers.

To provide additional information on the distribution of the extent of underemployment among the underemployed, Table 5.4 presents the median, standard deviation and inter-quartile range. The medians presented are all below corresponding means, implying most underemployed persons have less than the mean level of underemployment. Dispersion, as measured by the standard deviation and inter-quartile range, is greater for the part-time employed than the full-time employed, reflecting the greater scope for variation in the extent of underemployment among part-time workers. Dispersion is also greater for males compared with females.

Table 5.4: Extent of underemployment among the underemployed – Difference between desired and actual hours.

	Part-time employed		Full-time employed	
Persons				
Mean	13.09 (0.280)		9.22 (0.255)	
Median	10.0 (0.50)		8.0 (0.73)	
Standard deviation	8.38 (0.258)		5.53 (0.330)	
Inter-quartile range	10.0 (0.85)		5.0 (0.93)	
By sex				
	Males	Females	Males	Females
Mean	14.34 (0.521)	12.29 (0.320)	9.45 (0.292)	8.41 (0.516)
Median	12.0 (0.90)	10.0 (0.23)	9.0 (0.83)	7.0 (0.83)
Standard deviation	9.25 (0.438)	7.69 (0.297)	5.59 (0.352)	5.26 (0.765)
Inter-quartile range	13.0 (1.09)	10.0 (0.75)	7.0 (0.92)	5.0 (0.62)

Notes: Standard errors reported in parentheses. ‘Underemployed’ means preferred hours of work exceed actual hours of work. The measured extent of underemployment is based on Volume Measure 1.

6. The Outcomes Associated with Underemployment

The purpose of this section is to investigate the effects on various outcomes that are potentially attributable to underemployment. This is undertaken by regression analysis of the correlation between underemployment and outcomes, controlling for the effects of differences in characteristics other than underemployment status. The primary motivation for the analysis is to ascertain whether underemployment is associated with the adverse outcomes associated with unemployment. The population of interest is therefore persons in the labour force. However, the apparent consequences of underemployment for employment outcomes are also examined. Since these outcomes are only observed for employed persons, the analysis of these outcomes is over employed persons only.¹³

Estimates are presented in Table 6.1 of the association between underemployment and:

- whether the income unit receives income support;
- income unit equivalent income;
- personal income; and
- life satisfaction

where the sample includes all persons in the labour force.

Table 6.2 presents estimates, obtained from equations estimated over employed persons only, of the association between underemployment and:

- personal income;
- the wage rate; and
- job satisfaction.¹⁴

¹³ Note that no attempt has been made to correct for ‘selection effects’ for the equations estimated over employed persons only.

¹⁴ Descriptive comparisons of underemployed workers with both unemployed persons and fully employed workers for a wider range of outcomes are presented in Wilkins (2003). Health outcomes could also have been examined in this section, but were not, on the basis that health is more likely to affect, than be affected by, underemployment status.

The explanatory variable used for underemployment is a dummy variable, rather than the difference between preferred and actual hours – that is, the explanatory variable is whether a person is underemployed, not the extent of underemployment. The motivation for this approach is that primary interest is in comparisons of the effects associated with underemployment with those associated with unemployment. It gives the ‘average’ effect of underemployment on the outcome variable, compared with the ‘average’ effect of unemployment. Investigation of how the outcomes associated with underemployment depend on the extent of underemployment is considered of secondary importance, and not undertaken in this study. However, for all regression equations, the underemployed who are employed on a part-time basis are distinguished from the underemployed who are employed full-time, by employing separate dummy variables for each group.

Controls are included for a variety of personal characteristics (age, educational attainment, family type, number and ages of dependent children, region of residence, country of birth, years since migration, whether indigenous, health and English proficiency), coefficient estimates for which are reported in Appendix B, as well as variables for part-time and casual employment. The effects associated with part-time employment (including casual employment), and with being employed on a casual basis, are included in the main tables to show the distinct effects of part-time and casual employment from underemployment. For employed persons, specifications are also estimated including variables for industry, occupation, tenure with current employer, trade union membership and self-employment status. The interpretation of the regression coefficients is largely one of descriptive association, although it is reasonable to interpret them as reflecting causal effects, especially for the life satisfaction and job satisfaction models.¹⁵

Table 6.1 presents estimates obtained from equations estimated over all persons in the labour force. The dependent variable for Model 1 is a qualitative variable equal to one if the income unit receives income support payments and zero otherwise. For this model, a probit equation is estimated. The probit model is given by:

$$\Pr(y_i = 1 | x_i) = \Phi(\mathbf{x}_i \mathbf{b}) \quad (6.1)$$

where y is the outcome of interest (equal to one or zero), $\Phi(\cdot)$ is the standard cumulative normal distribution, \mathbf{x} is a vector of explanatory variables and \mathbf{b} is the coefficient vector. Coefficient estimates are not readily interpretable for probit models, and the effects of individual explanatory variables on the outcome variable depend on the values of the explanatory variables at which they are evaluated. Table 6.1 therefore reports ‘mean marginal effects’ of the explanatory variables. For a continuous variable, the mean marginal effect is given by:

$$MME_k = (1/n) \sum_{i=1}^n \phi(\mathbf{x}_i \mathbf{b}) b_k \quad (6.2)$$

where MME_k is the mean marginal effect of variable x_k on the predicted probability $\Pr(y = 1 | x)$, and the summation is over the n individuals in the sample. This is, as the name suggests, the mean marginal effect of the explanatory variable on the predicted probability that the dependent variable takes a value of one, evaluated over all individuals in the sample, and holding all other variables constant at their actual values. For a binary explanatory variable, the

¹⁵ Specifications were estimated which included interactions between the variables for underemployment and the variables for personal characteristics. However, none of these interaction terms was statistically significant at the 5% level, possibly reflecting sample size constraints. The number of observations varies across the specifications reported because of missing values. A sensitivity test (not attempted) could be conducted by, for example, restricting the sample to those who have non-missing values for all variables.

marginal effect is obtained by changing the explanatory variable from zero to one for each individual, holding all other variables at their actual values.¹⁶

Models 2 and 3 have log income as the dependent variable. For Model 2, the income variable is ‘income unit equivalent income’, defined as current-year income unit income from all sources, divided by the square root of the number of members of the income unit.¹⁷ For Model 3, the income variable is current-year personal income from all sources. OLS regression estimates are reported for both models in Table 6.1, and can be interpreted as the percentage change in income associated with a one-unit increase in the explanatory variable (evaluated at the midpoint of income before the change and income after the change).

The dependent variable for Model 4 is an index of life satisfaction, where respondents were asked to rate overall satisfaction with life on a scale from zero (completely dissatisfied) to ten (completely satisfied). OLS regression may not be appropriate for such a dependent variable. For example, the improvement in satisfaction associated with a unit-increase in the index may not be the same at all values of the index. For this reason, and because the variable is bounded between 0 and 10, both OLS and ordered probit models were estimated for the life satisfaction variable. Implied effects were very similar for both models, and hence only the OLS estimates, which are much easier to interpret, are reported.

The evidence from Table 6.1 is as follows:

1. *Income unit income support receipt*: For both males and females, underemployment among part-time workers is associated with a significantly higher likelihood of income support receipt by their income unit. The coefficient estimates imply the mean effect of being part-time underemployed is to increase the probability of income support receipt by 0.08 for males and by 0.05 for females. These effects are, however, much smaller than the effects associated with unemployment, which has a mean effect on the probability of income support receipt of 0.59 for males and 0.46 for females. In contrast to part-time worker underemployment, full-time worker underemployment appears to have no impact on income support receipt, which is unsurprising given income support eligibility criteria.
2. *Income unit equivalent income*: For males, neither part-time nor full-time worker underemployment is associated with a significant decrease in income, although the point estimates of the coefficients suggest negative effects, which are twice as strong for the part-time underemployed as the full-time underemployed. The effect is much smaller than the effect associated with unemployment, which acts to decrease income by 100 per cent. For females, part-time worker underemployment is associated with a 21 per cent decrease in income, which is about one quarter the effect associated with unemployment. Full-time worker underemployment among females is associated with a 10 per cent decrease in income, but this is not statistically significant.
3. *Personal income*: For males, while part-time employment is, as might be expected, associated with lower personal income than full-time employment, there is no additional adverse effect associated with being underemployed for such workers. Interestingly, however, underemployment among full-time employees is associated with lower personal income compared with fully employed full-time employees – the coefficient estimate shows a 10 per cent reduction in personal income for an underemployed full-time worker compared with being fully employed. For females, no significant effect of full-time underemployment

¹⁶ A more common approach is to evaluate marginal effects at mean values of the explanatory variables. However, this is problematic because no-one is actually at the mean when we have binary explanatory variables and, furthermore, marginal effects can vary substantially, and in a non-linear fashion, with characteristics. Mean marginal effects are therefore more likely to produce representative estimates of the effects of characteristics.

¹⁷ An income unit is defined to consist of either a single person or a couple living in the same household, plus any dependent children.

is evident, but there is a significant negative effect on personal income associated with part-time worker underemployment. At 13 per cent, however, this is very small compared with the 139 per cent decrease in personal income associated with unemployment.

4. *Life satisfaction*: Part-time underemployment has almost as large a negative impact on the life satisfaction variable as unemployment for both males and females. Full-time underemployment also has a significant negative effect for males, only slightly smaller than that evident for underemployed part-time workers. Interestingly, for females there is no adverse effect associated with full-time worker underemployment.

Table 6.1: Outcomes associated with underemployment and unemployment – All persons

Dependent variable:	1. Income unit income support receipt	2. Income unit equivalent income	3. Personal income	4. Life satisfaction
<i>Males</i>				
Unemployed	0.588 (22.96)*	-0.999 (-13.45)*	-1.288 (-15.92)*	-0.517 (-4.31)*
Underemployed – PT	0.076 (3.11)*	-0.153 (-1.93)	0.074 (0.79)	-0.404 (-3.38)*
Underemployed – FT	-0.018 (-0.97)	-0.073 (-1.70)	-0.102 (-2.18)*	-0.327 (-2.97)*
Part-time employed	0.112 (5.08)*	-0.204 (-3.56)*	-0.700 (-10.10)*	0.085 (0.93)
Casual employee	0.077 (4.62)*	-0.210 (-4.51)*	-0.310 (-6.26)*	-0.182 (-2.26)*
<i>Females</i>				
Unemployed	0.455 (14.74)*	-0.861 (-10.04)*	-1.387 (-13.48)*	-0.551 (-3.57)*
Underemployed – PT	0.053 (3.03)*	-0.214 (-4.51)*	-0.129 (-2.12)*	-0.419 (-5.00)*
Underemployed – FT	0.029 (0.73)	-0.102 (-1.20)	-0.063 (-0.89)	-0.019 (-0.12)
Part-time employed	0.098 (6.86)*	-0.139 (-4.22)*	-0.487 (-11.90)*	0.282 (4.43)*
Casual employee	0.089 (5.96)*	-0.230 (-6.59)*	-0.375 (-8.83)*	-0.113 (-1.72)

Notes: *Underemployed – PT*: Underemployed and employed part-time. *Underemployed – FT*: Underemployed and employed full-time. Income support receipt estimates are obtained from a probit model, with the reported statistic the mean effect on the probability of income support receipt of a discrete change of the dummy variable from 0 to 1, evaluated over all persons in the sample. Statistics in parentheses are z statistics for the test that the mean marginal effect is zero. Estimates for models 2-4 are OLS coefficient estimates, with t statistics reported in parentheses. * indicates significance at the 5% level. Coefficient estimates for all other explanatory variables used in the estimating equations are reported in Appendix B.

The dependent variables are (see Appendix A for further details):

1. Income unit currently receives income support payments (dummy variable).
2. Log of annual (previous financial year) income unit equivalent income from all sources.
3. Log of annual (previous financial year) personal income from all sources.
4. Index of life satisfaction.

To summarise the findings presented in Table 6.1, part-time worker underemployment for females is associated with significant negative effects for all four outcomes, while full-time worker underemployment is not associated with any significant effects for females. For males, significant negative effects of part-time worker underemployment are evident for income support receipt and life satisfaction, while significant negative effects of full-time worker underemployment are found for life satisfaction and personal income. For both males and females, all negative effects attributable to underemployment are smaller than those attributable to unemployment, generally much smaller.

Table 6.2 presents OLS regression coefficient estimates estimated over employed persons only. Two specifications are estimated for each of the three outcomes examined, the first using the same controls as in Table 6.1, the second adding employment variables. Model 1 has the same dependent variable as Model 3 in Table 6.1, and is presented to examine the effects of adding employment controls. The dependent variable in Model 2 is the log hourly wage rate, while in

Model 3 the dependent variable is an index of job satisfaction, similar to the life satisfaction index used in Model 4 in Table 6.1.¹⁸ Results are as follows:

1. *Personal income*: The negative effects associated with full-time underemployment for males are still evident, although only significantly different from zero at the 10% level when employment controls are added. Similarly, the significant negative effect of part-time underemployment for females becomes statistically insignificant when the employment variables are added.
2. *Wage rate*: No significant effects of underemployment are evident for males or females.
3. *Job satisfaction*: For both males and females, part-time underemployment is associated with lower job satisfaction. Full-time underemployment has no significant effect, although the point estimate is (a smaller) negative.

Table 6.2: Outcomes associated with underemployment – Employed persons

Dependent variable:	1. Personal income		2. Wage rate		3. Job satisfaction	
	(A)	(B)	(A)	(B)	(A)	(B)
<i>Males</i>						
Underemployed – PT	0.082 (0.88)	0.087 (0.93)	0.057 (1.06)	0.063 (1.22)	-0.472 (-2.92)*	-0.452 (-2.83)*
Underemployed – FT	-0.102 (-2.17)*	-0.082 (-1.84)	-0.027 (-1.10)	-0.009 (-0.39)	-0.068 (-0.55)	-0.026 (-0.21)
Part-time employed	-0.729 (-10.56)*	-0.600 (-8.56)*	-0.048 (-1.02)	0.041 (0.89)	0.203 (1.60)	0.232 (1.79)
Casual employee	-0.316 (-6.40)*	-0.270 (-5.15)*	-0.080 (-2.83)*	-0.012 (-0.44)	-0.413 (-4.02)*	-0.331 (-3.01)*
<i>Females</i>						
Underemployed – PT	-0.127 (-2.08)*	-0.095 (-1.57)	0.027 (0.74)	0.049 (1.40)	-0.399 (-3.61)*	-0.366 (-3.36)*
Underemployed – FT	-0.067 (-0.94)	-0.037 (-0.53)	-0.020 (-0.59)	0.018 (0.50)	-0.208 (-0.72)	-0.148 (-0.50)
Part-time employed	-0.493 (-12.09)*	-0.407 (-9.46)*	0.059 (2.48)*	0.119 (5.25)*	0.220 (2.70)*	0.221 (2.64)*
Casual employee	-0.385 (-9.13)*	-0.345 (-8.34)*	-0.094 (-3.89)*	-0.022 (-1.00)	-0.071 (-0.81)	-0.001 (-0.02)

Notes: *Underemployed – PT*: Underemployed and employed part-time. *Underemployed – FT*: Underemployed and employed full-time. Specification (B) adds to specification (A) controls for industry, occupation, trade union membership, tenure with current employer and self employment status. Statistics reported are OLS coefficient estimates, with t statistics reported in parentheses. * indicates significance at the 5% level. Coefficient estimates for all other explanatory variables used in the estimating equations are reported in Appendix B.

The dependent variables are:

1. Log of annual (previous financial year) personal income from all sources.
2. Log of the current hourly wage rate.
3. Index of overall job satisfaction.

7. Factors Associated with Underemployment

Identification of the predictors of underemployment – more specifically, the characteristics associated with a higher probability of underemployment – is potentially valuable for the

¹⁸ As with the life satisfaction variable, ordered probit models of job satisfaction were also estimated in place of OLS regression, but are not reported because inferences were not significantly different, and OLS estimates are much more easily interpreted.

targeting of policies to assist those affected. In the absence of a compelling case for any one approach, and with all potential approaches having limitations, a two-pronged approach is taken.

Initially, the focus is on employed persons only, and on predictors of the *occurrence* of underemployment, rather than its *extent*. This approach delivers information on the factors associated with underemployment, given a person is employed. It allows estimation of binary outcome models, estimates from which are relatively easily interpreted. Restricting to employed persons also permits us to investigate the effects of characteristics that are only observed for employed persons, such as occupation and industry of employment. Furthermore, the approach is consistent with previous research in Australia, including Wooden (1993) and Doiron (2003), facilitating comparisons of findings from the HILDA survey data with evidence from other data sources.¹⁹

The restriction to employed persons precludes investigation of how the factors associated with underemployment compare with those associated with unemployment. For this reason, analysis is also undertaken on all persons in the labour force, with a view to comparing predictors of underemployment with the predictors of unemployment. Among the alternative approaches potentially suited to examination of this issue, estimation of multinomial logit models was viewed as most appropriate. This allows flexibility in terms of the nature of the effects of characteristics on outcomes when compared with alternatives such as ordered probit. However, it is necessary to invoke the ‘Independence of Irrelevant Alternatives’ (IIA) assumption. This requires the probability of one outcome relative to another to be insensitive to the existence of another possible outcome.²⁰ Compared with the probit analysis of employed persons, it is also somewhat more difficult to interpret estimation results, and we cannot examine the impact of characteristics that are only observed for the employed.²¹

For all of the models estimated, two alternative definitions of underemployment are used:

1. When desired hours of any employed person exceeds usual actual hours

¹⁹ Wooden (1993) estimates probit models of the probability of being underemployed on all employed persons and on part-time employed persons only. Doiron (2003) takes a slightly different approach, estimating ordered probit models of the difference between desired and actual hours, identifying three separate states: underemployed, fully employed and overemployed. Although Doiron models overemployment, her approach is similar to the current study in that the *magnitude* of the difference between preferred and actual working hours is not modelled. (The argument for ordered probit over multinomial logit is that the latent variable is the difference between desired and actual hours, which is ordered. However, the validity of this approach critically depends on believing the underlying model is correct. For example, in contrast to the multinomial logit model, the ordered probit model cannot allow specific characteristics to increase both underemployment and overemployment.)

²⁰ Tests for the validity of the IIA assumption exist (and are reported in this study), but in fact provide little guidance to violation of the assumption. In practice, the validity of the IIA assumption depends on modelling outcomes that are sufficiently distinct from each other. Note that an implication of the IIA assumption is that tests of sensitivity of results to the inclusion of persons not in the labour are redundant. See Long and Freese (2001) for further discussion of the IIA assumption.

²¹ An alternative to the multinomial logit approach is ordered probit, where the ordering is: unemployed, underemployed (possibly disaggregated further by extent of underemployment) and fully employed. However, such a model imposes restrictions that do not seem justified in the current context. Specifically, a single index explaining unemployment and underemployment doesn’t seem appropriate, and is in part assuming what is of interest. Note that the probit and logit models estimated consider the factors affecting the *likelihood* of an individual being underemployed, but do not consider the issue of the *extent* of underemployment. To this end, two further approaches were taken. First, multinomial logit models were estimated which distinguished between two levels of underemployment. This allowed examination of whether the factors associated with underemployment differed for the ‘mildly underemployed’ (defined as desiring fewer than 10 additional hours of work per week) from the ‘very underemployed’ (desiring 10 or more additional hours). Second, an approach that attempted to identify the determinants of the extent of underemployment was taken by estimating OLS models of the extent of underemployment on samples comprising the underemployed. Results of implementation of these two approaches are not reported in this paper, however, since they delivered few new insights (see Wilkins (2003) for details).

2. When desired hours of a part-time employed person exceeds usual actual hours.

The first definition corresponds to a general definition of underemployment that does not condition underemployment status of employed persons on the number of hours worked. It includes both part-time and full-time workers who would like to work more hours. Including the full-time underemployed is preferable from the perspective that underemployment occurs whenever an employed person wants more hours, irrespective of current hours. However, the second definition is also implemented because it more closely corresponds with the ILO (1998) definition and definitions used by previous research.

The effects on underemployment of a wide range of characteristics are examined, based on judgements of factors that could potentially be relevant to underemployment status. These include socio-demographic characteristics, health, local labour market conditions, employment history and, for the employed, employment characteristics. They are for the most part consistent with the characteristics that have been examined in other labour market studies, for example of unemployment and wages (e.g. Brooks and Volker (1985), Preston (1997)). Specifically, for all specifications estimated, variables (details of which are provided in Appendix A) are employed for:²²

- Socio-demographic characteristics:
 - Age (5 dummy variables)
 - Educational attainment (4 dummy variables)
 - Region of residence (dummy variable for whether reside in a major city)²³
 - Income unit type (4 dummy variables)
 - Number of dependent children (number aged less than 15 years; number aged 15-24 years)
 - Indigenous status (dummy variable)
 - Immigrant status (2 dummy variables)
 - Length of residency in Australia of immigrants (quadratic, interacted with immigrant dummies)
 - English proficiency (dummy variable)
- Health (dummy variable)
- Local labour market conditions (local unemployment rate)
- Employment history:
 - Proportion of working-age life not employed
 - Proportion of working-age life unemployed
 - Proportion of preceding (1999-2000) financial year not employed
 - Proportion of preceding (1999-2000) financial year unemployed
 - Number of jobs in preceding (1999-2000) financial year

For models estimated over employed persons only, specifications are also estimated which include variables for:

- Tenure with current employer
- Industry of main job (16 dummy variables)
- Occupation of main job (9 dummy variables)

²² Also considered for inclusion were variables for receipt of income support payments by the income unit, housing tenure type, enrolment at an educational institution, being employed part-time and being employed on a casual basis. These were not used, however, on the basis that they are potentially affected by underemployment status (or, more to the point, there is some unobserved third factor that affects both underemployment and the other variable, causing biased and inconsistent coefficient estimates if that variable is included in the estimating equation).

²³ Specifications with dummies for state of residence were also estimated, but are not reported because state of residence was found to have little impact.

- Trade union membership (dummy variable)
- Self employment status (dummy variable)

The local unemployment rate is included to attempt to capture the effects of the labour demand conditions facing the individual. All other variables essentially reflect labour supply factors, in terms of the nature (productivity) of the labour supplied, or labour supply behaviour (preferences). The inclusion of variables for employment history is relatively novel for labour market studies using Australian data, and reflects the comparative richness of the HILDA data. These variables can be interpreted as capturing unobserved characteristics likely to affect labour market outcomes, including unobserved human capital, although they may also potentially capture ‘stigma’ or ‘scarring’ effects associated with past unemployment or non-participation in the labour force.

7.1. Underemployment among Employed Persons

All employed persons

Probit models are estimated of the probability of underemployment, given a person is employed. As for the probit models estimated in Section 6, mean marginal effects are reported rather than the coefficient estimates. Table 7.1 contains estimates for two specifications, for each of the definitions of underemployment, and for males and females separately (eight specifications in all). The baseline specification (1) contains variables for age, educational attainment, region of residence, disability, family type and composition, indigenous status, country of birth, length of residency in Australia (for immigrants), English proficiency, the unemployment rate in the local region and recent and lifetime employment history. Specification (2) adds variables for characteristics observed only for employed persons – employment tenure, industry, occupation, trade union membership and self-employment status.²⁴

Results for males

The baseline specification for males, where full-time workers can be underemployed, shows that a number of characteristics appear to be important to the likelihood of underemployment, including age, educational attainment, income unit type, number of dependent children, indigenous status, country of birth, local unemployment rate and employment history. To provide an example of interpretation of the reported estimates, being aged 35 years or over decreases the probability of underemployment, on average and holding all else constant, by approximately 0.1 compared with being aged 15-24, while being aged 25-34 lowers the probability by 0.05 compared with being aged 15-24.

²⁴ A range of other specifications were estimated, for the probit models and also the multinomial logit models estimated on persons in the labour force, to examine the sensitivity of estimates to the inclusion and exclusion of variables. No large effects on inferences were evident. Perhaps surprisingly, even the inclusion/exclusion of employment history variables did not have a large impact on other coefficient estimates. Interactions between the age and education dummies were also implemented, but all estimates on these interaction terms were statistically insignificant and so they were dropped. A further concern that arises with estimation of underemployment models over all employed persons is that results can to a significant extent be driven by part-time employment status, especially for the definition in which only part-time workers can be underemployed. Coefficient estimates may therefore be reflecting the factors determining part-time employment status, rather than the factors determining underemployment status. Although the problem of sample selection bias arises with a restriction to part-time workers (we observe full-time workers who become part-time because they become underemployed, but do not observe full-time workers who do *not* become part-time employed due to underemployment), it is nonetheless important to examine the sensitivity of estimates to the restriction to part-time workers. (An alternative is to include controls for part-time employment status in the probit models estimated over all employed persons, but a similar problem arises, which is that part-time employment status is endogenous with respect to underemployment status.) Estimation over part-time workers only was therefore undertaken, but had surprisingly little effect on inferences (see Wilkins (2003)).

Table 7.1: Probit estimates of mean marginal effects on the probability of underemployment – Employed males

	FT workers can be underemp.		Only PT workers can be underemp.	
	(1)	(2)	(1)	(2)
Aged 25-34	-0.050 (-3.44)*	-0.025 (-1.60)	-0.059 (-6.92)*	-0.046 (-5.27)*
Aged 35-44	-0.094 (-6.56)*	-0.061 (-3.78)*	-0.061 (-6.87)*	-0.042 (-4.45)*
Aged 45-54	-0.113 (-8.48)*	-0.069 (-4.25)*	-0.062 (-7.42)*	-0.039 (-4.12)*
Aged 55-64	-0.098 (-6.39)*	-0.055 (-2.64)*	-0.026 (-2.18)*	-0.004 (-0.24)
Degree	-0.074 (-5.13)*	-0.046 (-2.52)*	-0.037 (-3.85)*	-0.019 (-1.57)
Other P-S	-0.023 (-1.72)	-0.006 (-0.42)	-0.030 (-3.42)*	-0.019 (-2.13)*
Comp H-S	-0.024 (-1.48)	-0.019 (-1.15)	0.006 (0.55)	0.004 (0.35)
City	0.005 (0.45)	0.000 (-0.02)	0.000 (0.00)	-0.005 (-0.63)
Disabled	0.028 (1.36)	0.020 (0.99)	0.032 (2.06)*	0.020 (1.45)
Couple	-0.060 (-4.49)*	-0.055 (-4.08)*	-0.026 (-2.78)*	-0.023 (-2.54)*
Sole parent	-0.041 (-1.22)	-0.048 (-1.50)	0.007 (0.26)	-0.007 (-0.31)
Couple parents	-0.064 (-3.14)*	-0.059 (-2.92)*	-0.020 (-1.41)	-0.019 (-1.43)
No. dep <15	0.003 (0.40)	0.007 (0.85)	0.000 (0.06)	0.003 (0.57)
No. dep 15-24	0.037 (2.74)*	0.031 (2.28)*	0.038 (4.28)*	0.029 (3.46)*
ATSI	0.132 (2.09)*	0.109 (1.85)	0.060 (1.39)	0.036 (1.04)
ESB Immigrant	0.009 (0.20)	-0.010 (-0.24)	-0.020 (-0.70)	-0.030 (-1.20)
NESB Immigrant	0.170 (3.93)*	0.131 (3.23)*	0.037 (1.31)	0.013 (0.56)
Poor English	0.057 (1.07)	0.065 (1.21)	-0.011 (-0.39)	-0.001 (-0.04)
YSM	-0.003 (-0.68)	-0.001 (-0.34)	0.003 (0.83)	0.004 (1.12)
YSM2	0.000 (0.31)	0.000 (-0.01)	-0.001 (-1.04)	-0.001 (-1.29)
YSM-NESB	-0.002 (-0.35)	-0.003 (-0.53)	-0.004 (-0.91)	-0.004 (-0.93)
YSM2-NESB	0.000 (-0.05)	0.000 (0.21)	0.001 (0.74)	0.001 (0.89)
Region unemp	0.007 (2.52)*	0.005 (1.88)	0.004 (2.30)*	0.003 (1.76)
Not emp - life	2.47E-04 (0.48)	-2.38E-05 (-0.05)	1.13E-03 (3.53)*	9.07E-04 (2.97)*
Unemp - life	2.03E-03 (2.33)*	1.49E-03 (1.73)	3.51E-04 (0.65)	2.56E-04 (0.50)
Not emp - year	1.84E-03 (4.09)*	1.45E-03 (3.28)*	6.15E-04 (2.10)*	3.95E-04 (1.41)
Unemp - year	2.00E-04 (0.32)	-1.18E-04 (-0.19)	5.84E-04 (1.53)	3.29E-04 (0.92)
No. jobs - year	0.032 (3.72)*	0.023 (2.70)*	0.026 (4.65)*	0.019 (3.54)*
Tenure		-0.004 (-4.51)*		-0.003 (-3.87)*
Indaccom		0.114 (2.50)*		0.168 (3.48)*
Indcommun		0.042 (0.93)		0.006 (0.19)
Indconstr		0.007 (0.21)		0.038 (1.41)
Indcultrec		0.044 (1.01)		0.125 (2.66)*
Indeduc		0.069 (1.49)		0.175 (3.17)*
Indelec		-0.044 (-0.85)		-0.011 (-0.22)
Indfinance		-0.028 (-0.67)		0.010 (0.23)
Indgovdef		0.035 (0.84)		0.045 (1.12)
Indhlthcs		0.062 (1.36)		0.156 (3.02)*
Indmanuf		0.007 (0.24)		-0.001 (-0.04)
Indmining		-0.014 (-0.31)		-0.022 (-0.62)
Indperserv		0.088 (1.86)		0.074 (1.78)
Indpropbus		0.049 (1.39)		0.057 (1.87)
Indrtrade		-0.006 (-0.21)		0.033 (1.33)
Indtrans		0.008 (0.23)		0.031 (1.07)
Indwstrade		0.002 (0.05)		-0.021 (-0.96)
Occmgr		-0.122 (-8.58)*		-0.060 (-7.21)*
Occprof		-0.071 (-3.74)*		-0.063 (-6.44)*
Occasprof		-0.090 (-5.57)*		-0.053 (-6.03)*
Occadvclerk		-0.084 (-1.89)		-0.030 (-1.04)
Occintclerk		-0.027 (-1.35)		-0.007 (-0.57)
Occelemclerk		0.050 (1.80)		0.023 (1.44)
Occtrade		-0.033 (-1.89)		-0.041 (-4.31)*
Occintprod		-0.014 (-0.74)		-0.012 (-1.02)
Union		0.005 (0.38)		-0.028 (-3.50)*
Self employed		0.011 (0.74)		0.058 (4.46)*
Pseudo R-squared	0.105	0.142	0.156	0.259
Sample size	4426	4425	4426	4425

Note: z-statistics in parentheses. * indicates significance at the 5% level.

Table 7.1 continued: Probit estimates of mean marginal effects on the probability of underemployment – Employed females

	FT workers can be underemp.		Only PT workers can be underemp.	
	(1)	(2)	(1)	(2)
Aged 25-34	-0.083 (-5.41)*	-0.048 (-2.83)*	-0.078 (-5.63)*	-0.043 (-2.75)*
Aged 35-44	-0.076 (-4.66)*	-0.033 (-1.78)	-0.077 (-5.30)*	-0.034 (-2.01)*
Aged 45-54	-0.130 (-9.05)*	-0.083 (-4.71)*	-0.105 (-7.92)*	-0.058 (-3.47)*
Aged 55-64	-0.121 (-7.89)*	-0.075 (-3.39)*	-0.087 (-5.74)*	-0.040 (-1.76)
Degree	-0.089 (-6.20)*	-0.029 (-1.47)	-0.068 (-5.09)*	-0.012 (-0.63)
Other P-S	-0.053 (-3.67)*	-0.026 (-1.71)	-0.053 (-4.12)*	-0.030 (-2.23)*
Comp H-S	-0.031 (-1.83)	-0.017 (-0.98)	-0.024 (-1.52)	-0.010 (-0.62)
City	-0.002 (-0.16)	0.002 (0.17)	-0.013 (-1.03)	-0.008 (-0.62)
Disabled	0.026 (1.06)	0.023 (0.94)	0.043 (1.80)	0.038 (1.62)
Couple	-0.046 (-2.99)*	-0.038 (-2.45)*	-0.018 (-1.19)	-0.010 (-0.67)
Sole parent	0.022 (0.75)	0.007 (0.24)	0.081 (2.46)*	0.062 (2.04)*
Couple parents	-0.067 (-2.93)*	-0.073 (-3.26)*	-0.002 (-0.10)	-0.009 (-0.43)
No. dep <15	0.026 (2.67)*	0.030 (3.04)*	0.025 (2.89)*	0.027 (3.15)*
No. dep 15-24	0.011 (0.78)	0.009 (0.60)	0.000 (0.00)	-0.004 (-0.33)
ATSI	-0.025 (-0.58)	-0.021 (-0.47)	-0.026 (-0.70)	-0.024 (-0.64)
ESB Immigrant	-0.058 (-1.23)	-0.061 (-1.34)	-0.096 (-2.68)*	-0.094 (-2.63)*
NESB Immigrant	0.175 (3.54)*	0.112 (2.49)*	0.173 (3.50)*	0.112 (2.54)*
Poor English	-0.094 (-2.62)*	-0.109 (-3.50)*	-0.084 (-2.72)*	-0.095 (-3.52)*
YSM	0.007 (1.26)	0.007 (1.41)	0.013 (2.38)*	0.013 (2.43)*
YSM ²	-0.001 (-0.99)	-0.001 (-1.14)	-0.002 (-2.14)*	-0.002 (-2.16)*
YSM-NESB	-0.015 (-2.31)*	-0.012 (-1.91)	-0.024 (-3.75)*	-0.021 (-3.33)*
YSM2-NESB	0.002 (1.83)	0.002 (1.47)	0.004 (3.39)*	0.004 (2.98)*
Region unemp	0.000 (-0.14)	-0.002 (-0.51)	0.001 (0.30)	-0.001 (-0.22)
Not emp - life	6.13E-04 (1.93)	2.35E-04 (0.73)	6.80E-04 (2.37)*	2.83E-04 (0.99)
Unemp - life	3.40E-03 (3.52)*	3.11E-03 (3.25)*	3.62E-03 (4.22)*	3.28E-03 (3.89)*
Not emp - year	7.63E-04 (2.24)*	4.17E-04 (1.22)	5.74E-04 (1.88)	2.31E-04 (0.75)
Unemp - year	1.52E-03 (2.56)*	1.33E-03 (2.27)*	1.56E-03 (2.97)*	1.39E-03 (2.70)*
No. jobs - year	0.016 (1.76)	0.008 (0.90)	0.013 (1.64)	0.006 (0.74)
Tenure		-0.004 (-2.99)*		-0.004 (-3.70)*
Indaccom		0.087 (1.59)		0.054 (1.16)
Indcommun		0.023 (0.36)		-0.030 (-0.64)
Indconstr		-0.014 (-0.24)		-0.004 (-0.09)
Indcultrec		0.030 (0.52)		0.039 (0.73)
Indeduc		0.058 (1.15)		0.056 (1.22)
Indfinance		-0.027 (-0.60)		-0.046 (-1.28)
Indgovdef		-0.062 (-1.43)		-0.079 (-2.49)*
Indhlthcs		0.035 (0.76)		0.038 (0.92)
Indmanuf		-0.016 (-0.38)		-0.036 (-1.05)
Indperserv		0.047 (0.85)		0.037 (0.76)
Indpropbus		0.029 (0.62)		-0.007 (-0.20)
Indrtrade		0.023 (0.52)		0.011 (0.29)
Indtrans		0.037 (0.61)		-0.018 (-0.41)
Indwstrade		-0.037 (-0.82)		-0.055 (-1.62)
Occmgr		-0.161 (-12.82)*		-0.134 (-12.47)*
Occprof		-0.127 (-5.85)*		-0.120 (-6.34)*
Occasprof		-0.128 (-7.73)*		-0.118 (-8.68)*
Occadvclerk		-0.112 (-5.88)*		-0.091 (-5.30)*
Occintclerk		-0.070 (-3.41)*		-0.065 (-3.56)*
Occelemclerk		-0.008 (-0.30)		0.001 (0.03)
Occtrade		-0.057 (-1.99)*		-0.069 (-3.05)*
Occintprod		-0.012 (-0.34)		-0.026 (-0.85)
Union		-0.008 (-0.53)		-0.013 (-0.99)
Self employed		0.006 (0.27)		0.027 (1.35)
Pseudo R-squared	0.078	0.120	0.084	0.137
Sample size	3930	3907	3930	3907

Note: z-statistics in parentheses. * indicates significance at the 5% level. Omitted industry variables (*Indelec* and *Indmining*) reflect the absence of variation in the dependent variable for persons in those industries. Sample sizes are smaller for specification (2) for this reason and because of missing values for other employment variables.

The signs of most mean marginal effects are consistent with intuition. A characterisation of the results is that employed males who are younger, less educated, single, either Aboriginal or an NESB immigrant and who live in high unemployment regions, are more likely to be underemployed. These are characteristics also associated with higher rates of unemployment (e.g. Brooks and Volker, 1985). Furthermore, those who have a history of unemployment since the age of 15 and who did not work much in the preceding year, but nonetheless had a large number of jobs over that year, are also more likely to be underemployed. That a history of unemployment is a predictor of underemployment suggests the underemployed have a more tenuous foothold in the labour market than the fully employed.²⁵ The fact that a higher number of jobs in the previous financial year is associated with a higher underemployment probability is also consistent with the underemployed having a less secure position in the labour market, or perhaps having difficulty finding a good employment match.

Less easily explained is that, while there is no significant effect associated with the number of dependent children aged less than 15 years, the mean marginal effect is increasing in the number of dependent children aged 15-24 years. The mean effect of each additional dependent child aged 15-24 years is to increase the probability of underemployment by 0.037. This may reflect either increased costs or reduced caring needs of older children.

With respect to employment history, as noted, a higher rate of lifetime unemployment has a positive effect on the probability of underemployment, but there is no (additional) adverse effect associated with recent unemployment experience (within the previous financial year). The reverse is true with respect to non-employment: a higher rate of lifetime non-employment does not significantly affect chances of underemployment, but non-employment in the preceding financial year does have an adverse effect. The inference is that a long-term history of unemployment, reflecting long-term difficulty retaining employment, is associated with a higher probability of underemployment, whereas a long-term history of non-participation in the labour force does not impact on the likelihood of underemployment. In the short-term, however, non-employment, whether due to non-participation in the labour force or unemployment, makes underemployment more likely. This possibly reflects the difficulties workers face following non-employment in (re-)establishing themselves in the labour market and finding a good job.

The addition of employment variables (specification (2)) tends to slightly decrease the magnitude of estimated marginal effects of the existing variables, but does not alter the sign or statistical significance of most estimates. Of the added variables, only a few exert a significant effect on the probability of underemployment. Increased employment tenure is associated with a decreased probability of underemployment, which may be capturing effects of a good worker-firm match. The 'accommodation, cafes and restaurants' industry is associated with an increased probability of underemployment, which may reflect a high incidence of part-time and casual employment in this industry, or seasonal effects associated with the time of the year of the survey. The third type of significant effect of employment variables is that lower-skill occupations are associated with a higher probability of underemployment. Being in the occupational category 'managers and administrators', 'professionals', 'associate professionals' or 'advanced clerical' decreases the probability of underemployment by between 0.07 and 0.12 compared with being in the 'labourers and related' occupation (although the effect for 'advanced clerical' is only significant at the 6% level).

Restricting underemployment to part-time workers, estimates may differ, not only because the determinants of part-time worker underemployment may differ from the determinants of full-

²⁵ Although marginal effects estimates appear small for employment history variables, this is not in fact the case. For example, if the proportion of the previous year not employed increases from zero to half, the baseline model mean marginal effect estimate for this variable implies the probability of underemployment increases by 0.09.

time worker underemployment, but also because estimates are more likely to reflect the determinants of part-time employment status (since part-time employment is a precondition for underemployment).

In broad terms, however, mean marginal effects are somewhat similar for the restricted definition. This is to some extent surprising, given the differences between part-time and full-time workers and the high incidence of underemployment among full-time employed males (who are no longer treated as underemployed under the restricted definition). The main differences are that the adverse effects associated with being aged 15-24 are reduced, and long-term non-employment history takes over from long-term unemployment history as a significant predictor of underemployment status. Trade union membership and self employment also acquire significant average effects on the probability of underemployment, of -0.03 and 0.06 respectively.

Results for females

Allowing full-time workers to be underemployed, results for females are similar to males for age, educational attainment, income unit type and country-of-birth effects. Differences arise with respect to variables for number of dependent children, indigenous status, English proficiency, length of residency in Australia for NESB immigrants, local unemployment rate and employment history. The probability of underemployment is increasing in the number of dependent children aged less than 15, in contrast to males, for whom it is the number aged 15-24 that matters. This effect is likely to reflect parenting responsibilities for younger children, which are perhaps more likely to be borne by females than males. There is a negative mean effect of approximately -0.1 associated with a lack of proficiency in English, the reasons for which are not clear. As with males, NESB immigrants have a higher probability of underemployment, but, in contrast to males, increased length of time resident in Australia diminishes this effect for females.

Effects of unemployment history and non-employment history of females are broadly similar to those of males, the important difference being that recent unemployment history also has significant effects on underemployment status. Two variables with significant marginal effects for males do not have significant effects for females: indigenous status and the local unemployment rate. The absence of an effect for the latter implies labour demand conditions are not a factor in underemployment among employed females, which represents an important difference to males.

Most female underemployment is among part-time workers (see Table 5.3), so estimates would be expected to be relatively insensitive to the definition of underemployment adopted. However, this is not entirely the case. The significant positive effect on the probability of underemployment associated with being single disappears for those without dependent children (it remains for sole parents compared with couples). A negative effect of being an ESB immigrant also arises, which is diminishing in length of residency in Australia. The years-since-migration effect may derive from differences across ESB immigrant arrival cohorts (with more recent arrivals less likely to be part-time workers who are underemployed).

7.2. Persons in the Labour Force

Multinomial logit models

Multinomial logit models are used to model the probability of unemployment, underemployment, and full employment of persons in the labour force. The multinomial logit model is identified by normalising the parameters β to zero for one outcome (the base category), and is described by the system of equations:

$$\Pr(y = 1) = \frac{1}{1 + \sum_{j=2}^J e^{x\beta_j}} \quad (7.1)$$

$$\Pr(y = i) = \frac{e^{x\beta_i}}{1 + \sum_{j=2}^J e^{x\beta_j}}, \quad i = 2, \dots, J$$

where $y = 1$ is the base category.

Multinomial logit models involve estimation of more than one equation, and it is difficult to interpret individual coefficients. Marginal effects are, as with probit models, more informative. For multinomial logit models, the marginal effect of explanatory variable x_k on the probability outcome i occurs is given by:

$$\frac{\partial \Pr(y = i | x)}{\partial x_k} = \Pr(y = i | x) \left[\beta_{k,i|J} - \sum_{j=1}^J \beta_{k,j|J} \Pr(y = j | x) \right] \quad (7.2)$$

As is the case with probit models, marginal effects depend on the values of the explanatory variables at which they are evaluated. Mean marginal effects are therefore reported. Thus, for continuous variables, the mean marginal effect of a variable is obtained by evaluating equation (7.2) for each individual, holding constant other variables at actual values, and taking the mean effect over all individuals in the sample. Similarly, for binary explanatory variables, the effect of a discrete change from zero to one, holding constant all other variables at actual values, is evaluated for each individual in the sample, and the mean effect calculated.²⁶

Two sets of tests are conducted for all of the multinomial logit models estimated in this study. The first set comprises two commonly employed tests of the IIA assumption, the Hausman test and the Small-Hsiao test. Both involve estimation of restricted models in which one or more of the outcome categories (and observations in those categories) are eliminated. Coefficient estimates from the restricted models are then compared with coefficient estimates from the full model, with large differences between the estimates implying violation of the IIA assumption. The Hausman and Small-Hsiao test statistics are both distributed chi-squared, large values implying violation of the IIA assumption. These test statistics are reported for all models.²⁷

The second set of tests concerns whether the determinants of any two outcomes are similar, to the point that the outcomes can be regarded as indistinguishable. That is, if none of the independent variables significantly affect the odds of outcome m versus n , the two outcomes can be combined, resulting in more efficient estimates, with no loss of information. This amounts to a test of the hypothesis:

$$H_0 : \beta_{1,m|n} = \beta_{2,m|n} = \dots = \beta_{K,m|n} = 0 \quad (7.3)$$

where $\beta_{i,m|n}$ is the coefficient estimate of explanatory variable i for outcome m when the base outcome category is n . For example, outcome m might be underemployment and outcome n

²⁶ In contrast to the probit models, the z-statistics reported for the multinomial logit models are for the test that the underlying coefficient is zero. A more appropriate statistic is for the test that the mean marginal effect is zero. However, analytic standard errors for the mean marginal effects derived from multinomial logit equations are not available. Bootstrap standard errors therefore need to be calculated (a computationally intensive process which has not been able to be conducted as yet).

²⁷ As noted earlier, these tests often give inconsistent results and provide little guidance to violations of the IIA assumption. They are therefore of limited value.

might be unemployment. Both likelihood ratio (LR) and Wald tests can be used to test (7.3). The LR test of combining m and n involves estimating the unrestricted model and then a restricted model with base outcome m and with coefficient estimates for outcome n constrained to 0 (with the exception of the constant). The difference in the estimated log likelihood of the two models is distributed chi-squared with K degrees of freedom. The Wald test requires estimation of the unrestricted model only. It involves comparing the coefficient estimates for outcomes m and n , and the Wald statistic is also distributed chi-squared with K degrees of freedom.

Wald and LR tests for combining outcomes were conducted for all outcome combinations of all multinomial logit models. The results of the Wald and LR tests are not reported individually for each logit model, however, since the null hypothesis that two outcomes can be combined was rejected at the 1% level for all outcome combinations in all equations.

Table 7.3 reports mean marginal effects for the multinomial logit model, where persons in the labour force can be unemployed, underemployed or fully employed. The base case outcome is 'fully employed'. Estimates for the underemployed are very close to those of the probit models estimated on employed persons, possibly reflecting the IIA assumption underpinning multinomial logit.

For both males and females, there are a number of similarities between the factors associated with underemployment and those associated with unemployment. For males, the mean effects of being young, less educated, indigenous or an NESB immigrant, having a long-term history of unemployment and a recent history of non-employment are, compared with being fully employed, to increase the probability of being unemployed and also to increase the probability of being underemployed (by similar magnitudes). For females, the mean effects of being young, less educated, having a long-term history of both non-employment, (additionally) having a long-term history of unemployment, having a recent history of non-employment and having a recent history of unemployment are all to increase the probability of both unemployment and underemployment relative to full employment.

There are also some similarities between underemployment and unemployment in the factors that do not appear to have significant effects: region of residence, immigrant length of residence in Australia and English proficiency have insignificant effects on both the probability of unemployment and probability of underemployment, for both males and females.

While there are similarities, there are, however, also some notable differences between the factors associated with unemployment and those associated with underemployment. Important differences are evident for both males and females with respect to income unit type, number of dependent children and number of jobs held in the preceding financial year. Income unit type is not associated with significant effects on the probability of unemployment, but is for the probability of underemployment, with being single having a positive effect on the probability of underemployment. Similarly, the number of dependent children appears to play no role in unemployment, but does for underemployment – the probability of underemployment is increasing in the number of dependents aged under 15 for females (at an average rate of 0.03 per child), and increasing in the number of dependents aged 15-24 for males (at an average rate of 0.04 per child). It is possible that both income unit type and dependent children effects, present for underemployment but not unemployment, reflect labour supply preferences.

With regard to the number of jobs held in the last year, the effects attributable to this variable capture an importance difference between the underemployed and the unemployed, which is that the underemployed have a foothold in the labour market. The number of jobs held has a negative mean effect on the probability of unemployment, but a positive mean effect on the probability of underemployment – more jobs in the recent past is helpful for avoiding unemployment, but appears to reflect difficulty finding 'good' employment.

Table 7.3: Multinomial logit estimates of mean marginal effects on the probability of being unemployed and underemployed versus fully employed – Males in the labour force

	FT workers can be underemp.		Only PT workers can be underemp.	
	Unemployed	Underemployed	Unemployed	Underemployed
Aged 25-34	-0.030 (-4.27)*	-0.035 (-2.90)*	-0.030 (-4.53)*	-0.049 (-5.50)*
Aged 35-44	-0.034 (-4.84)*	-0.078 (-5.71)*	-0.034 (-4.66)*	-0.052 (-5.61)*
Aged 45-54	-0.037 (-4.95)*	-0.095 (-6.35)*	-0.038 (-4.76)*	-0.052 (-5.11)*
Aged 55-64	-0.028 (-4.01)*	-0.083 (-4.57)*	-0.029 (-3.60)*	-0.018 (-1.66)
Degree	-0.034 (-4.01)*	-0.060 (-3.87)*	-0.034 (-3.88)*	-0.030 (-2.69)*
Other P-S	-0.010 (-1.65)	-0.019 (-1.63)	-0.010 (-1.80)	-0.029 (-3.34)*
Comp H-S	-0.014 (-1.80)	-0.018 (-1.35)	-0.014 (-1.53)	0.005 (0.19)
City	0.007 (1.12)	0.002 (0.38)	0.007 (1.00)	-0.002 (-0.14)
Disabled	0.023 (2.60)*	0.019 (1.31)	0.023 (2.74)*	0.026 (2.15)*
Couple	-0.005 (-1.31)	-0.054 (-3.76)*	-0.005 (-0.91)	-0.026 (-2.42)*
Sole parent	0.049 (1.65)	-0.042 (-0.90)	0.054 (2.04)*	0.004 (0.52)
Couple parents	0.008 (0.20)	-0.062 (-3.05)*	0.009 (0.56)	-0.019 (-1.24)
No. dep <15	-0.008 (-1.42)	0.007 (0.57)	-0.007 (-1.47)	0.001 (0.03)
No. dep 15-24	-0.010 (-0.77)	0.040 (2.93)*	-0.009 (-0.65)	0.036 (4.32)*
ATSI	0.070 (3.36)*	0.101 (2.68)*	0.069 (2.94)*	0.035 (1.54)
ESB Immigrant	0.058 (2.23)*	0.002 (0.44)	0.059 (2.13)*	-0.016 (-0.20)
NESB Immigrant	0.036 (2.69)*	0.140 (3.69)*	0.032 (1.94)	0.030 (1.33)
Poor English	0.043 (1.89)	0.042 (0.98)	0.042 (1.59)	-0.013 (-0.17)
YSM	-0.001 (-0.83)	-0.003 (-0.91)	-0.002 (-0.66)	0.002 (0.38)
YSM2	0.000 (0.30)	0.000 (0.49)	0.000 (0.15)	-0.001 (-0.78)
YSM-NESB	0.000 (0.05)	-0.001 (-0.13)	0.001 (0.16)	-0.003 (-0.58)
YSM2-NESB	0.000 (0.19)	0.000 (-0.17)	0.000 (0.16)	0.000 (0.49)
Region unemp	0.001 (1.20)	0.006 (2.18)*	0.001 (1.05)	0.004 (1.71)
Not emp - life	5.07E-04 (1.92)	1.74E-04 (0.62)	5.69E-04 (2.58)*	9.59E-04 (3.24)*
Unemp - life	1.10E-03 (2.87)*	1.37E-03 (1.81)	1.01E-03 (2.48)*	9.13E-06 (0.32)
Not emp - year	7.86E-04 (5.99)*	1.44E-03 (3.19)*	7.61E-04 (4.98)*	4.24E-04 (2.01)*
Unemp - year	8.72E-04 (4.19)*	2.55E-04 (0.75)	9.00E-04 (4.58)*	5.90E-04 (2.04)*
No. jobs - year	-0.028 (-2.89)*	0.036 (3.42)*	-0.028 (-2.95)*	0.028 (4.62)*
IIA tests:				
Hausman (χ^2)	4.01	-14.53	1110.02*	-41.76
Small-Hsiao (χ^2)	38.07	67.78*	54.43*	29.77
Wald	700.06		717.66	
Sample size	4775		4775	

Note: z-statistics reported in parentheses are for the test that the underlying coefficient is zero. * indicates significance at the 5% level (or rejection of the null hypothesis of IIA at the 5% level).

Table 7.3 continued: Multinomial logit estimates of mean marginal effects on the probability of being unemployed and underemployed versus fully employed – Females in the labour force

	FT workers can be underemp.		Only PT workers can be underemp.	
	Unemployed	Underemployed	Unemployed	Underemployed
Aged 25-34	-0.035 (-4.43)*	-0.066 (-4.45)*	-0.035 (-4.34)*	-0.062 (-4.67)*
Aged 35-44	-0.041 (-5.13)*	-0.057 (-4.03)*	-0.040 (-5.10)*	-0.061 (-4.69)*
Aged 45-54	-0.029 (-4.85)*	-0.116 (-7.30)*	-0.029 (-4.65)*	-0.093 (-6.48)*
Aged 55-64	-0.045 (-5.33)*	-0.104 (-4.99)*	-0.045 (-5.18)*	-0.073 (-3.80)*
Degree	-0.021 (-2.82)*	-0.078 (-5.24)*	-0.021 (-2.71)*	-0.058 (-4.44)*
Other P-S	-0.016 (-2.62)*	-0.043 (-3.36)*	-0.016 (-2.68)*	-0.044 (-3.73)*
Comp H-S	-0.025 (-2.84)*	-0.022 (-1.63)	-0.025 (-2.82)*	-0.016 (-1.37)
City	0.011 (1.40)	-0.009 (-0.41)	0.011 (1.27)	-0.018 (-1.25)
Disabled	0.013 (1.25)	0.018 (0.94)	0.013 (1.36)	0.036 (1.83)
Couple	-0.009 (-1.32)	-0.038 (-2.44)*	-0.009 (-1.06)	-0.015 (-1.05)
Sole parent	0.023 (1.58)	0.011 (0.64)	0.023 (1.88)	0.066 (2.64)*
Couple parents	-0.004 (-0.66)	-0.061 (-2.58)*	-0.004 (-0.30)	0.000 (-0.04)
No. dep <15	-0.006 (-0.70)	0.025 (2.53)*	-0.006 (-0.70)	0.024 (2.79)*
No. dep 15-24	0.010 (1.71)	0.007 (0.66)	0.010 (1.58)	-0.003 (-0.03)
ATSI	0.044 (2.18)*	-0.032 (-0.53)	0.043 (2.08)*	-0.034 (-0.70)
ESB Immigrant	0.048 (1.32)	-0.072 (-1.01)	0.048 (1.22)	-0.101 (-1.57)
NESB Immigrant	-0.009 (0.18)	0.166 (3.14)*	-0.011 (0.12)	0.169 (3.34)*
Poor English	-0.001 (-0.34)	-0.077 (-1.57)	-0.001 (-0.28)	-0.066 (-1.56)
YSM	-0.002 (-0.50)	0.007 (1.06)	-0.002 (-0.39)	0.014 (1.97)*
YSM2	0.000 (0.22)	-0.001 (-0.83)	0.000 (0.12)	-0.002 (-1.93)
YSM-NESB	0.004 (0.93)	-0.016 (-1.85)	0.005 (0.82)	-0.025 (-3.03)*
YSM2-NESB	-0.001 (-0.91)	0.003 (1.50)	-0.001 (-0.79)	0.005 (3.00)*
Region unemp	0.002 (1.54)	-0.001 (-0.21)	0.002 (1.58)	0.000 (0.24)
Not emp - life	3.65E-04 (2.58)*	4.01E-04 (1.61)	3.71E-04 (2.65)*	4.66E-04 (1.99)*
Unemp - life	6.20E-04 (2.63)*	2.83E-03 (2.84)*	6.78E-04 (2.85)*	3.02E-03 (3.41)*
Not emp - year	8.37E-04 (7.53)*	4.52E-04 (2.07)*	8.35E-04 (7.33)*	2.77E-04 (1.60)
Unemp - year	5.17E-04 (3.85)*	1.49E-03 (2.65)*	5.24E-04 (3.94)*	1.49E-03 (3.00)*
No. jobs - year	-0.040 (-4.51)*	0.025 (1.44)	-0.040 (-4.52)*	0.022 (1.24)
IIA tests:				
Hausman (χ^2)	-1.66	34.59	-2.77	50.99*
Small-Hsiao (χ^2)	28.06	21.78	33.91	39.76
Wald	592.05		573.54	
Sample size	4186		4186	

Note: z-statistics reported in parentheses are for the test that the underlying coefficient is zero. * indicates significance at the 5% level (or rejection of the null hypothesis of IIA at the 5% level).

A further interesting difference between underemployment and unemployment for males is that the local unemployment rate appears to have no (significant) effect on unemployment. This is perhaps surprising, and is difficult to explain (as indeed is the absence for females of an effect for both unemployment and underemployment). For females, other differences include a positive mean effect on unemployment, but not underemployment, associated with being indigenous, and a positive mean effect on underemployment, but not unemployment, associated with being an

NESB immigrant. Length of female immigrant residency in Australia also has significant mean marginal effects on the likelihood of underemployment when we restrict the definition of underemployment to part-time workers, effects that are not evident for the probability of unemployment.

8. Conclusion

The evidence from Wave 1 of the HILDA survey is that underemployment is widespread and of significant proportions: over one in six employed persons expresses a preference for more hours of paid work, preferring, on average, approximately 12 hours more per week. While underemployment is by no means associated with as severe adverse consequences for welfare dependence and income as unemployment, it does appear to have detrimental consequences. Particularly telling is that, for both males and females, the adverse effects of part-time underemployment on subjective well-being (life satisfaction) are not far short of those associated with unemployment. For males, full-time worker underemployment, which is more prevalent among males than part-time worker underemployment, is also associated with adverse outcomes for income and life satisfaction. This is somewhat at odds with the conventional wisdom that only part-time worker underemployment is likely to have adverse consequences of concern to policy-makers.

The findings on the predictors of underemployment are broadly consistent with previous Australian research. Specifically, for the (more limited) range of variables he had available, Wooden (1993) found similar effects to those found in this study. Facilitated by the comparative richness of the HILDA dataset, this study has, however, identified additional significant factors associated with underemployment, including employment history, number of dependent children, the local unemployment rate, indigenous status, length of immigrant residency in Australia and employment tenure.

This study has also found that underemployment has many predictors in common with unemployment. There are, however, several important differences, including effects attributable to income unit type, number of dependent children and number of jobs held in the preceding year. The number-of-jobs effect on underemployment is in the opposite direction to its effect on unemployment, reflecting the fact that the underemployed do not appear to have difficulty gaining a foothold in the labour market, but do have difficulty finding good jobs with adequate hours. The impacts associated with income unit type and number of dependent children may in part reflect labour supply behaviour, deriving from family commitments, rather than insufficient labour demand. Underemployment deriving from such effects is, strictly speaking, not really underemployment (although may nonetheless be a policy concern).

A number of worthwhile lines of inquiry in relation to underemployment, and preferences over working hours more generally, have not been considered by this study. Several warrant specific mention. First, the consideration of underemployment in the community as a whole has precluded detailed study of specific groups in the community, such as persons with disabilities, indigenous Australians and older persons. Subject to sample size limitations, focusing on such groups would be a valuable exercise.

Second, the study of the divergence between preferred and actual working hours more generally, rather than simply underemployment, is likely to produce useful findings. This approach could incorporate into the analysis unemployed persons, overemployed persons, and even persons not in the labour force. The consideration of preferred and actual hours of employment for all persons, irrespective of labour force status, would be especially interesting in the context of study at the household level of work-family decisions and outcomes. Study of working time preferences and outcomes at the household level could consider issues such as joint decision-making of family members regarding working-time preferences, and the relationship between

working-time preferences of an individual and actual (and preferred) working-time of that person's partner.

Third, the release of Wave 2 (and subsequent waves) of the HILDA survey raises the prospect of study of dynamic features of underemployment. That is, longitudinal information at the individual level can inform us on pathways to and from underemployment, and the determinants of those pathways. Important issues in this regard include the persistence of underemployment over time, and the circumstances (if any) under which underemployment is a predictor of future unemployment, and the circumstances under which it is a predictor of future full employment.

References

- Australian Bureau of Statistics (ABS) (1984) *Employment, Underemployment and Unemployment 1966-1983, Australia*, Canberra, Catalogue No. 6246.0.
- ABS (2001) *Australian Standard Geographical Classification*, Canberra, Catalogue No. 1216.0.
- ABS (2002) *Statistical Geography, Volume 2, Census Geographic Areas Australia 2001*, Canberra, Catalogue No. 2905.0.
- Bosworth, D. (1986) *Labour Utilisation in Australia: An Economic Analysis*, National Institute of Labour Studies, Working Paper Series, No. 88, September.
- Bosworth, D. and T. Westaway (1987) 'Labour Hoarding, Discouraged Workers and Recorded Unemployment: An International Comparison', *Australian Bulletin of Labour*, Vol. 13, June, 143-61.
- Bregger, J. and S. Haugen (1995) 'BLS Introduces New Range Of Alternative Unemployment Measures,' *Monthly Labor Review*, October, 19-26.
- Brooks, C. and P.A. Volker (1985) 'Labour Market Success and Failure: An Analysis of the Factors Leading to the Workplace Destinations of the Australian Population', in P.A. Volker (ed.), *The Structure and Duration of Unemployment in Australia: Proceedings of a Conference, 4-5 August 1983*, AGPS, Canberra.
- Brown S., J. Sessions and D. Watson (2001) 'The Relative Contributions of Wage and Hours Constraints to Working Poverty in Britain,' mimeo.
- Cragg, J. (1971) 'Some Statistical Models for Limited Dependent Variables with Application to the Demand for Durable Goods,' *Econometrica*, Vol.39, No.5, 829-844.
- Denniss, R. (2001) 'Measuring Employment in the 21st Century: New Measures of Underemployment and Overwork,' The Australia Institute discussion paper.
- Denniss, R. (2003) 'Flexible Measures for a Flexible Labour Market,' *Australian Bulletin of Labour*, Vol. 29, No. 2, 113-125.
- Doiron, D. (2003) 'Is Under-Employment due to Labour Hoarding? Evidence from the Australian Workplace Industrial Relations Survey,' *Economic Record*, 79(246), 306-23.
- Dickens, W. and S. Lundberg (1993) 'Hours Restrictions and Labor Supply,' *International Economic Review*, 34(1), 169-92.
- Ham, J. (1982) 'Estimation of a Labour Supply Model with Censoring Due to Unemployment and Underemployment,' *Review of Economic Studies*, 49, 335-54.
- International Labour Organization (ILO) (1990) *Surveys of Economically Active Population, Employment, Unemployment and Underemployment: An ILO Manual on Concepts and Methods*, International Labour Organization, Geneva.
- ILO (1998) Report of the Sixteenth Conference of Labour Statisticians, Geneva.
- ILO (2000) Current International Recommendations on Labour Statistics, ILO, Geneva.
- Jacobs, J. (1993) 'Trends in Wages, Underemployment, and Mobility among Part-Time Workers,' Institute for Research on Poverty Discussion Paper No. 1021-93, University of Wisconsin-Madison.
- Kahn, S. and K. Lang (1991) 'The Effect Of Hours Constraints on Labor Supply Estimates,' *Review of Economics and Statistics*, 73(4), 605-11.
- Leppel, K. and S. Clain (1988) 'The Growth in Involuntary Part-Time Employment of Men and Women,' *Applied Economics*, 20(9), 1155-66.
- Long, J. and J. Freese (2001) *Regression Models for Categorical Dependent Variables Using Stata*, Stata Press, College Station, Texas.
- Mitchell, W. and E. Carlson (ed.) (2001) *Unemployment: The Tip of The Iceberg*, Centre for Applied Economic Research, University of NSW, Sydney.

- Preston, A. (1997) 'Where are we now with Human Capital Theory?' *Economic Record*, Vol. 73, No. 220, 51-78.
- Ruiz-Quintanilla, S. and R. Claes (1996) 'Determinants of Underemployment of Young Adults: A Multi-Country Study,' *Industrial and Labor Relations Review*, April.
- Ross, R.T. (1985) 'Improved Labour Market Information: Beyond Unemployment Statistics,' *Australian Bulletin of Labour*, Vol. 11, September, 236-45.
- Scutella R. and M. Wooden (2003) The Characteristics of Jobless Households in Australia: Evidence from Wave 1 of the Household, Income and Labour Dynamics in Australia (HILDA) Survey, Draft Report prepared for FaCS, August 2003.
- Sorrentino, C. (1995) 'International Unemployment Indicators, 1983-93,' *Monthly Labor Review*, August, 31-50.
- Stewart, M. and J. Swaffield (1997) 'Constraints on the Desired Hours of Work of British Men,' *The Economic Journal*, 107, 520-35.
- Watson, N. and T. Fry (2002) 'The Household, Income and Labour Dynamics in Australia (HILDA) Survey: Wave 1 Weighting,' HILDA Project Technical Paper Series No. 3/02, Melbourne Institute of Applied Economic and Social Research, University of Melbourne.
- Watson, N. and M. Wooden (2002) 'The Household, Income and Labour Dynamics in Australia (HILDA) Survey: Wave 1 Survey Methodology,' HILDA Project Technical Paper Series No. 1/02, Melbourne Institute of Applied Economic and Social Research, University of Melbourne.
- Wilkins, R. (2003) 'Underemployment in Australia: Evidence from the HILDA Survey,' Draft Report prepared for the Commonwealth Department of Family and Community Services.
- Wooden, M. (1993) 'Underemployment in Australia,' *Labour Economics and Productivity* 5, September, 95-110.
- Wooden, M. (1996) 'Hidden Unemployment and Underemployment: Their Nature and Possible Impact on Future Labour Force Participation and Unemployment,' National Institute of Labour Studies Working Paper No. 140, Flinders University of South Australia.

Appendix A: Variable Descriptions

- Educational attainment (dummy variables):
 - *Degree*: highest educational qualification is a bachelor's degree or higher.
 - *Other P-S qual.*: Highest educational qualification is a post-school qualification other than 'degree'.
 - *CHS*: Have no post-school qualifications and have completed the highest level of secondary school.
 - *NCHS*: Have no post-school qualifications and have not completed highest level of secondary school (omitted dummy in regression equations).
- *City* (reside in major city): Place of residence is one of the major cities of Australia (dummy variable). Derived from the Accessibility/Remoteness Index of Australia scores from the 1996 Census (see ABS (2001)).
- *Disabled*: Respondent has a long-term health condition or disability that limits the type or amount of work he or she can do (dummy variable).
- Income unit type (dummy variables):
 - *Single*: Single person (the omitted dummy in regression equations).
 - *Couple*: Couple living together (whether legally married or not) with no dependent children.
 - *Sole parent*: Lone parent with dependent children.
 - *Couple parents*: Couple living together (whether legally married or not) with dependent children.
- *No. dep <15*: Number of dependent children aged under 15 years.
- *No. dep 15-24*: Number of dependent children aged 15-24 years.
- Ethnicity/Country of birth (dummy variables):
 - *ATSI*: Aboriginal or Torres Strait Islander
 - *ESB* (English-speaking background immigrant): Person born in New Zealand, the UK, Ireland, Northern America or South Africa.
 - *NESB* (Non-English-speaking background immigrant): Non-ESB immigrant.
- *Poor English*: Respondent speaks English poorly or doesn't speak English at all (dummy variable).
- *YSM* (years since migration): 2001 minus year of arrival in Australia (0 for native-born persons).
- *YSM2*: YSM squared, divided by 10.
- *YSM-NESB*, *YSM2-NESB*: *YSM* & *YSM2* for NESB immigrants (0 for all others).
- *Region unemp* (local unemployment rate): Unemployment rate in ABS statistical region in 2001 (%), derived from the 2001 Census. There are 63 statistical regions in Australia. See ABS (2002) for details.
- *Not emp – life* (proportion of life not employed (%)): Percentage of time since 15 years of age have not been employed. Derived from data items in the HILDA survey dataset for 'age', 'years in paid work', 'years unemployed' and 'years not in the labour force'.

- *Unemp – life* (proportion of life not employed (%)): Percentage of time since 15 years of age have been unemployed. Derived from data items in the HILDA survey dataset for ‘age’ and ‘years unemployed’.
- *Not emp – year* (proportion of last year not employed (%)): Percentage of time not employed in the 2000-2001 financial year.
- *Unemp – year* (proportion of last year unemployed (%)): Percentage of time unemployed in the 2000-2001 financial year.
- *No. jobs – year*: Count of the number of full-time and part-time jobs held in the 2000-2001 financial year.
- *Tenure*: Tenure with current employer (years).
- Industry of employment (dummy variables):
 - *Indaccom*: Accommodation, cafes and restaurants
 - *Indcommun*: Communication services
 - *Indconstr*: Construction
 - *Indcultrec*: Culture and recreation
 - *Indeduc*: Education
 - *Indelec*: Electricity, gas and water
 - *Indfinance*: Finance and insurance
 - *Indgovdef*: Government administration and defence
 - *Indhlthcs*: Health and community services
 - *Indmanuf*: Manufacturing
 - *Indmining*: Mining
 - *Indperserv*: Personal and other services
 - *Indpropbus*: Property and business services
 - *Indrtrade*: Retail trade
 - *Indtrans*: Transport and storage
 - *Indwstrade*: Wholesale trade
 - *Indagric*: Agriculture, forestry and fishing (the omitted dummy in regression equations)
- Occupation of employment (dummy variables):
 - *Occmgr*: Managers and administrators
 - *Occprof*: Professionals
 - *Occasprof*: Associate professionals
 - *Occadvclerk*: Advanced clerical and service workers
 - *Occintclerk*: Intermediate clerical and service workers
 - *Occelemclerk*: Elementary clerks, sales workers and service workers
 - *Occtrade*: Tradespersons
 - *Occintprod*: Intermediate production and transport workers
 - *Occlabour*: Labourers and related workers (the omitted dummy in regression equations)
- *Union*: Member of a trade union (dummy variable).
- *Self employed*: Employer, own-account worker, owner-manager or family helper (dummy variable).
- *SEIFA decile* (Index of relative socio-economic disadvantage in deciles): ABS’s socio-economic indicators for areas from the 1996 census. 1 = lowest decile, 10 = highest decile.
- *Income unit income support receipt*: Dummy variable equal to 1 if any member of the income unit currently receives income support payments; 0 otherwise. If no member of the income unit is observed on income support payments and income support payments are missing for any member, the variable is set to missing.
- *Wage rate*: Current annual wage and salary income divided by (52.14 * current usual weekly hours of work in all jobs). Wages exclude business income; consequently, wage rate information is missing for self employed workers who report no wage or salary income.
- *Personal income* (Gross personal income in the previous financial year from all sources): Derived from variables for gross wages and salary, pensions and benefits, business income, investment income and ‘other’ income. It is coded as missing if:
 - both gross wages and salary and pensions and benefits are missing; or
 - one of gross wages and salary and pensions and benefits is zero, and the other is missing; or
 - both gross wages and salary and pensions and benefits are zero and business income is missing; or
 - gross wages and salary, pensions and benefits and business income are zero and either investment or other income is missing.
- *Income unit equivalent income*: Income unit gross income in the previous financial year from all sources, divided by the square root of the number of members of the income unit. It is missing if personal income is missing for any member.
- *Life satisfaction*: Respondent’s recorded score from 0 (completely dissatisfied) to 10 (completely satisfied) in answer to the question ‘All things considered, how satisfied are you with your life?’
- *Job satisfaction*: Respondent’s recorded score from 0 (completely dissatisfied) to 10 (completely satisfied) in answer to the question ‘All things considered, how satisfied are you with your job?’

Appendix B: Coefficient Estimates for Outcome Equations

Table B6.1: All persons

	1. Income support receipt	2. Equivalent income	3. Personal income	4. Life satisfaction
Males				
Aged 25-34	0.038 (2.12)	0.399 (8.07)	0.738 (13.55)	-0.543 (-6.19)
Aged 35-44	0.036 (2.01)	0.479 (9.43)	0.925 (16.20)	-0.705 (-7.60)
Aged 45-54	0.049 (2.58)	0.400 (7.87)	0.956 (16.51)	-0.572 (-6.08)
Aged 55-64	0.104 (3.90)	0.328 (5.19)	0.896 (11.78)	-0.378 (-3.30)
Degree	-0.068 (-5.57)	0.430 (10.77)	0.593 (13.15)	-0.232 (-3.11)
Other P-S	-0.022 (-1.98)	0.103 (2.77)	0.282 (6.80)	-0.138 (-2.03)
Comp H-S	-0.020 (-1.42)	0.116 (2.42)	0.351 (6.71)	-0.125 (-1.44)
City	-0.012 (-1.24)	0.168 (6.22)	0.151 (4.84)	-0.138 (-2.63)
Disabled	0.123 (6.17)	-0.153 (-3.30)	-0.181 (-3.02)	-0.548 (-5.41)
Couple	0.018 (1.16)	0.459 (12.77)	0.036 (0.84)	0.709 (9.56)
Sole parent	0.095 (2.32)	0.319 (3.62)	0.024 (0.16)	-0.122 (-0.58)
Couple parents	0.058 (3.11)	0.277 (5.96)	0.116 (1.96)	0.513 (5.11)
No. dep <15	0.025 (4.03)	-0.150 (-8.71)	-0.044 (-1.69)	0.015 (0.39)
No. dep 15-24	0.045 (4.34)	0.187 (5.70)	-0.168 (-3.84)	0.079 (1.24)
ATSI	0.045 (1.11)	-0.184 (-1.49)	-0.199 (-1.99)	0.460 (2.08)
ESB Immigrant	-0.129 (-4.64)	0.124 (0.97)	0.095 (0.69)	0.108 (0.62)
NESB Immigrant	0.036 (1.10)	-0.480 (-4.32)	-0.464 (-3.76)	-0.170 (-1.01)
Poor English	0.105 (2.04)	-0.253 (-1.99)	-0.112 (-0.85)	-0.232 (-0.81)
YSM	0.012 (2.65)	-0.011 (-1.01)	-0.007 (-0.61)	-0.005 (-0.34)
YSM2	-0.002 (-2.14)	0.001 (0.74)	0.001 (0.39)	0.001 (0.32)
YSM-NESB	-0.016 (-2.93)	0.038 (2.47)	0.041 (2.54)	0.007 (0.29)
YSM2-NESB	0.003 (2.51)	-0.005 (-1.86)	-0.007 (-2.11)	0.000 (0.10)
Constant		9.749 (171.64)	9.469 (151.95)	8.244 (90.92)
R-squared	0.267	0.325	0.408	0.083
Sample size	4617	3578	3950	4775
Females				
Aged 25-34	-0.001 (-0.03)	0.283 (6.33)	0.706 (13.61)	-0.266 (-3.12)
Aged 35-44	0.032 (1.67)	0.293 (6.26)	0.851 (14.92)	-0.242 (-2.67)
Aged 45-54	0.026 (1.40)	0.258 (5.34)	0.746 (12.94)	-0.172 (-2.00)
Aged 55-64	0.118 (3.97)	0.228 (3.28)	0.702 (9.14)	-0.048 (-0.42)
Degree	-0.057 (-3.99)	0.287 (8.05)	0.545 (12.13)	-0.226 (-3.23)
Other P-S	0.003 (0.20)	0.018 (0.52)	0.265 (6.00)	-0.205 (-3.06)
Comp H-S	0.043 (2.28)	0.010 (0.21)	0.364 (6.64)	-0.183 (-2.06)
City	-0.040 (-3.41)	0.195 (7.06)	0.104 (3.08)	-0.188 (-3.62)
Disabled	0.086 (3.73)	-0.200 (-3.73)	-0.141 (-2.21)	-0.733 (-6.26)
Couple	-0.021 (-1.34)	0.658 (18.47)	-0.002 (-0.04)	0.419 (5.89)
Sole parent	0.282 (7.40)	-0.091 (-1.40)	0.119 (1.49)	-0.609 (-4.78)
Couple parents	-0.029 (-1.31)	0.689 (10.84)	-0.143 (-1.73)	0.018 (0.16)
No. dep <15	0.010 (1.22)	-0.173 (-5.53)	-0.114 (-2.90)	0.068 (1.59)
No. dep 15-24	0.042 (3.63)	0.133 (3.85)	-0.075 (-1.56)	0.087 (1.38)
ATSI	0.137 (2.71)	-0.061 (-0.60)	-0.030 (-0.24)	-0.293 (-1.35)
ESB Immigrant	-0.080 (-1.70)	-0.188 (-1.17)	-0.020 (-0.17)	0.034 (0.14)
NESB Immigrant	-0.040 (-1.15)	-0.518 (-3.88)	-0.296 (-2.22)	0.081 (0.39)
Poor English	0.089 (1.47)	-0.445 (-2.63)	-0.272 (-1.70)	-1.163 (-2.55)
YSM	0.006 (1.11)	0.014 (1.06)	0.000 (0.04)	0.006 (0.26)
YSM2	-0.001 (-1.02)	-0.002 (-0.83)	0.001 (0.44)	-0.002 (-0.40)
YSM-NESB	-0.001 (-0.16)	0.013 (0.74)	0.019 (1.14)	-0.026 (-0.85)
YSM2-NESB	0.000 (0.11)	-0.001 (-0.37)	-0.003 (-1.03)	0.007 (1.07)
Constant		9.788 (190.67)	9.449 (152.09)	8.277 (83.35)
R-squared	0.231	0.385	0.411	0.088
Sample size	3925	2983	3355	4186

Table B6.2: Employed persons – Males

	1. Personal income		2. Wage rate		3. Job satisfaction	
	(A)	(B)	(A)	(B)	(A)	(B)
Aged 25-34	0.693 (12.39)	0.637 (11.27)	0.262 (8.95)	0.211 (7.44)	-0.338 (-3.04)	-0.387 (-3.45)
Aged 35-44	0.880 (15.25)	0.801 (13.47)	0.362 (12.09)	0.280 (9.54)	-0.379 (-3.22)	-0.446 (-3.66)
Aged 45-54	0.909 (15.61)	0.814 (12.98)	0.357 (10.98)	0.254 (7.65)	-0.079 (-0.66)	-0.164 (-1.29)
Aged 55-64	0.909 (12.00)	0.791 (10.26)	0.331 (7.64)	0.209 (4.89)	0.148 (1.03)	0.002 (0.01)
Degree	0.599 (13.22)	0.469 (8.61)	0.411 (15.19)	0.265 (8.35)	-0.287 (-2.97)	-0.401 (-3.33)
Other P-S	0.284 (6.75)	0.251 (5.62)	0.131 (6.10)	0.091 (4.16)	-0.279 (-3.23)	-0.345 (-3.74)
Comp H-S	0.353 (6.72)	0.315 (5.92)	0.172 (5.77)	0.135 (4.68)	-0.303 (-2.67)	-0.329 (-2.87)
City	0.164 (5.31)	0.102 (3.37)	0.108 (6.00)	0.062 (3.45)	-0.183 (-2.69)	-0.174 (-2.49)
Disabled				-0.092 (-		
	-0.149 (-2.41)	-0.106 (-1.79)	-0.111 (-3.07)	2.67)	-0.271 (-2.07)	-0.270 (-2.06)
Couple	0.036 (0.85)	0.029 (0.70)	0.110 (4.34)	0.099 (4.21)	0.165 (1.80)	0.159 (1.75)
Sole parent	0.064 (0.49)	0.088 (0.67)	0.025 (0.37)	0.052 (0.79)	0.017 (0.07)	0.091 (0.37)
Couple parents	0.142 (2.44)	0.133 (2.33)	0.103 (3.14)	0.102 (3.37)	-0.021 (-0.16)	-0.015 (-0.11)
No. dep <15				-0.013 (-		
	-0.049 (-1.84)	-0.051 (-1.97)	-0.007 (-0.55)	1.15)	0.107 (2.34)	0.091 (1.98)
No. dep 15-24	-0.140 (-3.20)	-0.134 (-3.17)	0.000 (0.02)	0.003 (0.11)	0.069 (0.77)	0.069 (0.78)
ATSI				-0.002 (-		
	-0.239 (-2.48)	-0.217 (-2.52)	-0.049 (-0.76)	0.03)	0.845 (3.40)	0.945 (3.76)
ESB Immigrant	0.088 (0.72)	0.151 (1.21)	0.064 (0.94)	0.122 (1.89)	0.226 (1.01)	0.249 (1.11)
NESB Immigrant				-0.056 (-		
	-0.425 (-3.13)	-0.338 (-2.58)	-0.134 (-2.29)	1.03)	-0.216 (-0.92)	-0.124 (-0.53)
Poor English				-0.090 (-		
	-0.060 (-0.55)	-0.037 (-0.35)	-0.127 (-1.98)	1.36)	-0.406 (-1.13)	-0.379 (-1.03)
YSM				-0.002 (-		
	-0.004 (-0.39)	-0.008 (-0.72)	0.001 (0.23)	0.32)	-0.026 (-1.16)	-0.026 (-1.18)
YSM2	0.000 (0.08)	0.001 (0.37)	-0.001 (-0.47)	0.000 (-0.10)	0.005 (1.12)	0.005 (1.12)
YSM-NESB	0.037 (2.31)	0.037 (2.36)	0.010 (1.30)	0.009 (1.29)	0.043 (1.35)	0.043 (1.34)
YSM2-NESB				-0.001 (-		
	-0.006 (-1.87)	-0.006 (-2.01)	-0.002 (-0.98)	1.03)	-0.007 (-1.06)	-0.007 (-1.11)
Tenure		0.007 (3.63)		0.006 (5.24)		0.005 (1.18)
Indaccom		0.103 (0.93)		0.083 (1.04)		-0.222 (-1.04)
Indcommun		0.275 (2.02)		0.346 (4.38)		-0.394 (-1.71)
Indconstr		0.274 (3.24)		0.251 (3.49)		0.098 (0.61)
Indcultrec		-0.022 (-0.17)		0.016 (0.19)		0.204 (0.97)
Indeduc		0.056 (0.59)		0.042 (0.51)		0.018 (0.09)
Indelec		0.238 (2.52)		0.332 (4.24)		-0.070 (-0.23)
Indfinance		0.456 (3.51)		0.480 (5.14)		0.215 (0.94)
Indgovdef		0.217 (2.64)		0.244 (3.24)		0.075 (0.38)
Indhlthes		0.112 (1.04)		0.171 (1.93)		-0.105 (-0.46)
Indmanuf		0.235 (3.04)		0.211 (3.03)		-0.115 (-0.70)
Indmining		0.536 (5.79)		0.550 (7.10)		-0.177 (-0.63)
Indperserv		0.047 (0.46)		0.039 (0.47)		0.577 (2.79)
Indpropbus		0.329 (3.77)		0.293 (3.81)		-0.047 (-0.28)
Indrtrade		0.053 (0.60)		0.010 (0.13)		-0.150 (-0.88)
Indtrans		0.325 (3.70)		0.223 (3.03)		0.124 (0.63)
Indwstrade		0.217 (2.41)		0.127 (1.69)		-0.125 (-0.62)
Occmgr		0.357 (5.34)		0.262 (6.63)		0.412 (2.81)
Occprof		0.306 (5.09)		0.257 (6.84)		0.275 (1.84)
Occasprof		0.224 (3.37)		0.153 (3.54)		0.212 (1.46)
Occadvclerk				-0.005 (-		
		0.217 (1.08)		0.03)		0.765 (2.50)
Occintclerk		0.188 (2.83)		0.115 (3.11)		-0.049 (-0.31)
Occelemclerk				-0.041 (-		
		-0.067 (-0.72)		1.00)		0.076 (0.42)
Occtrade		0.119 (2.13)		0.080 (2.40)		0.335 (2.53)
Occintprod		0.165 (2.76)		0.031 (0.97)		0.161 (1.10)
Union		0.111 (3.59)		0.082 (4.24)		-0.106 (-1.39)
Self employed		-0.233 (-4.89)		-0.152 (-		0.058 (0.67)

Constant	9.474 (150.16)	9.175 (96.33)	2.316 (73.25)	2.086 (30.81)	7.988 (65.72)	7.864 (40.46)
R-squared	0.358	0.391	0.222	0.319	0.034	0.049
Sample size	3680	3679	3724	3723	4423	4422

Table B6.2 continued: Employed persons – Females

	1. Personal income		2. Wage rate		3. Job satisfaction	
	(A)	(B)	(A)	(B)	(A)	(B)
Aged 25-34	0.665 (12.99)	0.594 (11.61)	0.277 (8.37)	0.215 (6.49)	0.069 (0.58)	0.007 (0.06)
Aged 35-44	0.801 (14.11)	0.703 (12.11)	0.320 (10.31)	0.250 (7.80)	0.173 (1.49)	0.081 (0.67)
Aged 45-54	0.709 (12.31)	0.574 (9.23)	0.311 (9.71)	0.216 (6.62)	0.198 (1.64)	0.083 (0.64)
Aged 55-64	0.674 (8.61)	0.496 (5.77)	0.324 (7.86)	0.195 (4.72)	0.641 (4.20)	0.526 (3.13)
Degree	0.533 (11.84)	0.356 (6.63)	0.399 (15.56)	0.206 (5.98)	-0.503 (-5.28)	-0.711 (-6.14)
Other P-S	0.255 (5.78)	0.204 (4.55)	0.132 (6.06)	0.075 (3.52)	-0.189 (-2.14)	-0.300 (-3.35)
Comp H-S	0.352 (6.34)	0.304 (5.53)	0.172 (5.77)	0.122 (4.23)	-0.325 (-2.90)	-0.346 (-3.09)
City	0.114 (3.39)	0.087 (2.64)	0.069 (3.83)	0.059 (3.38)	-0.206 (-2.91)	-0.240 (-3.37)
Disabled				-0.046 (-		
Couple	-0.155 (-2.37)	-0.130 (-1.97)	-0.063 (-1.72)	1.29)	-0.414 (-2.96)	-0.439 (-3.12)
Sole parent				0.050 (2.12)	0.182 (1.80)	0.159 (1.60)
Couple parents				-0.018 (-		
No. dep <15	0.133 (1.64)	0.137 (1.72)	-0.021 (-0.48)	0.43)	0.162 (0.99)	0.144 (0.89)
No. dep 15-24	-0.124 (-1.54)	-0.128 (-1.61)	0.074 (1.79)	0.053 (1.34)	0.346 (2.59)	0.306 (2.30)
ATSI	-0.111 (-2.85)	-0.112 (-2.86)	0.051 (0.90)	0.058 (1.06)	0.337 (1.41)	0.288 (1.22)
ESB Immigrant	-0.068 (-1.40)	-0.071 (-1.49)	0.053 (0.76)	0.075 (1.26)	0.088 (0.29)	0.167 (0.55)
NESB Immigrant				-0.117 (-		
Poor English	-0.156 (-1.11)	-0.144 (-1.00)	-0.195 (-1.63)	1.06)	-0.173 (-0.61)	-0.089 (-0.32)
YSM				-0.227 (-		
YSM2	0.047 (0.42)	0.087 (0.82)	-0.296 (-2.45)	1.93)	-0.827 (-2.40)	-0.630 (-1.82)
YSM-NESB				-0.011 (-		
YSM2-NESB	-0.313 (-2.29)	-0.224 (-1.74)	-0.005 (-0.33)	0.75)	0.002 (0.03)	-0.003 (-0.05)
Tenure				-0.038 (-		
Indaccom	-0.209 (-1.50)	-0.160 (-1.08)	-0.033 (-1.45)	1.76)	-0.040 (-0.56)	-0.039 (-0.55)
Indcommun				-0.002 (-		
Indconstr	-0.003 (-0.24)	-0.006 (-0.52)	-0.001 (-0.14)	0.37)	-0.004 (-0.12)	-0.010 (-0.33)
Indcultrec	0.001 (0.63)	0.002 (0.88)	0.000 (-0.16)	0.000 (-0.09)	-0.002 (-0.29)	-0.001 (-0.11)
Indeduc	0.023 (1.40)	0.022 (1.44)	0.015 (1.24)	0.014 (1.24)	0.011 (0.25)	0.014 (0.33)
Indelec				-0.001 (-		
Indfinance	-0.004 (-1.22)	-0.004 (-1.27)	-0.002 (-0.70)	0.65)	0.000 (0.04)	0.000 (0.00)
Indgovdef		0.013 (4.61)		0.005 (2.95)		0.003 (0.54)
Indhlthcs				-0.061 (-		
Indmanuf		-0.001 (-0.01)		0.71)		0.037 (0.14)
Indmining		0.231 (1.42)		0.142 (1.49)		0.336 (0.95)
Indperserv		0.168 (1.08)		0.088 (0.79)		0.295 (1.01)
Indpropbus				-0.098 (-		
Indrtrade		0.027 (0.17)		1.02)		0.334 (1.12)
Indtrans				-0.052 (-		
Indwstrade		-0.096 (-0.69)		0.64)		0.675 (2.78)
Occmgr		0.056 (0.18)		0.026 (0.24)		-0.444 (-0.51)
Occprof		0.193 (1.35)		0.098 (1.14)		0.064 (0.23)
Occadvclerk		-0.016 (-0.10)		0.084 (1.00)		0.641 (2.38)
Occintclerk				-0.034 (-		
		0.036 (0.26)		0.42)		0.603 (2.55)
		0.128 (0.94)		0.051 (0.61)		0.440 (1.71)
		0.360 (1.48)		0.191 (1.49)		0.480 (1.00)
				-0.105 (-		
		-0.074 (-0.49)		1.18)		0.563 (2.05)
		0.129 (0.94)		0.047 (0.57)		0.252 (1.04)
				-0.100 (-		
		-0.069 (-0.51)		1.26)		0.136 (0.56)
		0.165 (1.05)		0.089 (0.97)		0.502 (1.72)
		0.037 (0.21)		0.099 (1.07)		0.246 (0.93)
		0.531 (5.35)		0.450 (7.52)		0.500 (2.30)
		0.339 (3.72)		0.372 (9.00)		0.512 (2.75)
		0.249 (2.72)		0.237 (5.76)		0.502 (2.73)
		0.284 (3.04)		0.287 (5.58)		0.752 (3.80)
		0.104 (1.27)		0.100 (2.50)		0.384 (2.24)

Occelemclerk		0.061 (0.71)		0.067 (1.67)		0.385 (2.05)
Occtrade		0.108 (0.93)		0.061 (1.00)		0.390 (1.58)
Occintprod				-0.057 (-		
		0.020 (0.17)		0.98)		0.470 (2.06)
Union		0.102 (2.75)		0.055 (2.90)		-0.288 (-3.49)
Self employed		-0.256 (-3.43)		0.041 (0.75)		0.011 (0.10)
Constant	9.479 (154.10)	9.295 (66.46)	2.265 (64.11)	2.147 (24.60)	7.819 (57.74)	7.247 (24.62)
R-squared	0.381	0.413	0.199	0.269	0.046	0.065
Sample size	3164	3163	3443	3442	3927	3926