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# Labour Underutilisation in Metropolitan Labour Markets in Australia: Individual Characteristics, Personal Circumstances and Local Labour Markets

Scott Baum, Anthea Bill and William Mitchell

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## Abstract

There has been a growing awareness that the issue of labour market disadvantage is substantially greater than merely considering unemployment and the ability to find a job. There is an increasing literature that points to the advantages of considering a broader concept which accounts not only for those people who are traditionally unemployed, but also for individuals who are underemployed and those who are sub-unemployed or discouraged workers. Taking multidimensional survey and census data for Australian metropolitan regions, this paper applies a broad employability framework to an understanding of labour underutilisation which presents the risk of underutilisation as a function of individual characteristics, personal circumstances and the impact of local labour market characteristics. The analysis finds that the risk of labour underutilisation is associated with a range of individual characteristics and personal circumstances together with the characteristics of the metropolitan local labour market.

## Introduction

The purpose of this paper is to develop an analysis of the associations between individual-level labour market outcomes, the personal and family characteristics of

individuals and the characteristics of local metropolitan labour market contexts. It has long been recognised that problems associated with broad labour market outcomes are central to understanding questions of disadvantage, poverty and social exclusion.

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In this sense, the analysis of labour market disadvantage within metropolitan contexts is certainly not new. However, while researchers and policy-makers are keenly interested in official unemployment rates, with the dominant concern being the contrasts between people with jobs and those who are unemployed, it is generally agreed that the assumptions underpinning this division are no longer valid as the boundaries between work and non-work have become increasingly fluid (Beck, 1992; Dooley and Catalano, 2003). A stylised view of labour markets now includes reference to increasing casualisation of jobs and a rise in part-time employment, a growth in so-called good jobs and bad jobs, an increase in the reference period for long-term unemployment and a more complex picture of occupation and employment mobility that may also include periods of marginal labour market attachment. In short this increasingly fluid picture is no longer just a divide between employment and unemployment but is now increasingly multidimensional.

In the face of these changing employment dynamics, labour underutilisation is seen as an increasingly important concept for articulating a wide range of employment hardship and disadvantage (Jensen *et al.*, 1999; Carter, 1982; Clogg, 1979; Hauser, 1974). In that unemployment is considered to underestimate the true level of joblessness, an accurate understanding of underutilisation is required in order to inform and enable appropriate responses and reasoning within policy debates. Moreover, concerns are expressed about the extent of the underutilisation problem, because, like unemployment more generally, labour underutilisation has significant impacts on economic efficiency, social isolation and exclusion and individual wellbeing. Defining labour underutilisation moves beyond the narrow notion of unemployment to include other types of inadequate employment or other forms of dislocation from the labour market. It includes individuals who

want to work but are not actively seeking employment or those who are claiming benefits and it also includes individuals who are not working full-time but would like to work more hours. Within broader definitions, it also may include individuals who are working full-time or part-time voluntarily but who receive very low wages (working poor) and those who are employed in jobs that are classified as low-skilled relative to the individual's qualifications.

There is general agreement that underutilisation is of large enough magnitude to warrant its inclusion as an important area of social concern. International comparisons suggest that, while unemployment rates in many industrialised countries have fallen, once a broader measure of underutilisation is considered, the level of labour market activity and engagement changes significantly. The work by Fothergill (2001) and others (Beatty *et al.*, 2000; Turok and Edge, 1999) has illustrated the divergence that has appeared between activity rates and claimant unemployment rates in the UK, while in the US work has also recognised the utility of considering a broad measure of labour underutilisation (Clogg, 1979; Jensen and Slack, 2003). In Australia, while official unemployment rates have declined, there is significant evidence to suggest that taking a broader measure of labour underutilisation illustrates the true extent of labour disadvantage. Official Australian Bureau of Statistics estimates illustrate the converging trends that characterise unemployment and underutilisation rates, suggesting that while headline unemployment rates have shown improvement underlying labour market disadvantage as represented by broader labour underutilisation has remained much more constant. Similar concerns have been raised in the research by Mitchell and Carlson who argue that

while the aggregate unemployment rate in Australia has returned to levels that existed in

the late 1980s ... the level of underemployment and the impact of marginal attachment have risen over that time (Mitchell and Carlson, 2001, p. 63).

Recent estimates using Australian social survey data indicate that 1 in 6 employed persons can be classified as being underemployed—employed persons who usually work less than 35 hours per week and who would like to work more hours than they currently work—while adding the number of persons who are only marginally attached to the labour market—discouraged workers—and the numbers who are characterised as unemployed suggests an underutilisation rate of around 18 per cent (Wilkins, 2004).

It is clear from a range of research seeking to understand labour market outcomes that a multiscalar or multidimensional approach is increasingly becoming more appropriate with a focus not only on individual behaviour but also on the impacts of local contextual factors (see for example Flynn, 2003; McCulloch, 2003). There has been a long history in education research and increasingly in sociology and other social sciences of considering the ways that different multiscalar constructs impact on outcomes at different levels of scale. In some of this research, the focus has been on understanding the ways in which individual-level outcomes are influenced by broad social and geographical (community, neighbourhood, regional) scales. Such an approach is placed within a larger developing international social science literature seeking to connect changes from the global to the local, or the macro to the micro, and to understand the associations between these changes and human life (Brooks-Gunn *et al.*, 1997; Sampson *et al.*, 2002; Briggs, 2003; Friedrichs *et al.*, 2005). This agenda focuses on

- Understanding the impacts of neighbourhood effects or area effects or more broadly

the impacts of interactions between people and place.

- Conceptualising the hierarchical nature of social phenomena and the way in which individual-level outcomes are reflected in the uneven spatial impacts on labour markets, housing markets and other broad contextual issues, together with the impact of individual-level characteristics arguing that the broad impacts are linked because of where particular people live and their roles in society and the economy.
- Establishing that understanding the effects of people and place is becoming increasingly crucial as individuals, households and local communities face continued economic restructuring and major social and demographic change and as policy-makers and researchers try to understand the impacts and outcomes of these changes.

The research reported in this paper makes a contribution to this agenda.

For policy-makers, an understanding of these multiscalar factors refocuses debate on the broader range of correlates and questions regarding the best mix of policy response. A concrete example of these types of concerns are the policy arguments by O'Connor *et al.* (2001) and others (Bolton, 1992; Karmel *et al.*, 1993; Partridge and Rickman, 2006) who refer to the tension between people prosperity and place prosperity. The focus on place prosperity involves dealing directly with places when policy is designed and implemented. In contrast, people prosperity is associated with economic and social policies that influence the social and economic fortunes of people, irrespective of where they live. The multiscalar approach suggested in this paper fundamentally situates people within a particular metropolitan labour market context and raises questions regarding potential conflicts in understanding the associations that exist with regard to

socioeconomic advantage and disadvantage and hence the need for different policy responses. Different human beings, based on their individual capacities, can experience the same labour market context in profoundly different ways, generating considerable variation in socioeconomic outcomes. If individual capacities are the significant drivers of individual outcomes (i.e. geography is less important) then the appropriate policy response may be to focus on improving individual capacities or assets. Alternatively, individual capacities may be less important in comparison with the geographical context in determining socioeconomic outcomes. Here, a different set of policies would be indicated which focus on improving opportunities and outcomes based on where people live and their spatial interactions. A third, more likely, alternative focuses on both individual capacities and the impact of the labour market context and on the ways in which a combination of people- and place-based policies can aid in mitigating the negative impacts of social disadvantages.

Encouraged by the need to provide broader understandings of labour underutilisation, this paper suggests a holistic model of labour market outcomes within Australian metropolitan labour markets. Specifically, the paper uses individual- and aggregate-level data and applies multinomial logit models to consider the association between labour underutilisation and a range of individual and contextual factors. The analysis allows us to consider the multidimensional or multiscalar nature of underutilisation risk and provides a useful broad framework with which to consider appropriate policy responses. In what follows, we first consider the individual and contextual issues associated with understanding the risk of underutilisation before discussing in detail the methods and data adopted for the analysis. Following this, we present the findings from our analysis, before

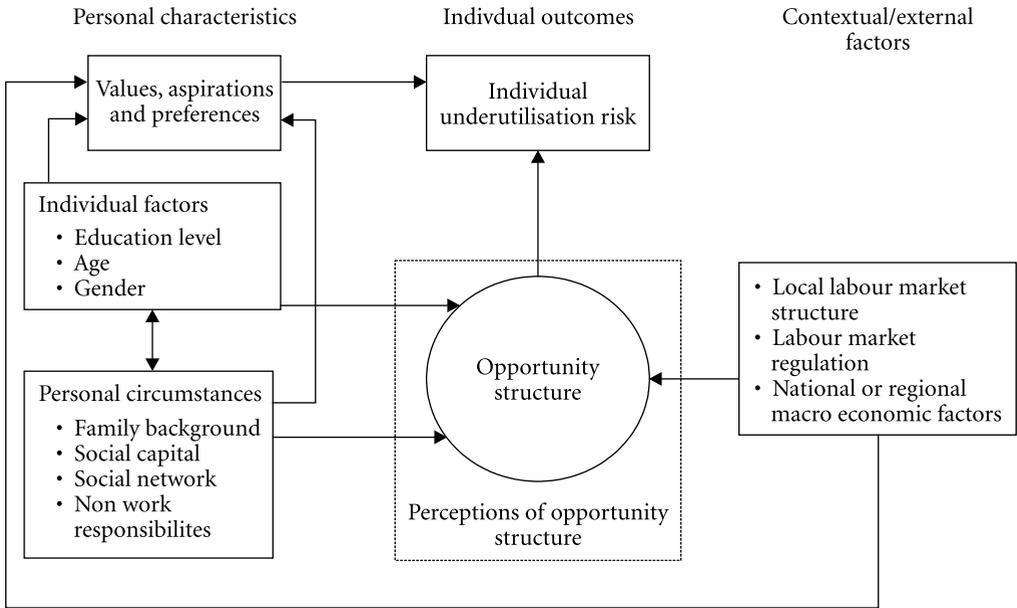
undertaking a discussion of the implications of our analysis.

## Labour Underutilisation: Individual and Contextual Issues

As a genre of broader labour market research, the study of labour underutilisation can be understood from a range of conceptual approaches developed across a number of social science disciplines. Often these approaches are piecemeal, focusing on narrowly defined drivers and processes. However, there has been an increasing movement towards utilising a framework focusing on aspects of employability (McQuaid *et al.*, 2005; McQuaid and Lindsay, 2005). Employability includes both narrowly defined individual assets—labour supply—but more broadly also introduces issues such as job search, labour market regulation and labour market demand. Narrow definitions are often associated with neo-liberal foci on improving the individual's capacity to perform in the labour market (Confederation of British Industry, 1999), while broader definitions move beyond this to provide a more holistic approach which considers employability to be

the capability to move into and within labour markets and to realise potential through sustainable and accessible employment. For the individual, employability depends on: the knowledge and skills they possess, and their attitudes; the way personal attributes are presented in the labour market; the environmental and social context within which work is sought; and the economic context within which work is sought (DHFETE, 2002, p. 7; see McQuaid and Lindsay, 2005, for a range of definitions).

Heuristically, we can represent the characteristics of employability in a framework such as that presented in Figure 1. Here, individual labour market outcomes are seen as a function of three interrelated factors including



**Figure 1.** Heuristic model of individual underutilisation risk

Source: adapted from Galster and Killen (1995).

individual and personal circumstances and external or contextual factors which may impact directly on labour market outcomes or via impacts on an individual’s real or perceived opportunity structure (McQuaid and Lindsay, 2005; see also Galster and Killen, 1995). The first two factors relate to individual and personal circumstances and are thought of as factors influencing labour supply. The third set of factors are considered largely external to the individual and can be seen as representing a broad range of contextual factors including those characteristic of labour market demand (McQuaid, 2006).

Individual characteristics include skills and attributes such as basic education, transferable skills, demographic characteristics, health and wellbeing, job-seeking skills and an individual’s level of adaptability and mobility. Personal characteristics, such as education, formal and learned job skills, social status and age, are often included in models attempting to understand labour market outcomes. In particular, the

operations of the opportunity structure objectively vary greatly across individuals, depending on their personal characteristics and how these characteristics are evaluated by the markets and institutions (Galster and Killen, 1995, p. 14).

Other factors, such as an individual’s health and wellbeing, together with an individual’s job-seeking behaviour and knowledge which may act to funnel information about known jobs (possibly in connection with an individual’s social networks), are also important. Lastly, adaptability and mobility refer to the extent to which an individual is willing to change/adapt to meet changing labour market conditions or in some cases be geographically mobile (McQuaid and Lindsay, 2005). Here, individual characteristics are seen as impacting on outcomes either via their impact on preferences, values and aspirations or through their impact on the individual’s opportunity structure.

Personal circumstances include many socioeconomic contextual factors which

generally relate to an individual's social, family and household circumstances. Household circumstances which may include the need to care for children or elderly parents may act as an important constraint on employability or may act to change work preferences. Family background can impact on an individual's opportunity structure via the influence of personal characteristics of the individual, but also through the impact of social networks and social capital of parents and other intergenerational effects (Case and Katz, 1991). Importantly, the impact that social networks might have on an individual's employment outcomes is widely discussed in the research literature and includes the impact on perceived and real opportunity structures and individual aspirations and preferences (Holzer, 1988; Buck, 2001; Elliott, 1999). Buck (2001) suggests that an individual's links into social and interpersonal networks provide critical information and support that are important to understanding eventual employment and other social outcomes. In situations where social networks are not widely developed, and this is often compounded by residential concentrations in disadvantaged neighbourhoods or localities, job search including information regarding employment opportunities is thought to be less effective and hence is associated with negative individual employment outcomes (Granovetter, 1973; Elliott, 1999; Topa, 2001; Calvó-Armengol and Jackson, 2004).

The impact of local or regional resources or local contextual factors is most often related to the quality, quantity and diversity of institutions at a neighbourhood or local level. It refers to

the array of markets and institutions that provide the potential means of social mobility within which an individual may interact, such as labour, housing and financial markets, schools and the social welfare and criminal justice systems (Galster, 2002, p. 6).

With direct reference to employment, McQuaid and Lindsay (2005) refer to these factors as a range of external influences that include local labour market demand and local vacancies, the nature of national macro-economic demand and enabling support factors such as local jobs policies, governance or the local labour control regime (see also Abraham and Wachter, 1987; Holzer, 1991; Jonas, 1996; Peck, 1998; Helms and Cumbers, 2005).

In understanding labour underutilisation, the spatial organisation of metropolitan employment opportunities in terms of the number, quality and distribution of jobs is important. Although researchers such as Buck (2001) question whether local labour demand can be considered as a source of local or regional contextual effect, others—including Green (1996), Noble and Smith (1996), Gould and Fieldhouse (1997), Jargosky (1997), Flynn (2003) and Sunley *et al.* (2006)—point to its necessary inclusion in an analysis of individual labour market outcomes. Significantly

there is no such thing as a national labour market, but rather a complex geographical mosaic of overlapping local and sub-national labour markets (Sunley *et al.* 2006, p. 43)

which will have differential effects on individuals' opportunity structures and hence on employment outcomes. Segmented local labour market regions will mean that demand is likely to be significantly different between geographically separate labour market regions or zones. Similarly, the extent to which there is non-local competition for jobs from in-commuting may also be important in influencing demand for local workers (Bailey and Turok, 2000; Bill *et al.*, 2005). Here, the metropolitan local labour market contexts will impact in different ways on perceived or real opportunity structures as individuals are differentially located in varying localities.

There is a significant body of evidence illustrating those particular social groups and individuals who are more vulnerable to underutilisation due to their individual characteristics or personal circumstances (Wooden, 1993; Le and Miller, 1999, 2001; ACOSS, 2003; Wilkins, 2004; Flynn, 2003; de Anda, 1994; de Jong and Madamba, 2001; Soltero, 1996; Zhou, 1993). Early Australian work by Wooden (1993) identified that the underutilised were more likely to be female, aged less than 25 years of age, unmarried and to be from a non-English-speaking background (NESB). The likelihood of being underutilised was also higher for those working in less-skilled occupations and for those working in the recreation and personal services and construction industries. The more recent work by Wilkins (2004) expands these findings illustrating that for males and females part-time underutilisation is higher among younger than older respondents and respondents who are single and who have low levels of human capital, although for females, part-time underutilisation is also high for those aged 35–44 years and for respondents in couple families with dependent children. There is also a notable, although insignificant, difference between indigenous males and other males. For full-time underutilisation, males aged 25–34 years were more likely to be underutilised, while for both males and females there was a higher incidence of full-time underutilisation for those from a non-English-speaking background. A US study by Jensen and Slack (2003) reports that the risk of underutilisation is strongly related to age, although the effect is not linear with a u-shaped association between age and underutilisation being detected. The risk is also higher for females, respondents from Hispanic or Native American backgrounds, respondents who were unmarried and those with low education. While much of the research into labour underutilisation has used an aggregate measure of underemployment

(i.e. underemployment versus adequately employed), others have identified the important differences that may arise when different states of underutilisation are considered. Using a disaggregated measure of underutilisation that includes low hours and low wages, Flynn (2003) identifies important gender, age and race factors that drive the risk of underutilisation. Of significance are the gendered differences that exist in labour market outcomes, with women more likely to suffer low pay and men more likely to suffer low hours.

The impact of local or regional labour market contexts has also been explored. Ruiz-Quintanilla and Claes (1996) recognise the importance of considering underutilisation from within a broad framework, focusing on both supply-side and demand or contextual factors. They find that besides the individual, supply-side factors included in their model, a range of labour market and societal factors including the level of organisational socialisation (the strategies employers took to integrate the young workers into their first jobs) were important for explaining the prevalence of underutilisation. In the more recent paper by Flynn (2003), labour market demand variables accounting for the availability of jobs in services and manufacturing were included, with the findings suggesting that, taking account of the range of individual-level factors, the aggregate labour demand characteristics were important in explaining the risk of marginal employment outcomes. Using regional proxies for labour demand Jensen *et al.* (1999) found that differences in regional labour market characteristics were significantly related to transitions into and out of underutilisation, net of individual-level characteristics. The use of regional proxies has been also applied in Australian research with the recent work by Wilkins (2004) finding that the incidence of underutilisation is marginally higher in major cities than in other areas.

## Methods and Data

The investigation of the impacts and associations between individual behaviour and outcomes has, as pointed out by Galster (2003), assumed several methodological guises with the focus often being on the best way to account for data that are hierarchical or composed of indicators taken at different levels of measurement or scale. In the case of the current research, we are faced with data measured at the individual level together with data measured at the level of metropolitan local labour markets. In order to consider the issues raised in this paper, we run a series of multivariate logit models which specifically account for the clustering of observations at the level of the local labour market region. This provides us with a modelling technique that produces robust outcomes in the face of the two-level structure of our data. Prior to fitting the final set of models, several alternative approaches were considered including the fitting of multilevel models that specifically take into account the hierarchical nature of the data (Goldstein, 2003). While this type of approach has become increasingly popular, it was not used in the final analysis as initial modelling suggested that, with reference to the dataset and sample we use, no additional benefit is gained by fitting a multilevel model versus a standard multivariate model accounting for clustering.

We estimate our models with individual respondents placed in one of four categories depending on responses to a range of questions regarding their employment situation. The four categories used are

- *Adequately employed*: employed persons who do not fit the categories below, including those who are working part-time voluntarily.
- *Involuntarily part-time*: persons who are working part-time, but would like to work more hours (underemployed).<sup>1</sup>
- *Unemployed*: persons not working, but actively looking for work.
- *Sub-unemployed (discouraged workers, also known as hidden unemployed)*: persons not working and not looking for work, who would take a job if one became available.<sup>2</sup>

The models are built up in several stages

- *Model 1*: individual-level independent variables, showing differences in labour underutilisation risk between respondents with different socioeconomic and demographic characteristics.
- *Model 2*: Model 1 plus the addition of independent variables accounting for personal circumstances, showing the added difference of personal circumstances on labour underutilisation risk.
- *Model 3*: Model 2 plus the addition of local labour market independent variables, showing the added difference of local labour market demand conditions on labour underutilisation risk.

## Data

The data used in this paper have come from the Household, Income and Labour Dynamics in Australia (HILDA) survey and aggregate-level data from the Australian Bureau of Statistics (ABS). The HILDA survey is a broad social and economic survey conducted annually which contains information on employment, individual socioeconomic characteristics and household/family characteristics. It also contains identifiers that allow broad spatial characteristics (such as labour market or local area available from census data and labour force surveys) to be considered. This current paper considers the first wave of the HILDA survey (2001) with subsequent papers considering longitudinal outcomes. The wave-one survey file contains a total of around 19 000 respondents. A reduced dataset is used in this paper which includes

individuals of working age defined as either adequately employed, involuntarily working part-time, unemployed or sub-unemployed and who are living in the major metropolitan regions. This reduced dataset includes 5372 individuals.

The dependent variable used in this paper is defined earlier. The individual-level independent variables are developed with regard to the availability of data and the framework presented in the previous section and are similar to those used elsewhere in micro-level studies of employment outcomes (Caspi *et al.*, 1998; Dujardin and Goffette-Nagot, 2006; Le and Miller, 1999; Beggs and Chapman, 1988; Brooks and Volker, 1985; Harris, 1996; Dex and McCulloch, 1997; Flynn, 2003). We have included the following independent variables: AGE2544 (1 if aged 25–44, 0 otherwise), AGE4564 (1 if aged 45–64, 0 otherwise), GENDER (1 if female, 0 if male), MIN\_ED (1 if respondent has received only the minimum level of education, 0 otherwise), ATSI (1 if Aboriginal and Torres Strait Islander (ATSI) background, 0 otherwise), DISABLE (1 if have long term disability, 0 otherwise), ENG\_PROF (1 if self-reported English proficiency is poor or very poor, 0 otherwise) and MOVE (1 if respondent had moved in the past 12 months, 0 otherwise).

Four independent variables are included to account for the impact of personal circumstances and family background. COUPLE\_KIDS (1 if couple family with dependent children, 0 otherwise) and SINGLE\_KIDS (1 if single-parent family with dependent children, 0 otherwise) are included to account for the possible impact that family responsibilities have on labour market participation. In addition, a variable accounting for the impact of parental employment—PAR\_UN—is included (1 if no employed adult role-model/parent, 0 otherwise), while another accounts for the ethnic background of parents—PAR\_OS—(1 if one or both parents born in a non-English-speaking country, 0 otherwise).

In addition to family background, the HILDA data allow us to include proxies for the impact of social networks on labour under-utilisation. While we experimented with a range of possible measures, we only include one in the analysis presented here. An index of individual social networks (SOC\_NET) is included to account for the potential impact that social networks may play in labour market outcomes. The index was developed using responses to questions relating to the extent to which individuals had contact with friends and colleagues.<sup>3</sup>

The metropolitan local labour market contexts are modelled using data relating to Australian Bureau of Statistics labour force survey regions. Each of the metropolitan regions considered here (Sydney, Melbourne, Brisbane, Adelaide and Perth) consists of several labour force survey regions which can be thought to approximate the types of local travel-to-work areas used in other research of this kind (McCulloch, 2003). A total of 36 regions are included. Data are taken from the ABS census product which includes information on individuals both at their place of residence and their place of employment and also information relating to journey-to-work. This allows us to construct local labour market variables accounting for the general strength of the local labour market, but also characteristics accounting for the types of local jobs available and the extent to which local workers are able to gain local employment. Local labour market strength has been accounted for using various indicators (McCulloch, 2003; Bartik, 1993; Flynn, 2003). In this paper, although several possibilities were considered, we have used the employment rate in the local labour market region (EMP\_RATE). Beside the general strength of the local labour market, we also include an indicator of the extent to which local workers are able to gain jobs within their local labour market. The self-containment rate (LOC\_EMPLOY) measures the percentage

of jobs in the local labour market which are taken by workers living in that region. Finally, as a measure of the extent to which local labour markets supply jobs for all those wishing to work full-time, we include the percentage of part-time jobs in the local labour market (LMR\_PT).

## Labour Underutilisation in Metropolitan Labour Markets

Table 1 presents the preliminary analysis of labour underutilisation. The data presented confirm that there are likely to be significant differences in labour market outcomes across individuals differentiated by socioeconomic and demographic characteristics. Older age-groups are associated with lower levels of labour underutilisation, while standard markers of labour market disadvantage such as indigenous status or English proficiency or low formal education are associated with higher levels of labour underutilisation. The variable for gender suggests a mixed outcome, with females having higher rates of

involuntary part-time employment and sub-unemployment compared with males. For respondents in couple households with dependent children, sub-unemployment is relatively high and, for respondents in single-parent households with dependent children, all categories of underutilisation appear important. The remaining variables accounting for personal circumstances are also illustrative of the associations that may exist. In terms of family/household background, both variables suggested that there may be an association with higher levels of labour underutilisation, while the same holds for the social network index. Finally, in this preliminary analysis, the three measures of local labour market strength and characteristics while not large are suggestive of some potential differences.

To explore the associations between the range of independent variables and under-utilisation in a more meaningful way, we fit a series of multinomial logit models using the four categories of employment outcome. We build the models in three stages as described

**Table 1.** Labour market outcomes, descriptive analysis

	<i>Adequately employed</i>	<i>Involuntarily part-time</i>	<i>Unemployed</i>	<i>Sub-unemployed</i>
AGE25_44	79.8	7.4	4.5	8.6
AGE45-64	82.2	5.3	4.4	8.1
MIN_ED	68.9	9.0	8.9	13.2
GENDER	71.2	11.0	4.5	13.3
ATSI	56.4	8.4	18.3	16.9
ENG_PROF	58.2	5.5	18.7	17.6
DISABLE	68.8	9.2	7.8	14.2
MOVED	74.0	7.4	8.3	10.2
COUPLE_KIDS	76.9	8.4	4.1	10.6
SINGLE_KIDS	47.1	16.5	9.2	27.2
PAR_UN	62.4	6.3	12.1	19.1
PAR_OS	71.2	9.5	8.9	10.2
SOC_NET	-0.06	0.14	0.38	0.28
EMP_RATE	93.8	93.7	93.4	93.4
LMR_PT	31.7	32.2	31.6	31.9
LOC_EMP	58.3	58.9	59.0	60.7

earlier. The results of the three separate models are presented in Tables 2–4. The tables contain the regression coefficient, robust standard errors and the relative risk ratios for each category of underutilisation relative to the reference category ‘adequately employed’. In all cases, values on the relative risk ratio above 1 indicate that higher values of the explanatory variable increase the predicted probability of being in the particular category of underutilisation, compared with being adequately employed. Coefficients less than 1 indicate the opposite. The constant is interpreted in the usual way.<sup>4</sup>

### Individual Characteristics Model

We begin by modelling only the individual-level independent variables. The first three columns of Table 2 report the result for the relative risk of being involuntarily employed part-time versus adequately employed. An analysis of Table 2 reveals that the coefficients on the age variables are significant at the 1 per cent level. Older cohorts are significantly less likely to be involuntarily part-time compared with being adequately employed. The coefficient of the education variable is significant and largely reflects existing studies. Having a lower level of formal education is associated with an increased risk of being employed involuntarily part-time. Importantly, the significant gender variable suggests that females are more likely to be classified as involuntarily part-time. Having a disability typically restricts the job opportunities available to an individual and consequently the coefficient on the variable accounting for the presence of a long-term disability is positive and significant. The final significant variable for the category involuntary part-time is the indicator of residential mobility. Having moved in the 12 months prior to the survey significantly decreases the relative risk of being involuntarily employed part-time.

The second category of underutilisation is unemployed versus adequately employed, with the outcomes reported in columns 5–7 in Table 2. Largely, the significant variables reflect the vast amount of research which purports to understand supply-side factors that predict unemployment. The two age variables are significantly related to the relative risk of unemployment with negative coefficients in both cases. The education variable is positively associated with unemployment, illustrating the expected relationship between negative labour market outcomes and lower levels of education. The significant negative gender coefficient is in direct contrast to the outcome for the previous category of underutilisation and suggests that, as found in other studies, unemployment risk is much higher for men than women. The variable indicating indigenous background (ATSI) is included to account for the impact of racial disadvantage associated with employment outcomes. The ATSI variable is highly significant and suggests that the risk of unemployment is a significant issue for individuals from an indigenous background. The variable ENG\_PROF may record the impact of racial or ethnic background on employment outcomes or may also be implicated in the impacts of human capital on disadvantaged labour market outcomes. This variable is significant at the 1 per cent level, illustrating that poor English proficiency is associated with an increased relative risk of unemployment. The variable DISABLE has the expected significant positive association with unemployment. The final variable MOVED is significant at the 1 per cent level and indicates that respondents who had moved in the past 12 months had an increased relative risk of being unemployed.

The final three columns of Table 2 present the results for the final category of underutilisation, sub-unemployed or discouraged workers. The age variables show only a weak association with the relative risk of sub-unemployment being lower with increasing

**Table 2.** Multinomial logit results, individual characteristics and underutilisation

	<i>Involuntary part-time</i>			<i>Unemployed</i>			<i>Sub-unemployed</i>		
	$\beta$	Robust S.E.	Relative risk	$\beta$	Robust S.E.	Relative risk	$\beta$	Robust S.E.	Relative risk
AGE25_44 (1 = person aged between 25 and 44, 0 otherwise)	-1.174***	0.136	0.309	-1.116***	0.139	0.328	-0.568**	0.203	0.566
AGE45-64 (1 = person aged between 45 and 64, 0 otherwise)	-1.489***	0.169	0.226	-1.192***	0.169	0.304	-0.340**	0.178	0.712
MIN_ED (1 = person has the minimum level of education only, 0 otherwise)	0.308**	0.142	1.361	0.853***	0.135	2.346	0.639***	0.150	1.895
GENDER (1 = female)	0.863***	0.100	2.371	-0.278**	0.103	0.757	1.323**	0.124	3.753
ATSI (1 = ATSI background)	0.120	0.416	1.127	1.211***	0.329	3.358	0.709	0.468	2.032
ENG_PROF (1 = person has poor self-reported English proficiency)	0.080	0.446	1.083	1.685***	0.270	5.390	1.073***	0.312	2.925
DISABLE (1 = person has self-reported disability)	0.430***	0.158	1.538	0.525***	0.150	1.690	0.874***	0.132	2.396
MOVED (1 = respondent had moved in the past 12 months)	-0.280***	0.139	0.756	0.479***	0.106	1.615	0.371**	0.134	1.449
CONSTANT	-1.989***	0.162		-2.186***	0.134		-3.567**	0.190	

Notes: \*\* significant at 5 per cent; \*\*\* significant at 1 per cent. Log pseudo likelihood: -3754.24. Count R<sup>2</sup>: 0.78. BIC: -38 347.963.

age. The MIN\_ED variable is again significant, reflecting the positive association between low human capital and the risk of under-utilisation generally. The GENDER variable has a significant coefficient and indicates that, like the category of involuntary part-time workers, females are more likely to be sub-unemployed or discouraged workers. The variable ENG\_PROF is highly significant suggesting that poor English skills are associated with increased relative risk of sub-unemployment or being a discouraged worker. As with the previous categories of underutilisation, the variable accounting for disability is positive and significant. Finally, undertaking recent residential mobility is significant and positive, illustrating that respondents who have moved recently have a higher relative risk of being sub-unemployed or of being discouraged workers.

### Individual Characteristics and Personal Circumstances Model

Table 3 presents the outcomes of the multinomial logit model including the independent variables accounting for individual characteristics and personal circumstances. Adding the predictors accounting for aspects of personal circumstances changes the individual-level predictor variables only marginally. The most significant change is to render the age 45–64 years variable on the category sub-unemployed no longer significant.

Columns 2–4 contain the results for the sub-category involuntary part-time versus adequately employed. The two variables accounting for the presence of dependent children (COUPLE\_KIDS, SINGLE\_KIDS) are both significant. In both cases, the presence of dependent children appears to increase the relative risk of involuntary part-time employment. The variable ‘parents born overseas’ is significant at the 5 per cent level and suggests that respondents whose parents were born in an non-English-speaking

country were at a higher risk of being involuntarily employed part-time. The variable ‘social networks’ is highly significant. Finally, the significant coefficient on the social networks variable indicates that the risk of being employed involuntarily part-time is associated with weaker social networks.

Columns 5–7 present the results for the category unemployment versus adequately employed. Four of the variables accounting for personal circumstances are significant. The variable SING\_KIDS is significant and illustrates the disadvantaged position often associated with single-parent families. The variable PAR\_UN accounts for the presence of positive work role-models in a respondent’s childhood household. The positive coefficient on this variable indicates that the presence of positive role-models is important to labour market outcomes and situations where such role-models are absent are associated with a higher relative risk of unemployment. The significant coefficient on the variable accounting for parental country of birth indicates that having parents born in a non-English-speaking country is associated with an increased relative risk of unemployment. Finally, the social networks variable is negative suggesting that the often-hypothesised association between unemployment and weak social networks is supported in this case.

The results for the final sub-category of underutilisation are presented in columns 8–10 of Table 3. For the category of sub-unemployed or discouraged worker, the signs of the coefficients are similar to those for the previous unemployment category. The presence of dependent children is significant for both respondents from couple families and single-parent families. In both cases, there is an increased risk of sub-unemployment. The positive coefficient on the variable accounting for having parents in paid employment during childhood indicates that the presence of positive role-models is also important for understanding the relative risk of being

**Table 3.** Multinomial logit results, individual characteristics, personal circumstances and underutilisation

	<i>Involuntary part-time</i>			<i>Unemployed</i>			<i>Sub-unemployed</i>		
	$\beta$	Robust S.E.	Relative risk	$\beta$	Robust S.E.	Relative risk	$\beta$	Robust S.E.	Relative risk
AGE25_44 (1 = person aged between 25 and 44, 0 otherwise)	-1.120***	0.138	0.326	-0.999***	0.158	0.368	-0.462**	0.204	0.630
AGE45-64 (1 = person aged between 45 and 64, 0 otherwise)	-1.417***	0.175	0.243	-1.002***	0.187	0.367	-0.208	0.187	0.812
MIN_ED (1 = person has the minimum level of education only, 0 otherwise)	0.301**	0.145	1.352	0.832***	0.143	2.297	0.650***	0.145	1.915
GENDER (1 = female)	0.881***	0.101	2.414	-0.231**	0.102	0.793	1.352***	0.125	3.864
ATSI (1 = ATSI background)	0.155	0.439	1.167	1.299***	0.320	3.665	0.693	0.474	1.999
ENG_PROF (1 = person has poor self-reported English proficiency)	-0.153	0.466	0.858	1.099***	0.266	3.002	0.644**	0.300	1.903
DISABLE (1 = person has self-reported disability)	0.414**	0.161	1.512	0.542***	0.154	1.720	0.870***	0.139	2.386
MOVED (1 = respondent had moved in the past 12 months)	-0.253**	0.142	0.777	0.596***	0.110	1.815	0.414**	0.134	1.514
COUPLE_KIDS (1 = couple family with dependent children, 0 otherwise)	0.325**	0.129	1.384	-0.145	0.189	0.865	0.896***	0.106	2.449
SINGLE_KIDS (1 = single parent with dependent children, 0 otherwise)	1.053***	0.213	2.866	0.783**	0.287	2.187	1.703***	0.159	5.490
PAR_UN (1 = parents not in paid employment when respondent child, 0 otherwise)	-0.081	0.314	0.922	0.830**	0.337	2.293	0.911***	0.263	2.488
PAR_OS (1 = parents born overseas, 0 otherwise)	0.274**	0.123	1.316	0.825***	0.140	2.281	0.538***	0.110	1.712
SOC_NET	-0.196***	0.043	0.822	-0.347***	0.071	0.707	-0.235***	0.051	0.791
CONSTANT	-2.137**	0.166		-2.726***	0.174		-3.910***	0.211	

Notes: \*\* significant at 5 per cent; \*\*\* significant at 1 per cent. Log pseudo likelihood: -3684.781. Count  $R^2$ : 0.78. BIC: -38 409.571.

sub-unemployed or a discouraged worker. The significant coefficient on the variable accounting for parental country of birth indicates that having parents born in a non-English-speaking country is associated with an increased relative risk of being sub-unemployed or a discouraged worker. Finally, the social networks variable is negative suggesting that the relative risk of being sub-unemployed or a discouraged worker is higher in the presence of weaker social networks.

### **Individual Characteristics, Personal Circumstances and Local Labour Market Contexts Model**

The final multinomial logit model includes all three levels of independent variables. The addition of the local labour market predictors only results in a minor change in the magnitude of the individual-level and personal-circumstances-level predictors. The only significant change is that the variable accounting for residential mobility is no longer significant in relation to involuntary part-time employment.

The results for the category involuntary part-time employment are presented in columns 2–4 of Table 4. Not surprisingly, the number of part-time jobs available in a local labour market is significantly associated with the relative risk of being involuntarily employed part-time. This can be taken to suggest that the extent to which a local labour market has full-time jobs for all people who want them is a significant issue in understanding labour market outcomes at the individual level. The variable LOC\_EMP accounts for the extent to which there is in-commuting into the local labour market which may result in increased competition for local jobs. For the sub-category involuntary part-time employment, this variable is significant at the 1 per cent level suggesting that local labour markets that have more self-containment (less in-movement) are

associated with a reduced relative risk of being involuntarily part-time.

The results for the second category of underutilisation, unemployment versus adequately employed, are presented in columns 5–7 of Table 4. Only one of the suspected outcomes is significant. The significant coefficient on the variable EMP\_RATE indicates that generally stronger local labour markets are associated with a reduced risk of unemployment.

Finally, the results for the third category of underutilisation, sub-unemployed or discouraged workers, are presented in the last three columns of Table 4. As with unemployment, there is a significant association between local labour market strength and sub-unemployment with increases in local labour market strength reducing the relative risk of being sub-unemployed or a discouraged worker. In this case, weaker local labour market conditions may act to discourage workers who may have otherwise been active in the employment market.

Comparing results across the groups, indicates that there are similar outcomes between the unemployed and sub-unemployed; however, results for the underemployed differ across a number of factors. The likelihood of underutilisation is generally lower for older age-groups, but does more to reduce the risk for the category involuntarily part-time. Higher education does more to reduce the likelihood of being unemployed or sub-unemployed than being involuntarily part-time, although the variable is significant for the three categories. Factors commonly associated with labour market disadvantage, including Indigenous status, disability and having parents born overseas and not in paid employment, are more important determinants for the unemployed and sub-unemployed than for involuntary part-time workers. Females are more likely than males to be amongst the sub-unemployed and involuntary part-time workers (this could be explained

**Table 4.** Multinomial logit results, individual characteristics, personal circumstances, local labour market contexts and underutilisation

	<i>Involuntary part time</i>			<i>Unemployed</i>			<i>Sub-unemployed</i>		
	<i>Robust</i>	<i>Relative</i>	<i>risk</i>	<i>Robust</i>	<i>Relative</i>	<i>risk</i>	<i>Robust</i>	<i>Relative</i>	<i>risk</i>
	$\beta$	S.E.		$\beta$	S.E.		$\beta$	S.E.	
AGE25_44 (1 = person aged between 25 and 44, 0 otherwise)	-1.109***	0.138	0.330	-0.993***	0.158	0.370	-0.450**	0.204	0.638
AGE45-64 (1 = person aged between 45 and 64, 0 otherwise)	-1.427***	0.175	0.240	-0.982***	0.190	0.374	-0.187	0.188	0.830
MIN_ED (1 = person has the minimum level of education only, 0 otherwise)	0.314**	0.130	1.368	0.769***	0.145	2.158	0.590***	0.148	1.803
GENDER (1 = female)	0.902***	0.104	2.464	-0.215**	0.102	0.807	1.374***	0.127	3.950
ATSI (1 = ATSI background)	0.005	0.461	1.005	1.231***	0.320	3.424	0.607	0.452	1.835
ENG_PROF (1 = person has poor self-reported English proficiency)	-0.028	0.477	0.972	1.128***	0.259	3.089	0.701**	0.305	2.016
DISABLE (1 = person has self-reported disability)	0.403**	0.165	1.496	0.538***	0.154	1.712	0.870***	0.140	2.387
MOVED (1 = respondent had moved in the past 12 months)	-0.231	0.142	0.794	0.601***	0.110	1.824	0.416**	0.132	1.516
COUPLE_KIDS (1 = couple family with dependent children, 0 otherwise)	0.338**	0.131	1.402	-0.167	0.194	0.846	0.877***	0.106	2.403
SINGLE_KIDS (1 = single parent with dependent children, 0 otherwise)	1.070***	0.214	2.915	0.769**	0.290	2.157	1.680***	0.161	5.368
PAR_UN (1 = parents not in paid employment when respondent child, 0 otherwise)	-0.106	0.316	0.900	0.816**	0.339	2.262	0.892***	0.265	2.439
PAR_OS (1 = parents born overseas, 0 otherwise)	0.356**	0.119	1.427	0.865***	0.141	2.374	0.595***	0.114	1.813
SOC_NET	-0.209**	0.042	0.811	-0.347***	0.071	0.707	-0.239***	0.051	0.787
EMP_RATE (local employment rate)	-0.019	0.028	0.981	-0.082**	0.026	0.921	-0.075**	0.030	0.928
LMR_PT (percentage of local jobs that are part-time)	0.108***	0.018	1.114	0.007	0.027	1.007	0.031	0.026	1.031
LOC_EMP (local employment self-containment)	-0.007**	0.003	0.993	0.002	0.004	1.002	0.001	0.004	1.001
CONSTANT	-3.474	2.611		4.629	2.678		2.046	3.170	

Notes: \*\* significant at 5 per cent; \*\*\* significant at 1 per cent. Log pseudo likelihood: -3663.06. Count  $R^2$ : 0.78. BIC: -38 375.704.

by the dominance of part-time work in traditional female industries and occupations); they are less likely to be unemployed, which may be related to lower rates of labour force participation. The presence of dependent children is most strongly associated with involuntary part-time employment and sub-unemployment, although being in a single-parent family is also associated with unemployment. Movers are more likely to be unemployed or in the sub-unemployed; this variable is not significant for the involuntary part-time unemployed. As we would expect, the weaker the outside competition for jobs in the local labour market (measured by labour market self-containment) the less likely a person is to be involuntary part-time unemployed. This variable is not significant for the sub-unemployed and unemployed. Social networks are significant and positive for all three categories and the coefficient is of a similar magnitude. The share of jobs which are part-time is a significant and positive predictor of involuntary part-time work suggesting that the types of jobs that are available in a local area and that are accessible may be significant. The employment rate in the local labour market is positive, significant and of a similar magnitude for all three categories.

## Discussion and Conclusion

This paper sets out an analysis of labour underutilisation in Australian metropolitan labour markets using a combination of data from the first wave of the Household, Income and Labour Dynamics in Australia (HILDA) survey and aggregate employment data from the 2001 Australian Census of Population and Housing. Acknowledging that there exists a range of frameworks within which to place issues surrounding underutilisation, we cast the research conducted in this paper in terms of a conceptual framework that considers labour underutilisation as

a function of a broad range of factors that include individual characteristics, family and personal circumstances and characteristics of metropolitan local labour markets.

In undertaking the analysis, we recognise that the outcomes and patterns identified have several limitations. It is important to note that, in undertaking the analysis presented in this paper, we have not sought to identify causal relationships. Rather, we have simply identified associations that exist between a range of independent variables net of other factors in the model and the dependent variable of interest—namely, labour underutilisation. Further analysis using longitudinal data will provide some insight into these issues and will be the subject of further work. Additionally, the analysis presented could not consider all hypothesised associations. For instance, we could not satisfactorily consider the ways in which labour market policy, which may be regionally differentiated, impacts on outcomes in the ways suggested by Peck (1998) and others (Helms and Cumbers, 2005; Jonas, 1996), nor have we been able to account satisfactorily for the impact of local vacancy conditions or the way in which there may be a local skills mismatch (Abraham and Wachter, 1987; Holzer, 1991). In addition, while it would have been useful to have included a more robust indicator of the strength of social networks this type of data was not available.

With these limitations in mind, the analysis provides some interesting findings. Not unexpectedly, the individual-level factors often associated with labour market disadvantage were largely important in the model of underutilisation presented here and do reflect the findings from a range of existing studies. As we expected, low education hampered the ability of individuals to be employed adequately (not underutilised in some way), illustrating the important returns to investment in education discussed by researchers working from a human capital theory perspective

(Becker, 1975). Other individual-level factors such as racial background or English proficiency were also important, especially in terms of the most extreme forms of underutilisation and may be associated with lower levels of necessary skills (in the case of language proficiency) or discrimination.

The results for the variables accounting for the presence of dependent children are interesting. In both cases, the results suggest that the presence of dependent children may act as a constraint on labour market participation or may impact through changing an individual's work preferences or values. McQuaid and Lindsay (2005) identify that the presence of caring responsibilities may be an important impediment to employability. Others have specifically considered the issue of caring responsibility on employment outcomes, noting that the extent to which there are suitable alternatives for child care is an important determinant on labour market outcomes, especially for women (Presser and Baldwin, 1980; Kimmel, 1998; Kreyenfeld and Hank, 2000; Michalopoulos and Robins, 2000). Associated with these outcomes, there is clearly a gendered division in underutilisation outcomes with males more likely to be unemployed and females more likely to be working part-time involuntarily or being sub-unemployed. These patterns reflect the findings of previous research, with the outcomes identified being compounded by the gendered dimension of segmented labour demand (Flynn, 2003; Wilkins, 2004; Sunley *et al.*, 2006) and the impact of changes in the make-up of households and other demographic factors which have impacted on the way in which females are able to engage in the labour market.

Aspects of a respondent's family background were also seen as important. Researchers such as Wilson (1987) have persuasively argued that household and family dynamics are important to understanding disadvantage in labour markets net of other

factors. Social capital, the role-models and the social/employment networks provided by parents are likely to impact on the life-chances of children even into adulthood. The impacts may be through the knowledge regarding opportunities or may be through changes to preferences, values or aspirations regarding work. The existing empirical research is highly suggestive of the impact of intergenerational outcomes, suggesting that family background does have an important impact on school-to-work transitions and later in adult life (Caspi *et al.*, 1998; McCoull and Pech, 2000) and our results support these findings. Apart from issues surrounding intergenerational transfers of disadvantage, captured by whether the respondent's parents were working and their ethnic background, our model suggests that individuals who have weaker social networks have a higher risk of underutilisation than those with stronger social networks. There has been significant work on the impact that social networks have on employment outcomes (see for example, Granovetter, 1973; Elliott, 1999; Topa, 2001; Calvó-Armengol and Jackson, 2004) and our findings support the suggestion that

social isolation impedes individual success in the labour market because it denies residents informal job contacts that are critical not only for finding jobs but good jobs that promote prolonged labour force attachment (Elliott, 1999, p. 200).

Finally, the outcomes relating to residential mobility also pose interesting questions. Although the findings presented here do not lend themselves to a direct analysis of mobility and a consideration of employment status pre- and post-move—we do not know if people who move were unemployed prior to moving or if their unemployment status is temporary—the significant unemployment and sub-unemployment categories are suggestive of the patterns identified in other research. In line with research focusing on mobility and

labour market outcomes (Pekkala and Tervo, 2002; Goss *et al.*, 1994), recent Australian research by Bill and Mitchell (2006) has considered the impact of residential mobility on employment outcomes using four waves of the HILDA data (the survey data used here). They found that while government policy has encouraged individuals to move to stronger labour markets in an attempt to encourage positive employment outcomes, the evidence suggests that net of other factors mobility *per se* does not benefit the unemployed significantly.

Over and above these factors, the role of metropolitan local labour markets should be highlighted. Although some existing research tends to ignore the impact of these demand-side factors, focusing only on the narrower supply-side or individual influences, we have illustrated that there is a small but important local labour market dimension to understanding individual-level outcomes. Importantly, we hypothesised that the differential nature of metropolitan labour markets would mean that net of other factors individuals with access to different types of metropolitan labour markets would be differentially affected. It is clear that those local labour markets which have deficiencies in broad labour demand characteristics result in an increase in the risk of negative labour market outcomes. This is a similar message to that presented by researchers including Green and Owen (1998), Turok and Edge (1999), Turok and Webster (1998) and Sunley *et al.* (2006). Deficiencies in jobs may be measured in a number of ways and the variables included in this paper suggested that, while the general strength of the local labour market is important, it is also important to consider the types of jobs available and the impact that the gross supply of labour (both local residents and in-commuters) has on labour market outcomes in any given labour market.

In sum, while the individual-level variables might be thought of as accounting for risk

associated with belonging to a particular socioeconomic group or having weaker individual employability assets, there are other factors such as the constraints posed by caring responsibilities, the impact of family background, the strength of social ties and the contextual milieu of local labour markets within broad metropolitan areas which also act on labour market outcomes. These outcomes clearly suggest that narrow approaches to considering metropolitan labour market questions are likely to be less effective than those which take account of both the impacts of individuals and their circumstances and the potential impact of the contextual milieu of space, whether that be neighbourhood, locality, labour market region or some other level of scale.

Returning to consider the implications of the research for policy, it is reasonable to suggest that the type of framework and analysis discussed here can be useful in considering the best mix of policy with which to address labour market disadvantage. Discussion about policy mix has, in the past, debated the merits of both people-based policy and place-based policy (O'Connor *et al.*, 2001; Bolton, 1992; Karmel *et al.*, 1993; Partridge and Rickman, 2006). The policy message from this paper is that a mix of both may well be the most appropriate course of action. The empirical example discussed here clearly shows that, if governments are to pursue policy to address questions of labour market disadvantage in metropolitan regions, then simply focusing on one facet of the problem is likely to be sub-optimal. In several industrialised countries, the emphasis of government policy on combating labour market disadvantage is to improve personal employment prospects by introducing schemes which focus on the employment assets of the individual job-seeker that are increasingly neo-liberal in their approach. However, improving the employability of individuals through increasing their

employability assets or helping them to overcome other personal constraints to adequate employment is, in itself, insufficient and to a large extent simply reshuffles the existing queue for the available jobs. A more sustainable and successful approach is likely to include also improving the available job opportunities. Turok and Webster (1998) and Sunley *et al.* (2006) argue that employment creation that is targeted at the local level (i.e. is place-based) is the missing link in much contemporary labour market policy. Similar arguments have been put forward by Australian researchers including Mitchell and Watts (1997) who suggest that buffer-stock employment schemes or public-sector employment schemes are required to appropriately address disadvantage in the labour market. A significant question also relates to the correct balance of jobs. Ensuring that sufficient full-time jobs are created will be important. Additionally, local labour markets are generally not entirely self-contained. As was noted here, some potential workers may be bumped down by the in-movement of commuters into an area (Gordon, 1999; Bailey and Turok, 2000; Bill *et al.*, 2005) and hence this is also an important issue in understanding potential labour market outcomes and adjustment in metropolitan labour markets. Clearly, while the exact mix between people-based policies and place-based policies will require careful consideration and further understanding, there can be little debate on the need to consider both. Further research is needed to unpack fully these dimensions, but analysis such as that presented in this paper will be an important start to this understanding.

## Notes

1. Involuntary part-time was calculated from two survey responses—whether the respondent was full-time or part-time and if they specifically wished to work more hours. The category may

or may not include part-time people who are constrained to working part-time due, for example, to child-care responsibilities.

2. Although discouraged workers may be difficult to measure, we have drawn this category from a direct survey response that asked those outside the labour force whether they would take work if it came available. This includes respondents who prefer to look after children, but would take a job if one became available and those who are sick and may return to work at a later stage.
3. The social network index was constructed by considering the main components from a principal components analysis of questions coded on a five-point Likert scale. The statements included in the index are: people don't come to visit me as often as I would like; I often need help from other people but can't get it; I don't have anyone I can confide in; I have no one to lean on in times of trouble; I often feel very lonely. Although this does not allow us to consider the strength of these social ties, the frequency of contact or the extent to which social networks are used to access information on employment, the index is suggestive of potential impacts of social networks.
4. In the multinomial logit model, one of the response categories is taken as the reference case and then we use this case to compute the log-odds for all other response categories relative to it. Thus the constant term is the multinomial logit estimate for unemployed relative to the reference category (adequately employed) when the explanatory variables are evaluated at zero. Typically, we would mean-centre the explanatory variables so that the constant applicable to unemployed gives the logit of being unemployed versus adequately employed (reference category) when the explanatory variables take their average values.

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