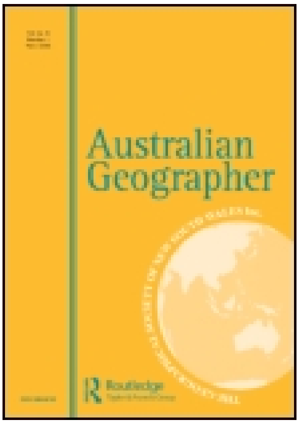

Australian Geographer
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/cage20

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Available online: 23 Jul 2008

Australian Geographer, Vol. 39, No. 2,
pp. 193–210, June 2008

Routledge
Taylor & Francis Group

Unemployment in Non-Metropolitan Australia: integrating geography, social and individual contexts

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ABSTRACT *Despite a significant period of strong economic and jobs growth nationally, there is well-established evidence in Australia that the proceeds of this growth have not been shared equally, either between places or between individuals. Empirically, it is well known that particular socioeconomic groups have a higher risk of unemployment and it has become equally well established that there are particular geographic patterns of labour market disadvantage that suggest that local geographic context is also important. What is not well understood are the ways in which phenomena at the geographic level are associated with individual-level characteristics and other social contexts in ways that negatively impact on a range of social outcomes, including unemployment. The present paper specifically addresses this issue by using a multi-scalar approach and using survey data from the Housing, Income and Labour Force Dynamics Australia (HILDA) survey and aggregate level census data to model unemployment risk. The paper argues that to better understand unemployment and to add to sound policy development, approaches that incorporate a variety of contexts, including the impact of local geographies, are important.*

KEY WORDS *Non-metropolitan labour markets; unemployment; multilevel modelling; people-based policy; place-based policy; Australia.*

Introduction

Despite a significant period of strong economic and jobs growth nationally, there is well-established evidence in Australia that the proceeds of this growth have not been shared equally. Empirically, it is known that particular geographic clusters of social advantage and disadvantage exist and that the geographic context of the local labour markets is important (Lawson & Dwyer 2002; Mitchell & Carlson 2003a, 2003b; Mitchell & Bill 2005a, 2005b). A socially disadvantaged region (defined by, for example, high unemployment) is likely to be proximate to other regions with similar disadvantages and vice versa. It is also known that particular social groups or individuals are more likely to suffer particular types of disadvantage (Beggs & Chapman 1988, Wooden 1991, Le & Miller 1999, 2000). For example, individuals

ISSN 0004-9182 print/ISSN 1465-3311 online/08/020193-18
DOI: 10.1080/00049180802056856

with low levels of human capital are more likely to be disadvantaged in the job market, resulting in lower life chances generally. What is not well understood are the ways in which phenomena at the *geographic level* (e.g. neighbourhood, local area, or region) are associated with *individual-level* characteristics and other *social contexts* in ways that negatively impact on a range of social outcomes, including unemployment.

This final point raises an important challenge for geographers and other spatially oriented social scientists—how do we contribute to an understanding of socio-economic disadvantage that accounts for the spatial or geographical contexts that individuals operate in, as well as the impact of other contexts, including the social and individual? In short, although geography is clearly important, as shown by a range of studies, a full understanding of the potential drivers of disadvantage should include a focus on the multi-scalar associations between the individual, the social, and the spatial. For academic researchers, these multi-scalar, multidimensional approaches to understanding social and economic outcomes have become increasingly popular. There has been a long history in education research, and increasingly in sociology and other social sciences, in considering the ways that different multi-scalar 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 geographic (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 understanding the associations between these changes on human life (Sampson *et al.* 2002, Friedrichs *et al.* 2005).

This agenda focuses on three main issues: (1) understanding the impacts of neighbourhood effects or area effects or, more broadly, the impacts of interactions between people and place; (2) 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; and (3) establishing that understanding the effects of people and place is becoming increasingly crucial as individuals, households, and local communities face continued economic restructuring and large-scale social and demographic change, and as policy makers and researchers try to understand the impacts and outcomes of these changes.

For policy makers, an understanding of these multi-scalar 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 Karmel *et al.* (1993), 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 multi-scalar approach suggested in the present paper fundamentally situates people within a geographic 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 humans, based on their individual capacities, can experience the same geographic 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 compared with the geographic context in determining socioeconomic outcomes. Here, a different set of policies would be indicated that 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 geographic 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.

It is within this introductory context that the present paper considers the issue of labour market disadvantage and, more specifically, unemployment in Australia's non-metropolitan regions. Applying a broad multi-scalar framework, the paper considers unemployment to be a function of a number of contexts, including the impact of local geographic differentials in labour market performance, broader social contexts, including family background, and the characteristics of the individual. In what follows, we first consider the geographic and other contexts associated with understanding the risk of unemployment before discussing, in detail, the methods and data adopted for the analysis. Following this, we present the findings from our analysis, before undertaking some discussion.

Geography and other contexts: multi-scalar approaches to understanding unemployment

The type of multi-scalar approach suggested in the present paper requires a focus across different levels of scale, from the broad aggregate geography of labour market processes to finer microlabour market processes and trends. In this sense, a useful framing approach has been the broad discussions that have emerged regarding the concept of employability. Although various definitions have been applied, including those narrowly focused around simple supply side characteristics only, a more holistic definition of employability would include:

> . . . 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. (Department of Higher and Further Education Training and Employment—UK (DHFETE) 2002, p. 7)

Within this context, labour market outcomes depend on a range of factors that are external to the individual (i.e. local labour market demand and local environment) and a range of factors internal to the individual (i.e. individual employability assets).

The components covering external factors are likely to include the impact of local or regional resources or the local opportunity structure and are most often related to the quality, quantity, and diversity of institutions at some local level. These external factors refer 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). Importantly for our understanding of unemployment, the geographic context of labour markets is most important.

These geographic contexts refer to the segregated set of spatial labour markets that, nationally, may be characterised in terms of journey-to-work regions, local labour market regions, or local employment fields (Morrison 2005), that have processes reflected in broad geographic labour market outcomes, and that, in a labour market system, may be seen as impacting on individual outcomes independent of other factors. In Australia, Watts (2004), Watts *et al.* (2006) have identified the spatial nature of labour market regions in New South Wales and nationally, whereas earlier work by O'Connor (1978) and O'Connor and Maher (1979) explored the geography of labour markets in Melbourne through analysis of journey-to-work patterns. These studies allow us to begin to understand the broad geographic contexts of labour markets, whereas other aggregate level labour market research has allowed us to begin to consider the characteristics and potential processes underway in geographically defined labour markets (Karmel *et al.* 1993; Lawson & Dwyer 2002; Trendle 2002; Mitchell & Carlson 2003a, 2003b; Baum & O'Connor 2005; Mitchell & Bill, 2005a, 2005b). This work has identified the existence and the persistent nature of unemployment hot spots and cold spots (Mitchell & Bill 2005b), the geographic nature of growth and decline (Baum & O'Connor 2005), the ways in which labour markets are segmented geographically (Beer *et al.* 2003, Fagen 2002) and the characteristics and processes underpinning change in geographically segmented labour markets (Karmel *et al.* 1993; Lawson & Dwyer 2002).

This type of research serves as a background to understanding the potential impact of the local geographic context for individual labour market outcomes. We would hypothesise that the ability to successfully navigate positive outcomes will be influenced by the strength and characteristics of labour markets that are set in particular geographic contexts. If, as is seen above, geographically segmented labour markets offer differing labour market opportunities and processes within which individual action is undertaken, then we will expect to see the impact of geography remain even when individual characteristics and contexts are taken into account.

Following from this, and in line with the general argument in the present paper, the structure of internal factors will also be important. The components covering the internal factors associated with employability relate to the way individual characteristics and capabilities impact on opportunity structures and socioeconomic 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 operative in the individual's place of residence' (Galster & Killen 1995, p. 14). These individual contexts include a person's skills and employability assets. These are generally well understood, include levels of formal education, and are associated with discussions of human capital theory (Becker 1975). Internal factors also include a range of demographic factors—age, gender, race/ethnicity—along which labour markets are segmented (Piore 1983), together with health status and the potential and ability to move to other labour markets. Following Sen (1999), if an individual's capabilities are low, then we can expect that outcomes across multidimensional opportunities will be disadvantaged net of other influences.

Personal circumstances include many socioeconomic contextual factors that generally relate to an individual's social, family, and household circumstances. Family background can also impact on an individual's opportunity structure via the impact of personal characteristics of the individual, but also through the impact of social networks, the social capital of parents, and other intergenerational effects that impact on social capital more generally (Case & Katz 1991). Importantly, the impact that social networks may have on an individual's employment outcomes is widely discussed and includes the impact on perceived and real opportunity structures, as well as individual aspirations and preferences (Holzer 1988; Buck 2001; Elliott 1999). Following a 'network model', 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 searches, including information regarding employment opportunities, are thought to be less effective and, hence, are associated with negative individual employment outcomes. The question raised by considering the individual context is the extent to which individual characteristics and background are important net of the geographic context. The range of existing research focusing on the impacts of individual characteristics on labour market outcomes provides significant background to the likely outcomes (see, for example, Beggs & Chapman 1988; Wooden 1991; Le & Miller 1999, 2000) and we would expect these impact to remain when a multi-scalar approach is considered.

The research by Karmel *et al.* (1993) and Lawson and Dwyer (2002) referred to above does go some way to understanding the outcomes of individual and geographic contexts in the analysis of unemployment. Using aggregate-level census data, these studies distinguish between factors attributed to individuals in a particular place and factors attributed to locality. Both studies report associations across both levels, but the use of only aggregate-level data to imply outcomes attributable to individuals does raise some questions regarding the level of interpretability—in particular, questions regarding the ecological fallacy. There have been other Australian studies that have attempted to analyse both individual-level attributes (captured at the individual level) and aggregate-level attributes. This includes work by Borland (1995), Hunter (1996), Cardak and McDonald (2001), Andrews *et al.* (2002), and Shields and Wooden (2003), all of which have yielded interesting and useful findings. Despite this, examination of the impacts of multi-scalar contexts on labour market outcomes remains largely undeveloped, providing additional impetus for the analysis reported here. This deficiency in knowledge is significantly a result of the failure of these studies to use a research design with sophisticated multilevel modelling techniques and the availability of appropriate data. This issue is taken up in the next section.

Modelling strategy

Investigation of the impacts of multidimensional or multi-scalar contexts on individual behaviour has, as pointed out by Galster (2003), assumed several methodological guises. Researchers have used standard multiple regression techniques; however, there has been an increased use of multilevel modelling techniques to understand the hierarchical structure and interplay between geographic context and individual or other social contexts in fields including education (Jones 1990; Jones & Shurmer-Smith 1990), health and wellbeing (Entwistle *et al.* 1984; Moorer & Suurmeijer 2001), criminology (Sampson *et al.* 1997), and, with direct reference to the present paper, employment (McCulloch 2001; Vartanian & Buck 2005). Multilevel approaches are flexible and allow the substantial questions in this paper to be addressed. Importantly, multilevel modelling does not force data that may be measured at different scales into a single linear equation. Unlike traditional Ordinary Least Squares or logit regression models that treat all variables as a single level, multilevel modelling allows the researcher to account for the hierarchical nature of data by explicitly treating independent variables as occurring at different levels. By doing so, multilevel modelling overcomes the biases in modelling that would occur using standard regression models to fit hierarchical data (Goldstein 2003; Skinner *et al.* 1989; in addition, for discussion of technical benefits of multilevel approaches, see Jones & Bullen 1993 and Jones 1991).

An additional benefit of multilevel modelling techniques is that they allow the researcher to partition the total variance into different components of variation due to various hierarchal levels in the data. Following Goldstein (2003) and Snijders and Bosker (1999), a variance partition coefficient (VPC) can be calculated that measures the extent to which the values of the dependent variable for individuals in the same geographic context are similar to each other compared with those for individuals in other geographic contexts. The level of the VPC varies significantly between studies, but it is generally accepted that for studies considering neighbourhood effects or some other broad geographic context, a VPC around 5 per cent would suggest that the geographic or spatial context may be important (Brannstrom 2005).

Multilevel modelling techniques can be used to fit a range of regression models. In the present paper, our dependent variable is binary, taking '1' if the individual is unemployed or '0' if the individual is employed. Consequently, we fit a multilevel logistic regression model that considers the risk of being unemployed as a function of a group of individual characteristics, personal/family background, and regional labour market characteristics.

Data

A significant hurdle in providing analysis of the multi-scalar impacts on unemployment in the past has been the lack of suitable data. To be successful, data must be available to account for individual and other social characteristics and these data must be able to be linked to aggregate spatial data. The main data used in the present paper have come from the Household, Income and Labour Dynamics in Australia (HILDA) survey, with aggregate spatial-level data being obtained from the ABS census. The HILDA survey is a broad social and economic survey conducted annually that contains information on employment, individual socioeconomic characteristics, and household/family characteristics. It also contains identifiers to allow broad spatial characteristics (such as local labour markets) to be considered. Households included in the study were selected using a multistaged approach. A list of 1996 Census Collection Districts (CDs) formed an area-based frame from which 488 CDs were selected. The 488 CDs were selected (consisting of approximately 200–250 households) on the basis that they formed a representative sample of metropolitan and non-metropolitan areas in each of the Australian states (smaller states were not oversampled). Second, within each of these CDs, a sample of 22–34 dwellings was selected, depending on expected response and occupancy rates, and selections were made after all dwellings within each of the CDs were fully listed. Finally, within each dwelling, up to three households were selected (Watson & Wooden 2002).

The present study considers the first wave of the HILDA survey (2001), with subsequent papers considering longitudinal outcomes. The wave one survey file contains a total of approximately 19 000 respondents. A reduced data set is used in the present paper that includes individuals currently in the labour force (employed or unemployed) who are aged 15–64 years and live outside the main capital cities. Those individuals studying full-time have been excluded from the analysis. This reduced data set includes 3289 individuals.

The dependent variable used in the present paper is defined above. The individual-level independent variables, listed in Table 1 and discussed below, 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 microlevel studies of employment outcomes (Brooks & Volker 1985; Beggs & Chapman 1988; Harris 1996; Dex & McCulloch 1997; Caspi *et al.* 1998; Le & Miller 1999; Flynn 2003; Dujardin & Goffette-Nagot 2006). The following independent variables are included: AGE2544, age 25–44 years (1 if aged 25–44; 0 otherwise); AGE4564, age 45–64 years (1 if aged 45–64; 0 otherwise); GENDER, (1 if female; 0 if male); POST-SECOND, education beyond high school but not university (1 if yes; 0 otherwise); DEGREE, education at university level (1 if yes; 0 otherwise); MARRIED, marital status (1 if currently married; 0 otherwise); ATSI, Indigenous Australian background (1 if ATSI; 0 otherwise); DISABLE, self-reported disability or long-term health issue (1 if have disability; 0 otherwise); ENG_PROF, self-reported English proficiency (1 if poor very/poor English; 0 otherwise); SINGLE, single parent (1 if single parent; 0 otherwise); and MOVED, self-reported residential mobility in the past 12 months (1 if respondent had moved; 0 otherwise).

Two variables are included to account for the impact of family background and personal circumstances. One, PAR_UN, measured the impact of parental employment (employed role model/parent in childhood: 1 if no employed adult role model/ parent; 0 otherwise); the other, PAR_OS, accounts for the ethnic background of parents (parent country of birth: 1 if one or both parents are from a non-English-speaking background (NESB) country; 0 otherwise). In addition to family background, the HILDA data allows inclusion of proxies for the impact of social networks on labour underutilisation. Although we experimented with a range of possible measures, we include only one in the analysis presented in the present paper. An index, SOC_NET, for an individual's social networks was included to account for the potential impact that social networks may play in employment outcomes; it was developed using responses to questions relating to the extent to which individuals had contact with friends and colleagues.[1]

The geographic context of labour markets is modelled for considering non-metropolitan local government areas (LGAs), with available Australian Bureau of Statistics (ABS) 2001 and 1991 Census data. Six variables are included in the analysis. Local labour market strength has been accounted for using various

TABLE 1. Variables used in the analysis

Predictor variables used in underutilisation model	
AGE2544	Age 25–44 years: 1 if aged 25–44, 0 otherwise
AGE4564	Age 45–64 years: 1 if aged 45–64, 0 otherwise
GENDER	1 if female, 0 if male
ATSI	Indigenous Australian background: 1 if ATSI, 0 otherwise
ENG_PROF	Self-reported English proficiency: 1 if poor very/poor English, 0 otherwise
DISABLE	Self-reported disability or long-term health issue: 1 if have disability, 0 otherwise
MARRIED	Marital status: 1 if currently married, 0 otherwise
SINGLE	Single parent: 1 if single parent, 0 otherwise
POST_SECOND	Education beyond high school but not university: 1 if yes, 0 otherwise
DEGREE	Education at university level: 1 if yes, 0 otherwise
MOVED	
SOC_NET	Index of social ties, continuous variable
PAR_OS	Impact of parental employment, employed role model/parent in childhood: 1 if no employed adult role model/parent, 0 otherwise
PAR_UN	Ethnic background of parents, parent country of birth: 1 if one or both parents born in non-English-speaking background country, 0 otherwise
LGA_EMP	
LGA_MAN	Share of employment in manufacturing within the local government area
LGA_EDUC	Measure of the region's aggregate human capital: certificate education and above
LGA_SPEC	
LGA_PC	Local government area population change
LGA_IM	Industry mix employment growth effects
LGA_RS	Specific employment growth effects

indicators (Bartik 1993; Flynn 2003; McCulloch 2003). Here, although several possibilities were considered, the employment rate in the LGA (LGA_EMP) was used. Employment growth is considered to be an important determinant of the robustness of labour demand and two components of this are included in the model. Shift-share analysis (see Mitchell & Carlson 2003a, 2003b) was used to decompose regional employment growth into industry mix employment growth effects (LGA_IM) and regional-specific employment growth effects (LGA_RS). The LGA_IM variable captures the share of regional employment growth that can be attributed to the local industry mix and reflects the degree to which an industry is specialising in industries that are either fast or slow growing nationally. A region that has a lot of industries that are fast growing will have a positive LGA_IM, whereas a region with a concentration of industries that are slow growing (or declining) nationally will have a negative LGA_IM. LGA_RS captures the growth or decline in industry employment due to local factors. Apart from changes in jobs, we include a variable on population change (LGA_PC) that accounts for changing population dynamics on potential labour market outcomes.

Several studies have indicated the impact that a share of manufacturing employment may have on regional unemployment. Thus, Gregory and Hunter

(1995) have documented the very significant and disproportionate impact of deindustrialisation on employment population ratios for males in low socio-economic status urban areas; the percentage share of employment in manufacturing within the local government area (LGA_MAN) is included to account for this. The percentage of people with a trade certificate or tertiary education is included as a measure of the region's aggregate human capital (LGA_EDUC) and has been shown to impact on regional labour market outcomes (Glaeser & Shapiro 2001). Although the impact may vary, it may be hypothesised that a region with a highly skilled labour force may have more success in attracting firms, thereby providing increased regional labour demand. The final regional variable included is a measure of industry specialisation (LGA_SPEC). Variable values range from 0 to 100, with scores approaching 100 indicating a more specialised industry structure. It is expected that regions with a diversified industry structure may be less exposed to industry specific shocks and may, therefore, have a dampening effect on individual unemployment risk.

Individual and geographic contexts and unemployment risk

In undertaking the analysis in this paper we set out the modelling process in two stages, as described below.

(1) Model 1: Individual-level variables (including family background and personal circumstances) showing any impacts of individuals with different socio-economic or demographic backgrounds and characteristics.
(2) Model 2: Geographic-context variables added, demonstrating the extent to which geography matters net of individual level impacts.

Individual-level variables (model 1)

The model with the individual independent variables is presented in Table 2. The VPC reported in Table 2 is 0.071, suggesting that without the inclusion of the geographic-context variables the individual level variables account for the majority of the variance (approximately 93 per cent). The value of the exponential of the β coefficients (column 3) reported for any category is interpreted as the odds ratio of a person in that group being unemployed compared with a person in the reference category. In all cases, values above 1 indicate that higher values of the independent variable increase the risk of being unemployed. Coefficients less than 1 indicate a lower risk. As with multiple linear regression, this is the net effect after taking into account other variables in the model. From the initial set of independent variables fitted, several were significant in explaining the risk of unemployment.

The significant variables largely reflect the body of research that purports to understand the individual characteristics that may predict unemployment. Although the two variables accounting for age are of the expected sign, only one is significant at the 5 per cent level. Compared with respondents in the youngest age group (15–24 years) those aged between 25 and 44 years (AGE2544) are significantly less likely to be unemployed with an e^{β} of 0.67. The education coefficients are also negatively associated with unemployment, illustrating the expected inverse relationship between negative labour market outcomes and increasing levels of education.

TABLE 2. Individual level predictors of unemployment, random coefficient model

	β	*t*-score	e^{β}
CONSTANT	−2.09		
AGE2544	−0.40	2.92**	0.67
AGE4564	−0.20	0.90	0.82
GENDER	−0.26	1.80*	0.77
ATSI	0.93	2.87**	2.53
ENG_PROF	1.53	1.53	4.62
SINGLE	0.59	2.98**	1.80
MOVED	1.01	6.76**	2.75
DISABLE	0.79	4.65**	2.20
MARRIED	−1.14	6.46**	0.32
POST_SECOND	−0.53	3.09**	0.59
DEGREE	−1.37	3.93**	0.25
PAR_OS	0.15	0.78	1.16
PAR_UN	0.63	2.23**	1.87
SOC_NET	−0.16	2.31**	0.85

Note: deviance = 1504.62; variance partition coefficient (VPC) = 0.071 (7.1%) [VPC for intercept-only model = 0.078 (7.8%)]
**Significant at the 0.05 level; *significant at the 0.1 level.

After controlling for other variables, respondents with some form of post-school education but no university degree (POST_SECOND) were only half as likely to be unemployed, whereas those with a university degree (DEGREE) were 0.25 times as likely to be unemployed. In addition to AGE, GENDER is an important demographic characteristic in segmented labour market outcomes. The significant negative GENDER coefficient indicates that unemployment risk is much higher for men than women. Indigenous background (ATSI) was included to account for the impact of that aspect of racial disadvantage and potentially lower opportunity associated with employment outcomes. In fact, ATSI is highly significant and suggests that individuals from an Indigenous background are 2.5-fold more likely to be unemployed than others. DISABLE had the expected significant positive association with unemployment and suggests that those who self-reported a disability are over twofold more likely to be classified as unemployed than those with no disability. MARRIED and SINGLE are both significant and not surprisingly reflect opposite impacts. Being currently married is associated with a reduced risk of being unemployed ($e^{\beta} = 0.32$), whereas being a single parent or in a single parent family is associated with an increased risk of being unemployed ($e^{\beta} = 1.8$). The results on both these variables concur with previous studies of unemployment risk. MOVED is significant at the 5 per cent level of significance and indicates that respondents who had moved in the past 12 months are over 2.5-fold more likely to be unemployed.

Apart from these individual characteristics, the first model also included variables accounting for an individual's personal or family background. All three variables included were of the expected sign, with two being significant at the 5 per cent level. PAR_UN accounts for the lack 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 risk of unemployment. In line with an increasing amount of research on the role of personal contacts and labour market outcomes, SOC_NET is negative, suggesting that individuals with weaker social networks (as defined here) have a higher risk of unemployment, net of other factors.

Individual plus LGA variables (model 2)

The model with both individual variables and geographic context variables is presented in Table 3. The exponentials of the β coefficients are interpreted in the same way as above. By entering the variables accounting for the geographic context (the LGA variables), we can further improve the model and begin to consider the way local geographic context is related to unemployment while taking account of individual and personal/family background characteristics. The variable partition coefficient with the geographic context has been reduced to 0.045, suggesting that the inclusion of the LGA-level data has explained an additional 2.6 per cent of the variation (total variation explained is now 95.5 per cent). The coefficients on the variables carried over from the previous model are similar, although they have changed slightly in the size of the impact. The risk of unemployment remains higher for individuals with an Indigenous background, those in a single parent family, those who moved in the past 12 months, those who have a disability, and those with poor parental employment role models. Being female, older, currently

TABLE 3. Individual and local government area-level predictors, random coefficient model

	β	t-score	E^{β}
CONSTANT	−0.55		
AGE2544	−0.44	2.38**	0.64
AGE4564	−0.23	0.96	0.79
GENDER	−0.28	1.97**	0.75
ATSI	1.06	3.05**	2.9
ENG_PROF	1.73	1.63	5.6
SINGLE	0.54	2.56**	1.71
MOVED	0.99	6.05**	2.7
DISABLE	0.81	4.53**	2.20
MARRIED	−1.16	6.00**	0.31
POST_SECOND	−0.57	3.36**	0.56
DEGREE	−1.32	3.93**	0.27
PAR_OS	0.11	0.56	1.12
PAR_UN	0.57	2.03**	1.77
SOC_NET	−0.15	2.10**	0.86
LGA_EMP	−0.04	2.66**	0.96
LGA_MAN	0.03	1.78*	0.97
LGA_SPEC	0.01	0.38	0.99
LGA_RS	−0.04	2.12**	0.96
LGA_IS	−0.04	0.98	0.96
LGA_HUMAN	0.01	0.36	1.01
LGA_PC	0.04	1.89*	1.04

Note: deviance = 1479.01; variance partition coefficient (VPC) = 0.045 (4.5%).
**Significant at the 0.05 level; *significant at the 0.1 level.

married, or having education above basic secondary school reduces the unemployment risk at the individual level, as does the presence of strong social networks.

Four of the variables accounting for geographic context are significant in this case. The outcome on the variable accounting for the strength of the local labour market (LGA_EMP) is not surprising. It suggests that the stronger the local labour market, the less likely an individual would be unemployed regardless of that individual's personal characteristics. However, it is not only the relative strength of the local labour market that matters. The composition and performance of the local labour market is also important. There is a slight but significant (at the 10 per cent level) positive association between manufacturing employment and unemployment, so that individuals located in an LGA with higher levels of manufacturing employment are at a higher risk of unemployment net of their individual characteristics. The variable LGA_RS has an additional impact on unemployment risk net of the impacts of other factors. The significant coefficient for this variable suggests that local growth conditions separate from industry growth effects or national growth effects do impact, with a stronger local growth component reducing unemployment risk. Although the industrial share component (LGA_IS) was of the expected sign, it did not have a significant additional impact on unemployment risk. Interestingly, there is a positive association between population change and unemployment risk. Net of all other influences, individuals in LGAs with higher population growth have a higher risk of unemployment. Neither the index accounting for specialisation nor the variable accounting for the human capital of the LGA were significant.

Discussion

The present paper has explored the risk of unemployment for individuals living in non-metropolitan Australia, focusing on two interrelated aspects of unemployment risk: (1)the characteristics of the LGA in which an individual lives; and (2) the employability assets or personal/family characteristics of these individuals. It is argued that although each of these characteristics is important in itself, a more meaningful and useful picture of labour market disadvantage can be gained, and better-informed policy can be developed, by accounting for outcomes in a multi-scalar context. To develop this multi-scalar approach empirically, the present paper uses data from the first wave of the HILDA survey, together with aggregate ABS census data to analyse outcomes on a dichotomous unemployed/employed variable within a multilevel environment.

The results of the empirical investigation need to be tempered by the fact that the types of factors we have attempted to measure here are difficult to model in a way that produces a clear-cut understanding of causal direction and, rather, what we have found are associations between a number of variables and the individual risk of unemployment. This caveat aside, the analysis does illustrate interesting outcomes. The first model containing only individual characteristics, family background, and personal circumstances reflected a range of previous research across the social science literature that points to the relative risk assigned to different socioeconomic groups in our society. The inclusion of these individual-level factors in a model of unemployment showed that risk of unemployment differed according to gender, racial background, age, and educational level. It was also found that the risk of unemployment was associated with having a disability, marital status, family status, and residential mobility.

The characteristics of an individual's family or other personal circumstances are also important. Researchers, including 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 social/employment networks imbued by parents impact on the life chances of children and these impacts are likely to have a significant impact even into adulthood. The existing empirical research is highly suggestive of the impact of intergenerational outcomes (Caspi *et al.* 1998; McClelland *et al.* 1998; Pech & McCoull 1999) 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 narrower social networks have a higher risk of underutilisation than those with wider social networks. There has been significant work on the impact that social networks have on employment outcomes 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 labor force attachment' (Elliott 1999, p. 200).

Over and above these individual-level characteristics, the modelling exercise also illustrated that geographic context may matter when considered net of other factors. The impact of adding the LGA-level data was to explain a further 2.6 per cent of the variation. Previous research (Duncan & Raudenbush 1999; Leventhal & Brooks-Gunn 2000; Brannstrom 2005) has suggested that place of residence (i.e local neighbourhood) has accounted for approximately 5–10 per cent of the variation. In the analysis presented here, because the LGAs are larger than local neighbourhoods, a small percentage of variance explained is not surprising. Local geographies in which there are job deficiencies result in an increase in the risk of negative labour market outcomes at the individual level net of other characteristics. 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 the present paper suggested that although the general strength of the local labour market is important, it is also important to consider other characteristics that may segment labour markets along geographic lines. Hence, the variable accounting for the regional shift effect suggests that local and regional conditions driving jobs growth (i.e. local jobs growth program) are important net of individual-level employability, as are the sectors in which jobs are found. Those localities with old economy sectors, which are often characterised by relatively large shares of manufacturing, have often been identified as having potentially weaker labour markets. The upshot is that these geographic contexts act to ration the supply of adequate employment and interact with individual employability assets in negative ways. Finally, an important aspect of non-metropolitan development, population change, was seen as having an impact on the relative risk of unemployment. Although further modelling is required using longitudinal data, there does appear to be some support for arguments that link regional population growth to potential negative labour market outcomes as population in-migration outstrips jobs growth and those less skilled or employable potentially face further disadvantage (Bill & Mitchell 2006).

In summary, although the individual level variables may be thought of as accounting for risk associated with belonging to a particular socioeconomic group or having weaker individual employability assets, local geography forms a contextual milieu that acts on unemployment risk net of the individual-level characteristics. In this sense, the type of analysis presented here suggests that individuals with similar individual employability assets, when placed within different geographic labour market contexts, will likely face differing unemployment risk profiles, as will those with different employability assets in the same geographic context. The point to be made here is that both the individual context and the geographic context that individuals find themselves in are important to understanding labour market outcomes. The research message for geographers and others involved in understanding the ways in which society works is clearly that a multi-scalar approach to understanding social problems and issues provides a much more holistic and wide-ranging way of addressing the types of research questions we pursue. What has been presented here represents the initial modelling of the data. Several issues remain unexplored. For example, we do not know the exact role of residential mobility, with several possible explanations arising from the analysis presented here. Work by Bill and Mitchell (2006) using the same data used in the present study suggests that the impact of residential mobility is complex. The types of models presented here will need to be extended by the inclusion of a longitudinal aspect to begin to understand any causal relationship between mobility and unemployment.

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. The policy message from the present 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 non-metropolitan regions, then simply focusing on one facet of the problem will likely be suboptimal. In several industrialised countries, the emphasis of government policy on combating labour market disadvantage is to improve personal employment prospects by introducing schemes that focus on the employment assets of the individual job seeker and are increasingly neoliberal in their approach. However, improving the employability of individuals 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 also likely to include improving the available job opportunities and considering other contextual effects, such as building sustainable and strong communities and regions.

Acknowledgements

The research was funded by an Australian Research Council discovery Grant ‘A society divided: a multi-level approach to understanding socio-economic opportunity and vulnerability (DP0879382). This paper uses unconfidentialised unit record file from the Household, Income and Labour Dynamics in Australia (HILDA) survey. The HILDA Project was initiated and is funded by the Commonwealth Department of Family and Community Services (FaCS) and is managed by the Melbourne Institute of Applied Economic and Social Research (MIAESR). The findings and views reported in this paper, however are those of the authors and should not be attributed to either FaCS or the MIAESR. The authors wish to thank the referees for their helpful comments.

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NOTE

[1] 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 questions included in the index were: 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.

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