

MEASURING SOCIO-ECONOMIC OUTCOMES IN SYDNEY: AN ANALYSIS OF CENSUS DATA USING A GENERAL DEPRIVATION INDEX

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ABSTRACT: The release of the ABS 2001 census data has allowed renewed analysis of the spatial patterns of social phenomena to be reviewed with up-to-date data. This paper adopts a methodology first outlined in Canadian studies to calculate several measures of deprivation across Sydney suburbs. The methodology uses principal components analysis and develops measures of deprivation across various socio-economic and demographic aspects. The paper also calculates a general deprivation index based on weighted factor scores. The analysis illustrates that significant spatial variations exist across different aspect of urban deprivation, but that generally urban deprivation is concentrated in the western suburbs of Sydney with smaller pockets in suburbs located in the inner-city and towards the New South Wales central coast. The analysis provides further support for the methodology and points to several avenues of future research.

1. INTRODUCTION

A consistent focus of research within social geography, urban sociology and urban economics has been the analysis of the spatial patterning of disadvantage, deprivation and inequality. Tied to concerns regarding the widespread economic and social changes that have taken place on a global scale, researchers have been interested in discussing and analysing the new social and spatial order that has emerged in large urban areas. These changes are placed into broader conceptual frameworks focusing on the literature dealing with the rise of the post-Fordist or post-industrial city (see Forrest and Kennett 1997; Baum et al 2002) with the argument being that although urban deprivation and inequality has always been a feature of large cities, new forms of disadvantage and exclusion are beginning to be noted. At a broad level, such interest has resulted in the categorising of spatial outcomes in cities in terms of social polarisation, dual cities and quartered cities (see for example Castells 1989; Marcuse 1997; Marcuse and van Kempen 2000a, 2000b). At a more focused empirical level, these research interests have resulted in the use of statistical techniques and spatially based data to develop measures or indicators of socio-economic outcomes at various levels. Research such as this has been important in testing social theory of ghetto formation, urban segregation and urban social change-including questions of social polarisation and dual cities (Bentham 1985; Sloggett and Joshi 1998; Baum et al 1999; Langlois and Kitchen 2001). These indicators have also had important policy outcomes allowing

interested stakeholders to evaluate, among other things, the strengths and weaknesses of local areas so as to improve targeting of local social and economic development programs (Bentham 1985; Coombes and Wong 1994; Connolly and Chisholm 1999).

As an increasingly important element of social science research (Chakravorty 1996; Rey 2004) and one that has been strengthened in recent years by the growth in methodological approaches and the availability quality spatial data (Goodchild and Janelle 2004) the focus on urban deprivation, disadvantage and inequality has moved questions of distributional equity from 'who gets what, when and how' (Lasswell 1936) to ones of 'who gets what where' (Smith 1979). With reference to urban deprivation, the focus of this paper, such 'who gets what where' questions are interested in identifying the presence of high concentrations of relative material and social disadvantage in cities and considering how deprived areas differ from remaining areas in the city (Townsend 1993; Langlois and Kitchen 2001).

Studies considering issues including urban deprivation have focused on both the individual dimensions of the problem (i.e. urban deprivation as an outcome of low income or poor housing) or have elected to take a broader approach by considering deprivation as the outcome of a combination of factors thereby taking a multi-dimensional approach to understanding urban deprivation (see for example Bentham 1985; Carstairs and Morris 1989; Bradford et al. 1995; Chakravorty 1996; Baum et al. 1999; DETR 2000; Rahman et al. 2000; Langlois and Kitchen 2001; Midgley et al. 2003). While the focus of studies differ, localities characterised as suffering from significant levels of deprivation tend to show similar problems which might include high levels of poverty, low levels of formal human capital, poor attachment to the formal labour market, high concentrations of disadvantaged families including single parent households and immigrant households and a higher incidence of social problems such as crime and health problems (OECD 1998; Wacquant 1999; Conway and Konvitz 2000; Langlois and Kitchen 2001;). Moreover, while all these indicators are not necessarily present in all deprived areas, most large urban areas have localities that have at least some of these characteristics (Conway and Konvitz 2000).

In this context, deprived areas are referred to in terms of 'distressed urban areas (Conway and Konvitz 2000) or less favourably 'entrenched quarters of misery' (Wacquant 1999) where is recognised that 'differences between affluent and poor suburbs are multi-dimensional creating cumulative and compound power differentials in the command over resources through time' (Jamrozik et al. 1995: 131). The problem then becomes that these cumulative and compound power differentials are further reinforced through concentrated deprivation which creates an environment that enhances the likelihood of negative outcomes for individuals. Often considered in terms of concentration effects (Wilson 1987; Young 2003) or inter-generational transfer of social problems these negative outcomes include reduced employment opportunities and generally poorer life chances and are seen as the result of a lack of positive role models and poor social and job networks.

It is within the context of measuring urban deprivation that the current paper is set. It contributes to the ongoing interest in spatial outcomes within cities by taking an existing set of measures designed to account for urban deprivation and applying these to the case of Sydney using data from the Australian Bureau of Statistics 2001 Census of Population and Housing. In setting out the findings from this analysis the paper first considers methodology issues including the development of urban deprivation indicators and the variables and data used. This establishes the main methodological framework and further establishes the background for considering in detail the findings from the analysis. The paper finishes with some concluding comments.

2. METHODS AND DATA

Within the research literature there has been a range of empirically based indicators and indices designed to account for urban deprivation (for example see Bentham 1985; Carstairs and Morris 1989; Bradford et al. 1995; Chakravorty 1996; Baum et al. 1999; DETR 2000; Rahman et al. 2000; Midgley et al. 2003). While all of these approaches cover various aspects of urban deprivation, they vary in terms of the method of indicator construction, the types of individual measures used and the spatial scale at which deprivation is measured. Common indicators of deprivation include income levels (both of households and individuals), levels of unemployment and labour force participation (see for example Bentham 1985; Chakravorty 1996; Baum et al. 1999) all of which are considered to be direct measures of deprivation. In addition to these variables some research (depending on data availability) use indicators relating to housing condition or quality while others make use of social problems indicators such as crime or health outcomes data (see for example Bentham 1985; Williams and Windebank 1995).

From a design point of view, some measures take standardised data and produce unweighted indices (Carstairs and Morris 1989), while others (Bentham 1985; Baum et al 1999) make use of multivariate methodology to derive typologies of localities based on a range of socio-economic variables. Finally, considering spatial units, the choice made depends on the level of aggregation at which data is available and includes suburbs, neighbourhoods, local boroughs and local government authorities and enumeration districts (Bradford et al 1995; Chakravorty 1996; Sloggett and Joshi 1998; Baum et al 1999).

The indicators and index used in this paper were developed by Langlois and Kitchen (2001) using census data for Montreal, Canada. The indicators, which were developed using multivariate analytic techniques, provided an interesting way to consider the dimensions of urban deprivations and as such provide a compliment to the existing range of measures.

2.1 Methodology

Considering the methodology in more detail, this paper developed a range of deprivation indicators and a General Deprivation Index (GDI) following the method outlined in Langlois and Kitchen (2001) who make use of Principal Components Analysis and the resultant factor scores as the basic building blocks

for their measures. Principal components analysis is used to reduce a larger set of variables thought to be associated with urban deprivation into a smaller number of sub-sets or factors. The meaning of each sub- group or factor is determined by the variables most highly associated with that factor (as displayed in the rotated components matrix). Each observation (in this case urban locality) is given a score on each factor which are used to develop the indicators used in the analysis. These factors, when taken in combination can be used to represent aggregate urban dimensions of deprivation.

In setting out the indicators of deprivation one factor is considered to represent a general measure of deprivation, with other factors representing variations of situations where deprivation is considered to exist. The development of the indicators of deprivation is driven by reference to Figure 1, which shows possible combinations of factors 'from which different situations of urban deprivation can be derived' (Langlois and Kitchen (2001: 130)). The factor considered to be the general indicator of deprivation (factor I in Figure 1) plays a major part in defining the types of deprivation and is considered to be a necessary condition for urban deprivation. Once this condition is satisfied, the overlaps with other components in figure one (I/II, I/III, I/IV, I/V) define more specific situations of urban deprivation. Apart from situations where there is an overlap between Factor I and other factors (II, III, IV, V) localities can be characterised as having low deprivation or deprivation only defined by membership to factor I.

Considering this more specifically, a set of operational rules can be established which guides the placement of any given locality within a particular group or deprivation type. The operational rules are:

If factor $S_{i,I} < \beta$, then type = 0;

If factor $S_{i,I} \geq \beta$ and if (factor $S_{i,II} \leq \beta$, factor $S_{i,III} \leq \beta$, factor $S_{i,IV} \leq \beta$, factor $S_{i,V} \leq \beta$) then type = I;

If factor $S_{i,I} \geq \beta$ and if (factor $S_{i,II} \geq \beta$, factor $S_{i,III} \leq \beta$, factor $S_{i,IV} \leq \beta$, factor $S_{i,V} \leq \beta$) then type = I/II;

If factor $S_{i,I} \geq \beta$ and if (factor $S_{i,II} \leq \beta$, factor $S_{i,III} \geq \beta$, factor $S_{i,IV} \leq \beta$, factor $S_{i,V} \leq \beta$) then type = I/III;

If factor $S_{i,I} \geq \beta$ and if (factor $S_{i,II} \leq \beta$, factor $S_{i,III} \leq \beta$, factor $S_{i,IV} \geq \beta$, factor $S_{i,V} \leq \beta$) then type = I/IV;

If factor $S_{i,I} \geq \beta$ and if (factor $S_{i,II} \leq \beta$, factor $S_{i,III} \leq \beta$, factor $S_{i,IV} \leq \beta$, factor $S_{i,V} \geq \beta$) then type = I/V;

where $S_{i,j}$ is the factor score of suburb i on component j and β represents a cut-off which defines the point at which deprivation is considered to exist. If a particular locality has a score on factor I and factor II greater than the cut-off, and scores on the other factors lower than the cut-off, then it would be placed in deprivation type I/II. Alternatively, if a locality has a score on factor I less than the cut-off then it would be placed in type 0. Using these operational rules localities were placed into groups reflecting either the absence or presence of significant levels of deprivation together with the different types of deprivation which might be identified.

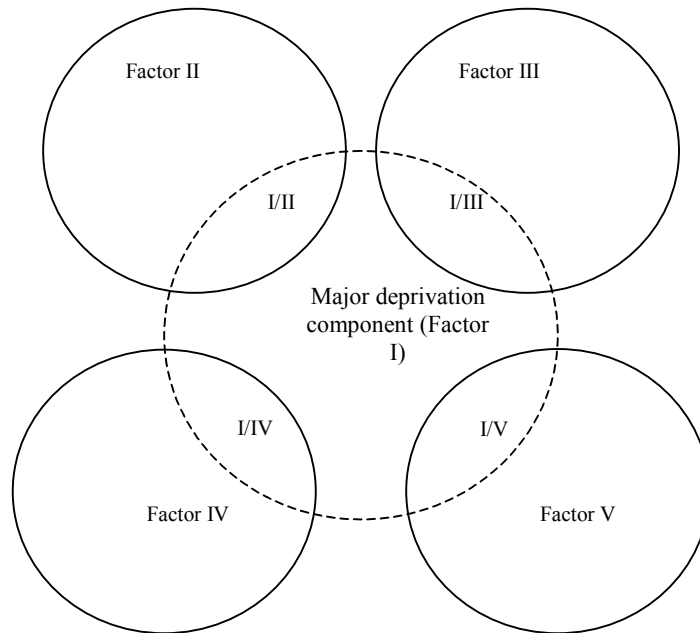


Figure 1. Types of Urban Deprivation, based on the Principal Components
(Source: Adapted from Langlois and Kitchen, 2001)

While localities can be analysed on the basis of the different types of deprivation, following Langlois and Kitchen (2001) it is recognised that places can suffer from several types of deprivation and hence the development of a general deprivation index (GDI) was considered useful. In order to develop the index the factor scores from the initial principal components analysis were rescaled using the following equation:

$$S_{ij}^* = (S_{ij} - \min_j) / (\max_j - \min_j) \quad (1)$$

where $(0 \leq S_{ij}^* \leq 1)$; and S_{ij} is the factor score for locality i on principal component j ; \max_j and \min_j are the highest and lowest factor score on component j . This equation produced rescaled factor scores in the range of zero to one and allowed the following equation to be utilised in developing a general deprivation index.

$$GDI_i = S_{ik} (1 + \sum S_{ij}^*) / p \quad (2)$$

where $(0 \leq GDI_i \leq 1)$; and S_{ik} is the rescaled factor score of locality i on component k which plays the primary role in deprivation; S_{ij}^* is the rescaled factor score of one of the secondary components; and p is the total number of

components. This produces a simple weighted index number that accounts for all the factors derived from the initial PCA.

2.2 Data

The data used in this paper came from the Australian Bureau of Statistics 2001 Census of Population and Housing and in particular from the basic community profile contained in the CData CD-ROM. The basic community profile contains a range of basic census information for individuals and households including many variables that may be used as indicators of deprivation. The variables chosen for use in this paper were selected with reference to existing studies (most notably Langlois and Kitchen 2001) and with due regard to the data constraints imposed by the content of the Australian Bureau of Statistics CD-ROM.

Fifteen individual variables were used in the analysis presented here and were divided into demographic variables, income variables, engagement with work variables and housing variables (see Table 1). Demographic variables included the percentage of the population who are indigenous Australians; the percentage of persons aged 65 years and older; the percentage of the overseas born population who moved to Australia between 1996 and 2001 (recent arrivals); and the percentage of the overseas born population who did not speak English well. These four variables were included as they tend to be among the sections of the population identified across a number of studies as vulnerable to adverse economic and social change (Bentham 1985; Baum et al. 1999; Langlois and Kitchen, 2001).

Three income measures were included in the analysis. Two indicators account for the presence of low incomes. One is a measure of low income families and comprises the percentage of families earning less than \$399 per week, while the other accounts for low income individuals and is measured using the percentage of individuals earning less than \$159 per week. In addition to these variables, a measure of median family income was also included. Income measures such as these are often used in the development of indicators of deprivation and disadvantage and can be considered as a direct indicator of deprivation (Chakravorty 1996; Baum et al. 1999; Langlois and Kitchen 2001).

Like the measures of income, factors accounting for the degree to which individuals in any given area are engaged in the labour force form an important component of deprivation indicators (Slogett and Joshi 1998; Baum et al. 1999; Langlois and Kitchen 2001; Midgley et al. 2003). The selection of variables used here included measures accounting for a lack of labour force engagement (youth and adult unemployment) as well as measures that accounted for participation in work (youth and adult labour force participation and the extent of part-time work). Youth unemployment is measured as the number of persons aged between 15 and 24 years in a given area who were unemployed as a percentage of the total labour force aged between 15 and 24 years in that area. Adult unemployment is divided into both male and female unemployment and accounted for the number of males or females aged over 24 years in an area as a percentage of the total labour force in that area.

Table 1. Variables included in the Analysis

<i>Demographic</i>
<ul style="list-style-type: none">• Indigenous population (%)• Persons aged older than 64 years of age (%)• Recent immigrants to Australia (arrived in the between 1996 and 2001) (%)• Recent immigrants who consider they do not speak English well (%)
<i>Income</i>
<ul style="list-style-type: none">• Individuals with low incomes (less than \$159 per week) (%)• Families with low incomes(less than \$399 per week) (%)• Median family income (%)
<i>Housing</i>
<ul style="list-style-type: none">• Households in public housing (%)
<i>Engagement with work</i>
<ul style="list-style-type: none">• Youth unemployment rate (persons aged 15 to 24)• Youth labour force participation rate• Male unemployment rate• Male labour force participation rate• Female unemployment rate• Female labour force participation rate• Males working part time

As with the measure of youth unemployment, youth labour force participation accounts for the labour force activity of persons aged between 15 and 24 years. In this case, youth labour force participation is accounted for by the number of persons aged 15 to 24 in the labour force as a percentage of the total persons aged 15 to 24 in an area. Male and female labour force participation was measured by the number of males and females over 24 years of age in the labour force as a percentage of the total males and females aged over 24 years. The variable, part-time male workers are included because in many cases high proportions of part time work may indicate a weak local labour market. It was measured as the number of males working part-time as a percentage of the male labour force.

One housing variable is included in the analysis. The percentage of households living in public housing has often been included in measures of deprivation and is viewed as being closely associated with disadvantage, low

incomes and a lack of labour force engagement (Williams and Windeband 1995; Slogget and Joshi 1998).

2.3 Spatial Units

In undertaking the analysis in the paper several possible levels of spatial data were considered. Australian Bureau of Statistics data are available at levels of aggregation from collector districts (CDs) comprising approximately 200-300 households, to state and national level data. The use of the lowest level of aggregation imposed restrictions on the types of data that could have been used due to the unavailability of some data items at such a disaggregated level. The difficulty in identifying locations in a meaningful way using a collector district codes rather than a place name also meant that data at this low level of aggregation was impractical. Given this and given the goal of considering disadvantage across local communities, suburbs that were contained within the Sydney Statistical Division were chosen (Figure 2). The Australian Bureau of Statistics develops suburb boundaries by aggregating collector district data to generally accepted suburb boundaries. A total of 600 suburbs within the Sydney Statistical Division are developed in this way.

3. DEPRIVATION IN SYDNEY'S SUBURBS

The methodology described above was applied to the 600 Australian Bureau of Statistics defined suburbs in the Sydney Statistical Division. The principal components analysis with varimax rotation resulted in four factors accounting for 80 per cent of variance. The four factors and the variables associated with each of the factors are outlined in Table 2. One factor (the first factor in this analysis) was considered as the general disadvantage factor. Other factors included a measure accounting for suburbs with high rates of indigenous populations and public housing, one accounting for high concentrations of people with low English skills and recently arrived migrants and one accounting for high concentrations of aged persons. These four factors were taken to be the main dimensions of disadvantage across Sydney's suburbs and for each suburb scores were recorded for each factor.

Considering the factors more specifically, the figures in bold in Table 2 indicate high associations with a given factor and were used to describe that factor. Factor one was positively associated with the percentage of people with low incomes (0.876), the percentage of low income families (0.838) and the percentage of unemployed males (0.660). The factor was negatively associated with median family incomes (-0.886) and the level of female labour force participation (-0.676). This factor was interpreted as a general socio-economic variable and taken to be the over-arching explanatory variable in the analysis of deprivation discussed here and accounted for the largest share of the variance (48.38 percent). The second factor, which explained 13.03 percent of the variance, was interpreted as a measure accounting for a specific group of disadvantaged namely indigenous populations, households residing in public housing and more generally disadvantaged families. The highest positive associations were for the variables measuring the presence of indigenous people



Figure 2. Australian Bureau of Statistics derived suburbs: Sydney

(0.792) and public housing tenets (0.713). Less strong associations were for youth unemployment (0.685) and unemployed females (0.612). The third factor is straightforward and reflects residential patterns associated with older populations. The highest association was for the percentage of population aged 65 and older (0.849). Additionally high positive associations were recorded for the percentage of males working part-time (0.816) and negative associations with male labour force participation (-0.671). This factor accounted for 11.62 percent of the variance. The final factor accounts largely for the presence of people with low levels of English language skills and migrants who had recently arrived in Australia. This factor accounts for 7.23 percent of the variance and is clearly a reflection of residential patterns associated with recently settled migrants.

Table 2. Rotated Components Matrix

Variable	Factors			
	1	2	3	4
Low individual income	0.876	0.199	0.191	-0.0074
Median family income	-0.866	-0.304	-0.0083	0.0011
Low income families	0.838	0.344	0.199	0.230
Female labour force participation rate	-0.672	-0.291	-0.569	-0.193
Male unemployment	0.660	0.601	0.111	0.244
Percentage indigenous population	0.0096	0.792	0.0021	-0.207
Public housing	0.320	0.713	0.003	0.102
Youth unemployment	0.503	0.685	0.008	0.217
Female unemployment	0.586	0.612	0.004	0.330
Persons aged 65 years and older	0.223	-0.239	0.849	-0.217
Males working part-time	-0.003	0.112	0.816	0.108
Male labour force participation	-0.467	-0.359	-0.671	-0.258
Recently arrived immigrants	-0.004	0.006	-0.002	0.882
Persons who do not speak English well	0.589	-0.118	-0.009	0.679
Youth labour force participation	-0.143	-0.344	-0.229	-0.722
<i>Per cent variance explained</i>	<i>48.38</i>	<i>13.03</i>	<i>11.62</i>	<i>7.23</i>

Following this initial analysis, suburbs were allocated to selected groups following the operational rules outlined above. Six groups of suburbs were identified which were used to develop the typology of deprivation:

- Suburbs with low scores on factor one (low/ no disadvantage);

- Suburbs with high scores on factor one, and low scores on all other factors (socio-economic disadvantage);
- Suburbs with high scores on factor one and factor two (disadvantaged indigenous / public housing concentration);
- Suburbs with high scores on factor one and factor three (disadvantaged elderly);
- Suburbs with high scores on factor one and factor four (disadvantaged non-English speaking background);
- Suburbs with high scores on factor one and high scores on more than one of the other factors (multiple disadvantage).

High scores on any of the factors were considered to be those scores within the top 20 percent of the distribution of scores. From the information provided in Tables 3 and 4 the patterns of deprivation across each of the categories can be considered.

Category '0' was designated as those suburbs with low levels of deprivation. These were suburbs that did not record high scores for the first factor and included localities such as Mosman, Cremorne Point, Manly and Rose Bay on the Sydney Harbour, Palm Beach, Avalon and Bilgola to the north of Sydney CBD, Valley Heights, Springwood and Winmalee to the far west and Heathcote, Engadine and Yarrowarrah in Sydney's south. Some of these suburbs are among those typically associated with affluence when studies concerning advantage and disadvantage are considered (Hovarth and Tait 1986; Baum et al 1999; 2002). The means presented in Table 3 reflect the low level of deprivation that exists across this group of suburbs. Levels of median family income were above average (\$1 358.89) and proportions of low income families and individuals were below average (7.54 and 31.49 percent respectively). This group of suburbs had on average stronger labour force attachment, reflected in high labour force participation (male 71.97 percent and female 57.52 percent) and low levels of unemployment (youth 9.67 percent; male 5.48 percent and females 4.81 percent).

The category 'I' was designated as those suburbs scoring in the top 20 percent of scores on factor one, the general socio-economic factor, but not highly on other factors. It was labelled as the SES disadvantaged group. This category included suburbs such as Blacktown, Kingsgrove, South Granville and Wyongah. Spatially the suburbs were generally located in clusters of places to the west of the Sydney CBD. Reflecting the score on the first factor the suburbs generally had below average median family income (\$939.50) and above average proportions of low income families (14.01 percent) and low income individuals (41.92 percent). This group of suburbs also recorded below average levels of female labour force participation (46.67 percent) and above average levels of male unemployment (8.28 percent). Considering the other measures of deprivation, this group of suburbs had above average proportions of public housing tenants (6.69 percent), youth unemployment (12.87 percent) and female unemployment (6.30 percent).

Table 3. Mean Indicators of Type of Deprivation

	0	I	I, II	I, III	I, IV	multiple	Total
Low individual income (%)	31.49	41.92	47.56	47.37	45.34	49.76	34.32
Median family income (\$)	1358.89	939.50	737.00	721.72	812.36	608.32	1245.58
Low income families (%)	7.54	14.01	17.45	16.80	17.96	20.85	9.45
Female labour force participation rate (%)	57.52	46.67	40.63	37.18	43.16	34.86	54.34
Male unemployment (%)	5.48	8.28	15.02	10.46	12.04	17.67	6.78
Percentage indigenous population (%)	1.08	0.81	3.00	1.60	0.57	2.57	1.15
Public housing (%)	4.12	6.69	20.62	3.05	6.31	23.17	5.35
Youth unemployment (%)	9.67	12.87	22.01	14.00	16.95	22.98	11.12
Female unemployment (%)	4.81	6.30	13.13	8.37	11.92	14.70	5.92
Persons aged 65 years and older (%)	11.42	14.39	11.71	27.77	10.54	18.84	12.25
Males working part-time (%)	18.98	17.65	18.45	23.13	19.89	23.59	19.20
Male labour force participation (%)	71.67	64.06	60.11	52.80	62.50	51.70	69.26
Recently arrived immigrants (%)	4.26	3.53	2.50	1.27	8.90	3.28	4.32
Persons who do not speak English well (%)	2.44	6.82	3.99	0.82	14.97	6.45	3.54
Youth Labour Force Participation (%)	63.84	61.22	57.49	66.37	51.40	57.02	62.67

Table 4. Five Categories of Deprivation, Suburbs

<i>Category I</i>	<i>Category I, II</i>	<i>Category I, III</i>	<i>Category I, IV</i>	<i>Multiple</i>
Bass Hill	Airds	Chester Hill Ramsgate	Arncliffe	Bonnyrigg
Belfield	Ashcroft	Beach	Auburn	Carramar
Beverly Hills	Busby	Bateau Bay	Bankstown	Claymore
Bexley North	Cartwright	Blackwall	Belmore	Miller
Birrong	EasternCreek	Booker Bay	Berala Bonnyrigg	Villawood Warwick
Blacktown	Heckenberg	Canton Beach	Heights	Farm
Bossley Park	Lalor Park	Daleys Point	Cabramatta Cabramatta	Waterloo
Chullora	Lurnea	Erina	West	Yennora
Condell Park	Mount Lewis	EttalongBeach	Campsie	Blue Bay
Earlwood	Sadleir	Gorokan	CanleyHeights	Budgewoi
Enfield	St Marys	KillarneyVale Kincumber	Canley Vale	Halekulani
Greenacre	Buff Point	South	Canterbury	Lake Haven
Guildford	Charmhaven	Noraville	Edensor Park	Long Jetty
Kingsgrove	ChittawayBay	Shelly Beach	Fairfield	TheEntrance TheEntrance
Kyeemagh	San Remo	Toukley	Fairfield East Fairfield	North Toowoan
Marayong	Tuggerawong	Umina Beach	Heights	Bay
Merrylands West		West Gosford	Fairfield West	Wyong
Mount Pritchard		Woy Woy	Granville	
Narwee			Green Valley	
Prairiewood			GreenfieldPark	
Revesby			HomebushWest	
Roselands			Lakemba	
Rydalmer			Lansvale	
Sefton			Lidcombe	
Smithfield			Liverpool	
South Granville			Marrickville	
South Wentworthville			Merrylands	
Turrella			Old Guildford	
Wareemba			Punchbowl	
Wetherill Park			Regents Park	
Woodpark			Riverwood	
Yagoona			Silverwater	
Davistown			St Johns Park	
Kanwal			Wakeley	
Wyongah			Wiley Park	

Category I, II was designated as those suburbs that score highly on factor one, the general socio-economic factor, and on factor two which loaded highly on the presence of indigenous populations and disadvantaged families/households and was labelled as the SES disadvantage/indigenous population and public housing tenants group. This group includes the suburbs of Airds, Eastern Creek and San Remo and were a group of suburbs similar to those identified by Vinson (n.d.) in his report 'Key indicators of poverty in Western Sydney'. Spatially the suburbs were generally located in Sydney's western metropolitan region. The suburbs had on average high concentrations of both indicators suggesting deprivation more generally as well as indicators showing concentrations of indigenous persons, public housing and unemployment (especially female and youth). Considering these factors more specifically, in relation to the first factor, this group of suburbs had low family incomes (median \$ 737.00) and above average proportions of low income individual incomes (47.56 percent) and family incomes (17.45 percent), below average rates of female labour force participation (40.63 percent) and above average levels of male unemployment (15.02 percent). In relation to the second function this group of suburbs recorded the highest proportion of persons from an indigenous background (3 percent) and the second highest proportions (second to the group reflecting multiple deprivation- see below) of households in public housing (20.62 percent), youth unemployment (22.01 percent) and female unemployment (13.13 percent).

Category I, III was designated as those suburbs that score highly on factor one and on factor three, the factor accounting for the presence of aged persons. It was labelled as the SES disadvantage/ elderly population group. The suburbs in this group included Chester Hill, Erina and West Gosford. Spatially these generally clustered in areas towards the New South Wales central coast, with some located in the western suburbs. They do to some extent reflect the problems of aging in place that has been identified as an important urban issue in recent decades. Reflecting the high score on factor one this group of suburbs recorded low median family income (\$721.72) and above average proportions of low income individuals (47.37 percent) and families (16.80 percent). The group of suburbs also had high levels of male unemployment (10.46 percent) and low levels of female labour force participation (37.18 percent). Reflecting the high score on factor three this group of suburbs recorded the highest mean proportion of persons aged 65 years and older (27.77 percent).

Category I, IV was designated by suburbs that score highly on the first factor and also on the fourth factor, the factor accounting for persons with poor ability in English language and those recently arrived in Australia. This category therefore represented those suburbs most likely to have high levels of disadvantage associated with ethnicity and a lack of English skills and reflect the places that some researchers suggest may be developing ghetto communities (Birrell 1993) and where 'ethnic migrants from non-English speaking backgrounds make up the major disadvantaged component of a significant and growing socio-economic divide in Sydney (Forrest and Poulsen 2003: 9). Suburbs in this group included Auburn, Cabramatta and Punchbowl and spatial

these suburbs were clustered in the western region of the metropolitan area. As with the other groups of deprived suburbs, this group recorded a low level of median family income (\$812.36) and high proportions of low income individuals (45.34 percent) and families (17.96 percent), high levels of unemployed males (12.04 percent) and low female labour force participation (43.16 percent). Reflecting the score on the fourth factor, the suburbs in this group recorded the highest percentage of people who were recent arrivals (8.90 percent) and persons who do not speak English well (14.97 percent).

The final category of suburbs contains those places that recorded high scores on the first factor and high scores on more than one of the other factors. Suburbs included in this group were Claymore, Waterloo and Wyong. Spatially, these suburbs are generally located in the city's western region and in the suburbs towards the New South Wales central coast. This category of suburbs represents places with multiple facets of deprivation. The suburbs in this category recorded the highest mean percentages on several of measures of deprivation including the percentage of low income individuals (49.76 percent), low income families (20.85 percent), unemployed males (17.67 percent), public housing tenants (23.17 percent), youth unemployment (22.98 per cent) and female unemployment (14.70 per cent). These suburbs also recorded the lowest levels of labour force participation (males 51.70 percent and females 34.86 percent) and the lowest level of median family income (\$608.32).

The section above has illustrated the ways in which the factors emerging from the principal components analysis were combined to develop a typology of urban deprivation. The second part of this analysis focuses on the development and analysis of a general deprivation index and provides a measure of the intensity of deprivation across the suburbs of Sydney. The general index of deprivation (GDI) accounts for the impact of multiple aspects of deprivation by combining the individual principal component analysis factors which were the basis of the analysis in the previous section using the equation set out in the methods section. The GDI ranges from 0.04 to 0.56 and has a mean of 0.19. Lower scores represent less deprivation, while commensurately, higher scores indicate more deprivation. Forty-two per cent of the suburbs included in this analysis had scores above the mean. In order to present the data for all 600 suburbs, the GDI is divided into quintiles. The suburbs in each of the five groups together with their individual GDIs are listed in Tables 5-9.

As with the individual factors discussed in the previous section, the distribution of the GDI illustrates a distinctive spatial patterns with considerable deprivation concentrated in the suburbs to the immediate west of the Sydney CBD. The suburb of Cabramatta recorded the highest score of the GDI (0.56). Other suburbs located in the Local Government Area of Fairfield including Villawood, Cabramatta West and Fairfield also recorded high GDIs ranging from 0.43 to 0.44. Generally, it was the suburbs located in this area that recorded the highest GDIs. Other suburbs located in the western suburbs including Bankstown (0.35), Campsie (0.37) and Auburn (0.39) also recorded high GDIs. These are among the suburbs that have been identified as suffering

from multiple forms of deprivation in previous work (See for example Burnley and Walker 1982; Matwitjiw 1985; Hovarth and Tait 1986; Baum et al. 1999, 2002). Other small pockets of high deprivation exist in the suburbs located towards the New South Wales Central Coast including those located in the Local Government Area of Wyong (The entrance-0.36; Wyong -0.31; Canton Beach - 0.43) and Gosford (Booker Beach- 0.31; Woy Woy- 0.29) and in suburbs closer to the inner city (Waterloo-0.44 and Marrickville-0.28).

Table 5. General Deprivation Index (Quintile 1), Sydney Suburbs

Index scores 0.0 to 0.13 (least disadvantaged)					
Suburb	GDI	Suburb	GDI	Suburb	GDI
Alfords Point	0.12	Kangaroo Point	0.11	Elizabeth Bay	0.08
Balgowlah Heights	0.12	Killara	0.11	Lavender Bay	0.08
Barden Ridge	0.12	Lilli Pilli	0.11	Paddington	0.08
Berowra	0.12	Naremburn	0.11	Tamarama	0.08
Bilgola	0.12	Newport	0.11	Balmain East	0.07
Castle Cove	0.12	North Sydney	0.11	Darlinghurst	0.07
Castlecrag	0.12	Osborne Park	0.11	Longueville	0.07
Cheltenham	0.12	Rouse Hill	0.11	Scotland Island	0.07
Chiswick	0.12	St Ives Chase	0.11	Sydney	0.07
Curl Curl	0.12	Voyager Point	0.11	Northwood	0.06
Glen Alpine	0.12	Balmain	0.10	Birchgrove	0.05
Glenhaven	0.12	Cammeray	0.10	Darling Point	0.05
Glenwood	0.12	Clontarf	0.10	Linley Point	0.05
Greenwich	0.12	Clovelly	0.10	McMahons Point	0.05
Hornsby Heights	0.12	Cremorne	0.10	Milsons Point	0.05
Kareela	0.12	Crows Nest	0.10	Palm Beach	0.05
Liberty Grove	0.12	Double Bay	0.10	Potts Point	0.05
Middle Cove	0.12	Dover Heights	0.10	Woolwich	0.05
Mortlake	0.12	Manly	0.10	Cremorne Point	0.04
North Wahroonga	0.12	Mosman	0.10	Huntleys Point	0.04
Northbridge	0.12	North Bondi	0.10	Point Piper	0.04
Pymble	0.12	Pyrmont	0.10		
Queens Park	0.12	Riverview	0.10		
Roseville	0.12	Rose Bay	0.10		
Seaforth	0.12	Rozelle	0.10		

Table 5 (continued)

Suburb	GDI	Suburb	GDI
South Turramurra	0.12	Tarban	0.10
St Ives	0.12	Warrawee	0.10
Surry Hills	0.12	Waverton	0.10
Terrey Hills	0.12	Wollstonecraft	0.10
Watsons Bay	0.12	Alexandria	0.09
Westleigh	0.12	Camperdown	0.09
Willoughby East	0.12	Centennial Park	0.09
Woronora Heights	0.12	Church Point	0.09
Yarrawarrah	0.12	Coogee	0.09
Annandale	0.11	Edgecliff	0.09
Bondi Beach	0.11	Forest Lodge	0.09
Bonnet Bay	0.11	Kirribilli	0.09
Bronte	0.11	Macquarie Links	0.09
Darlington	0.11	Neutral Bay	0.09
Davidson	0.11	Rushcutters Bay	0.09
Erskineville	0.11	Vaucluse	0.09
Fairlight	0.11	Woollahra	0.09
Grays Point	0.11	Bellevue Hill	0.08
Henley	0.11	Chippendale	0.08

Table 6. General Deprivation Index (Quintile 2), Sydney suburbs

Index scores 0.14 to 0.16					
Suburb	GDI	Suburb	GDI	Suburb	GDI
Abbotsbury	0.16	Currans Hill	0.15	Holsworthy	0.14
				Horningsea	
Blaxland	0.16	Engadine	0.15	Park	0.14
Bondi	0.16	Enmore	0.15	Hunters Hill	0.14
Cambridge Gardens	0.16	Erskine Park	0.15	Ingleside	0.14
Camden South	0.16	Glenbrook	0.15	Kyle Bay	0.14
				Narellan	
Claremont Meadows	0.16	Haymarket	0.15	Vale	0.14
Emu Heights	0.16	Kensington	0.15	Normanhurst	0.14
				North	
Faulconbridge	0.16	Kings Langley	0.15	Epping	0.14
				North	
Kearns	0.16	Kings Park	0.15	Narrabeen	0.14
Long Point	0.16	Lane Cove West	0.15	North Rocks	0.14
Lugarno	0.16	Lapstone	0.15	Oyster Bay	0.14
Manly Vale	0.16	Leichhardt	0.15	Parklea	0.14

Table 6 (Continued)

Suburb	GDI	Suburb	GDI	Suburb	GDI
				Pennant Hills	
Mount Ku-ring-gai	0.16	Little Bay	0.15	Phillip Bay	0.14
North Curl Curl	0.16	Malabar	0.15	Randwick	0.14
North Turramurra	0.16	Menai	0.15	Tennyson	0.14
North Willoughby	0.16	Milperra	0.15	Warriewood	0.14
Northmead	0.16	Minchinbury	0.15	Wattle Grove	0.14
Prestons	0.16	Mona Vale	0.15	Werrington	
Prospect	0.16	Mount Colah	0.15	Downs	0.14
Quakers Hill	0.16	Mount Riverview	0.15	Woronora	0.14
Raby	0.16	North Balgowlah	0.15	Yowie Bay	0.14
Regentville	0.16	Putney	0.15	North Avoca	0.14
Ruse	0.16	Valley Heights	0.15	Holsworthy	0.14
St Clair	0.16	Warrimoo	0.15	Horningsea Park	0.14
Stanmore	0.16	Werrington County	0.15	Hunters Hill	0.14
Sylvania Waters	0.16	Winmalee	0.15	Ingleside	0.14
Taren Point	0.16	Woy Woy Bay	0.15	Kyle Bay	0.14
The Rocks	0.16	Acacia Gardens	0.14	Narellan	
Thornleigh	0.16	Balgowlah	0.14	Vale	0.14
West Hoxton	0.16	Baulkham Hills	0.14	Normanhurst	0.14
Willoughby	0.16	Bayview	0.14	North	
Woodcroft	0.16	Berowra Heights	0.14	Epping	0.14
Woolooware	0.16	Bondi Junction	0.14	North	
Horsfield Bay	0.16	Cabarita	0.14	Narrabeen	0.14
Rocky Point	0.16	Castle Hill	0.14	North Rocks	0.14
Tacoma South	0.16	Cherrybrook	0.14	Oyster Bay	0.14
Abbotsford	0.15	Collaroy	0.14		
Beacon Hill	0.15	Denistone	0.14		
Belrose	0.15	Dural	0.14		
Bow Bowling	0.15	East Ryde	0.14		
Como	0.15	Elanora Heights	0.14		
Connells Point	0.15	Glenmore Park	0.14		
Cromer	0.15	Gordon	0.14		
Cronulla	0.15	Harrington Park	0.14		

In contrast to suburbs located in the fifth quintile are suburbs that scored GDIs (quintile 1) which include many of the suburbs that were placed in category '0' in the initial analysis. The greatest spatial concentration of these

suburbs is in the inner city and near inner-city regions especially those located on the shores of the Sydney Harbour or other waterfront localities. Cremorne Point, located in Sydney's lower north shore (North Sydney Local Government Area), Point Piper (Woollahra Local Government Area) and Huntleys Point (Hunter's Hill Local Government Area) recorded the lowest GDI (0.04). Other suburbs in this area including Cremorne (0.10), Lavender Bay (0.08) and Neutral Bay (0.09) and in other harbour front localities (Double Bay- 0.10; Point Piper -0.04; Manly -0.10) also had low GDIs. Away from the harbour places including St Ives (0.12) Warrawee (0.10) and Killara (0.11) also had low GDIs.

Table 7. General Deprivation Index (Quintile 3), Sydney Suburbs

Index scores 0.17 to 0.20					
Suburb	GDI	Suburb	GDI	Suburb	GDI
Blairmount	0.20	Russell Lea	0.19	Jamisontown	0.17
Bradbury	0.20	South Coogee	0.19	Kirrawee	0.17
Brookvale	0.20	St Peters	0.19	Loftus	0.17
Cambridge Park	0.20	Sylvania	0.19	Marsfield	0.17
Chifley	0.20	Narara	0.19	Narrabeen	0.17
Concord	0.20	Niagara Park	0.19	Oakhurst	0.17
Eagle Vale	0.20	Tascott	0.19	Oatlands	0.17
Georges Hall	0.20	Terrigal	0.19	Oatley	0.17
Greystanes	0.20	Wamberal	0.19	Petersham	0.17
Hinchinbrook	0.20	Blakehurst	0.18	Picnic Point	0.17
Hurstville Grove	0.20	Caringbah	0.18	Schofields	0.17
Ingleburn	0.20	Carss Park	0.18	St Andrews St	0.17
Jannali	0.20	Cecil Hills	0.18	HelensPark Stanhope	0.17
Kingsford	0.20	Dee Why	0.18	Gardens	0.17
Leumeah	0.20	Elderslie	0.18	Sutherland	0.17
Miranda	0.20	Emu Plains	0.18	Ultimo	0.17
Moorebank	0.20	Epping	0.18	Winston Hills	0.17
Mortdale	0.20	Eschol Park	0.18	Avoca Beach	0.17
North Parramatta	0.20	Hornsby	0.18	Copacabana	0.17
North Ryde	0.20	Kurnell	0.18	Kariong	0.17
North Strathfield	0.20	Lewisham	0.18	Lisarow	0.17
Redfern	0.20	Lilyfield	0.18	Yattalunga	0.17
Rosehill	0.20	Macquarie Park	0.18	Jamisontown	0.17
Sandringham	0.20	Peakhurst Heights	0.18	Kirrawee	0.17
Springwood	0.20	Plumpton	0.18	Loftus	0.17
Toongabbie	0.20	South Penrith	0.18	Marsfield	0.17

Table 7 (Continued)

Suburb	GDI	Suburb	GDI	Suburb	GDI
Werrington	0.20	Summer Hill	0.18	Narrabeen	0.17
Woolloomooloo	0.20	Waverley	0.18	Oakhurst	0.17
Mardi	0.20	Woodbine	0.18	Oatlands	0.17
Bardwell Park	0.19	Bensville	0.18	Oatley	0.17
Canada Bay	0.19	Forresters Beach	0.18	Petersham	0.17
Carlingford	0.19	Glenning Valley	0.18	Picnic Point	0.17
Concord West	0.19	Ourimbah	0.18	Schofields	0.17
Dawes Point	0.19	Allambie Heights	0.17		
Gymea	0.19	Asquith	0.17		
Hoxton Park	0.19	Botany	0.17		
Maroubra	0.19	Chipping Norton	0.17		
Melrose Park	0.19	Cranebrook	0.17		
Millers Point	0.19	Forestville	0.17		
Narellan	0.19	Gladesville	0.17		
North Manly	0.19	Glebe	0.17		
Padstow Heights	0.19	Glendenning	0.17		
Rhodes	0.19	Hassall Grove	0.17		
Rodd Point	0.19	Heathcote	0.17		

Table 8. General Deprivation Index (Quintile 4), Sydney Suburbs

Index scores 0.21 to 0.26					
Suburb	GDI	Suburb	GDI	Suburb	GDI
Bexley North	0.26	Padstow	0.24	Homebush	0.22
				Homebush	
Blackett	0.26	Pendle Hill	0.24	Bay	0.22
Blacktown	0.26	Penrith	0.24	Kingswood	0.22
Edensor Park	0.26	Rosebery	0.24	Mascot	0.22
Green Valley	0.26	Sans Souci	0.24	Narraweena	0.22
Kyeemagh	0.26	Westmead	0.24	Panania	0.22
Mays Hill	0.26	Wetherill Park	0.24	Penshurst	0.22
Parramatta	0.26	Norah Head	0.24	Riverstone	0.22
Ramsgate Beach	0.26	Saratoga	0.24	Ryde	0.22
Rockdale	0.26	Wyongah	0.24	Seven Hills	0.22
Roselands	0.26	Allawah	0.23	Strathfield	0.22
				Strathfield	
Shalvey	0.26	Ashfield	0.23	South	0.22
Blackwall	0.26	Brighton Le Sands	0.23	Waitara	0.22
East Gosford	0.26	Campbelltown	0.23	Wareemba	0.22
Kanwal	0.26	Carlton	0.23	Woodpark	0.22

Table 8 (Continued)

Suburb	GDI	Suburb	GDI	Suburb	GDI
Tuggerawong	0.26	Croydon	0.23	Gosford Point	0.22
Banksia	0.25	Croydon Park	0.23	Frederick	0.22
Bossley Park	0.25	Denistone West	0.23	Tacoma	0.22
Earlwood	0.25	Doonside	0.23	Wyoming	0.22
Enfield	0.25	Dulwich Hill	0.23	Ambarvale	0.21
Kogarah	0.25	Haberfield	0.23	Ashbury	0.21
Lalor Park	0.25	Hillsdale	0.23	Beverly Park	0.21
Macquarie Fields	0.25	Monterey	0.23	Colyton	0.21
Minto	0.25	Oxley Park	0.23	DenistoneEast	0.21
North St Marys	0.25	Peakhurst	0.23	East Hills	0.21
Revesby	0.25	Ramsgate	0.23	Eastwood	0.21
Rydalmere	0.25	South Hurstville	0.23	Glenfield	0.21
South Wentworthville	0.25	Tempe	0.23	Hammondville	0.21
Sydenham	0.25	Berkeley Vale	0.23	Kogarah Bay	0.21
Wentworthville	0.25	Blue Haven	0.23	Matrville	0.21
Chittaway Bay	0.25	Green Point	0.23	Meadowbank Old	0.21
Davistown	0.25	North Gosford	0.23	Toongabbie	0.21
Kincumber	0.25	St Huberts Island	0.23	Pagewood	0.21
Point Clare	0.25	Tumbi Umbi	0.23		
Watanobbi	0.25	Bardwell Valley	0.22		
Bexley	0.24	Burwood Heights	0.22		
Dolls Point	0.24	Camden	0.22		
Dundas	0.24	Casula	0.22		
Eastern Creek	0.24	Chatswood	0.22		
Ermington	0.24	Dean Park	0.22		
Guildford West	0.24	Dharruk	0.22		
Hebersham	0.24	Dundas Valley	0.22		
Hurlstone Park	0.24	Five Dock	0.22		
Marayong	0.24	Girraween	0.22		

4. CONCLUSION

This paper has developed a series of indicators of deprivation across the suburbs of Sydney. Utilising a methodology described by Langlois and Kitchen (2001), the paper took factor scores derived from a principal components analysis to firstly locate several clusters or groups of deprived suburbs based on a series of indicators of deprivation. It then calculated a general deprivation index (GDI) that could be applied to suburbs across the region and used to rank the suburbs from high to low. The analysis illustrated that deprivation across Sydney suburbs could be characterised in terms of several dimensions that included

general socio-economic status (principally measured by income), the presence of disadvantaged households including indigenous households and households in public housing, the presence of disadvantaged older populations and the presence of disadvantaged migrant groups. The analysis also pointed to the important fact that suburbs can reflect multiple dimensions of deprivation. The analysis considers the spatial distribution of deprivation across Sydney and illustrates the concentration of deprivation across in Sydney's western suburbs, together with pockets in localities including the inner-city and suburbs located towards the New South Wales central coast. The findings also show that in some cases these places sit along side places reflecting high levels of advantage. Such a finding is certainly not new and reinforces the results of other studies (see for example Stilwell 1989; Hovarth and Tait 1986; Baum et al. 1999, 2002) that have shown the ways in which deprivation and disadvantage are spatially concentrated and often contrast with concentrations of advantage.

Table 9. General Deprivation Index (Quintile 5), Sydney Suburbs

Index scores 0.27 to 0.56 (most disadvantaged)					
Suburb	GDI	Suburb	GDI	Suburb	GDI
Cabramatta	0.56	Fairfield West	0.31	Whalan	0.28
Canley Vale	0.45	Granville	0.31	Bateau Bay	0.28
Cabramatta West	0.44	Lidcombe	0.31	Blue Bay	0.28
Fairfield	0.44	Old Guildford	0.31	Buff Point	0.28
Waterloo	0.44	Regents Park	0.31	Killarney	
Villawood	0.43	Smithfield	0.31	Vale	0.28
Canton Beach	0.43	Wakeley	0.31	San Remo	0.28
Canley Heights	0.42	Booker Bay	0.31	Bass Hill	0.27
Yennora	0.41	Daleys Point	0.31	Beverly	
Claymore	0.40	Lake Haven	0.31	Hills	0.27
Auburn	0.39	Wyong	0.31	Merrylands	
Bonnyrigg	0.39	Daceyville	0.30	West	0.27
Carramar	0.39	Greenacre	0.30	Mount	
Fairfield East	0.39	Greenfield Park	0.30	Druitt	0.27
Ashcroft	0.37	Lansvale	0.30	Narwee	0.27
Campsie	0.37	Lurnea	0.30	St Marys	0.27
Cartwright	0.37	Mount Pritchard	0.30	Turrella	0.27
Fairfield Heights	0.37	Sefton	0.30	Willmot	0.27
Lakemba	0.37	South Granville	0.30	Ashcroft	0.27
Warwick Farm	0.37	Yagoona	0.30	Charmhaven	0.27
				Erina	0.27
				Noraville	0.27
				Shelly	
				Beach	0.27
				Umina	
				Beach	0.27
				West	
				Gosford	0.27

Table 9 (Continued)

Suburb	GDI	Suburb	GDI	Suburb	GDI
Liverpool	0.36	Bidwill	0.29	Whalan	0.28
Wiley Park	0.36	Birrong	0.29	Bateau Bay	0.28
Kincumber South	0.36	Bonnyrigg Heights	0.29	Blue Bay	0.28
The Entrance	0.36	Chester Hill	0.29	Buff Point	0.28
				Killarney	
Airds	0.35	Chullora	0.29	Vale	0.28
Bankstown	0.35	Eastlakes	0.29	San Remo	0.28
Punchbowl	0.35	Guildford	0.29	Bass Hill	0.27
				Beverly	
Sadleir	0.35	Merrylands	0.29	Hills	0.27
				Merrylands	
Busby	0.34	The Entrance North	0.29	West	0.27
				Mount	
Heckenberg	0.34	Toowoon Bay	0.29	Druitt	0.27
Miller	0.34	Woy Woy	0.29	Narwee	0.27
Toukley	0.34	Arncliffe	0.28	St Marys	0.27
Berala	0.33	Belfield	0.28	Turrella	0.27
Homebush West	0.33	Burwood	0.28		
Riverwood	0.33	Canterbury	0.28		
St Johns Park	0.33	Condell Park	0.28		
Budgewoi	0.33	Emerton	0.28		
Belmore	0.32	Harris Park	0.28		
Mount Lewis	0.32	Hurstville	0.28		
Prairiewood	0.32	Kingsgrove	0.28		
Ettalong Beach	0.32	Lethbridge Park	0.28		
Gorokan	0.32	Marrickville	0.28		
Halekulani	0.32	Silverwater	0.28		
Long Jetty	0.32	Tregear	0.28		

What the findings also show is that the spatial concentration of urban deprivation identified here are despite the generally improved economic conditions in Sydney as Australia's global city and the nation more generally. Of course the association between pockets of deprivation and advantage has been an important part of the research literature on global cities (see for example the work by Sassan 1991, 1994). In Sydney's case this raises questions regarding the extent to which positive economic gains are being shared across the city in some form of trickle down effect and that disadvantaged places in Sydney might not be doing as bad as disadvantaged places in other Australian cities (Stimson et al. 2001). While there is likely to be some truth to this -as Stimson et al. 2001 point out- such arguments do not take away from the fact that the spatial concentration of deprivation is a significant contemporary social problem within cities such as Sydney regardless of the level of economic prosperity. Furthermore, as has been

pointed out in the introduction to this paper, the concentration of deprivation in certain suburbs is likely to have prolonged outcomes in terms of intergenerational transfers of poverty or unemployment and in terms of the impacts of neighbourhood effects on the level of social problems in disadvantaged suburbs thereby further reducing the life chances of individuals and households (Wilson 1987; Young 2003). It is issues such as these which continue to be important for the nation's social welfare, jobs, and training policies, and are issues that will continue to be important in the foreseeable future.

Finally, from a research methodology point of view the analysis presented in this paper is useful in that it provides further support for a methodology that could be utilised across several applications. Most obviously, the methodology could be extended to provide measures across all metropolitan or urban areas thereby providing governments and interested stakeholders with a benchmarking measure based on the most up to date data (2001 census material). In these terms, the analysis presented in this paper provided a base from which to further expand such analysis. Further extensions to this work might include considering deprivation across the Australian settlement system thereby taking into account the spatial patterns of deprivation across all urban areas and the inclusion of other relevant deprivation measures derived from other data sources.

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Figure 3. Areas Associated with Deprivation, Sydney Suburbs

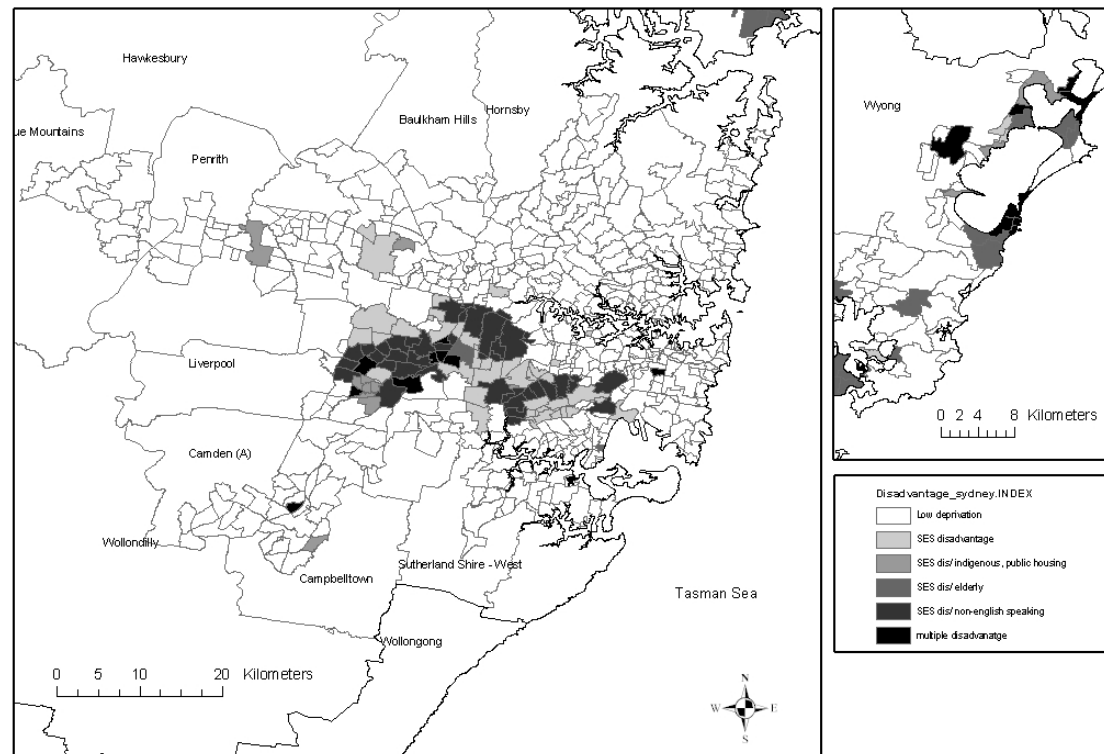


Figure 4. General Deprivation Index, Sydney Suburbs

