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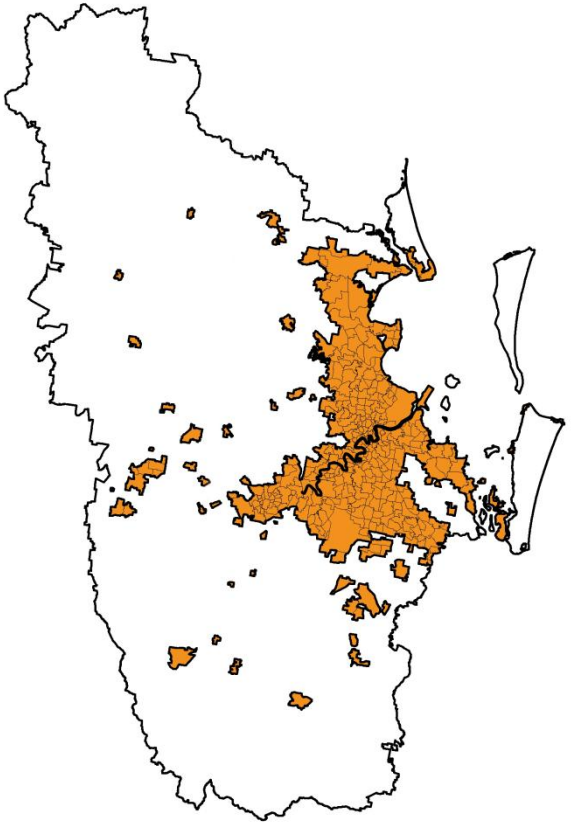
May 2013



# Who lives where: Brisbane

## Productive Cities: Supplementary Maps

Jane-Frances Kelly and Peter Mares

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## Grattan Institute Report No. 2013-8, MTH 2013

This publication was prepared by Grattan Institute Cities Program Director Jane-Frances Kelly and Cities Fellow Peter Mares. Cameron Harrison, Michael O'Toole, and Matthew Oberklaid provided extensive research assistance and made substantial contributions to the report.

We would like to thank the members of Grattan Institute's Cities Reference Group for their helpful comments, as well as numerous industry participants and officials for their input. We acknowledge the assistance of SGS Economics and Planning in producing the access to jobs maps.

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Kelly, J-F., Mares, P., Harrison, C., O'Toole, M., Oberklaid, M., 2013, *Who lives where: Brisbane*, Grattan Institute

ISBN: 978-1-925015-35-5

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# 1. Introduction

## 1.1 Introduction

Maps enable us to visualise data in new ways. Columns of numbers can be converted into a visual image that provides a more complex understanding of a familiar geography.

The maps contained in this booklet were developed as part of the underlying evidence base for the Grattan Institute report *Productive cities*[1] and are organised under three themes – Income, Education (level of qualifications) and Employment (participation in the labour market and access to jobs). There are separate map collections for Brisbane, Melbourne, Perth and Sydney.

These maps illustrate who lives where in Australia's largest cities and track how this has been changing over time. They draw on data from five censuses over twenty years – from 1991 to 2011.

One of the questions that this mapping exercise seeks to answer is whether or not Australian cities are becoming more geographically polarised – that is, whether residents of our cities are increasingly segregated by income and education levels.

In Australia, a western liberal democracy with a competitive, market-based economy, it is widely accepted that not everyone will be equal – with the same size pay packet, bank balance or house. Inequality can be seen as one way in which the market rewards performance and effort and provides an incentive to work harder or improve skills – even if that is only one motivating factor among many.[2]

Nor is it physically possible for every city resident to live equidistant from the things that matter for daily life such as workplaces, educational institutions, public transport or shops.

Yet if the distribution of outcomes and opportunities is too uneven, this can have profound implications. If the structure of the city severely restricts access to jobs or education then it can hold back productivity and constrain the ability of individual residents to improve their lives. If disadvantage or wealth is overly concentrated in particular areas, this could weaken social cohesion.

The overall picture that emerges from these maps is that the residents of Australia's four biggest cities have enjoyed rising incomes and have become much better qualified over the past two decades. Yet at the same time, Australian cities have become more polarised. Increasingly, high-income residents with university level qualifications cluster in suburbs close to city centres, while residents on lower incomes, and residents with vocational qualifications, are more likely to live around the city fringes.[3] In each city, it is also possible to identify particular areas of disadvantage, where a high proportion of residents have no

[1] Kelly, *et al.* (2013)

[2] Dadush, *et al.* (2012) p. 1

[3] The trends identified in these maps are also linked to changing house prices, with property values rising more rapidly in inner than outer suburbs. Since the census does not contain house price data it was not possible to map the changing distribution of residential property values, however the issue is discussed in greater detail in our report

formal qualifications beyond secondary school, where labour market participation is low and where a high proportion of young people are 'disconnected' – that is, neither working, nor engaged in education or training.

## 1.2 Reading the maps

For each city, we have restricted our maps to the relevant Urban Centre Zone as defined by the Australian Bureau of Statistics. This captures the built-up areas in which residents lived in the relevant Census year and avoids diluting the maps' visual impact with large but sparsely populated districts that fall within the broader Greater Capital City Statistical Areas (GCCSA). For context, we have included the GCCSA boundary to show the overall shape of metropolitan area – see Figure 1.

The larger, boxed view on each map magnifies as much of each city as possible to provide more clarity and detail (though inevitably excluding some outlying suburbs). Maps using 2011 census data are presented on a full page, but earlier maps are four to a page.

Maps from 2011 and 2006 show census data at a State Suburb (SSC) level – an area small enough for maps to be sufficiently detailed, yet large enough to generate meaningful statistics. Suburbs are also familiar to us as residents.

Census data was not available at a suburb level prior to 2006 in all states. To provide consistency between cities, maps from 2001 and 1996 use data at the level of Statistical Local Area (SLA). To ensure consistency over time, maps that track change between 1996 and 2011 also use data at SLA level.

Limitations on the original data and the lack of a consistent unit of spatial analysis made it impossible to map change back to 1991. Maps from 1991 use a larger area of analysis – the Statistical Subdivision (SSD), defined by the ABS as "socially and economically homogeneous regions characterised by identifiable links between the inhabitants".[4]

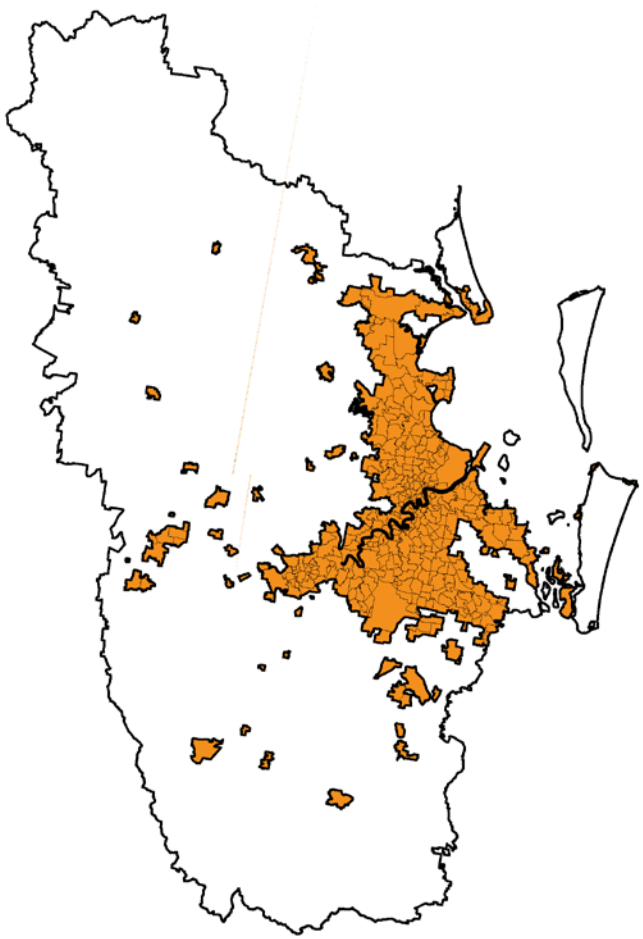
Despite unavoidable differences in the unit of spatial measurement for different census periods, comparing maps from 1991 to 2011 still provides an overall picture of change over time, with the most recent maps providing the highest level of detail.

We have excluded areas where the relevant population was too small for meaningful analysis.[5]

In general we have restricted our analysis to residents in the prime working ages of 25-65.[6] This helps avoid capturing people who are completing education or training, who may be still living with parents as they enter the workforce, or who have retired from the workforce.

[4] For more detail on ABS geographical classifications see: Pink (2011a) and Pink (2011b).
[5] Generally this was fewer than 50 people in the relevant sample.
[6] The exceptions are the job access and youth disconnection maps. Youth disconnection is specific to the age range 17-25 and age range is not relevant to the job access maps.

**Figure 1: Context Map showing urban footprint and Greater Capital City Statistical Area boundary for Brisbane 2011**



## 2. Income

Income maps are based on census data, counting people by their place of usual residence, but restricted to people between 25 and 65 years of age. Using this age group ensures a focus on the segment of the population more likely to be available for employment, and excludes most people who are still engaged in post-school education and most retirees. The selection of this cohort is also made in the knowledge that 75 per cent of the growth in real household income over the past twenty years has come from increased earnings in the labour force.[7]

Income is based on the total personal income (INCP) field in the relevant census year.[8] The census asks individuals to report their usual total pre-tax income by selecting an option from a number of possible ranges (e.g. $200-$299, $300-$399). This limits the type of analysis that can be undertaken using this data (for example it is not possible to calculate average incomes). To estimate the median income (in 2011 dollars) we first adjust the census data for inflation and then assume that individuals' incomes are distributed evenly within each income range reported by the ABS.

### Median income by area (Figures 2-3)

We calculated the median income for each area using State Suburb level (SSC) data for 2011 and 1996, Statistical Local Area (SLA) for 2001 and 1996 and Statistical Subdivision (SSD) for 1991). Maps were then colour-coded to show the median annual income range for each area from more than $70,000 to less than $30,000 – the darker the colour of an area, the higher the median income of its residents. See Figure 2 and Figure 3.

The maps reveal evidence of polarisation, with individuals on higher incomes clustered in inner suburbs and in suburbs with desirable natural attributes. In Brisbane, the highest median incomes are found in inner suburbs and suburbs located close to the Brisbane River, while the lowest median incomes are concentrated in suburbs to the south that are more distant from the CBD.

### Average annual growth in median income (Figure 4)

In order to track change over time and to see if it reveals any spatial patterns, a second map shows the average annual growth in median income by SLA between 1996 and 2011. As can be seen in Figure 4, most of the areas showing the highest income growth are close to the city centre, while the lowest rates of income growth were recorded in more distant suburbs to the south. This reflects shifts in individual earnings as well as demographic changes.

[7] Greenvillle, et al. (2013) p. 5
[8] INCP measures total personal income on a weekly basis; we have annualised by multiplying by 52. We have used pre-tax income, and have not considered non-financial benefits, such as the flow of housing services generated from home ownership.

**Figure 2: Median income (residents aged 25-65) Brisbane, 1991-2006**

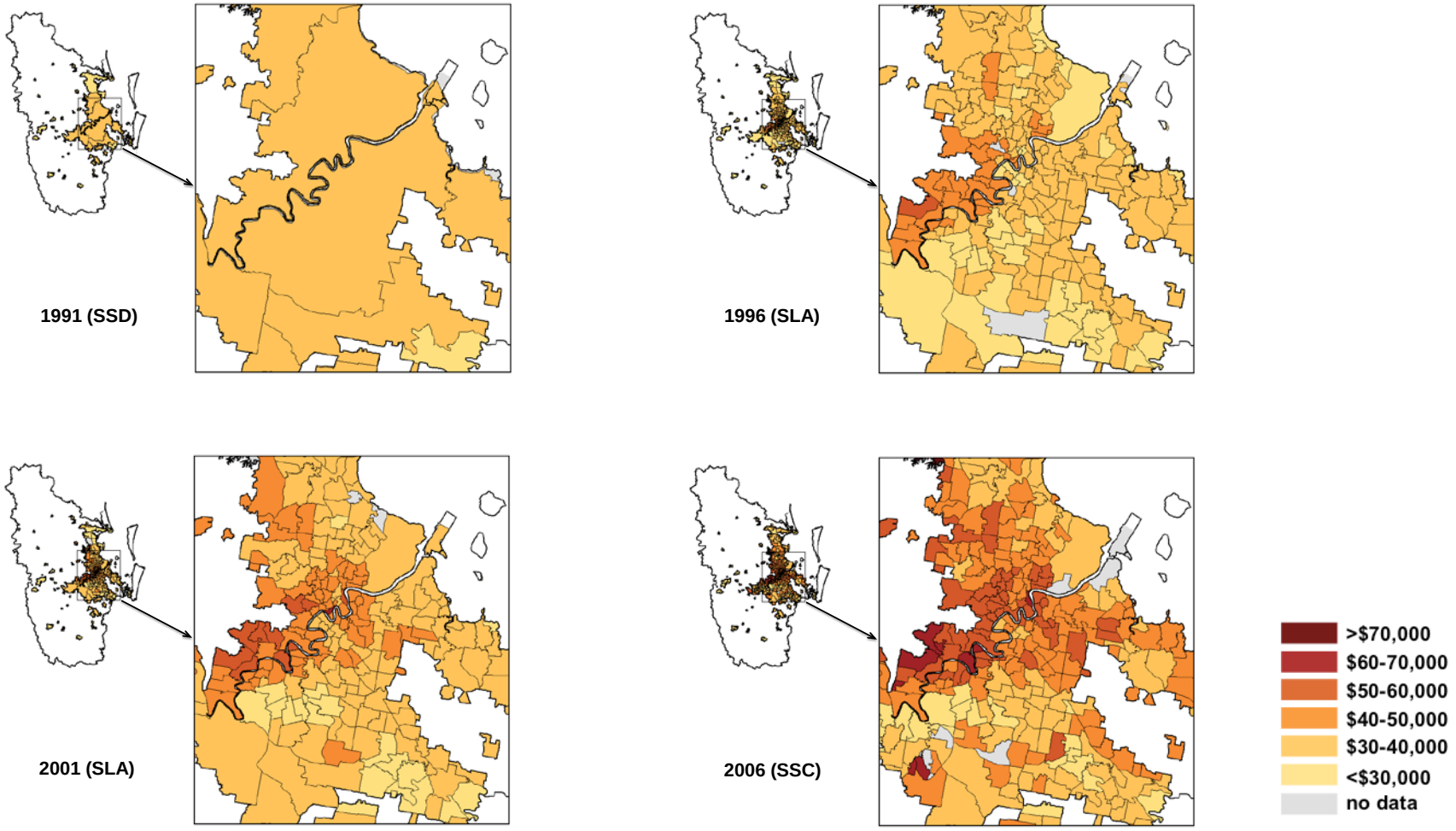


**Figure 3: Median income (residents aged 25-65), Brisbane. 2011 (SSC)**

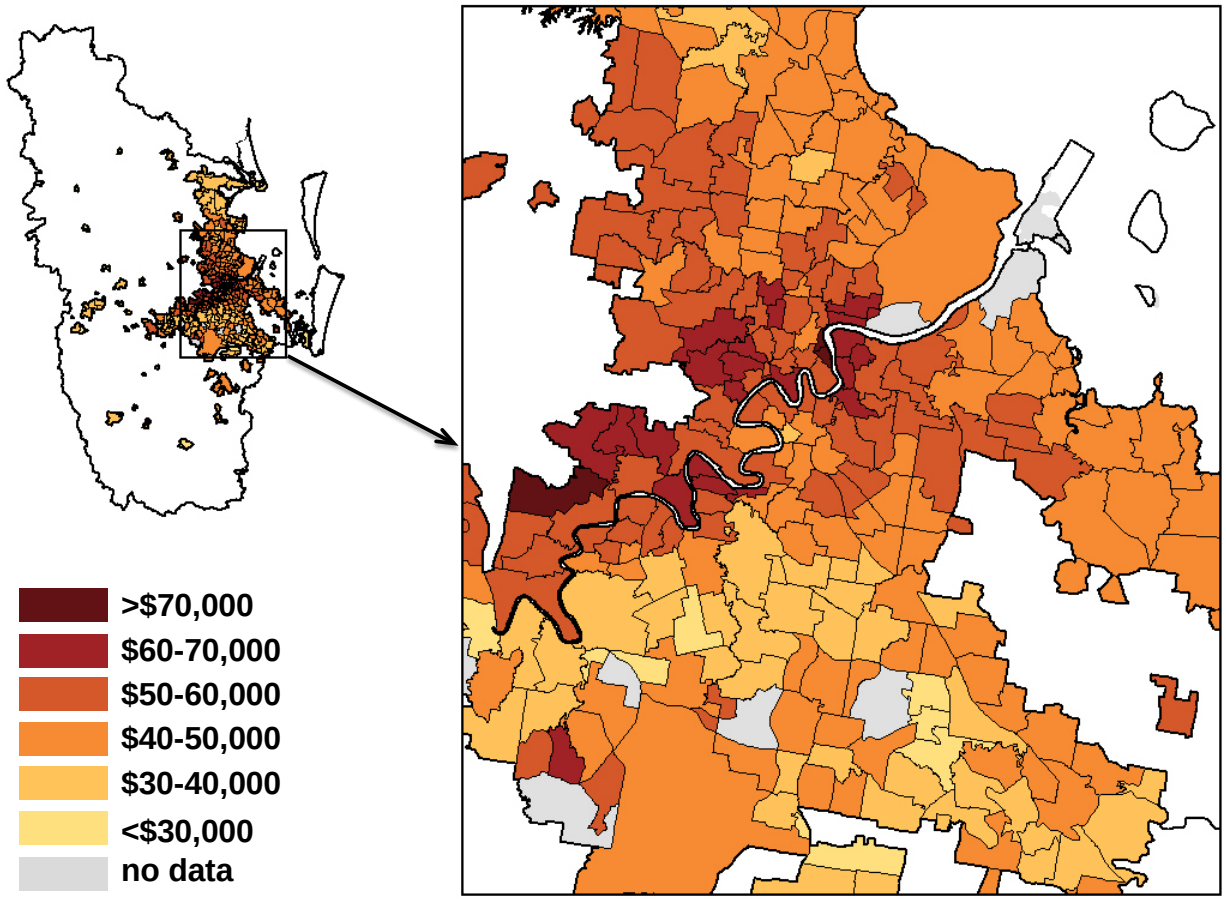
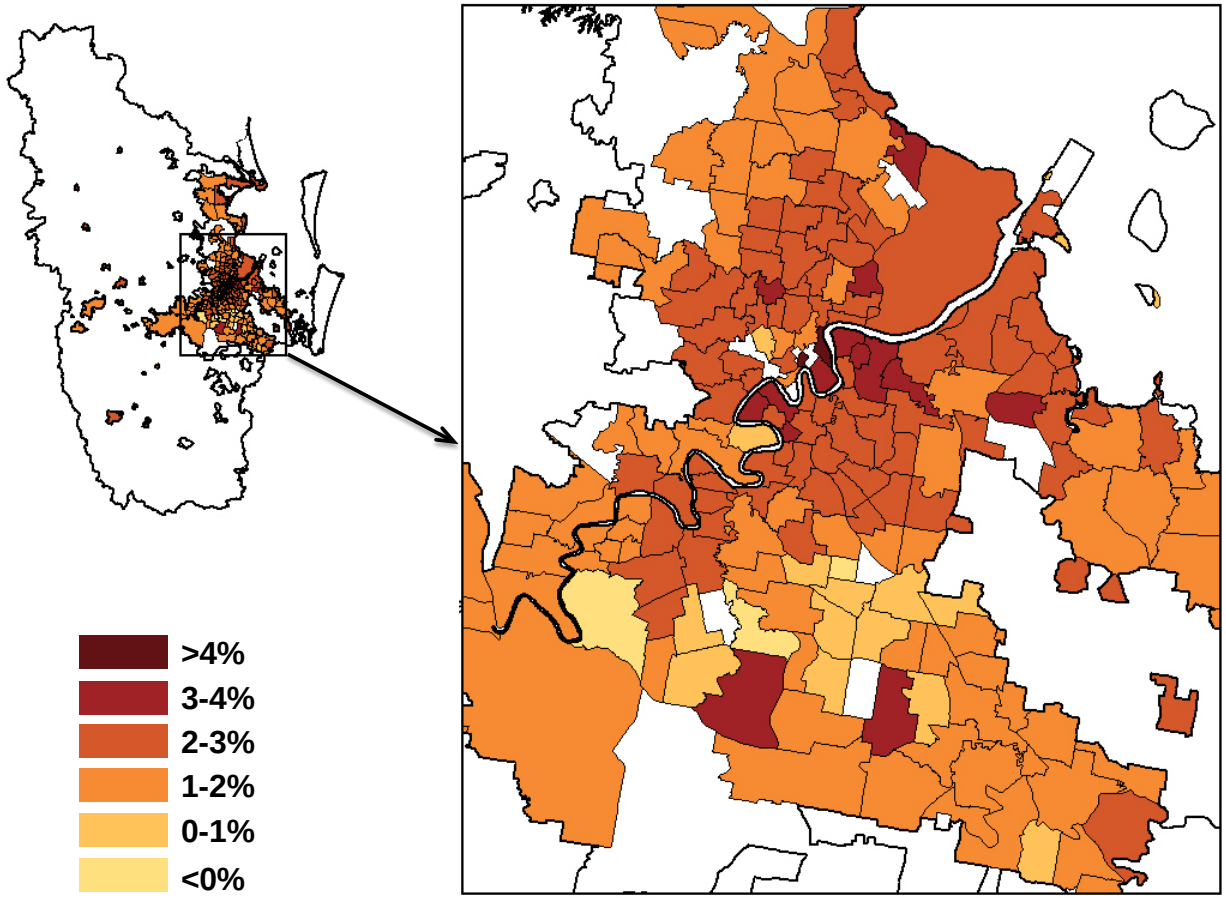


**Figure 4: Average annual growth in median income (residents aged 25-65), Brisbane 1996-2011 (SLA)**



# 3. Education

We have mapped three categories of educational achievement by the highest qualification level attained by people aged 25-65: bachelor degrees or higher from recognised universities (i.e. AQF level 7 and above); vocational qualifications such as diplomas or certificates (i.e. AQF levels 6 and below, usually from TAFEs or private training providers), and no post-school qualifications.

Qualification levels are determined using census data counting people by their place of usual residence. We have used the Post-School Qualification (QALLP) field at the 2-digit level, which provides sufficient detail for us to classify people into the three categories.

For each category, we have calculated the percentage of people in each area whose highest qualification is at that level. We have then colour-coded each suburb according to its percentage, with darker colours indicating that a suburb has a high proportion of people with that level of education.

### University qualifications (Figures 5-7)

The first set of maps (Figure 5 and Figure 6) shows changing levels of university attainment over the last twenty years. Two clear patterns emerge. Firstly, the maps show that the overall proportion of residents with a university qualification increased significantly between 1991 and 2011, with darker areas on the map spreading to cover a larger part of the city. Secondly, the maps show that people with university qualifications are concentrated in inner urban areas. The data is further analysed in a graph that shows the relative proportions in levels of university qualification by distance from the CBD for 1996 and 2011 (see Figure 7). While the city is, on average, much better qualified than twenty years ago, growth in university qualifications has been weakest in suburbs 30-40km from the city centre.

### Vocational qualifications (Figures 8-10)

The second set of maps (Figure 8 and Figure 9) is almost the inverse of the first. It shows the distribution of vocational qualifications. The maps become darker over time showing the increase in proportions of people with certificates, diplomas and other non-university qualifications. However the distribution is highly skewed towards outer urban areas, which have also seen more growth in vocational qualifications over time (see Figure 10).

### No post-school qualifications (Figures 11-13)

The third set of education maps (Figure 11 and Figure 12) show the proportion of the population with no formal qualifications beyond high school. The increase in education levels is evident in the decrease of dark colours over time. While change has occurred in all areas, it has been weaker in suburbs located 30-40km from the CBD than in the rest of the city (Figure 13). There are notable clusters of low-qualified suburbs in the south of Brisbane and there is an overlap between these areas and areas with low workforce participation rates and high levels of ‘disconnected youth’ (see next section, Figure 18).

**Figure 5: Percentage of residents (aged 25-65) with a university degree, Brisbane, 1991-2006**

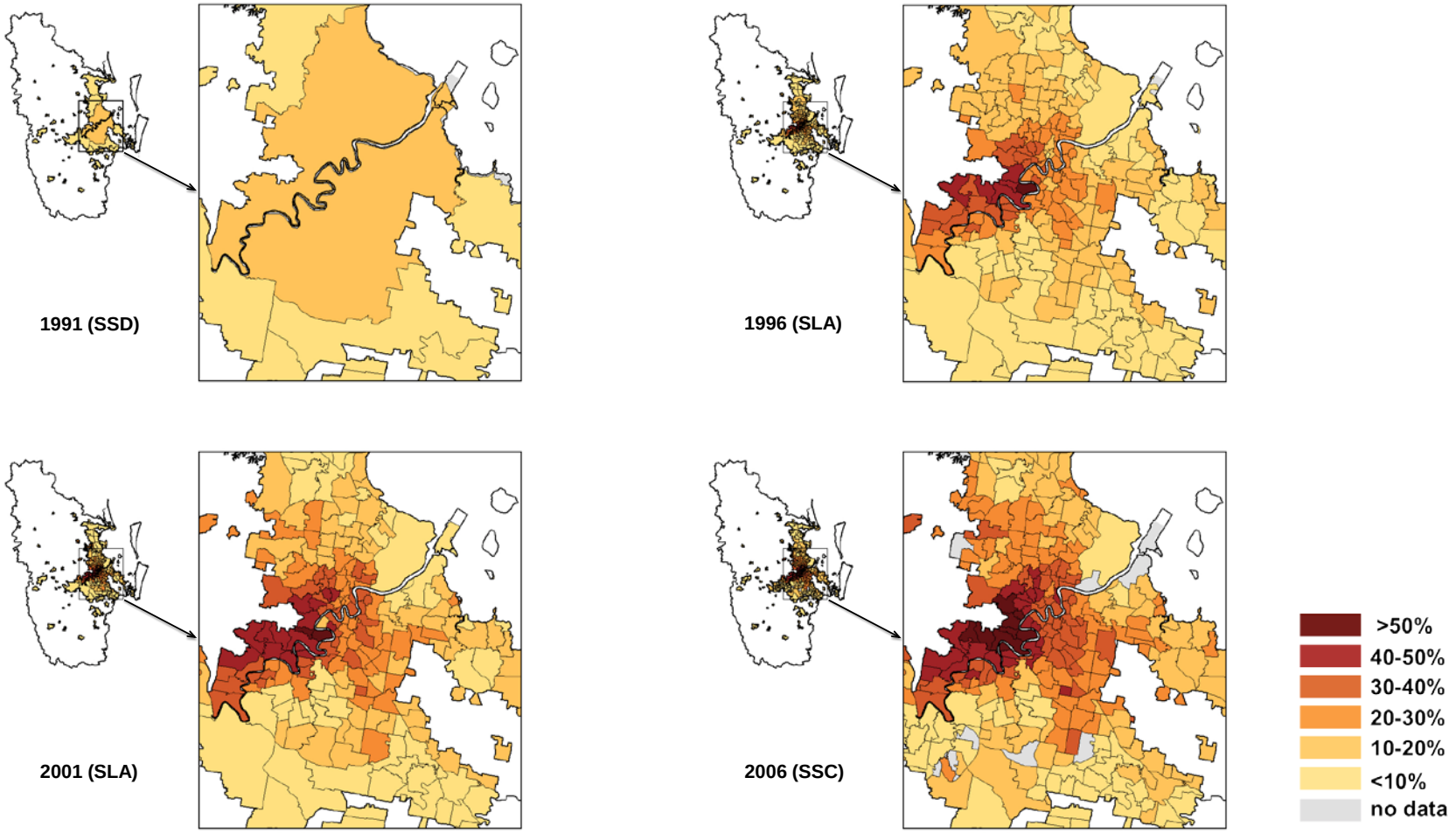


**Figure 6: Percentage of residents (age 25-65) with a university degree, Brisbane, 2011**

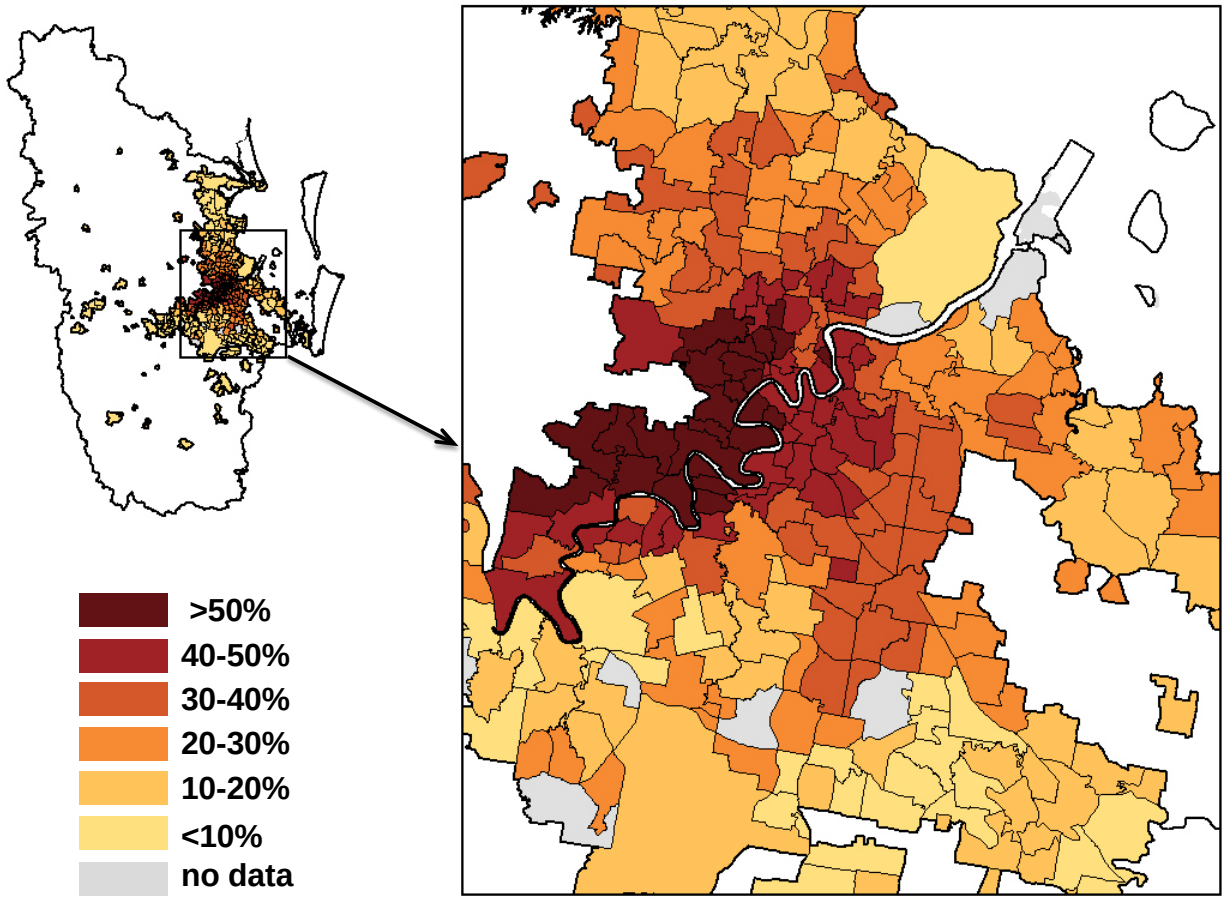


**Figure 7: Percentage of residents with university qualifications by distance from the CBD, Brisbane, 1996 and 2011**

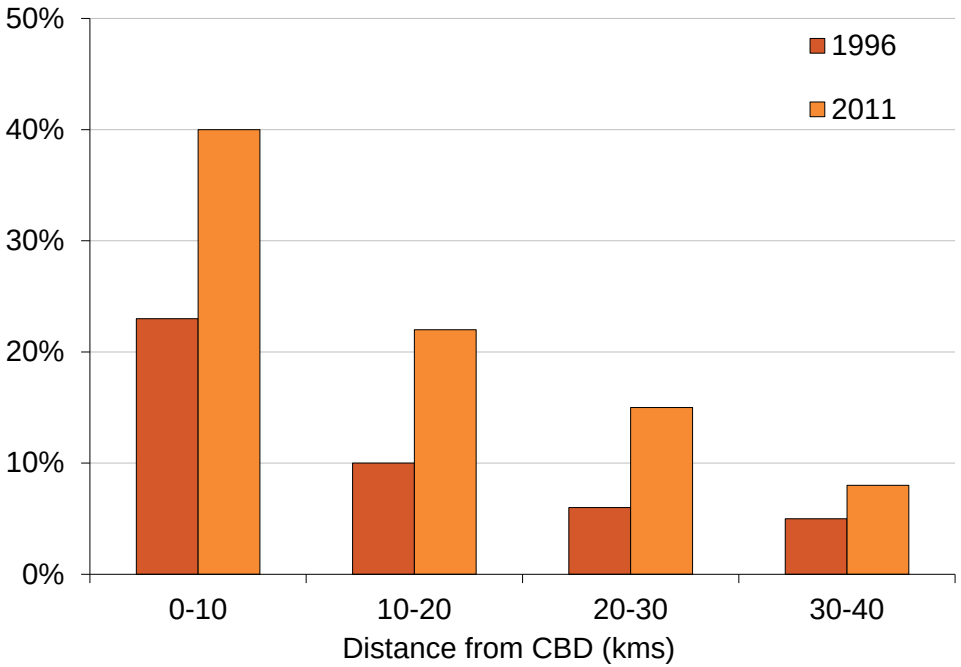


**Figure 8: Percentage of residents (aged 25-65) with vocational qualifications, Brisbane, 1991-2006**

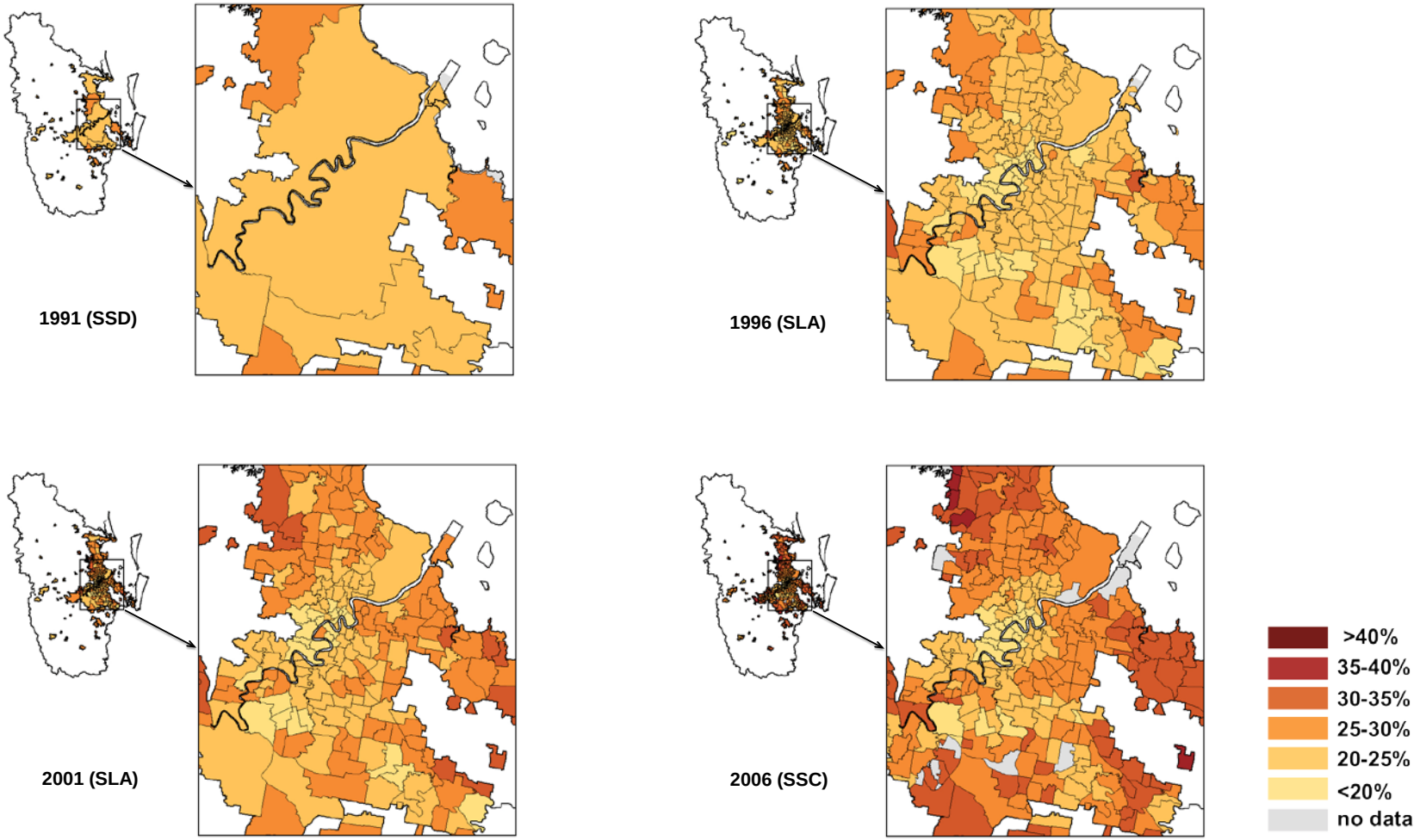


**Figure 9: Percentage of residents (aged 25-65) with vocational qualifications, Brisbane 2011**

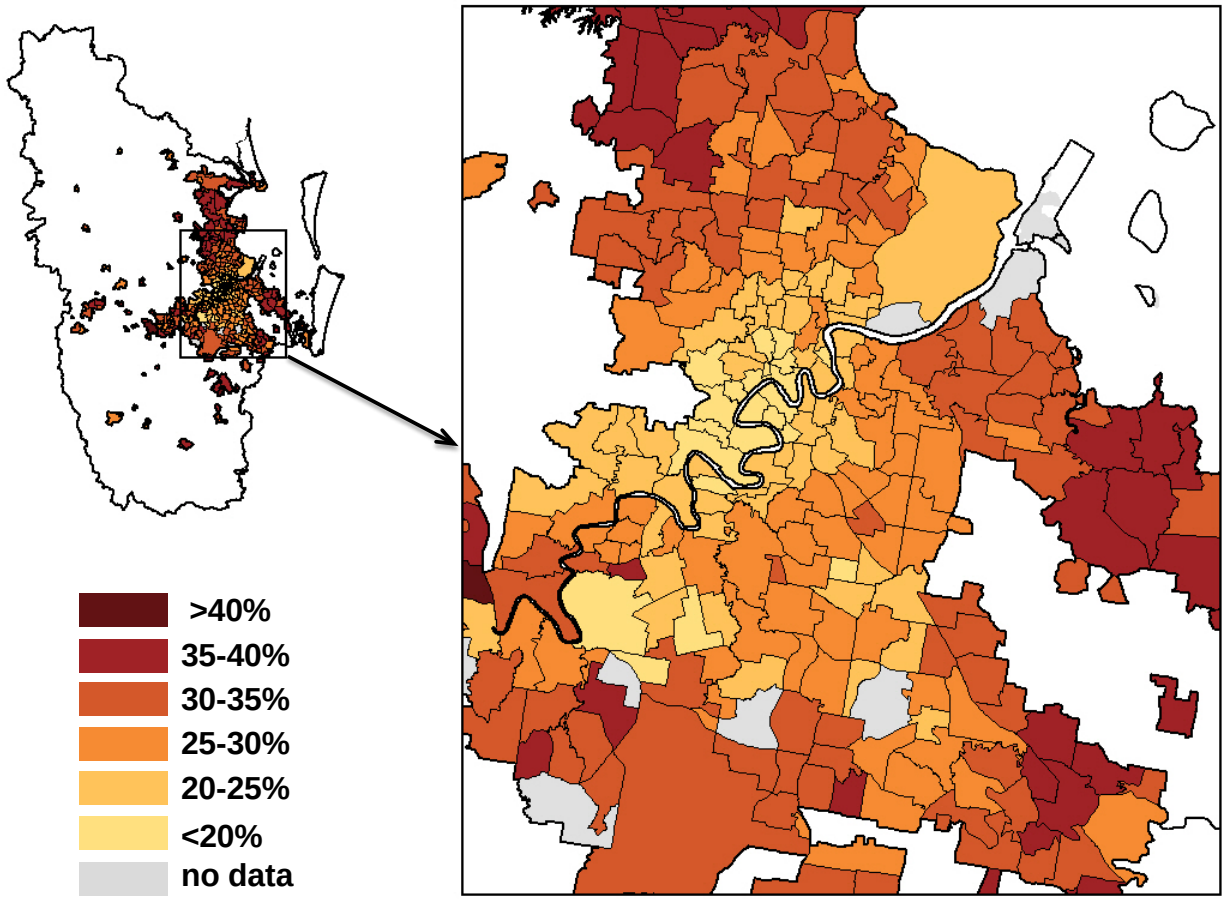


**Figure 10: Percentage of residents with vocational qualifications by distance from the CBD, Brisbane, 1996 and 2011**

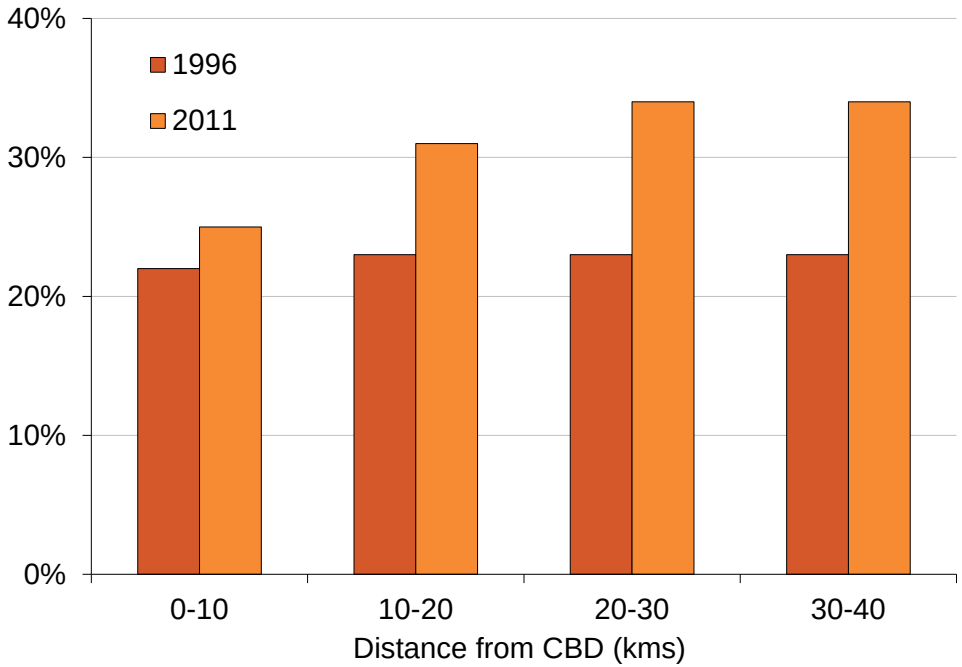


**Figure 11: Percentage of residents (aged 25-65) with no post-school qualifications, Brisbane, 1991-2001**

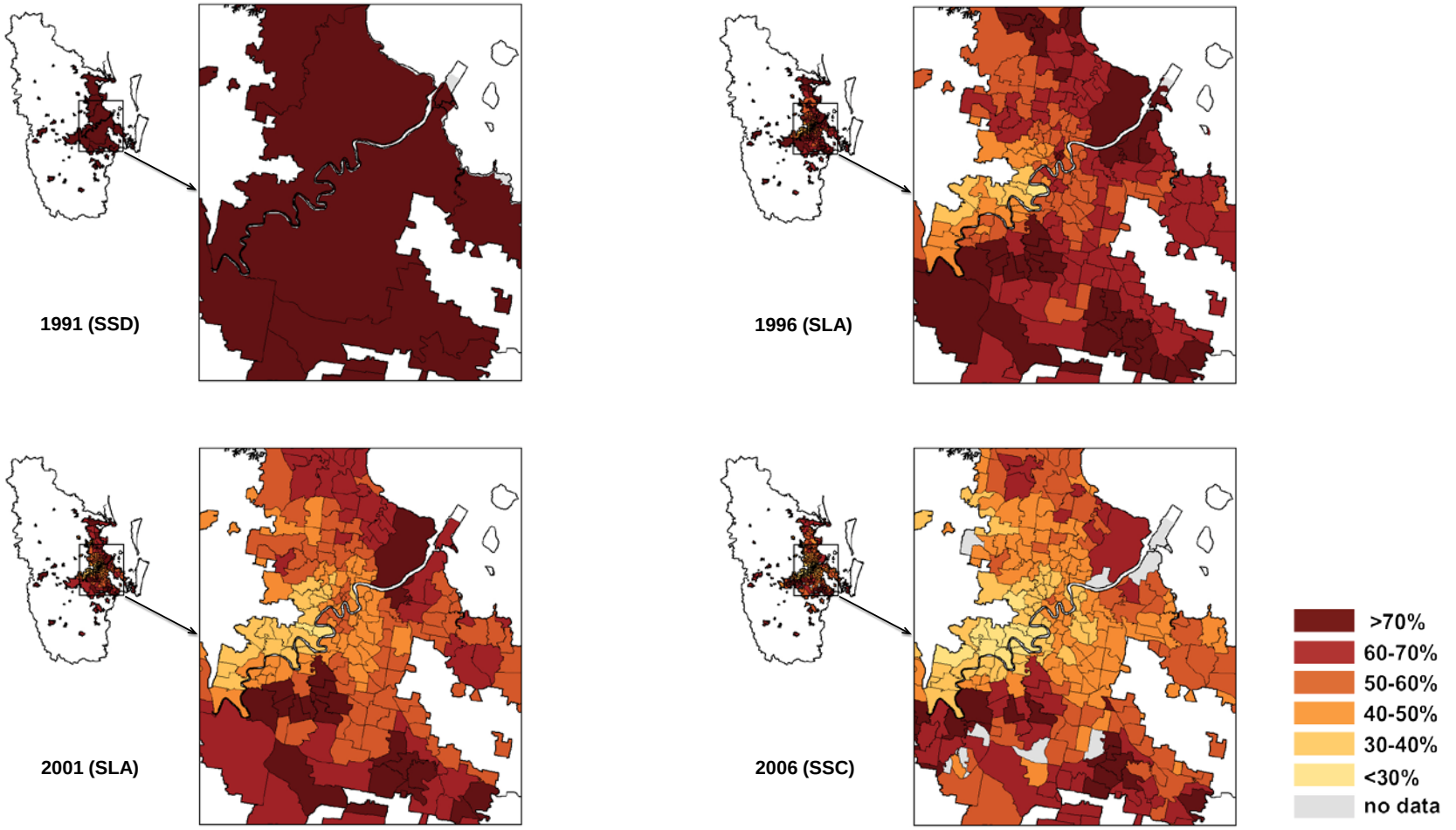


**Figure 12: Percentage of residents (aged 25-65) with no post-school qualifications, Brisbane 2011**

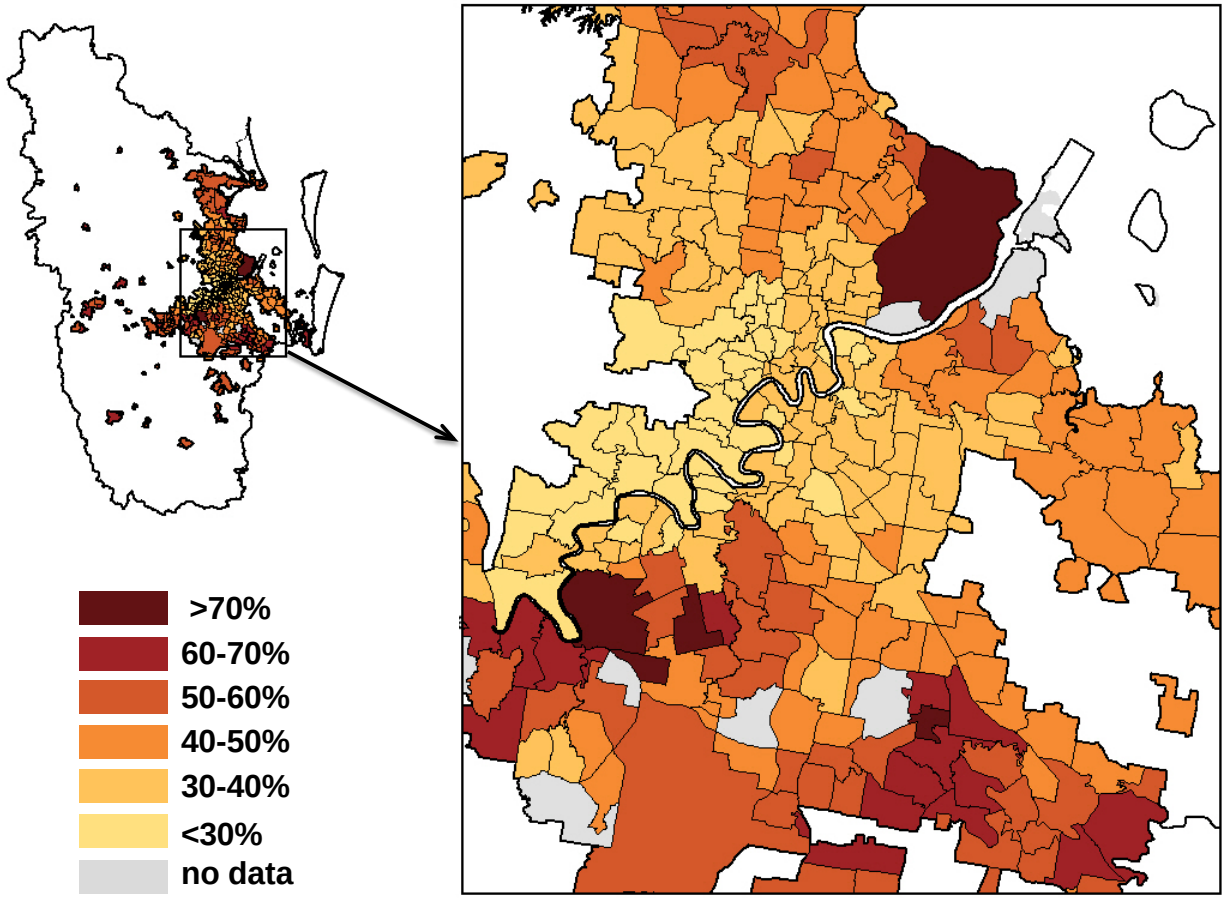
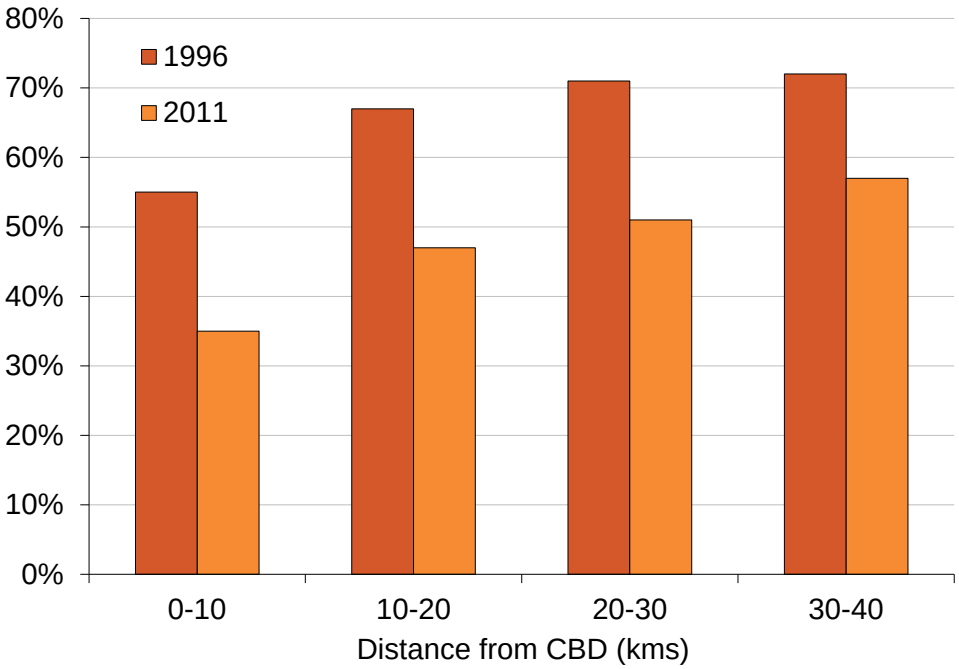


**Figure 13: Percentage of residents with no post-school qualifications by distance from CBD, Brisbane, 1996 and 2011**



# 4. Employment

This section maps various aspects of employment in Brisbane.

### Share of population in jobs (Figures 14-16)

The first set of maps (Figure 14 and Figure 15) show the employment to population ratio for residents aged between 25 and 65 across five census periods (1996-2011). In these maps, only people currently working are classified in the 'employed' count, and not those who are unemployed but looking for work. This employment to population ratio differs from the labour force participation rate, which counts those unemployed but actively seeking work as members of the labour force. Labour force participation is mapped for 2011 only (Figure 16).

Again, a geographic pattern emerges. Areas close to the city centre show high ratios of employment to population, as do many outer suburban areas (darker shaded areas). This pattern strengthens over time, with ratios rising above 80 per cent in many inner and fringe suburbs. On the other hand, low ratios (below 60 per cent) persist across census periods in certain areas in the west and southwest of Brisbane (lightest shaded areas).

The 2011 map of labour force participation (Figure 16) confirms this picture. There is a strong overlap between those suburbs with low labour force participation rates and suburbs where a high proportion of residents have a low median income and no formal educational qualifications beyond secondary school (see previous sections).

### Labour force participation and gender (Figure 17)

When we analyse labour force participation on the basis of gender we find significant variation in the level of female participation by suburb. As can be seen in Figure 17, the difference between male and female participation in the workforce is greater than 20 per cent in some outer metropolitan areas (darkest shaded suburbs on the map). There are several possible explanations for this difference.

The major barriers to increased female participation are financial, because the interaction of income tax, withdrawal of family payments and childcare costs can make it economically unattractive for women to re-enter the workforce after having a child. These disincentives have a stronger effect on women from lower income households. Hence, the gender participation gap might be higher in suburbs with a lower median income.[9]

Along with these factors there may be a more distinctly spatial element in explaining the gap between male and female labour force participation in these suburbs, which is that suburbs with comparatively low levels of female participation lack readily accessible jobs. Since women more frequently have primary responsibility for the care of young children and/or aged relatives they often need to be within a short journey time of home. This has been referred to as “the spatial leash”.[10] Greater numbers of women may therefore be unable or unwilling to take up jobs that require a longer commute.

[9] Daley, *et al.* (2012)
[10] Pocock, et al. (2012) p. 90

## Disconnected Youth (Figure 19)

The term 'disconnected youth' refers to young adults (aged 17-24) who are not in employment, education or training (sometimes described as 'NEETs' (Not in Employment, Education or Training) or described as 'neither earning nor learning').

To determine the extent of youth disconnection by area we have used census data (counting people by place of usual residence) to calculate the proportion of 17-24 year olds who are neither in the workforce (full or part-time) nor undertaking any form of formal study or training.[11]

A high level of youth disconnection in an area can be seen as a warning sign for the future, since the consequences of limited education and a lack of work experience can "snowball across the life course, coming to affect everything from earnings and self-sufficiency to physical and mental health and marital prospects".[12] In Figure 18, high levels of youth disconnection (above 30%) can be identified in certain suburbs. There is an overlap with areas that show low levels of overall adult workforce participation and low qualification levels. This suggests an intergenerational transfer of disadvantage.

[11] We have counted people with a studying status in the census of either "not attending" or "both not stated" and a labour force status (LFSP) of "Not in the labour force".
[12] Burd-Sharps and Lewis (2012) p. 1

## Access to jobs (Figures 19 & 20)

Another way to think about the distribution of employment is to map relative access to jobs. State governments produce transport models that attempt to replicate the travel behaviour of residents. When combined with job locations, these models can be used to map access to jobs from different suburbs by different modes of transport with a given travel time.

In this section job access is mapped using a one-way car journey of up to 45 minutes (Figure 19) and a one-way journey by public transport trip of up to 60 minutes (Figure 20).

These durations were chosen to represent a reasonable upper limit on commuting times in an Australian context, based on current travel patterns. In 2006, the average journey to work for full-time employees in Australia's four largest cities ranged from 35 minutes in Brisbane to 26 minutes in Perth.[13] While residents of outer suburbs generally have longer journey times on average than residents of inner areas the differences are modest. (Inner city residents take longer to travel short distances because there is more congestion and because they are more likely to walk, cycle or use public transport.)[14]

A higher limit was chosen for travel by public transport because these journeys generally take longer than trips by private car (though they often offer other savings or benefits). The maps show the clear benefits of a more central location for improved access to jobs, especially if travelling by public transport.

[13] Wilkins, *et al.* (2009)
[14] BITRE (2010);BITRE (2011);BITRE (2012)

**Figure 14: Employment to population ratio (residents aged 25-65), Brisbane, 1991-2006**

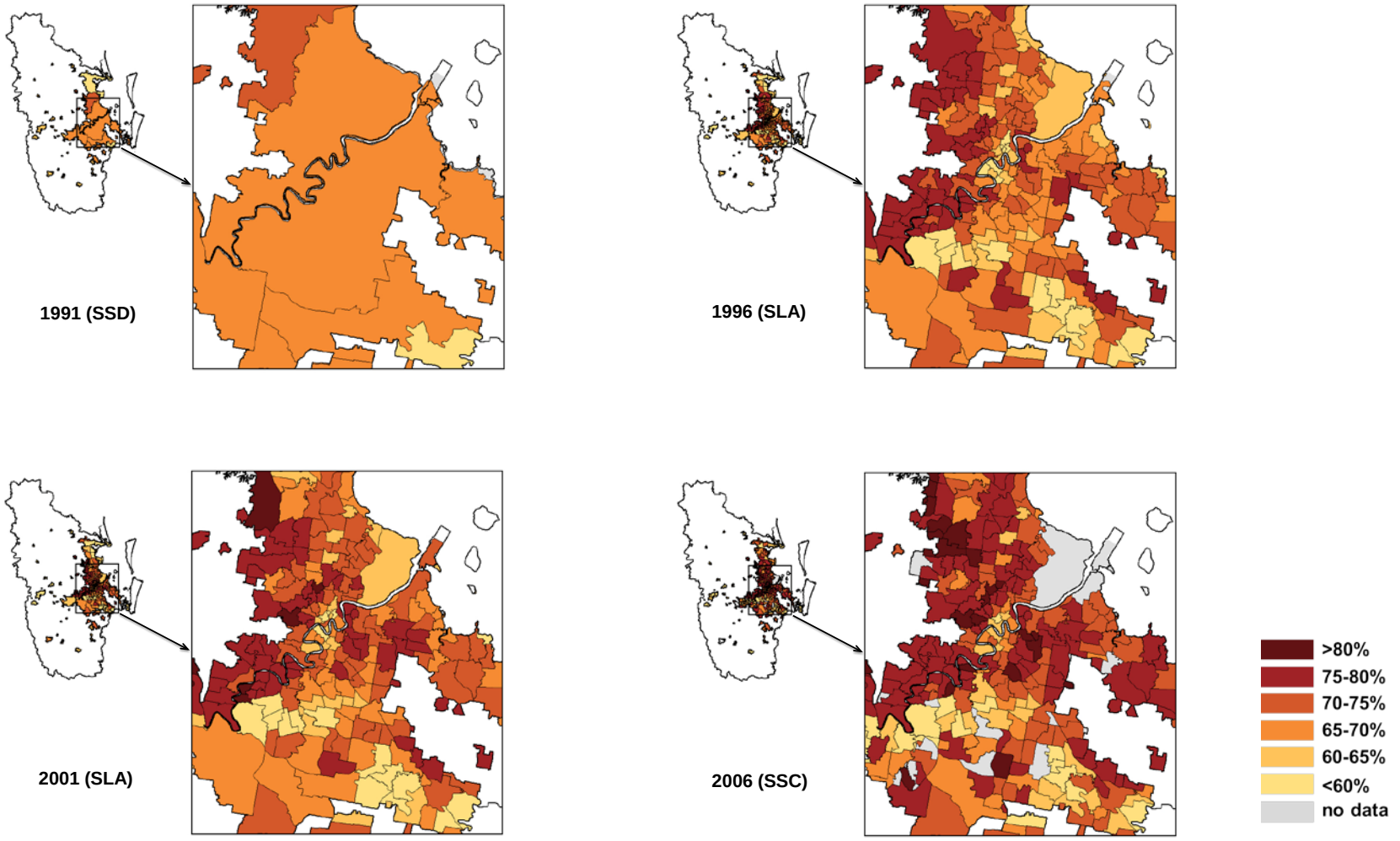


**Figure 15: Employment to population ratio (residents aged 25-65), Brisbane, 2011**

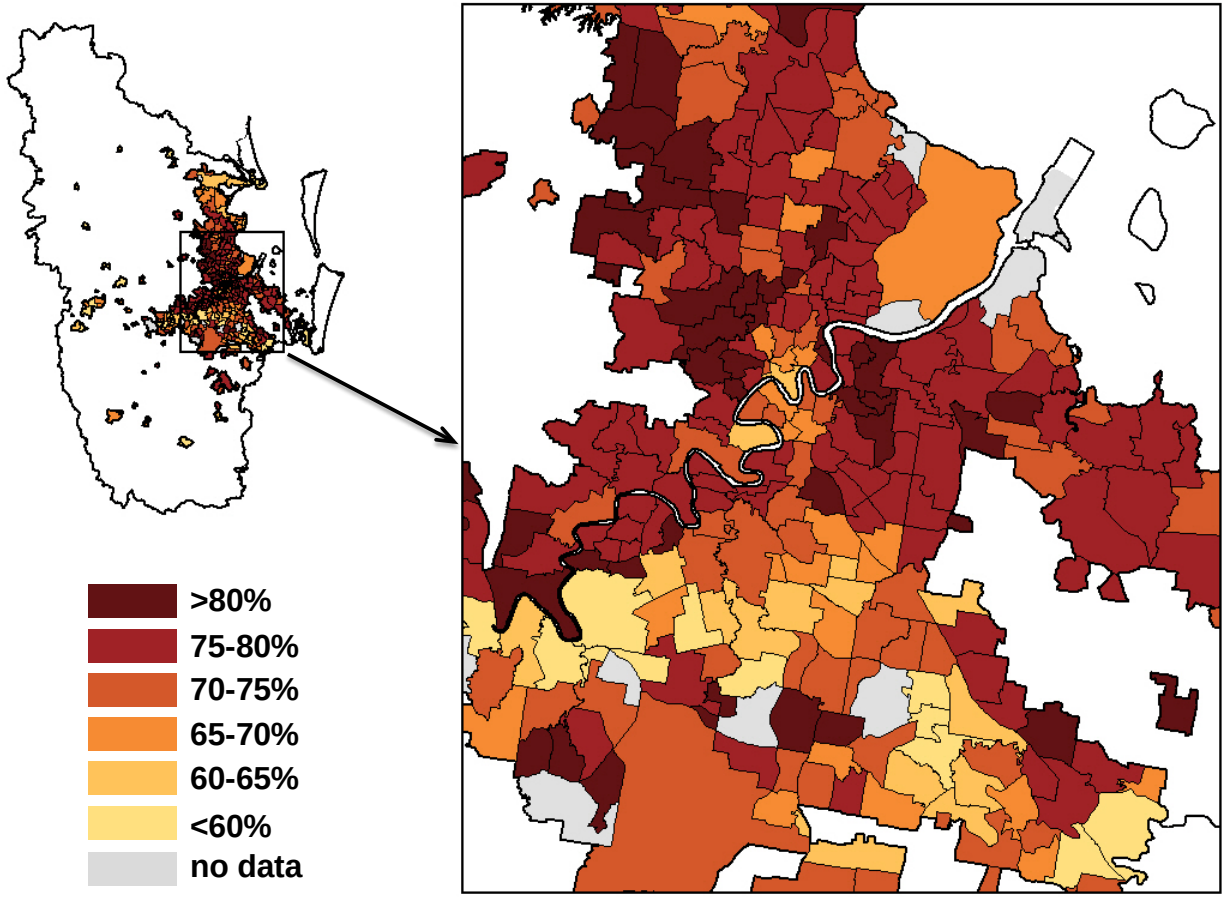


**Figure 16: Labour force participation rate (residents aged 25-65), Brisbane, 2011**

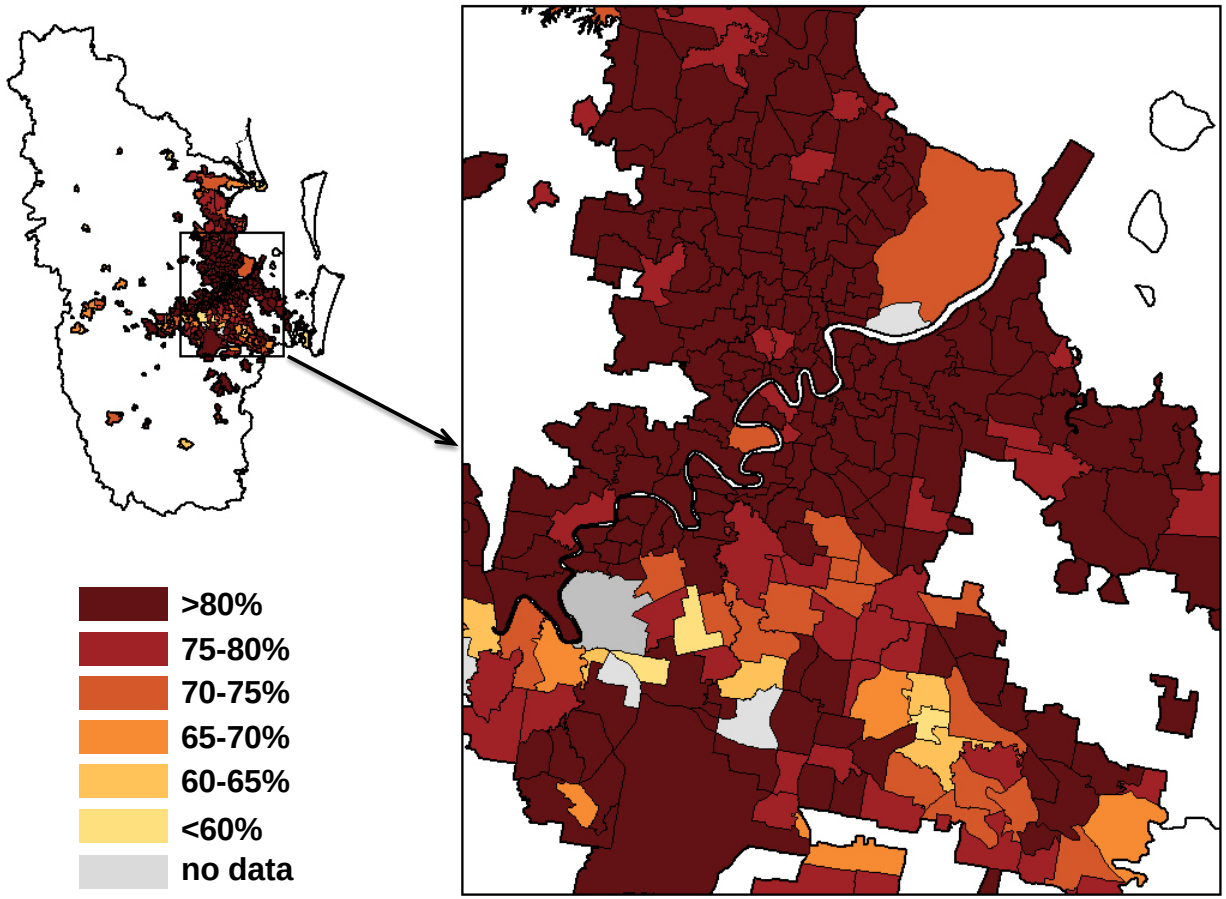


**Figure 17: Difference in male and female labour force participation (residents aged 25-65), Brisbane, 2011**

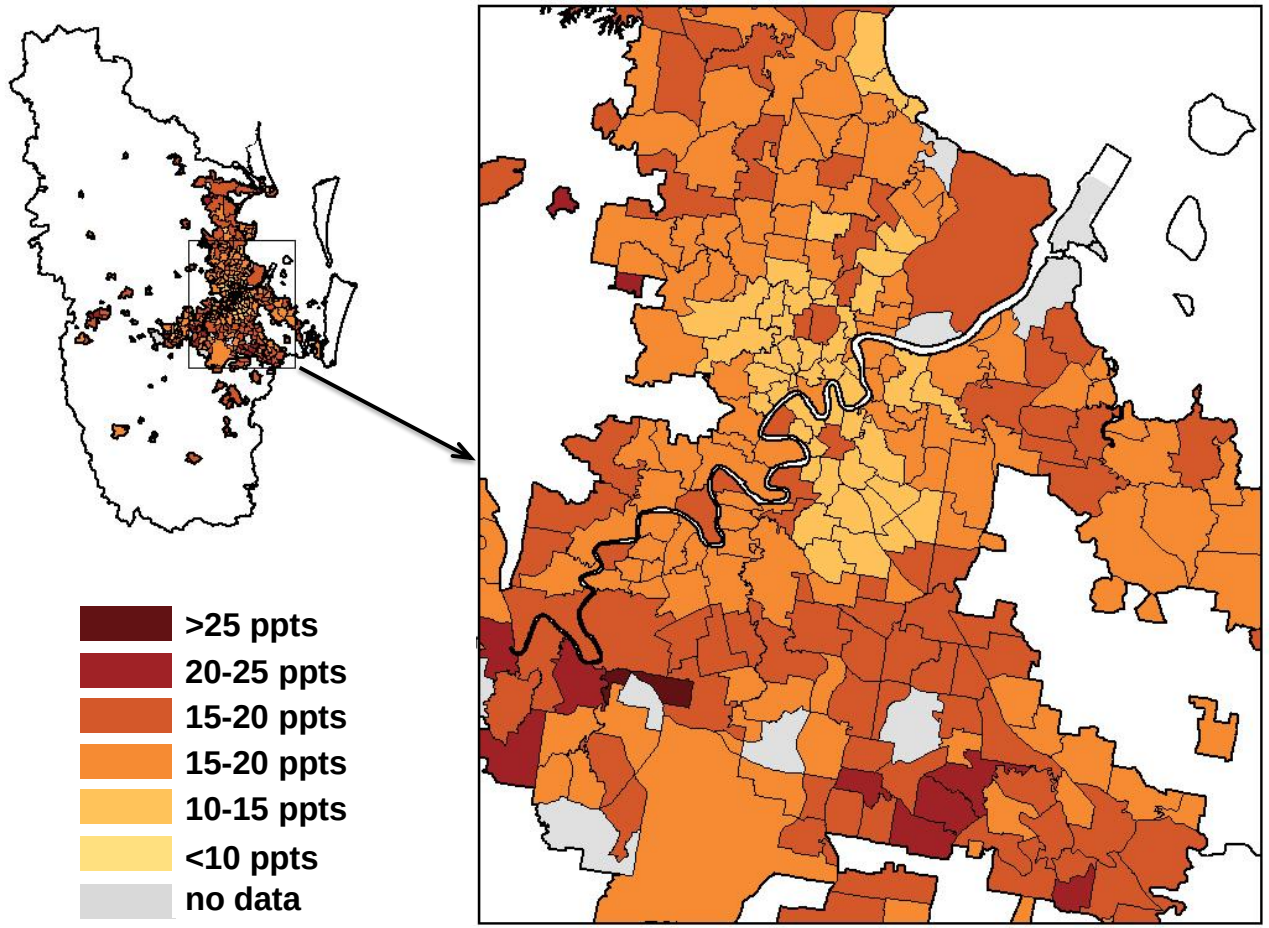


**Figure 18: Percentage of disconnected youth (ages 17-25), Brisbane, 2011**

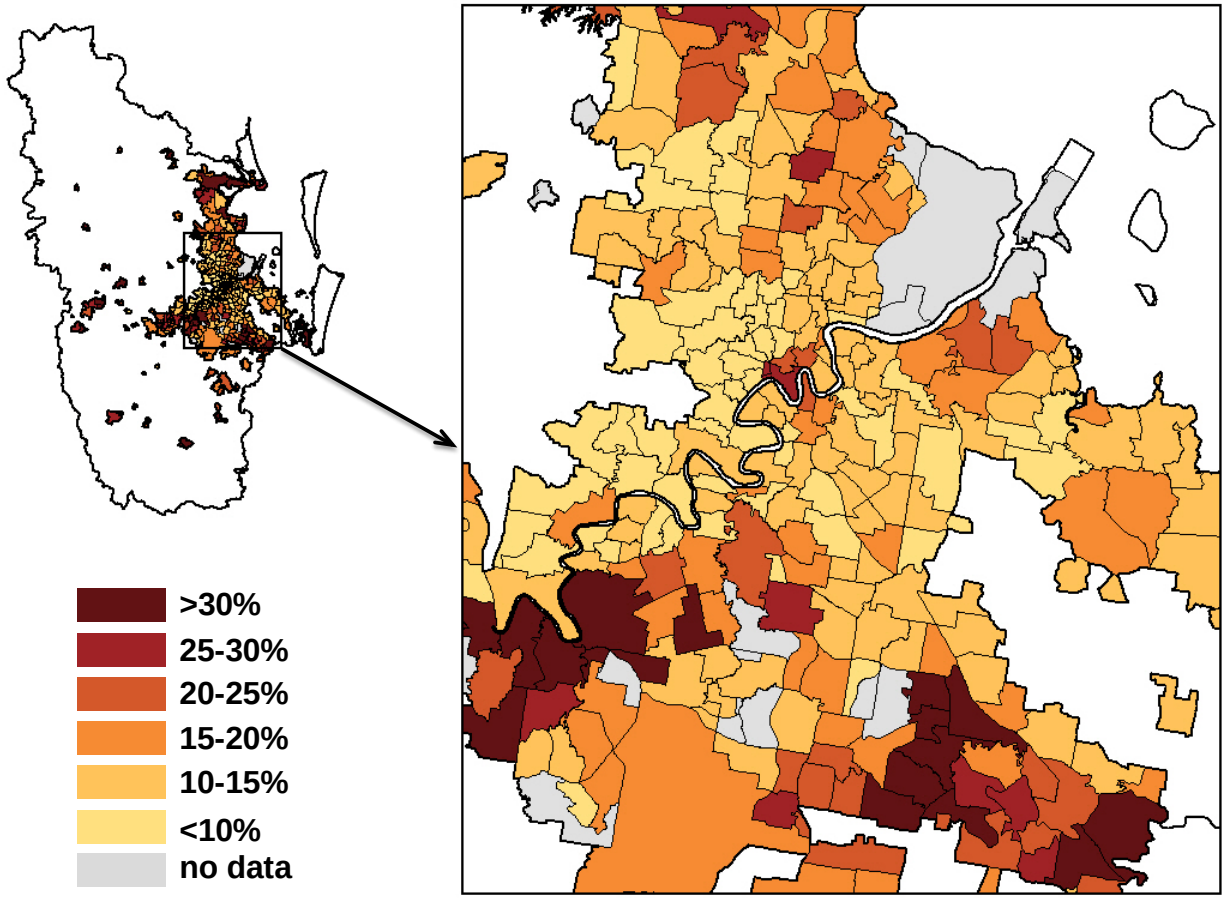
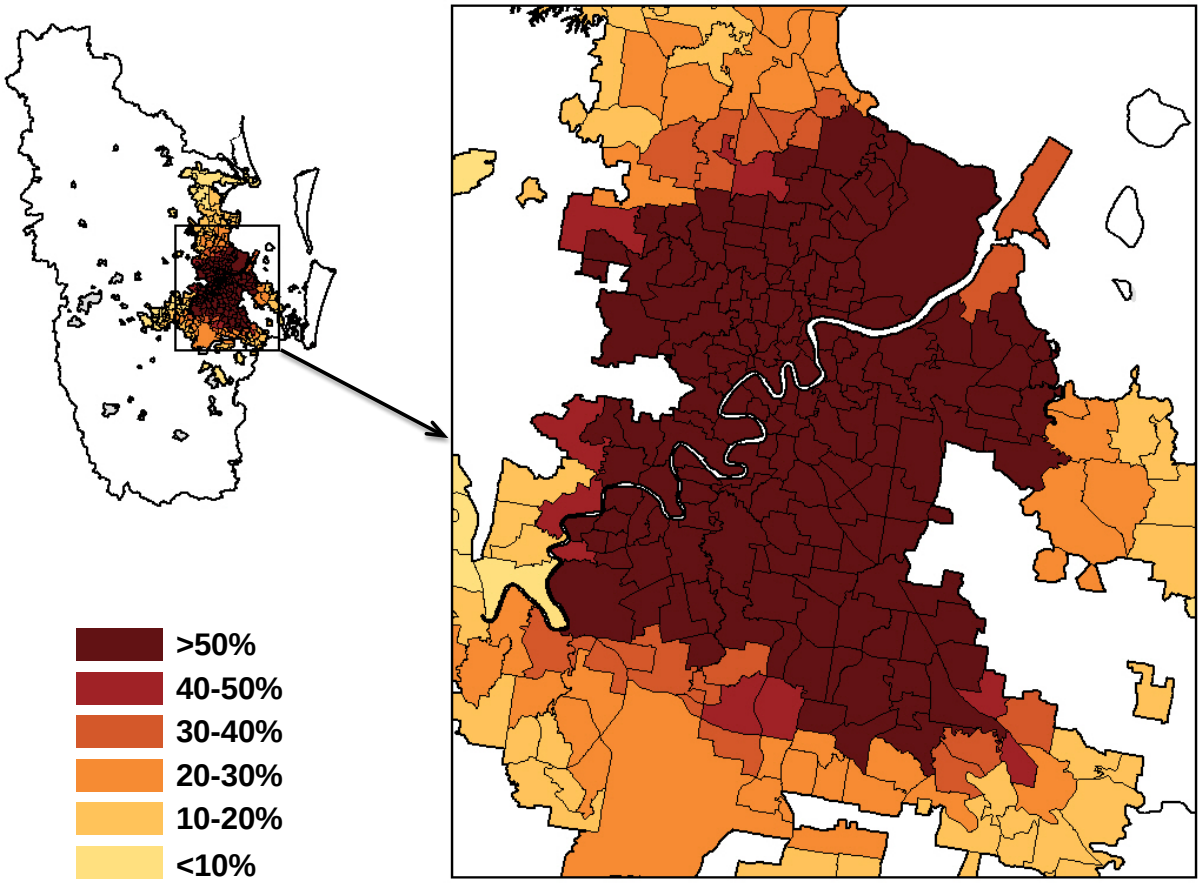


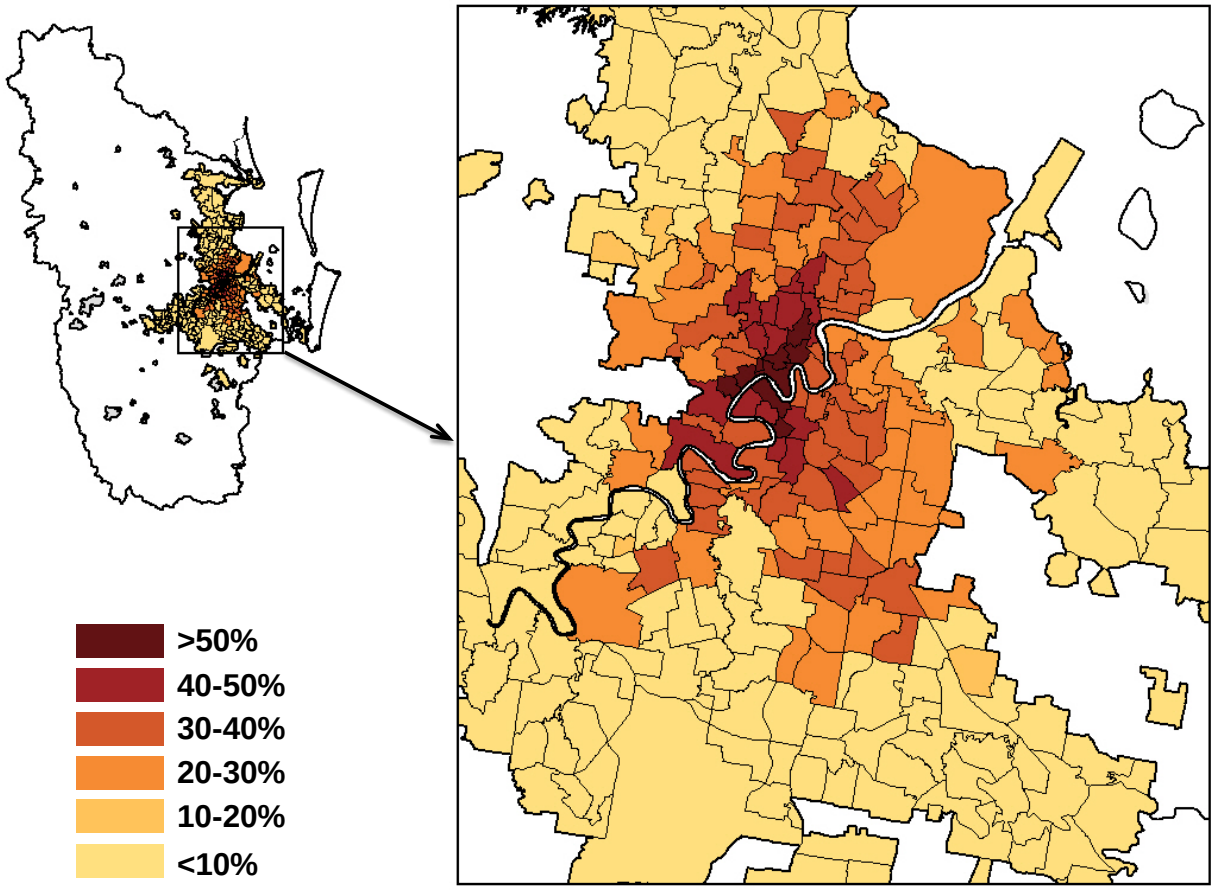
**Figure 19: Percentage of jobs that can be reached in a 45 minute car trip, Brisbane, 2011**




Residents living in the darkest shaded suburbs can reach more than half the jobs in the metropolitan area within a 45-minute, peak-hour car trip. In the lightest shaded areas, residents can access fewer than one in ten of those jobs.

*Source: SGS Economics and Planning using Brisbane Strategic Transport Model supplied by the Queensland Department of Main Roads*

**Figure 20: Percentage of jobs that can be reached with a 60 minute public transport trip, Brisbane, 2011**




Residents living in the darkest shaded suburbs can reach more than half the jobs in the metropolitan area within 60-minute peak-hour trip by public transport. In the lightest shaded areas, residents can access fewer than one in ten of those jobs.

*Source: SGS Economics and Planning using Brisbane Strategic Transport Model supplied by the Queensland Department of Main Roads*

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