



Final Report

Submarkets in public sector housing: an abstract concept or a decision-making tool?

authored by

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for the

Australian Housing and Urban Research Institute

Swinburne-Monash Research Centre

July 2009

AHURI Final Report No. 136

ISSN: 1834-7223

ISBN: 978-1-921610-17-2



ACKNOWLEDGEMENTS

This material was produced with funding from the Australian Government and the Australian States and Territories. AHURI Ltd gratefully acknowledges the financial and other support it has received from the Australian, State and Territory governments, without which this work would not have been possible.

AHURI comprises a network of fourteen universities clustered into seven Research Centres across Australia. Research Centre contributions, both financial and in-kind, have made the completion of this report possible.

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EXECUTIVE SUMMARY

This report is designed to evaluate the concept of 'housing submarkets' in terms of its relevance for social housing analysis and to assess its usefulness in informing management and administrative practices in the social housing sector. The submarket concept has not been employed in social housing analysis, given that 'markets' are typically seen as locations of exchange through consumer and producer responses to price signals. By contrast, in social housing, client and organisational decision-making revolves around administrative fiat. Nevertheless the private market public administration boundary may not be as sharp as this implies. It may be possible to extend the principle of submarkets to social housing.

Towards testing this idea, the first part of the report provides an overview of the concept of housing submarkets, while the second and more significant part uses administrative records to 'test' the validity of the concept in social housing and to illustrate how such data bases and 'social housing submarkets' can assist in more informed policy and practice. A theme of the report is that there is greater ability to achieve this in social housing than in private market housing because of the former's dependence on bureaucratic rather than price allocation. This is because the public sector stock, its tenants and potential applicants are potentially more amenable to policy or planning interventions than private sector submarkets.

Originally this study was to be a conceptual piece only, but during the course of the project the Office of Housing (OoH) within the Victorian Government progressively made available to the research team three de-identified administrative data files: (1) applicants for public housing between 1 January 2000 and 30 June 2008; (2) dwellings, which includes property characteristics of all public housing dwellings as of August 2008; and (3) tenants' rental payments and rebates as of August 2008. The availability of these data stimulated us to take the project further than originally designed. Thus, this present report has the additional aim of illustrating in an exploratory way how such administrative data sets can be used for better decision-making within social housing agencies.

The combined file contains information on the 50,600 applicants (from 1 January 2002 to 31 December 2006) for public housing in metropolitan Melbourne. A related spatial database based on local government areas (LGAs) has been prepared that matches selected data items from the OoH Melbourne Recent Applicants Research Ready Database with ABS census data and other relevant information (this is referred to as the LGA Spatial Database). While the newly constructed database contains information at a number of spatial levels, the data are presented in this report at an LGA level, mainly for ease of matching with available census figures.

This report, therefore, employs the OoH Melbourne Recent Applicants Research Ready Database to examine (albeit in an exploratory way) some of the key concepts and issues regarding submarkets and their use for policy and practice in social housing. The report demonstrates that public housing administrative databases have the potential to be reconfigured in such a way that researchers can investigate distinctly different demand and supply attributes, spatial variations and substitutable submarkets in the public sector in much the same way as the private sector. Moreover, it argues that state and territory housing agencies are sitting on a goldmine of untapped administrative data that, with some work, would yield valuable empirical, analytical and policy insights.

1 INTRODUCTION: HOUSING MARKETS OR SUBMARKETS

This report was prompted by the idea that the submarket concept so widely used in private housing market analysis may have relevance to the public housing sector. To test this idea, the report discusses the concept of housing submarkets both generally and in relation to public housing and then uses public housing administrative data to see whether public submarkets exist and the degree to which such data can be used to inform housing policy and practice.

The first part of the report reviews a wide range of literature that covers private sector submarket research, while the second part provides an example of a data-related response to submarket analysis. The empirical analysis is both indicative and explorative. It is indicative insofar as the examples provided are just some of many that could have been used to indicate the differential performance of public housing submarkets, and explorative in that they suggest issues and problems in the nature of performance.

As the term suggests, a submarket refers to a component of a larger housing market and, like many academic concepts, has intuitively been around for centuries. Many novels set in the cities of the nineteenth and early twentieth centuries in which class was one of the underlying themes recognised the idea that cities had submarkets, although – wisely, in terms of retaining readership – the term was not used. The rich lived in mansions on the hills or in outer urban (suburban) estates while the working class lived in terraces or tenements on the flatland or in close proximity to the city centre. Similarly, the rich owned and the working class rented.

The conflicts between those resident in different housing markets or the struggles to break out of the ‘inferior’ one into the superior one has been the grist for many a novel. Despite this popular recognition, it was not until the 1960s that the submarket concept formally entered the academic agenda, when Grigsby (1963) drew attention to the differentiated nature of the housing market in his influential book, *Housing Markets and Public Policy*. He argued that, instead of constituting a single whole, ‘the housing market in a given area consists of groups of submarkets which are related to one another in varying degrees’ (Grigsby 1963: 34). Their existence flowed logically from another housing concept that was widely in use at the time, i.e. filtering:

a unit of housing goes through a gradual decline, which makes it available to successively lower income groups until it becomes unlivable and is replaced. Thus, additions to the high-priced housing stock would cause high-income families to shift to the more desirable new housing, leaving their present units available; the surplus housing would bring a price decline, and the vacated housing would then become available to the income group next in line (Abrams 1971: 14).

Filtering models, therefore, implicitly acknowledge that different submarkets of demand and supply exist at any point in time. Moreover, over time, the ageing of the stock and changes in the value of property for different locations means that the submarkets are not immutable. The degree to which filtering worked was a contested issue for many years. Proponents argued that if filtering were left to the market, affordable housing would trickle down to poorer households and there would be little need for subsidised housing, yet the filtering concept itself intrinsically pointed to the existence of separate markets for different socioeconomic or racial/ethnic groups. Others were much more sceptical of its alleged practices, either through theoretical analysis based on different assumptions than those of proponents (Rothenberg et al.

1991: 241ff.; Galster 1996) or through simple empirical observation of the realities of the housing markets.

Submarkets are also conceived as interconnected in that 'the effect of a price or rent change within one submarket is diffused among numerous submarket channels' (Grigsby 1963: 35). This being the case, 'the size and number' (Grigsby 1963: 39) of submarkets are in a constant state of change. In other words, the concept is a dynamic one and 'stresses the evolving structure of housing opportunities and transactions in any urban area and the ever changing needs of households' (Bourne and Hitchcock 1978: 11).

There has been wide support for Grigsby's viewpoint, hence the sustained literature over the years. For example, Quigley (1978: 25) wrote:

'the' [author's emphasis] housing market is really a collection of closely related, but segmented, markets for particular packages of underlying commodities, differentiated by size, physical arrangement etc. and location. These submarkets are connected in a complex way.

Bourne (1981: 86-7) defined submarkets as:

quasi-independent subdivisions of an urban housing market [that are] homogenous clusters of housing types or household characteristics in which there is a unique set of prices (or rents) and between which there is little substitution of one unit for another.

While defining submarkets was one challenge, putting some methodological substance behind them was another.

2 METHODS OF IDENTIFYING SUBMARKETS

This section reviews the different approaches to putting some methodological rigour into identifying housing submarkets. There are three broad approaches, two of which emerge out of neoclassical economic analysis and one out of economic sociology/anthropology. The two neoclassical ones we can label as the static approach concerned with measurement of the demand and supply attributes of a submarket, and the dynamic approach which concentrates more on the processes that underpin a housing market, whether they be price changes or household mobility. The economic sociological/anthropological approach pays much more attention to people, not as consumers with a set of almost robotic behavioural responses to a limited set of economic variables, but as living and feeling beings with beliefs, values and emotions, operating in a world constructed with certain specific power and social relationships.

2.1 Static measures

The most common approach to defining submarkets is to classify markets using a set of key characteristics (Bourne 1981) but, of course, the question remains as to what the most appropriate collection of characteristics is. The three sets of measures used are those of supply or dwelling attributes, demand or household attributes, and locational attributes.

2.1.1 *Supply or dwelling attributes*

While academic debate surrounds whether consumer attributes, dwelling attributes or location indicators provide the best measures, researchers agree that dwelling characteristics are centrally important. These can include tenure, material of construction, number of rooms and price. The submarket identified may have no necessary spatial base and may in principle be scattered over a wide metropolitan area (although given that dwellings, unlike consumers, are considerably less mobile and fixed in place, this method is more likely to connect with location).

2.1.2 *Demand characteristics*

Demand characteristics are those that reflect housing needs, requirements and preferences. Household size and composition, stage in the life cycle and socioeconomic status all indicate the likelihood of different housing preferences. The consumer segments receive a great deal of popular attention, as they are segments for a particular product, housing. 'Empty nesters', young singles, family households, retired households and so forth are often mentioned in association with a particular housing submarket. Watkins (2001: 2243) considers demand segments as a 'fairly crude' approach and considers that 'none of these classifications performs well'. Instead, after empirically testing a number of models, he concludes that the combination of spatial and structural factors is foremost in determining submarkets.

2.1.3 *Classifying submarkets by location: Spatially defined submarkets*

Both of the previous classifications represent aspatial approaches and, it can be argued, overlook an intrinsic quality of housing, that is, its 'locational fixity'. The spatial characteristics of housing units are 'purchased jointly with structural characteristics' (Quigley 1978: 25). As Bourne and Hitchcock (1978: 11-12) described it, housing markets differ from other markets in 'the terms of trade'; as a consequence, 'because of immobility, the housing markets of geographically distant regions can demonstrate substantial independence, at least in the short term'. Grigsby (1963: 48) agreed and further pointed out that 'the link distance between two submarkets is determined by

the proportion of families in the first market who would react to a given change in the second submarket or vice-versa'. This would suggest, for example, that a boom in Sydney's inner city housing market would not impact on the Adelaide market.

While the significance of spatial location to submarket analysis would seem fundamental, analytical difficulties have mainly stemmed from the issue of how best to determine the spatial units and boundaries (Watkins 2001). One method – an a priori one – is for the researcher to predetermine the geographical areas or locations for which data are to be gathered, e.g. postcodes, census tracts, local government areas (LGAs) or government planning regions, and for the nominated variables seek to find which areas have the highest degree of relationship. The alternative is not to predetermine areas and to let the data and method generate and define the relevant areas. Bourassa et al. (2003), in an empirical study of submarkets in Auckland, concluded that the segmentation developed by local property appraisers proved to be the most accurate.

Table 1 shows the typical variables that have been used in the three static submarket categorisations, recognising of course that they are not immutable categories; many studies, particularly those attempting to identify locational or spatial areas, may choose from all three. Moreover, within these variables, more specific choices are made, thus household type might use 'single person households' as a key descriptor, while in tenure 'percentage of owner-occupation' may be the key, and in employment status 'percentage unemployed' might be seen to be crucial. Choice of relevant variables becomes a key part of the conceptualisation process and will drive the findings. A good example is the research of Adair et al. (2000: 1091) who, with reference to Craigavon in Northern Ireland, added religious affiliation (Catholic or Protestant) to the set of classificatory variables and found that, in this case, the submarkets were sharply defined by religion.

Table 1: Summary of submarket classificatory measures

<i>Demand/Household Attributes</i>	<i>Demand/Household Attributes</i>	<i>Locational/Spatial Attributes</i>
Income	Housing type	Proximity to public transport
Household type	Housing tenure	Proximity to schools
Employment status	Material of construction	Number of private schools
Ethnicity	Age of stock	Open space
Educational status	Housing quality	Population density
Recent arrivals	Number of bedrooms	Distance from CBD
Welfare beneficiaries	Lot size	Method of journey to work
Mobility rates	Garage or carport	Mobility rates
Religious status	Type of heating	Workplace accessibility
	Overcrowding	

Source: Burke and Wulff (2007)

2.2 Dynamic methods

An alternative way of distinguishing submarkets is by concentrating on the dynamic processes by which consumers and suppliers negotiate the housing market. If these can identify key elements of difference between housing markets, then it can be seen as a submarket. There are three broad ways in which the literature has categorised such dynamics: the degree to which people are willing to substitute one dwelling form or location for another (substitution method), the choices people make about where

they move to and when (household mobility method), and changes in dwelling prices or rents (hedonic price method).

2.2.1 Substitution method

A term that frequently appears in the submarket literature is substitution (or its counterpart, substitutability). This construct was central in Grigsby's foundational conception of submarkets. 'The test of whether two dwelling units are in the same submarket', Grigsby (1963: 34) argued, is in the substitutability of dwellings. This refers to the degree to which properties are substitutable by consumers for one another. For example, do two dwelling units (perhaps a two-bedroom house and a two-bedroom apartment, or an outer suburban detached house and one in the middle suburbs) compete with one another for the same consumer segment? Grigsby also noted the role of location (despite the fact that the specific boundaries between two submarkets tend to be blurred rather than clear-cut):

nevertheless, where the distance between two units on the continuum is large, they become weak substitutes and the price and rent behaviour of one does not affect the other.

If there is a low rate of substitutability between properties or locations, they can be said to be in different housing submarkets.

Despite its centrality in determining submarkets, substitutability is not easy to define:

functions of comparison and substitution are more difficult and less perfect in housing than in other markets ... partly because no two buildings and no two sites are identical, each having its own factors of location, convenience, amenities, and neighbourhood; partly because the housing market is composed of many small buyers and sellers each trying to create his own terms; and partly because the typical buyer enters the market only once or twice in his life-time, and thus has little knowledge or experience on which to base his decision (Abrams 1971: 141).

2.2.2 Markets defined by migration patterns

This approach is typified in the work of Jones (2002) who, in a study to determine local housing market areas in Scotland, argues that migration patterns provide the best measure of the spatial extent of a local housing market. Pryce (2004) describes this approach as one that applies 'the patterns of intra-urban housing flows to identify submarket boundaries'.

This approach emphasises the need to consider the geography of housing moves. It is aimed at defining housing market areas for the purpose of assisting planning authorities in preparing structure plans for future land requirements, not submarkets. While the terms seem analogous, Jones makes a clear distinction between the housing market area and the submarket. While both are based on migration patterns, submarkets can change more frequently due to changes in dwelling stock or tenure. In other words, submarkets can exist within a housing market area, and their number and nature can vary over time within the same stable housing market area.

Central to this approach is what Jones refers to as the 'spatial arbitrage' principle. Derived from economics, this suggests that the spatial boundaries of housing markets should be determined on the basis of where most transactions (buyers and sellers) take place, rather than on predetermined administrative units. This relies on migration patterns to define the areas. Jones (2002) has used this approach to develop a system of housing market areas for west central Scotland. His analysis is based on property sales data derived from the Scottish Land Registry Office which contain not

only dwelling sales prices, but the origin and destination of the movers. To smooth out price or movement variations, Jones computed averages based on ten years of transactions. It is important to point out that it is only the moves of purchasers that are considered. Moreover, the data could not signify whether or not the move was for owner-occupation or investment, a distinction that would be important in any Australian analysis.

2.2.3 Movements in prices and rents (hedonic price measures)

Hedonic price measures attempt to dissect the total sale price for a dwelling into individual attributes, such as the amount paid for an extra bedroom, a carport or a family room. In other words, rather than considering housing as a 'bundle of goods' with a single price, the proponents of hedonic price modelling attempt to break prices down into expenditure on specific attributes (Maclennan 1982: 52; Goodman 1981: 176). Consequently, a submarket is said to exist when, as Maclennan (1982: 26) observed, 'the price of a unit of housing service varied across space or quality sub-groups'. Watkins (2001: 2236) refers to it thus: 'This model suggests that implicit markets exist for each independent dwelling attribute'. A hedonic price is a statistically created dwelling price, or rent in the case of rental properties, that relates the price to some bundle of dwelling or spatial attributes. It recognises that actual market prices as measured through Valuer General's or other official records do not reflect the different qualities of properties sold or rented. Thus hedonic price indices which adapt for spatial or dwelling attributes enable more nuanced identification of submarkets. But, as one housing economist has remarked, 'the practical worth of this approach ... other than to improve hedonic regression performance, is questionable' (Pryce 2004).

Underpinning virtually all of the submarket studies is neoclassical market-clearing economics. The assumption here is that the market allocates dwelling units (which are a bundle of locational and dwelling attributes of the type in Table 1) on the basis of the price for the units in relation to the differential buying power of households as measured by their income. Efficient allocation occurs when all dwellings are allocated and all households accommodated, i.e. when supply meets demand. If this does not occur, a situation of market disequilibrium is said to occur.

Market disequilibrium is probably more likely than equilibrium in housing because of its distinctive attributes, including its fixity, the complexity of the product (dwellings are not like apples), its relationship to space, and its purchase price (most people cannot purchase out of current income and therefore rely on a mortgage and, in turn, on an arrangement with a financial institution). It is these attributes that can help shape and create submarkets. For example, there could be a surplus of dwellings in one part of a city, simultaneous with surplus demand in another. Even falling prices do not remove the disequilibrium, perhaps because buyers in the latter area do not have adequate information about the former area, or there are accessibility or search restrictions that limit consumers' capacity to seek out the market, e.g. limited public transport connecting the areas, or perceptions that the area is unsafe.

Few of the studies pay much attention to such market impediments as determinants of submarkets, although the voluminous work of Rothenberg et al. (1991) pays theoretical attention to the 'interventions' of US rent controls. However, the term 'market segmentation' is sometimes used to describe that condition in which there are two submarkets between which there is little interaction, with market impediments being used as an explanation. Particularly in the US literature, government intervention in the form of planning control or building regulation is often seen as the cause of this market segmentation.

Overlaying the challenges and problems in choice of appropriate variables for submarket analysis are those that attach to statistical techniques used to manipulate the variables and define the relevant submarkets. This is not the appropriate location to discuss the methods, but they include variations on cluster analysis, factor analysis, principal components analysis, computer algorithms and, more recently, neural network modelling (Kauko et al. 2002). The debates evolve around which has the most predictive capacity, is the most robust, can handle the most variables etc., but in many cases it is not hard to come to the conclusion that identified submarkets are as much statistical artefacts of the method as anything that is related to market realities. And, in the case of the voluminous US literature, it is hard not to conclude that the ever more sophisticated refinement of the statistical method is the objective, not the use to which submarket analysis can be put. Grigsby (1963) and Watkins (2001), for very different time periods, provide useful overviews of a range of submarket studies and choice of statistical methods.

2.3 Sociological/anthropological approach

This is the most recent contribution to housing market analysis and takes as its starting point the argument that an understanding of how markets work cannot be reached by economics alone or, more accurately, that which is based on the market assumptions of neoclassical economics. This approach is represented, among others, in the work of Smith who argues that research needs to take into account:

the social and power-filled character of a plurality of markets: their diversity and complexity, their sensitivity to context, their passions as well as their rationality, and their part in the social construction or performance of the economy (Smith 2004: 90).

She argues that a social and cultural critique is overdue and needs to give greater attention to the beliefs, values and practices of participants in the housing system and how they might shape or work within housing markets. Smith et al. (2006) illustrate this approach via a case study of the Edinburgh home purchase market, based on 20 in-depth interviews with property professionals. The emphasis is on the role of exchange agents (e.g. estate agents, financiers, solicitors) in the owner-occupied markets and on 'a qualitative investigation of the trade in places that drives the economy of housing' (Smith et al. 2006: 82).

This harks back to the urban managerialist writings emerging out of the work of Pahl. For a short time, this work initiated a flurry of research focusing on urban managers and gatekeepers, but subsequently 'institutional actors in the housing market became virtually invisible' (Smith et al. 2006: 84). This approach considers how these exchange agents position themselves in relation to the market and therefore how they behave. They found that agents see themselves as objective professionals reading market trends and offering consumer advice accordingly. In this process, professionals think and act as if the housing market operates in accordance with the traditional economic model, but when they see its behaviours (e.g. in a boom) operating in a way outside their expectation of the model, they adopt behaviours (e.g. setting unreasonably high bid prices) that in turn may make the market even less rational and perhaps amplify market volatility. Like the migration approach described previously, this approach considers only the market for owner-occupation.

Coiacetto (2007), while not explicitly informed by the economic sociology of Smith, adopts a similar framework and draws attention to how submarkets can be socially constructed. He interviewed developers in the Brisbane region to find out how their investment decision-making both identifies and shapes housing submarkets. Coiacetto illustrates their strategies for targeting submarkets but also highlights how

their investment decisions may be constrained by the costs and risks associated with the land search process and by the attributes of their organisation, e.g. size, skills or the internal bureaucracy.

Developers are, of course, just one set of 'agents' that negotiate and shape housing submarkets. Considerably more work is required to provide answers to whether key housing actors, e.g. exchange agents, have different values, beliefs and practices for different client groups, locations, and housing tenures that in some way may affect how a local housing market may operate and thereby give that the characteristics of a submarket. For example, do estate agents steer certain types of renters or buyers away from specific areas or properties, e.g. properties adjacent to public housing, in a way that actually shapes the market attributes of that area?

Further illustration of how this approach can be usefully applied forms the basis for a Housing Studies special edition on micro markets. In their introduction, the editors refer to the 'emotional economy' of housing, in other words, those feelings of optimism or pessimism that guide human behaviour in the housing market. In fact, these feelings are often 'the best predictor of price (Smith and Munro 2008: 160, 161). In the same edition, the authors report the results of 93 qualitative interviews across four Edinburgh neighbourhoods and argue that concepts of hope and fear (ignored in rational economic decision-making models) drive decisions about home purchase and forge attachments or disengagements from home and neighbourhoods. They use expressions such as 'ecology of hope', 'emotional geography', 'emotional relationships' and 'fear' as all having potentially strong effects on housing prices and housing markets (Munro and Smith 2008: 363).

It is too soon to say whether the socio-anthropological approach (to data applied only to the private market) can be extended to the public housing sector, although on the surface it would appear that it could. Because public dwellings are rationed and allocated through rules and procedures (rather than price), any 'agents' that have the ability to manipulate or affect these rules and procedures (e.g. support agencies and social workers representing clients, and client service officers in local housing offices) may hold the power to affect the performance of a housing agency. For example, any agency or area office could encourage a perception among applicants that it is harder or easier to get into that area or that certain types of client may be preferred. Alternatively, the concentration of demand in certain localities for high need applicants may be explained by the differential performance of crisis or transitional housing agencies in negotiating places for their clients in the public housing system. As certain agencies develop reputations for effective placement, more applicants are drawn to an area and more are successfully housed. This approach requires much more than simply administrative data to study in any detail, but it does suggest directions for further research.

2.4 Is it a useful policy tool?

There is general consensus that submarkets do exist and have important implications for housing market analysis. One can also conclude, however, that the concept is almost as elusive to pin down now as it was 40 years ago. Submarket identification in many cases seems to be a product of statistical method, with academic debate more about subtleties in the method than about actual use of the concept.

The extensive literature on housing submarkets has paid little attention to policy and planning relevance, despite Grigsby's (1963) assertion that:

our goal is a matrix of housing submarkets which can help us predict the impact of economic and social trends, and particularly governmental actions, on various sectors of the supply.

Most of the literature reviewed has a token section at the end saying something like submarkets have important potential use for urban policy, strategic planning or evaluation of urban policy initiatives (for example, Jones 2002: 562; Varma 2004: 3) or that they could provide the framework for more effective monitoring of housing markets to assist planning and policy (Jones et al. 2004), but only in very recent literature is there any evidence of reflective discussion on the actual use of submarkets for planning and policy design (Watkins 2008) or actual guidelines on the application of their use (O'Sullivan et al. 2004), the latter emphasising the policy implications of the connections between different submarkets or market segments.

Too often in submarkets analysis, the reader is left with the concern that the exercise is more one of academic gymnastics with housing data rather than the identification and development of an effective tool for policy or planning. One reason for this, of course, is that urban planning and policy requires some identified planning region or administrative area for a policy and planning focus, but many submarkets as identified by the various techniques have no necessary spatial focus, which makes it difficult to get a policy handle on them. Another reason is the highly mathematical nature of conventional submarket studies. It is not a form of writing that is accessible to most people, including, policy-makers and planners. As Maclennan and Whitehead (1996: 341) noted in the editorial to a special 'housing economics' issue of *Housing Studies*:

many of those interested in housing studies find the approach taken by housing economists both difficult to follow and of insufficient interest to make it worthwhile to understand the language.

3 ARE SUBMARKETS RELEVANT TO PUBLIC HOUSING?

It is no surprise that public housing has been left out of the submarket literature. The obvious explanation is the concept of the market and the centrality of price to market transactions in the neoclassical model. As most of the literature on submarkets is North American, the fact that the public stock was less than 1.5 per cent of the US stock in 1971 is a reinforcing explanation. However, it does not explain why in the British context, where the public stock was much higher (31 per cent), there was not some effort to extend the principles of submarket analysis to the public sector.

Despite there not being a 'priced' market for public housing, the concepts of demand and supply that underpin the static measurement of submarkets are still relevant. Households still demand public housing and it is supplied, although not through consumer and producer responses to price signals. Demand and supply outcomes in the public sector are shaped by more subtle and complex behaviours that are much more difficult to identify but are nevertheless there.

Underpinning public housing demand is need, which is defined by eligibility rules and expressed through waiting lists. It is not, however, the same as demand, particularly for specific types and locations of public housing. Expressed need can both understate and overstate the demand for public housing for many reasons; reasons which potentially give relevance to using the concept of submarkets in relation to public housing.

Public housing applicants and potential applicants negotiate and respond to a range of information at the point of application, including: perceptions of stigma associated with a particular location; potential to get accelerated access by applying for certain locations or dwelling types with low demand; ability to use or manipulate rules and procedures, e.g. priority status, to accelerate access; use of the waiting list as a safety net for some future point of access even though there may not be current need; perception of amenity or social problems associated with certain locations; and availability and cost of private market housing in the same general area.

This information may come from formal and informal contacts with friends, families and housing and support workers, and may be more or less an appropriate understanding of the actual situation. Whether a fair description of the public housing reality or not, this information, along with underlying needs requirements, shapes behaviour and will affect how many households apply for public housing in total and the specific locations and types of dwellings they apply for.

Parallel with processes relating to new applicants are those of existing tenants. Here their needs, and information about the local private market and their own estate or area, may affect duration of residency and the rate of exit from public housing. The net effect of decisions to apply for specific locations and decisions about exit will affect the total demand for public housing in different areas.

On the supply side, there can be the same variations as in the private market, e.g. size, quality, building material, locational attributes, amenity, age of construction and number of bedrooms. Thus, within any one public housing jurisdiction in Australia, and indeed within their administrative regions, there will be major variations in housing supply attributes. The only difference is that these cannot be bundled together in a consumer's mind and reduced to a price in order to facilitate a transaction. The transaction is a bureaucratic process, as has been detailed by Burke and Hulse (2003) and by Hulse et al. (2007).

There is the potential to put together a whole range of variables around public housing to identify areas with distinctly different demand and supply attributes in such a way that we could talk about public housing submarkets, and use the sort of statistical techniques as in the private market (e.g. factor analysis, principal component analysis) for this purpose. But, unlike much of the private sector submarket analysis, this data analysis is not primarily an exercise in statistical manipulation for submarket identification purposes alone. The intention is to provide a framework for policy and practice reform.

Ironically, we believe there is an ability to achieve this because of bureaucratic rather than price allocation. This is because the public sector stock, its tenants and its applicants are potentially more amenable to policy or planning interventions than private sector submarkets. The latter, most notably in market liberal societies, are protected from direct interventions by values associated with the sanctity of private property, and from indirect interventions through the rawness of the price mechanism, i.e. the difficulty of effectively manipulating price by policy or planning interventions without creating unanticipated spillover effects. For example, how could a taxation or planning instrument such as negative gearing be designed to manipulate an outcome for one or more specific submarkets with any confidence that there will not be unwanted outcomes in others?

What are the potential administrative or management practices that could be used to affect behaviour? These could be categorised as those that directly and indirectly affect the demand for public housing in an area and those that directly and indirectly affect supply. Table 2 provides a summary of some of the instruments potentially available. These range from, on the demand side, the form of eligibility, through the degree to which applicant choice is broadbanded, to rent policy. On the supply side, there is the complete range of asset management strategies, from new construction to sale and transfer.

Table 2: Potential instruments for manipulating public housing submarkets

<i>Direct</i>	<i>Demand</i>		<i>Supply</i>
		<i>Indirect</i>	<i>Direct</i>
Eligibility criteria		Shorten or lengthen waiting lists	Rate of new construction
Allocation method		Number of offers	Sales
Number of areas that households can nominate for		Estate renewal	Transfers
Occupancy provisions, i.e. who can occupy dwellings of certain sizes or types		Anti-social behaviour management	Stock alignment
Size of areas that households can nominate for, i.e. degree to which areas are broadbanded		Number of offers	Sales
Local area allocations		Choice-based letting	Demolition
Rent setting policy, including rebate policy		Differential rents	National Rental Affordability Scheme

Why a greater knowledge of public sector submarkets and of the instruments to manipulate them is potentially important relates to what might be seen as some of the limitations of current public housing policy and practice. The main one, as it relates to this topic, is the reliance on 'one size fits all' policies. Whether it is allocations, rent setting, arrears management or many aspects of asset management, there has been a historical tradition of uniform policy across the geography of any jurisdiction. The reason for this was to ensure equity and transparency. However, as the areas in which public housing is located become more differentiated in terms of housing costs and rents, access to services, employment prospects, perceptions of disadvantage, crime and anti-social behaviour, the 'one size fits all' model becomes increasingly problematic. Parallel with areas of intense demand and lack of stock turnover, there can be other areas of low demand and high vacancy rates. This might suggest the need for more nuanced policy of a type that could be informed by more effective data use along the lines outlined in this report.

4 OFFICE OF HOUSING ADMINISTRATIVE DATA

As mentioned, the researchers received three de-identified administrative data files from the Victorian OoH from which the comprehensive OoH Melbourne Recent Applicants Research Ready Database and the LGA Spatial Database were constructed. The administrative files and the construction of the databases are described briefly below:

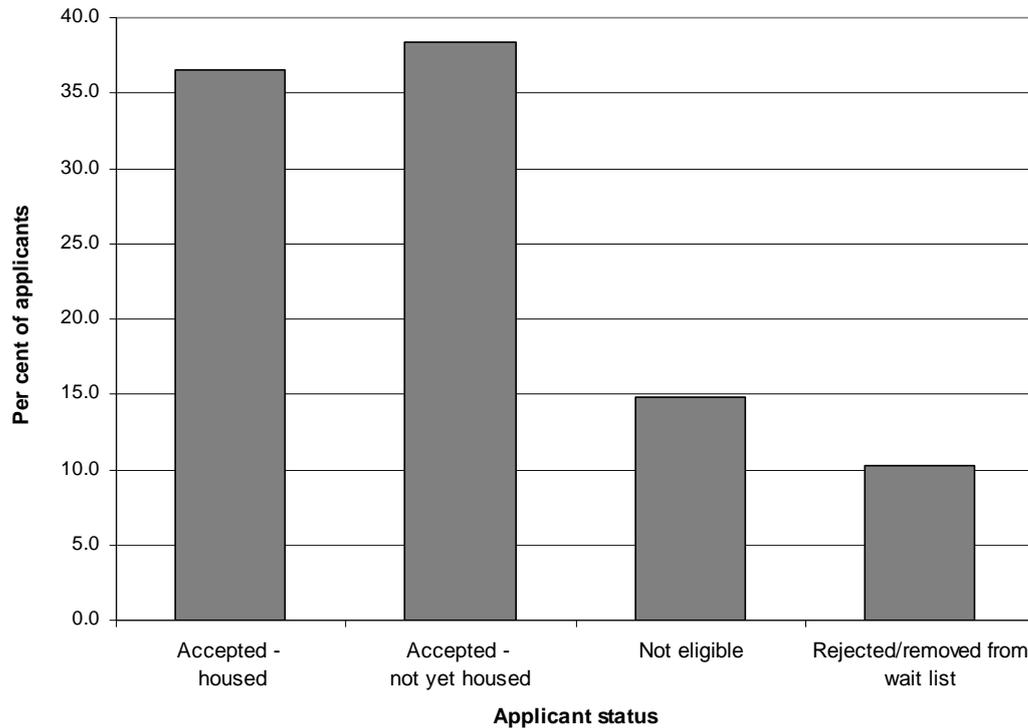
- **Applicant database:** The database contains information collected from the public housing application form. This includes date of application, source of income, several spatial variables (from postcode to region), household type, country of birth, main language spoken and gender. Information required for determining eligibility, such as the main reason for applying, and details on the regional housing office where the applicant applied along with preferences for location are also included.
- **Asset database:** This information was current as of August 2008. These asset variables describe a stock of 65,535 dwellings that has built up since 1946. Variables included dwelling type, year of construction and building material.
- **Rent database:** Weekly rent for all current tenancies including data on household type, source of income, income, the household rent each tenant pays, rebate amount, market rent for the property, and service charge. This file held 61,437 cases.

All three administrative files contained a postcode address that enabled the analysis to be conducted at a range of spatial levels from postcode, suburb, housing office area to LGA. The spatial analysis that follows presents information at an LGA level, mainly for ease of matching with available census figures.

This research represents the first time that Victorian public housing data has been used for academic research and one of few public uses in Australia of a housing administrative database.

For the purpose of this study, only applicants for public housing in metropolitan Melbourne (between 1 January 2002 and 31 December 2006) are contained in the merged data file. This decision had the benefits of substantially reducing the number of cases and locations under study and providing a neat five-year period for examining the applicant outcomes.

Figure 1: Status of all applicants (at 30 June 2007) who applied for public housing in Victoria between 2002 and 2006



Source: Department of Human Services, Office of Housing, Housing and Community Building Division, Melbourne Recent Applicants Research Ready Database, 2002-2006.

Figure 1 shows the status of the approximately 50,000 applicants for public housing during 2002-06. Just over 35 per cent (approximately 18,500 applicants) were allocated housing during this period; of these, 5,500 (or 30 per cent) later exited public housing.

Ineligible applicants tend to have assets or income over the means testing limit, while the final category, rejected or removed from the waiting list, include those who either gave up on waiting for housing or simply did not respond to subsequent requests for information.

The main submarket concepts and approaches discussed in Section 3 are used to frame the statistical analysis, with examples provided of how administrative information can shed light on these concepts. The analysis is necessarily limited, given the scope and resources of the project. Instead of the traditional research approach of asking one specific research question and providing detailed empirical analysis to address it, this report offers a preliminary consideration of the various aspects of the submarket concept and goes on to provide an example of the way administrative data can be used to shed light on this, either through a particular methodology (CHAID) or the development and mapping of relevant indicators and rates.

4.1 Submarket concepts and illustrative analysis

Section 3 described three broad methods of housing submarket analysis, two of which (the static and dynamic approaches) emerge out of neoclassical economics, and another more recent method out of economic sociology/anthropology.

4.1.1 Static measures

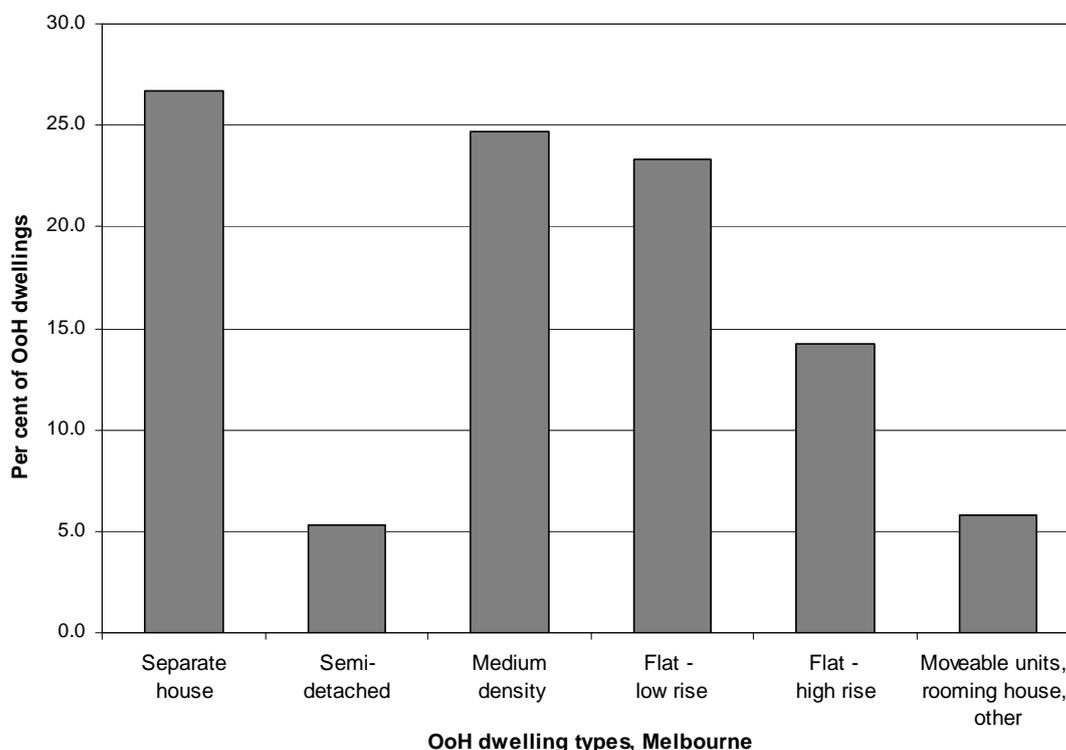
The most common approach to defining submarkets is to classify using a set of key characteristics (Bourne 1981). The three sets of measures generally used are supply or dwelling attributes, demand or household attributes, and locational attributes. Public housing authorities in a sense predetermine some of these submarkets through administrative decisions (both historical and ongoing) about the nature of the dwelling supply, types of applicants housed, and location of dwellings and estates.

Supply or dwelling attributes

Although academic debate surrounds which set of indicators provide the best measures, researchers agree that dwelling characteristics are centrally important. These can include tenure, material of construction, number of rooms and price. The submarket identified may have no necessary spatial base and may in principle be scattered over a wide metropolitan area.

As in the private sector, it is clear that the public housing stock varies considerably in dwelling type. Metropolitan Melbourne's public dwelling stock is shown in Figure 2.

Figure 2: Distribution of public dwelling stock by type, Melbourne, 2008



Source: Department of Human Services, Office of Housing, Housing and Community Building Division, Melbourne Recent Applicants Research Ready Database, 2002-2006.

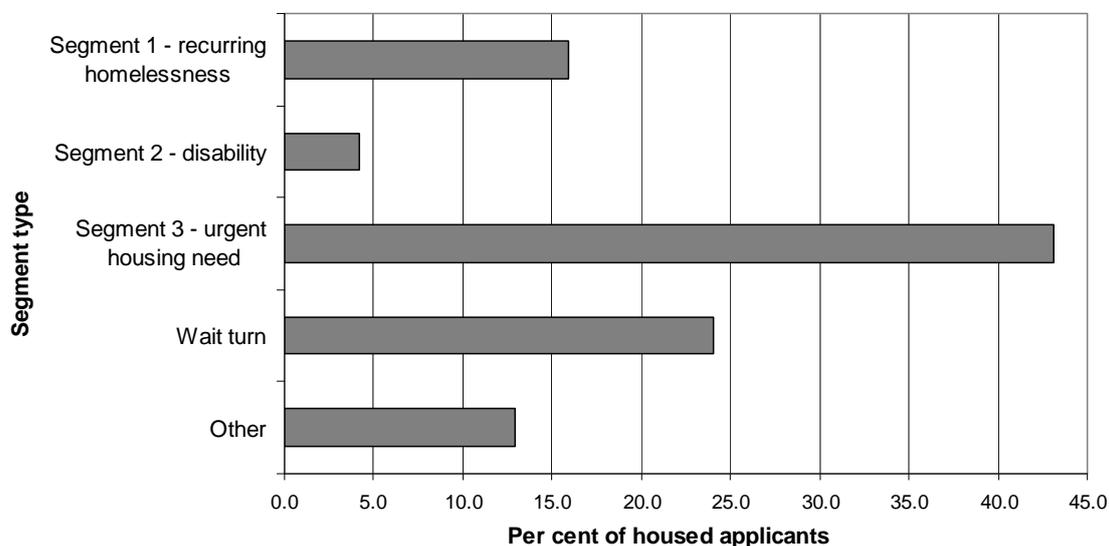
Separate houses are the most common dwelling form, followed by medium density dwellings (newer style townhouses and villa units), low rise walk-up flats, and high rise units.

Demand characteristics

Demand characteristics are those that reflect housing needs, requirements and preferences. Household size and composition, stage in the life cycle and socioeconomic status, such as income and employment status, may all indicate the likelihood of different housing preferences.

Public housing applicants are routinely segmented into one of three groups based on housing need, plus two other segments referred to as the 'wait turn' group (not priority housing need) and 'other'. These are shown in Figure 3.

Figure 3: Segment type of recently housed applicants, Melbourne, 2002-06

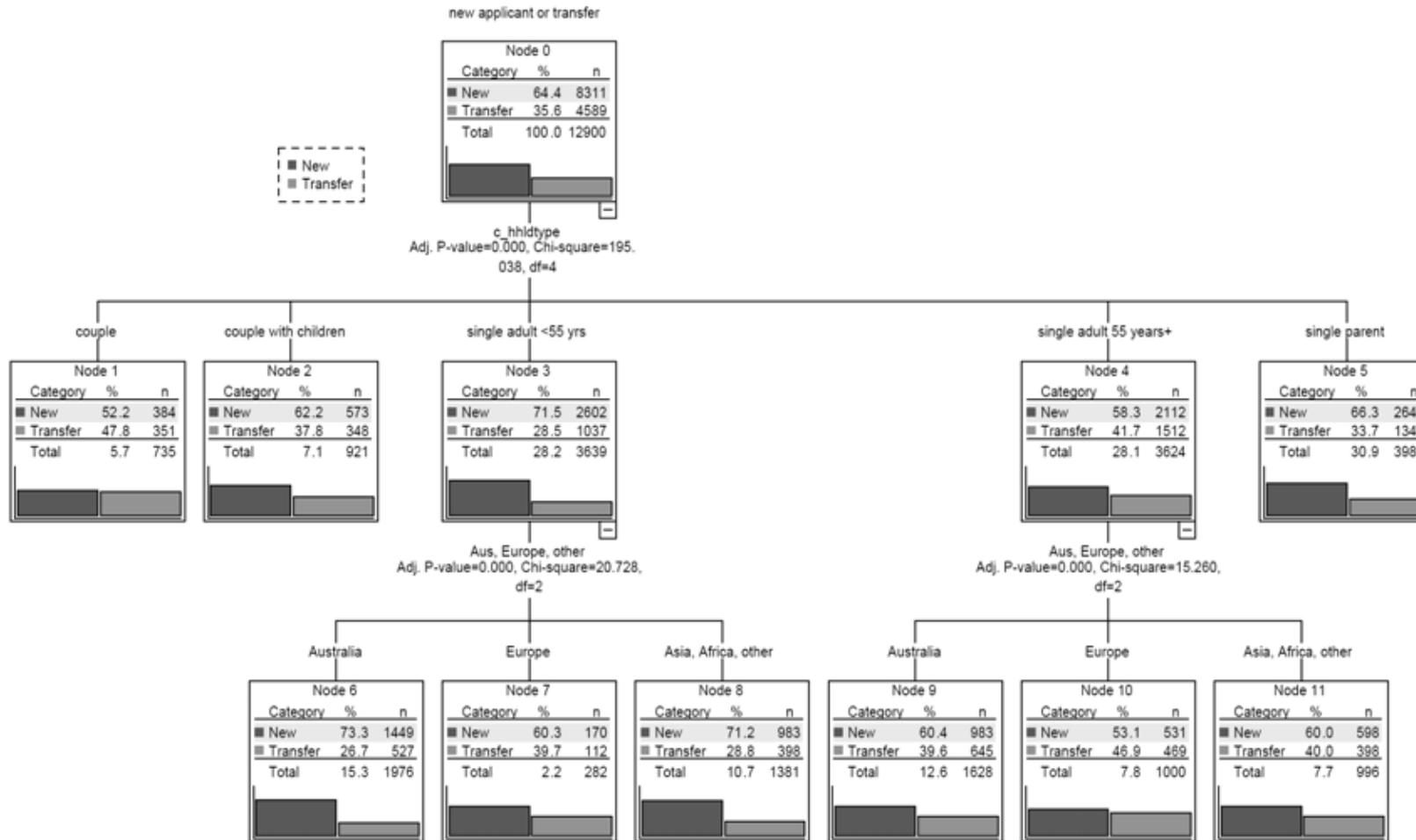


Source: Department of Human Services, Office of Housing, Housing and Community Building Division, Melbourne Recent Applicants Research Ready Database, 2002-2006

The largest segment is described as experiencing 'urgent housing need' and the smallest segment encompasses applicants with a disability. The applicant data file contains further detailed information on the reason for being allocated to a particular segment. Recurring homelessness, Segment 1, includes persons classified as experiencing social and relationship issues or being subjected to violence. Segment 2, disability, covers persons with a mental or physical disability. Segment 3, urgent housing need, primarily consists of applicants who are classified as homeless or have an urgent medical need. 'Other' refers to persons who are relocated by the OoH due to redevelopment of their house or unit.

Figure 4 illustrates another aspatial demand classification, which distinguishes between first time applicants for public housing and existing tenants who are applying for a transfer. The technique used is 'classification tree', formerly known as CHAID (Chi-Squared Automatic Interaction Detector), which involves automatically constructing several cross-tabulations and calculating the statistical significance of the proportions. The most significant relationships control the structure of the tree diagram. The classification tree predicts responses on a categorical dependent variable ('new' or 'transfer' applicant). The first split on the tree designates the strongest predictor of being a new applicant, and the most important predictors are placed closest to the dependent variable in the model. Significant interactions between independent variables are revealed in the branching pattern of the diagram.

Figure 4: Results of CHAID analysis (classification tree)



Source: Department of Human Services, Office of Housing, Housing and Community Building Division, Melbourne Recent Applicants Research Ready Database, 2002-2006

The analysis produces eleven nodes (which can be viewed as demand ‘submarkets’). The most important distinction between new and transfer applicants is their household type, and each of the five household types form separate nodes. The only household category with a further split relates to single adults less than 55 years of age. This group splits twice further into nodes depicting the likelihood of being a new or transfer applicant. New applicants are distinguished by their birthplace, with those born in Australia comprising a distinct node from those born in Africa or Asia (nodes 6 and 8 respectively) (see Figure 4). In contrast, single adults born in Europe have a very low likelihood of being a new applicant, they are more likely to be transfer applicants. Node 1 (couples) also has a higher than average likelihood of applying for a transfer. Single parents, on the other hand, have a higher than average likelihood of being a new applicant.

Table 3: Results of classification analysis: size and distribution of nodes and index scores*

<i>Node no.</i>	<i>No. of cases</i>	<i>%</i>	<i>No of new applicants</i>	<i>% new applicants in each node</i>	<i>Index</i>
New applicant 6	1,976	15.3	1,449	73.3	114
New applicant 8	1,381	10.7	983	71.2	111
New applicant 5	3,981	30.9	2,640	66.3	103
2	921	7.1	573	62.2	97
9	1,628	12.6	983	60.4	94
7	282	2.2	170	60.3	94
11	996	7.7	598	60.0	93
Transfer 10	1,000	7.8	531	53.1	82
Transfer 1	735	5.7	384	52.2	81
	12,900	100.0	8,311	64.4	

* The top three rows of the table indicate the node number and identify the nodes with the greatest likelihood of being new applicants. The bottom two rows indicate the two nodes least likely to be new applicants and most likely to be transfer applicants.

Source: Department of Human Services, Office of Housing, Housing and Community Building Division, Melbourne Recent Applicants Research Ready Database, 2002-2006.

The CHAID gains chart (Table 3) summarises the final outcome of the analysis by dividing the population of applicants for public housing into eleven end node segments that differ in the likelihood of being a new applicant. Each segment is defined by its unique combination of variables that determined its statistical selection in CHAID. For example, segment 6 comprises single applications under 55 years of age, born in Australia. Table 3 also ranks segments in terms of the likelihood of being a new applicant, rather than transfer applicant (see last column on right-hand side). In addition, it gives the absolute size of each segment; the share of the total population of recently housed applicants; the number of new applicants in each segment and the index score, which signifies the likelihood for each segment of being a new applicant in relation to the overall likelihood for all recently-housed applicants. To illustrate, segment 6, ranked number one, has the highest share of new applicants (73.3 per cent), a figure which is 14 per cent greater than the average likelihood (65 per cent).

Table 4: Selected indicators of new applicant segments

	<i>Node 6</i>	<i>Node 8</i>	<i>Node 5</i>
<i>Segment description</i>	<i>Younger single, Australian born</i>	<i>Younger single, Asian or African born</i>	<i>Single parent</i>
% in separate house	12.8	7.5	38.0
% in high rise flat	14.3	36.4	15.6
% in medium density townhouse or villa	25.1	12.8	18.3
% in low rise flat (old walk-up)	29.1	33.1	16.6
% on Disability Support Pension	51.9	22.4	8.2
% on NewStart	8.3	8.8	12.6
% on Single Parent Payment	8.3	8.7	66.9

Source: Department of Human Services, Office of Housing, Housing and Community Building Division, Melbourne Recent Applicants Research Ready Database, 2002-2006.

Table 4 shows how the three segments (or submarkets based on demand characteristics) can be further differentiated in terms of the type of dwelling to which they have been allocated and their income support payment. Node 6 contains a disproportionate number on Disability Support Pension; Node 8 stands out by a relatively high presence in high rise flats; and single parents are more likely to be allocated a separate house and, not surprisingly, rely on the Single Parent Payment.

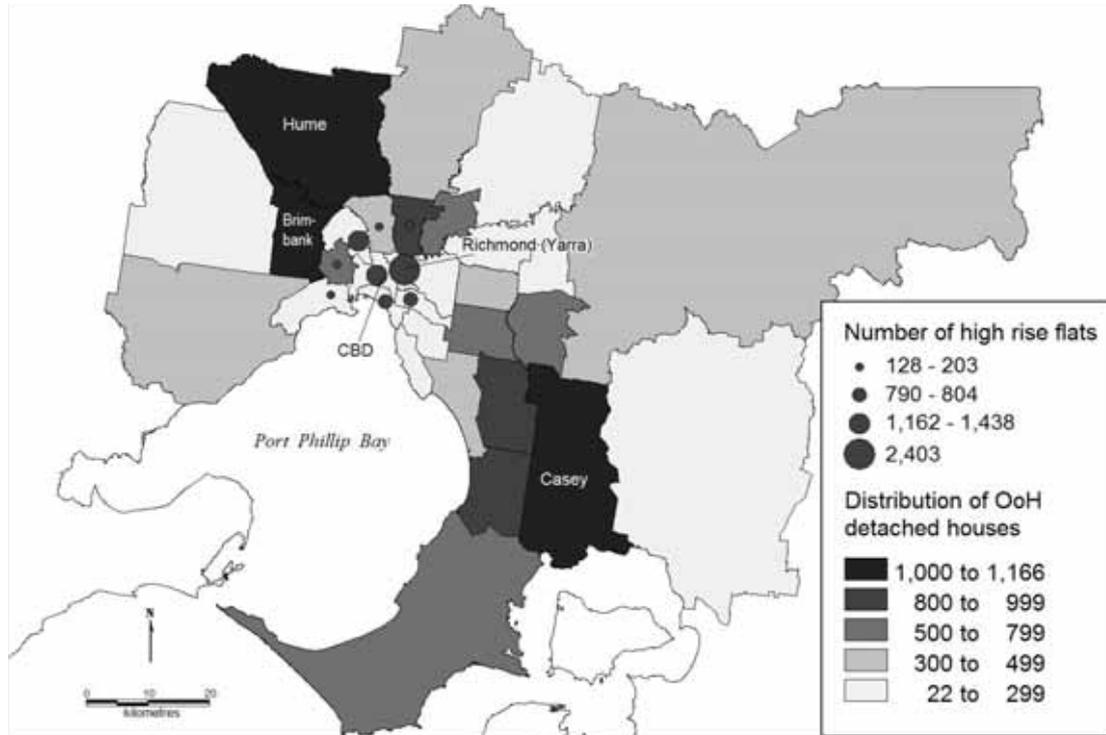
The above is but one question that can be examined with information in the database – and CHAID is suggested as a multivariate method worth considering, given its focus on identifying segments (nodes) or submarkets.

Classifying submarkets by location: Spatially defined submarkets

Both of the previous classifications represent aspatial approaches and, it can be argued, overlook an intrinsic quality of housing, that is, its 'locational fixity'. Thus much submarket analysis has focused on spatial variations, though in the process raising questions about how best to determine the spatial units and boundaries (Watkins 2001). The importance of identifying housing differentiation across different parts of the city is that applicants are more often than not aware of the dwelling attributes and thus their application may be influenced by the perceptions of the available stock. In fact, a very strong correlation (.87) exists between the total public stock in an LGA and the number of applicants who nominate it as their preferred area.

Figure 5 shows the spatial distribution of the separate houses and high rise units across Melbourne. The marked spatial differentiation between the main locations for these two dwelling types is revealed. Separate houses are disproportionately concentrated in two outer suburban LGAs, Hume to the north and Casey to the east. In contrast, the largest numbers of high rise units are found in inner Melbourne and nearby Richmond. Stated preferences for locations, accordingly, may be shaped by the awareness of the typical dwelling type found in a local area or just the sheer numbers of them.

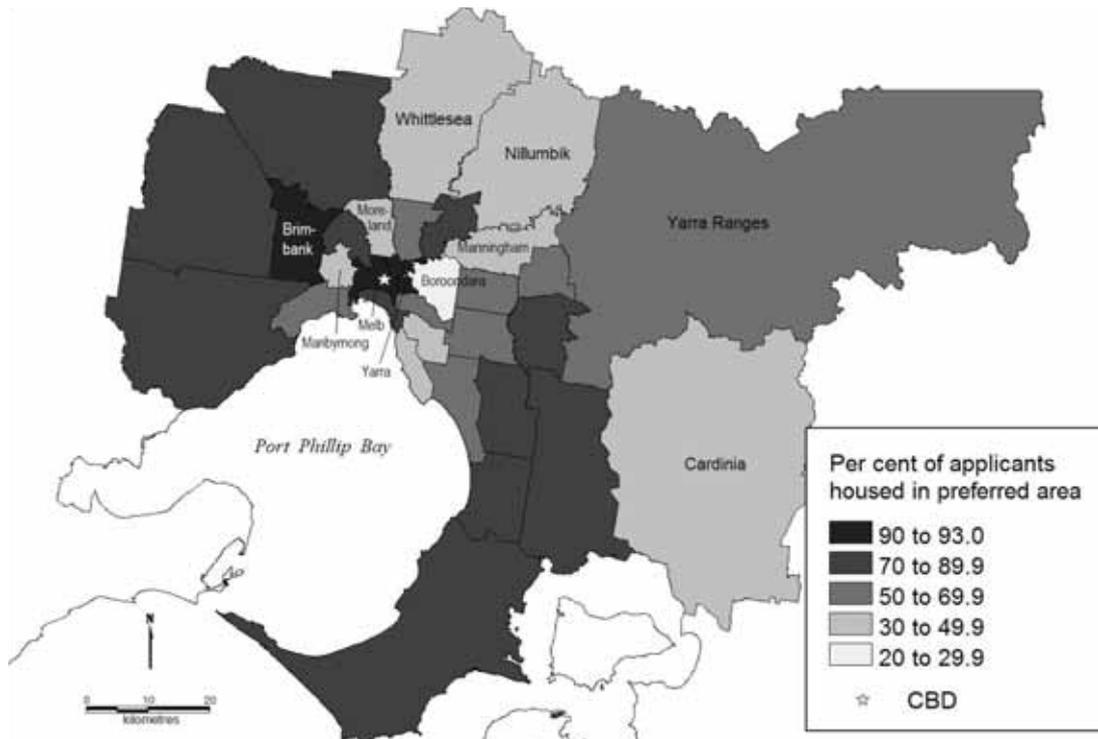
Figure 5: Distribution of public dwelling stock (detached houses and high rise only), Melbourne LGAs, 2008



Source: Department of Human Services, Housing and Community Building Division, Office of Housing, Annual Report 2006-2007.

Applicants have an opportunity to nominate up to three preferred locations for housing allocation. Figure 6 considers the proportion of applicants living in their nominated area by LGA.

Figure 6: Per cent of recently housed applicants residing in preferred area



Source: Department of Human Services, Office of Housing, Housing and Community Building Division, Melbourne Recent Applicants Research Ready Database, 2002-2006.

Areas with a close match between nominated preference and current residence include Brimbank to the west, the city of Melbourne, and Yarra in close proximity to the CBD. All three have a large number of public dwellings, with Melbourne and Yarra being characterised by high rise flats and Brimbank by separate detached houses.

4.1.2 Dynamic methods

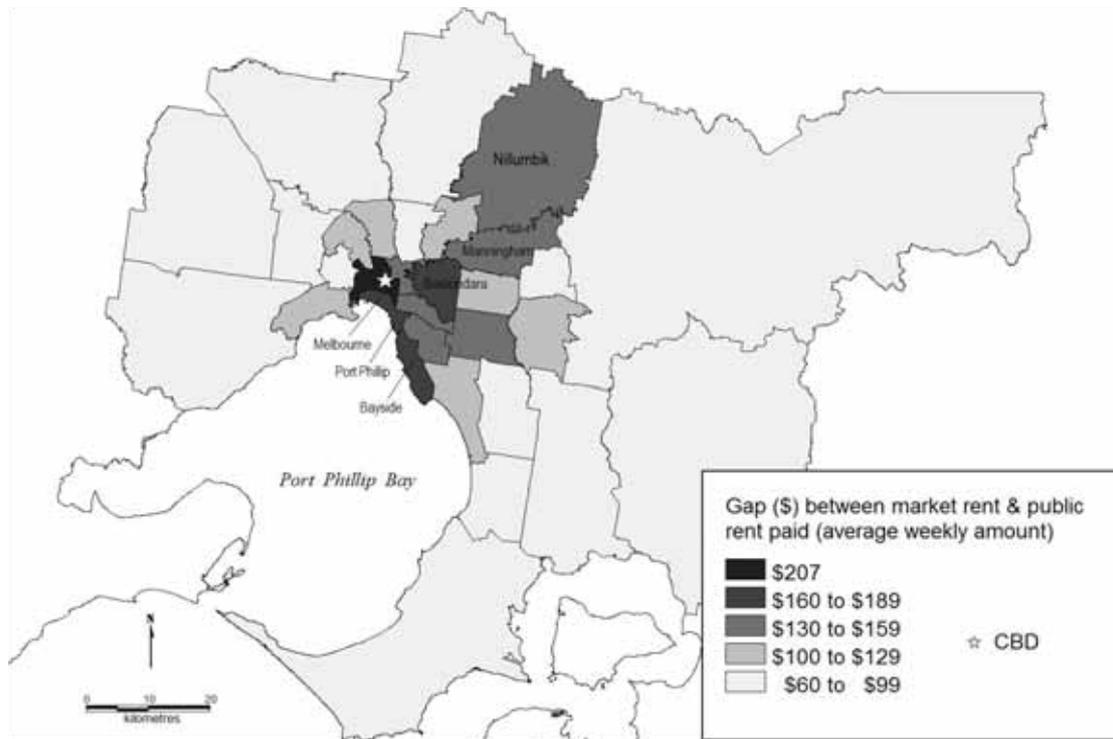
As outlined in Section 3.2, an alternative way of distinguishing submarkets is by concentrating on the dynamic processes by which consumers and suppliers negotiate the housing market. These are the degree to which they are willing to substitute one dwelling form or location for another (substitution method), the choices they make about where they move to and when (household mobility method), and changes in dwelling prices or rents (hedonic price method).

Substitution method

The concept of substitution raises the question of whether public rental can be a substitute for private rental. Although not explicitly in the context of submarket analysis, Burke et al. (2005) compared public rental with the low end of the private rental market (comparing rent assistance recipients on the public housing waiting list with those not on the waiting list, but potentially eligible).

Their results revealed that about half of low income private renters did not consider public housing as a substitute. The other 50 per cent, however, did. This suggests that the question of substitutability between public rent and low cost private rent required considerably more investigation. Figures 7 and 8 examine whether there might be a spatial component operating in terms of substitutability. We first consider the 'rent gap' (in different LGAs between the rent public renters pay compared with the local median weekly rent) and follow this by examining the public housing, low income private renter differential in the same areas.

Figure 7: Average rent gap, by LGA



Source: Department of Human Services, Office of Housing, Housing and Community Building Division, Melbourne Recent Applicants Research Ready Database, 2002-2006.

The rent gap is calculated by subtracting the weekly rent paid by the tenant (administrative data) from the market rent in the area (census data). Submarket research pays considerable attention to pricing as an explanation of consumer behaviour and as an instrument for defining submarkets. Although public housing has administered prices (embodied in the household rent), the difference between the household rent and private market rent may affect the demand for housing in different area or submarkets. In Victoria, the household rent for new tenants is typically set at 25 per cent of income. Given the low income of most applicants, this means that the household rent will be quite low. Compared to private market rents in most areas, a substantial differential will exist. Thus, pricing (as revealed in the rent gap) may still have some effect on client behaviour.

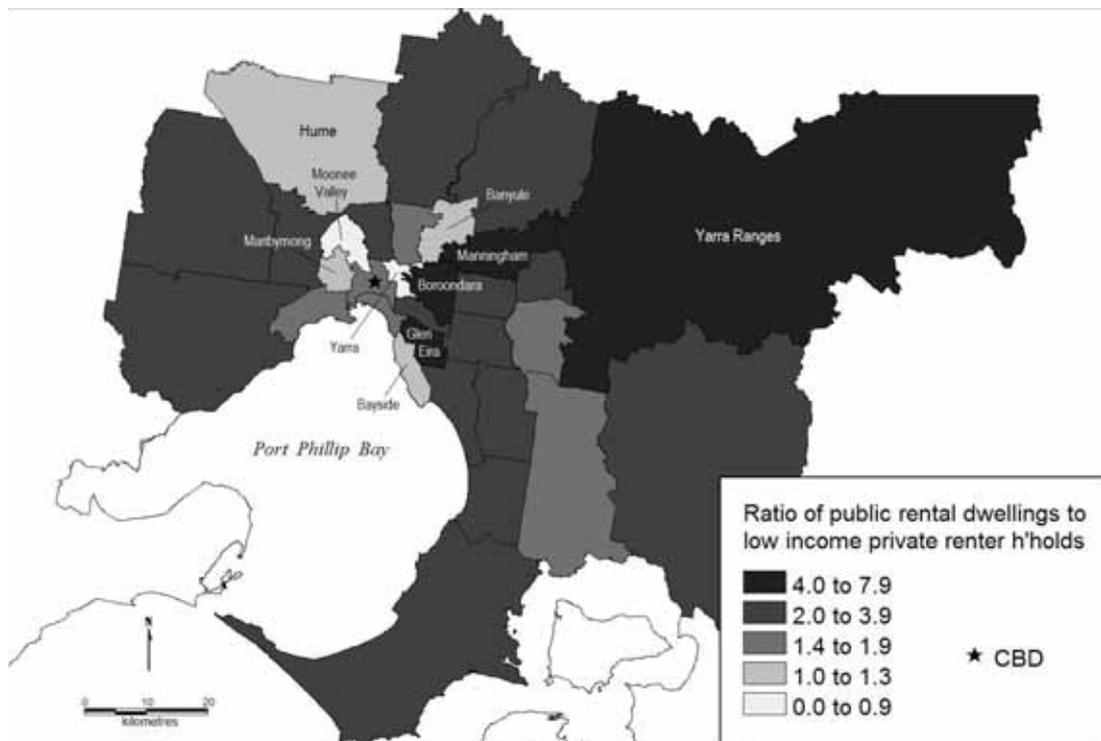
Figure 7 shows the differential between private market rents and public sector household rents for Melbourne LGAs as of August 2008 and highlights how they can vary substantially, with many outer suburban areas having differentials of less than \$100 per week (excluding any rent assistance) and others, mainly inner city, of \$160 and more. In some outer suburban LGAs, the differentials were less than \$60. These differentials have considerable potential to affect the behaviours of public sector applicants in ways that are perhaps unclear without further analysis.

For example, if the affordability differential is relatively small, then the relative attractiveness of private rental may be greater. An alternative behavioural response, however, is to take the differential as a de facto measure of the relative attractiveness and amenity of areas, with low differentials equalling low amenity and vice-versa. This may mean areas of high differential have a greater number of applicants as people seek public housing in areas that promise better services and facilities as well as lifestyle. This is an issue that further research could explore. The point here is to

illustrate how more effective use of spatial data could provide the capacity for better understanding of the dynamics of public sector consumer behaviour.

Figure 8 is another possible substitution indicator and shows the ratio of public rental stock to the number of private rental low income households by LGA¹. It could be hypothesised that the greater the ratio the greater the ability of a household to substitute public for private rental. It also suggests the potential of merging data sets, in this case, the OoH Melbourne Recent Applicants Research Ready Database with Centrelink rent assistance recipients. The figure, like others in this report, indicates major spatial variation (selected eastern suburbs have the highest ratios, and inner areas the lowest ones) and could explain differences in intensity of demand or where there is greatest supply need.

Figure 8: Ratio of public rental dwellings to low income private renter households, by LGA



Sources: Department of Human Services, Office of Housing, Housing and Community Building Division, Melbourne Recent Applicants Research Ready Database, 2002-2006; Randolph and Holloway (2007).

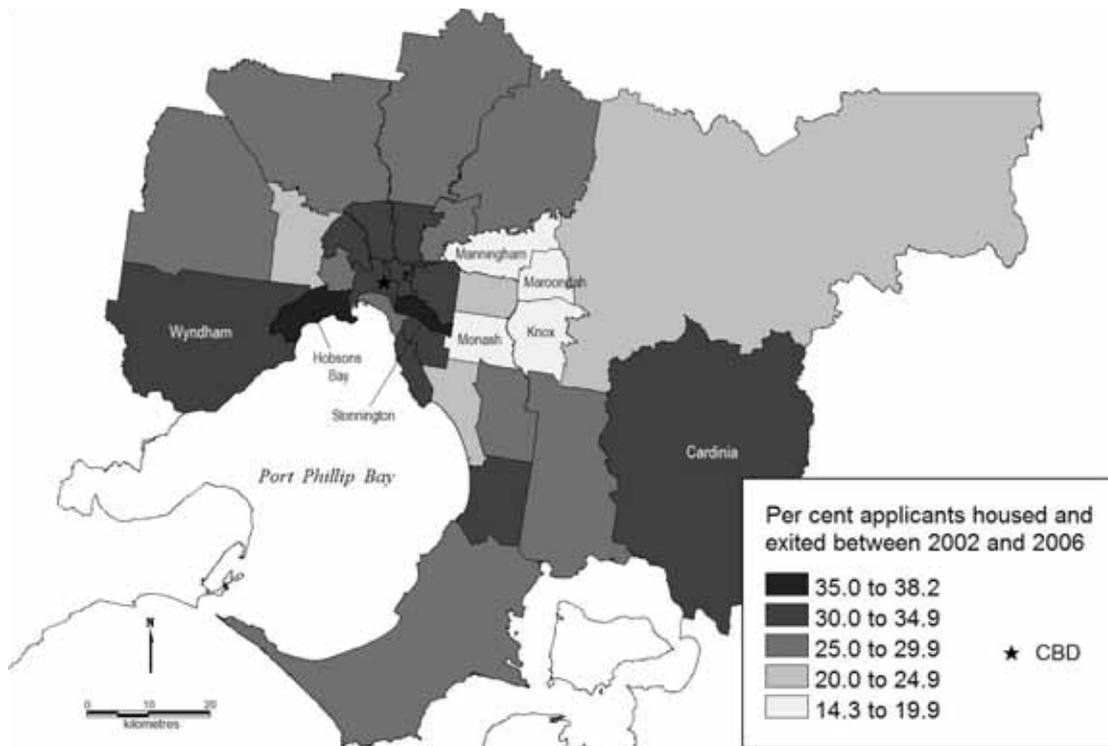
Household mobility method

Jones (2002) and Jones et al. (2004) argue that migration patterns provide the best measure of the spatial extent of a local housing market. The household mobility method emphasises the need to consider the geography of housing moves, with the spatial boundaries of housing submarkets determined on the basis of where buyers, sellers and renters move to and from. Thus, an area with high concentrations of purchasers from a local area might be seen as a distinct submarket. In public housing, mobility can be represented in the form of allocations and exits, and even though the former is by administrative process, the rates of mobility can vary between areas, with the potential to identify public housing submarkets. Figures 9 and 10 illustrate two

¹ The figures on low income private renter households are drawn from an earlier AHURI study by Randolph and Holloway (2007).

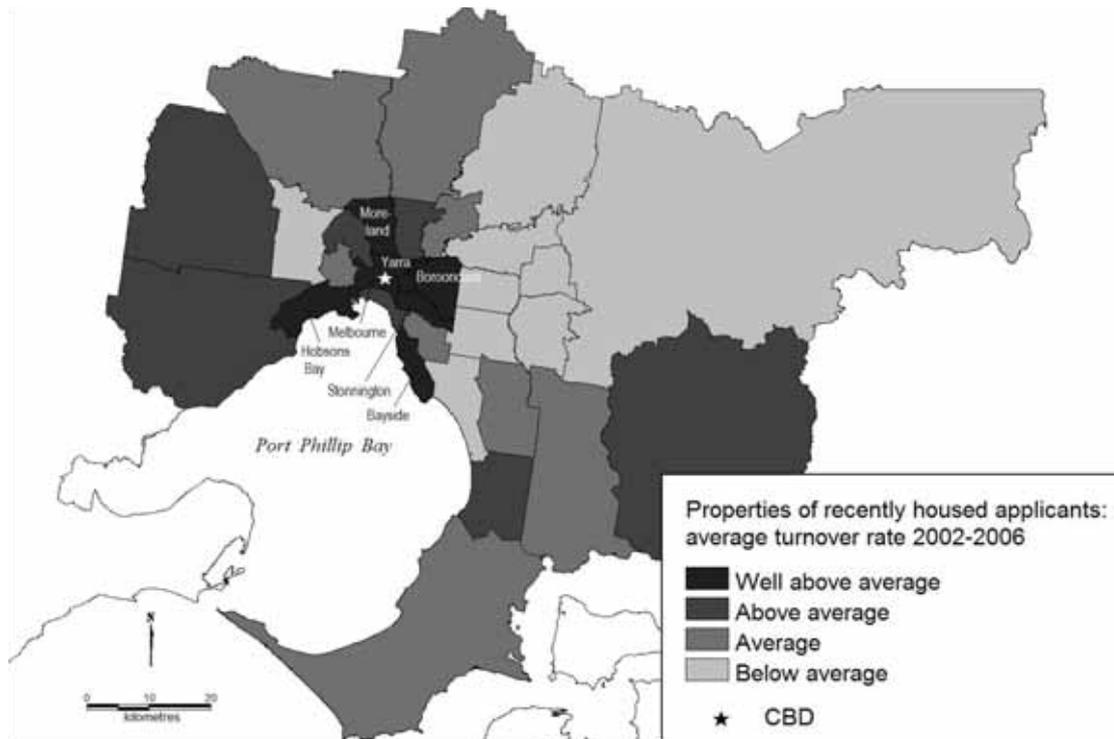
indicators, one being exits per housed applicants and the other property turnover among recently housed applicants in a five-year period. Both show quite marked spatial variations. The eastern suburbs, for example, show exit rates up to half of most inner and many western suburban areas, with some of the latter having exit rates over 35 per cent. Whether this reflects the attributes of the stock, the areas themselves or the tenants housed is unknown without further investigation. The data are presented here in order to demonstrate their potential to reveal differences in performance across public housing submarkets.

Figure 9: Per cent applicants housed and exited between 2002 and 2006, by LGA



Source: Department of Human Services, Office of Housing, Housing and Community Building Division, Melbourne Recent Applicants Research Ready Database, 2002-2006.

Figure 10: Properties of recently housed applicants, average turnover rate, 2002-06



Source: Department of Human Services, Office of Housing, Housing and Community Building Division, Melbourne Recent Applicants Research Ready Database, 2002-2006.

Price levels and changes

This highly quantitative approach uses price levels or price changes as indicators of submarkets (see Section 3.2.2). However, it does not have relevance to public housing, at least in Australia. The aforementioned household rent used in public housing is uniform across areas and dwelling quality and therefore negates the ability to use price levels (rents) as a measure of submarket difference. In countries such as Sweden and the Netherlands, however, prices set for social housing are a modified cost rent reflecting quality, location and type. This means that price, even if bureaucratically administered, could in principle reveal something about social housing submarkets. In fact, such a bureaucratically administered price would be better than private market hedonic measures in suggesting submarkets because the administrative price explicitly rather than implicitly builds in a 'value' for the various aspects of each property. In Australia, there is a property rent in the form of a market rent, but it tells us little about public housing submarkets as it is unrelated to any attributes of the stock or its clients. Instead, it represents a private market rent imputed to public housing.

5 CONCLUSION

This Final Report has taken a different direction than envisaged in the original research proposal. The opportunity to access OoH administrative data files has led to the creation of a research amenable dataset and the development of a series of indicators, rates, maps and analyses to illustrate the broader uses of such files. While for the purpose of this report, LGAs were chosen as the unit of analysis, finer grained spatial analysis could be done for empirical and analytical purposes.

This report demonstrates that public housing administrative databases have the potential to be reconfigured in such a way that researchers can investigate distinctly different demand and supply attributes, spatial variations, substitutable submarkets and so forth, so that public housing submarkets, however defined, can form the basis of policy and program decision-making.

We believe there is an ability to achieve this because of bureaucratic rather than price allocation. The public sector stock, its tenants and applicants are potentially more amenable to policy or planning interventions than private sector submarkets. State housing agencies have a potentially wide range of direct and indirect levers that could be used to shape applicants' and existing tenants' behaviours in ways that might enhance better performance from public housing submarkets. Examples of direct demand levers include eligibility criteria, allocation methods, occupancy provisions or rent-setting policy, including rebate policy. On the supply side, examples include the rate of new construction, estate renewal or demolition programs.

Our preliminary and indicative use of administrative data files suggests the rich potential for offering new insights into the performance of the public housing system and the choices and decisions of both applicants and housed tenants in their search for appropriate and affordable housing. It appears that (as illustrated by property turnover rates) these decisions are responses to the interaction between the attributes of the tenants, administrative procedures and practices of a state housing authority and, to some extent, the relationship between the two as indicated with rent differentials. This suggests that, unlike private sector submarkets, governments have greater capacity to manipulate submarkets for better social and economic outcomes.

As discussed in Section 3, the main limitation of current public housing policy and practice, as it relates to this report, is the reliance on 'one size fits all' policies. However, a greater knowledge of public sector submarkets reveals that this may be becoming increasingly problematic. As illustrated in this report, Melbourne contains spatial areas of intense demand, low property turnover, high unmet locational preference or high exits by recent applicants. These results, although preliminary, suggest that more effective data may provide capacity for more flexible or nuanced policy.

Despite the potential, public housing authorities are limited in their ability to use their administrative data for research and policy purposes, and some jurisdictions may have data bases that are less amenable to research and policy analysis than that of Victoria.

The purpose of this study has never been to explain – instead, it has been to identify distinctive patterns of difference in submarkets. There are many patterns that require considerable more work, and much of the explanation needs to come from the public housing authority personnel who know the internal operations of the system. This report supports the value that can come out of a more integrated data set and appropriate conceptualisation of variables that are to be teased out. We believe that all public housing authorities across Australia are sitting on a goldmine of untapped administrative data that, with some work, would yield valuable empirical, analytical and policy insights.

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