Deakin Research Online

200110211

API New Researcher Award

The significance of social influences and established housing values

By Richard Reed AAPI

This is an edited version of the paper which won the author the Australian Property Institute's
New Researcher Award for 2001, worth $1,000.

■ ■ Richard Reed is a lecturer at the University of
Queensland at the St Lucia campus. He is a
registered valuer with valuation experience in a
wide variety of real estate and is completing his PhD
in property. He has received First Class Honours and
published in numerous Australian and overseas
journals.

Abstract

Investment in housing represents the largest single source of wealth for individuals and has an
important role in the macro economy. Traditional economic indicators cannot always observe the
degree of purchaser and vendor willingness and therefore consideration should also be given to
characteristics of buyers and sellers in the marketplace. This study draws the disciplines of
housing research and demography closer and looks to social indicators for an insight into
residential housing markets.

The research analysed changes in the value of established residential house prices in Brisbane
and the influence of variations in social structure on a longitudinal time series basis. Results
confirmed the existence of strong linkages between social constructs and established house
prices. While it is acknowledged that established house values are significantly influenced by
external economic and political factors, this research confirmed that serious consideration must
also be given to social factors and demographic variables.

DESPITE the range of potential applications, the
use of demographic information has been
predominantly restricted· to household
population forecasts considered essential when
estimating future demand in a given area for
which the demographic data is ideally suited
(Runnels, 1989).

However when property valuers and analysts
are looking towards the future in relation to
housing and investment, demographic
statistics are increasingly acknowledged for
their significant contribution towards an in-
depth understanding (Hill & Petersen, 1994).
For example, statistics concerning income
levels are extremely useful for comparing
different life-cycle stages including the
formation, maturing and dissolving of the
traditional family (ABS, 6523.0, 1999).

Acknowledging and rationalising the high level
of neglect on the two fields of housing
research and demography collectively known
as 'housing demography', Myers (1990)
concluded the absence of combined studies is
primarily due to (a) the division of separate
agendas between these two fields of research

and/or (b) limitations in data availability and
analysis. This study addresses these obstacles
and makes a real and worthwhile contribution
to the combined field of social area analysis
and housing research.

This research analyses changes in the value of
established residential house prices in Brisbane,
Australia, and the influence of variations in
social structure on a longitudinal time series
basis. It is primarily concerned with three
important cross-sectional variables: location,
time and human behaviour. Changes in spatial
patterns and property values for established
residential housing are analysed for Brisbane
from 1976 to 1996 including data from five
censuses conducted during this period. The
research proposes a conceptual model based
on 'Social Area Analysis' and uses demographic
variables to increase the understanding of
established residential house values.

Background to the research

The price paid for residential real estate is often
reflected by the residents' willingness-to-pay
to live in these suburbs, suggesting a close

relationship existed between social indicators
and the price of established housing. However
previous research has not been entirely
successful in establishing empirical links
between these factors and intra-metropolitan
price variations (Potepan, 1996).

Property researchers and demographers from
varying disciplines have attempted to bridge
the gap between urban housing markets and
demography, although the results of
amalgamated studies have met with mixed
success. Even though substantial research has
focussed on variations between cities at the
inter-metropolitan level there has been a lack
of attention in developing the relatively small
body of knowledge at the intra-urban or
metropolitan scale and an overall lack of
concern in this area (Maclennan & Tu, 1996).

Social Area Analysis

The area of study known as 'Social Area
Analysis' or 'Social Geography' gained
momentum in the latter half of the 20th
century. It has been of keen interest to
geographers, sociologists and economists.

The majority of high profile social area analysis
studies have been undertaken in the US with
minimal changes since the original concept of
describing the socio-economic structure and
spatial distribution of urban populations was
initially proposed (Murdie, 1969). Social Area
Analysis is premised upon the application of
Principal Components Analysis (PCA) and forms
part of the foundation for this research. PCA
has the ability to transform a broad set of
variables into substantially smaller sets of
uncorrelated data represented by factors or

dimensions. As a statistical technique used for examining housing markets, PCA has proven its merits as an effective method for uncovering, disentangling and summarising patterns of correlations within a data set (Heikkila, 1992).

Shevky & Bell (1955) produced the first landmark Social Area Analysis study based on Los Angeles. Continuing on with this research, Murdie (1969) produced the model in Figure 1 representing the concept of layered social dimensions or constructs and the relationship with real estate being the Physical Space. This diagram can be described as an 'Idealised spatial model of urban ecological structure and change' whereby the model concentrated upon showing how identified social dimensions are spatially distinguished (Murdie, 1969, p.8). Importantly the unique spatial location of each property location is retained as a central component of the model - two parcels of lands cannot have the same location or be identical.
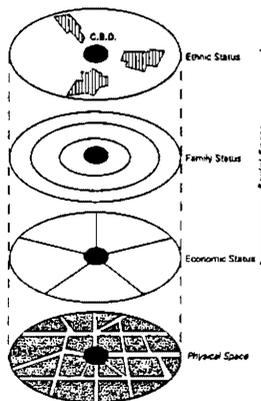

Figure 1 - Dimensions of Formal Social-Geographic Space (Murdie, 1969, p.8)

The research by Shevky and Bell (1955) concluded three main dimensions were evident in most urban cities as follows:

■ Socio-economic Status (measured by income, education, occupation type, etc.)

■ Family Status (measured by age, household type, marital status, etc.)

■ Ethnic Status (measured by country of birth, other languages spoken, etc.).

This original research procedure has been duplicated numerous times and the independent studies have supported the existence of these three dimensions in Seattle, USA (Schmid & Tagashira, 1964); Melbourne (Jones, 1965); Toronto (Murdie, 1969); Sunderland (Robson, 1969); and Chicago (Rees, 1970).

Importantly studies into Social Area Analysis were pursued to better understand how urban

structure varied on a spatial basis and why. The model in Figure 1 indicated the content and placement of the social constructs (Economic Status, Family Status, Ethnic Status) in the upper layers were influenced by the location of the infrastructure in the bottom physical space layer. This type of model assisted planning for future urban growth although the concept rarely progressed further in relation to other variables.

Research design

The conceptual model for this research is presented in Figure 2, a modification of the original Figure 1 model. The roles of the social dimensions have been reversed as indicated by the downward red arrows and Figure 2 becomes a 'top-down' model.

The emphasis is now placed upon the relationship between established house prices in the bottom layer and social dimensions in the upper layers. The impact of external factors (e.g. interest rate changes, political implications) cannot be ignored and are represented by the upward blue arrows as 'other factors'.
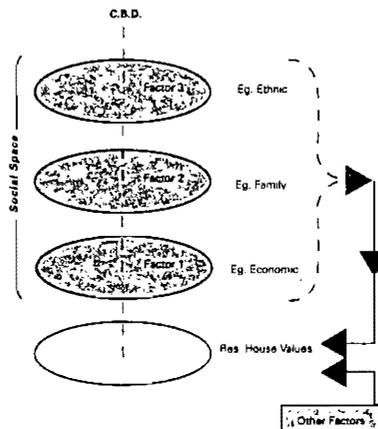

Fig. 2 - Research Model (adopted from Fig. 1)

This research draws attention to the following questions:

■ Question 1: What changes have occurred within the social structure of suburban Brisbane during the period 1976 to 1996?

■ Question 2: What is the relationship between social constructs and established residential housing values?

To address these research questions, a two-stage approach analysed established house sale prices and demographic data in Brisbane. For the first question a Principal Components Analysis (PCA) was conducted identifying social dimensions from five censuses conducted in Brisbane between 1976 and 1996 (inclusive).

To address the second question a Multiple Regression Analysis (MRA) was undertaken and regressed the factor scores from the PCA (as independent variables) against established residential house prices (dependent variable).

The analysis was restricted to sales of established residential houses and limited to improved properties with total land area not exceeding 2000m² located in suburban Brisbane. This limitation excluded properties such as rural-residential where the land was the significant component of the overall property value. Furthermore only suburbs which had reached advanced urbanisation were retained therefore decreasing the impact of vacant land supply. The house sales data was sourced from the Department of Natural Resources and the Real Estate Institute of Queensland. The census data was sourced from the Australian Bureau of Statistics.

Analysis

Stage One — Principal Components Analysis

The initial stage of this analysis was limited to census variables and used PCA to assemble social constructs based on Figures 1 and 2. Up to 49 demographic variables were sourced from five censuses conducted between 1976 and 1996 by the Australian Bureau of Statistics. A small number of factors were retained and those showing significant loadings on selected variables were allocated names. For example, Family Status was associated with variables including household status; Socio-economic Status related to income and education variables.

The factors from each census were assembled in descending order according to their ability to explain variations in the data set. The total number of suburbs included in the analysis gradually increased over the time series as new suburbs were added.

A notable aspect of Table 1 is Family Status listed as the first factor and accounting for the largest variance, with Socio-economic Status clearly the second factor. The balance of the factors highlighted demographic changes that occurred over this 20-year period. The significance of age factors was evident in each census. The existence of Ethnic Status in the 1986, 1991 and 1996 censuses generally supported the original Shevky and Bell (1955) concept of three original dimensions, although Ethnic Status is clearly not as strong as the first and second factors.

Allowances should be made for the lagged urbanisation of Brisbane in contrast to Los Angeles, appearing to lag about 40 years. The

API New Researcher Award

Table 1 — Results of 1976-1996 Principal Components Analysis ('X' denotes factor exists but is unnamed)

	1976	1981	1986	1991	1996
Total Suburbs	98	120	121	121	123
Factor 1	Family	Family	Family	Family	Family
Factor 2	Socio-economic	Socio-economic	Socio-economic	Socio-economic	Socio-economic
Factor 3	Age	Older Generation	Ethnic	Ethnic	Employment
Factor 4	X	Middle Age	Age	Middle Age	Older Generation
Factor 5	X	X	X	Employment Tenure	X
Factor 6	X	X	X	Income	Occupation
Factor 7	X	X	X	X	Ethnic
Factor 8	X	X	X	X	X
Factor 9	X		X	X	X
Factor 10	X		Older Generation	X	
Factor 11			X	X	
Factor 12				X	

remaining factors in Table 1 are closely connected to employment, occupation and income.

Stage Two — Multiple Regression Analysis

The original factors from the PCA were retained as factor scores and then entered into a stepwise Multiple Regression Analysis as independent uncorrelated variables. The median value of established housing for each suburb was also entered for each census year as the dependent variable. The factor scores were then regressed against established house prices with the results presented in Table 2. Only factors with significant contributions to the models were retained.

The regression analysis indicated social dimensions were associated with approximately 75% of the variation in median house prices between suburbs, rising to nearly 80% for 1996. Although Family Status was confirmed the number one factor in the PCA due to the lifecycle influence in most suburbs, its level of importance in the MRA diminished significantly in relation to house prices. This could be attributed to various factors including:

- changing social landscape in the last fifteen years with increases in sole person and single parent households
- sharp decreases in fertility rates and wider acceptance of childless families
- moving away from the 'typical' household incorporating a married couple and children.

The results presented in Table 2 clearly support the increasing role of Socio-economic Status in each census year. Suburbs with higher rankings in socio-economic status exhibited a strong positive correlation with house prices.

From 1981 the significance of the 'age' variable in society is evident being supported by the Older Generation, Middle Age and Age factors. Employment, Income and Occupation are all directly associated with household income and provided one-off contributions to the models in specific years. The remaining unnamed factors were acknowledged for their contribution to each model but were not interpreted due to inconsistent loadings on individual demographic variables.

Research findings

Following the data analysis each research question can be addressed. Although consideration must always be given to externalities or other factors as indicated in Figure 2, it has been demonstrated that a relationship exists between established house values and social constructs or dimensions. These constructs have been in a continual state of change in response to variations in household composition and society at large.

Question One: What changes have occurred within the social structure of suburban Brisbane during the period 1976 to 1996?

The dimension described as Family Status represented the largest proportion of variation in Brisbane suburbs and is clearly evident in all five censuses following the Principal

Components Analysis. Concentrating on lifecycle criteria such as general age brackets and marital status, this construct is a viable means of distinguishing between selected suburban areas. Unless the lifecycle process alters significantly, Family Status should remain an important dimension in future research.

Socio-economic Status has been confirmed as the second important factor with the demographic variable of financial income with close ties to housing affordability. There is substantial evidence of Family Status and Socio-economic Status existing as social constructs in Brisbane between 1976 and 1996, lending strong support to the Social Area Analysis theory of Shevky and Bell (1955).

The only contention lies with the third dimension of Ethnic Status which was not clearly represented as the third factor. Nevertheless, Ethnic Status was confirmed in some format for 1986, 1991 and 1996. Possibly the high multi-culture nature of Australia resulted in a large proportion of residents from overseas evenly distributed throughout Brisbane which lessened the significance of this construct using Social Area Analysis.

Question Two: Relationship between social constructs and established residential house values

After entering the social dimensions (representing demographic variables) as independent variables into the Multiple Regression Analysis, approximately 75% of variation in house prices could be explained. This result was consistent for all five censuses,

Table 2 — Results of 1976-1996 Multiple Regression Analysis

	1976	1981	1986	1991	1996
Total No. of Factors	6	5	7	7	6
Adjusted R^2	74.07%	76.62%	71.49%	74.12%	79.67%
Family	-0.5566	-0.1985	-0.3441		0.1526
Socio-economic	0.5553	0.7174	0.6166	0.7051	0.7302
Age	-0.1577		-0.0988		
Occupation	.				0.1779
Older Generation		-0.3908	.		-0.1680
Middle Age		0.2332		-0.2001	
Income				0.1792	
Employment				.	-0.2755
Factor 5	0.1424				
Factor 6			-0.2725		
Factor 7		0.1220		-0.1053	
Factor 8	0.2462		0.1606		
Factor 9			0.1342	0.3060	0.3384
Factor 10		0.1812	-0.3243	0.1478	
Factor 12				0.2457	

reaching 79.67% for the 1996 census.

The strongest influence in all five censuses was from Socio-economic Status, positively associating Brisbane suburbs with higher house prices. The contribution to the model from Socio-economic Status gradually increased over time indicating a closer relationship in 1996 between established house prices and socio-economic variables such as income placing additional emphasis on housing affodability. Interestingly the contribution of Family Status to the model has generally decreased.

Furthermore, various age dimensions (e.g. Older Generation, Middle Age) have increased in importance and this trend should continue into the future. Although yet to effectively influence house prices or trends, the growing significance of age was clearly evident throughout these results.

Conclusion

This research confirmed the existence and stability of Social Area Analysis dimensions over an extended time series. It also highlighted the increased affordability of high-income earners in regard to higher value housing,

possibly assisted by the deregulation of the banking industry in the 1980s with relaxed lending requirements (e.g. lending up to 100% of valuation).

Households with higher socio-economic status in the form of income were able to increase mortgage loans and purchase established housing in increasingly expensive suburbs, therefore strengthening the link between socio-economic status and house prices.

It has also been demonstrated that demographics have a distinct role to play in the analysis of established housing markets. No longer should the two disciplines remain separated and property professionals should now recognise the growing significance of demography.

While it is acknowledged that the level of house prices is influenced by a myriad of economic, political and social influences, this research has highlighted the important role played by social influences. The social construct referred to as Socio-economic Status was clearly identified throughout the research and is central to housing market research. In this process the close relationship between house values and income levels was also highlighted.

Furthermore age dimensions such as the Older Generation are becoming increasingly evident, with increasing implications for future housing markets. This age construct has the potential to significantly influence demand for future housing services (both new and established) and in turn housing prices, and catering to the needs of this group should benefit those with the foresight to anticipate and adapt to this demographic change. For example, perhaps the design of the four bedroom + study house will revert back to the original two bedroom dwelling to suit smaller, older families, in turn showing a higher capital return for investors.

Only time will provide the real answers but research into the field of 'housing demography' provides a valuable and often underestimated insight into residential housing markets.

References

Australian Bureau of Statistics, (1999), 6523.0 Income Distribution, Australia, ABS, Canberra.

Heikkila, E.J. (1992), 'Describing Urban Structure' in *Review of Urban and Regional Development Studies 4*.

Hill, J. K. and Petersen, D. M., (1994), 'Demographics and the Long-Term Outlook for Housing Investment' in *Economic Review*, First Quarter.

Jones (1965), 'A Social Profile of Canberra, 1961' in *The Journal of Australian and New Zealand Sociology*, Vol. 1, pp.107-120.

Maclennan, D. & Tu, Y., (1996), 'Economic perspectives on the structure of local housing systems' in *Housing Studies*, Vol.11, No.3.

Myers, D. (1990), Housing Demography – Linking Demographic Structure and Housing Markets, The University of Wisconsin Press, Wisconsin.

Murdie, R.A. (1969), Factorial Ecology of Metropolitan Toronto, 1951-1961, University of Chicago.

Potepan, M. J., (1996), Explaining Intermetropolitan Variation in Housing Prices, Rents and Land Prices, Real Estate Economics, Vol. 2, No. 2, pp.219-245.

Rees, P.H. (1970), 'Concepts of Social Space: Toward an Urban Social Geography' in *Geographical Perspectives on Urban Systems*, pp.306-394.

Robson, B.T. (1969), Urban Analysis: A Study of City Structure, Cambridge Uni. Press, Cambridge.

Runnels, J.A. (1989), Projecting Housing Demand from Demographics, Real Estate Issues, pp. 14-20.

Schmid, C.F. & Tagashira, K. (1964), 'Ecological and Demographic Indices' in *Demography*, Vol.1, No.1.

Shevky, E. & Bell, W., (1955), Social Area Analysis, Greenwood Press, Connecticut.

■ Richard Reed can be contacted at: r.reed@mailbox.uq.edu.au