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The relationship between socio-economic indicators and residential property values in Darwin.

Emma Jackson
Valuer, Integrated Valuation Services, Darwin
Valerie Kupke & Peter Rossini
Centre for Market Regulation and Analysis (CRMA)
University of South Australia, Australia

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Abstract: This paper examines the relationship between social and economic indicators and residential property prices in Darwin. Following early work on this approach that was developed in the 1970's the work extends similar studies from Adelaide in the 1980's and wider Australian works published more recently. The analysis uses 2001 census data at the collection district level and basic residential sales data at the unit level. Factor analysis is employed to develop basic social economic indicators at a CD level. The unit data is from a simple text based file and a basic grid and CD allocation method are used in the absence of digitised location data. Various amalgamations are used to measure the relationships between the socio-economic indicators and residential property data. Trend surface analysis is used to find a basic value surface. The comparison of the unit and amalgamated models provides useful guidance to developers of AVM's where data is scarce and not available in a GIS while the results provide an important insight into the dynamics of the Darwin property market.

Contact Author
Peter Rossini, Lecturer - University of South Australia
Centre for Market Regulation and Analysis, School of Commerce
North Terrace, Adelaide, Australia, 5000
E-mail peter.rossini@unisa.edu.au

Introduction

The identification and classification of urban areas along lines of social structure has become a productive area of housing research in that such analysis allows for a better understanding of residential submarkets and hence buyer behaviour. In an early study, Shevky and Bell (1955) used census data to apply social area analysis to Los Angeles and San Francisco and hypothesized that the social make up of these two cities could best be understood along the lines of socio-economic status, family status and ethnic status.. These they termed 'social constructs'. Murdie (1969) built on this approach to produce a model in which the social constructs of economic status, family status and ethnic status were given a spatial dimension atop a 'physical space', implying that such social constructs can be distinguished by location. A fundamental approach within housing analysis is that housing submarkets can also be distinguished by location. Households derive utility from accessibility and this is reflected in price. Location is therefore a potential link between these two conceptual frameworks, that of the social construct and the housing submarket. Reed (2001, 2005) has undertaken two studies on the impact of social constructs such as socioeconomic status and family make-up on house prices; the first an analysis of the Brisbane housing market between 1976 and 1996, and the second an analysis of the Melbourne housing market between 1996 and 2001. In both instances, he identified the importance of 'social area analysis' in his findings and and found the constructs of family and socio-economic status to be the most influential demographic factors impacting on house prices. He noted that socio-economic status was overtaking family make-up as the most influential price determinant. Another related study is that of Reynolds & Wulff (2005), who analysed the spatial polarisation of house price change in Melbourne between 1986 and 1996. They found a sector of 'increasing advantage' in Melbourne's inner and eastern suburbs, encircled by an adjacent sector of 'growing disadvantage'. This spatial polarisation was shown to correspond directly with a map depicting the median house price change over the same period.

Only limited research has been carried out on the real estate market in the Northern Territory and no 'social area analysis' type studies have been documented at all. The purpose of this paper therefore, is to build on the existing research in the field, add the dimension of census collection district (CD) level as a mode of analysis, compare and contrast this with past research and ultimately to be able to further understand the dynamics of the residential property market with relation to social and economic indicators found within the demographic breakdown of each neighbourhood at CD level.

Methodology

Study Area

Darwin is unique to other capital cities in Australia for many reasons, but primarily because of its isolation and its proximity to Asia. It is also characterised by a very transient population when compared to other Australian capital cities. According to the Territory Mobility Survey, being carried out by the School for Social and Policy Research at Charles Darwin University, at the time of the 2001 census some 25 per cent of Darwin's resident population had lived elsewhere five years prior, as compared to 10 per cent in most other capital cities. This is largely attributed to the large defence force population and their associated mobility, as well as the large number of short-term public service contracts on offer. Construction contracts on projects such as the LNG gas plant at Wickham Point, the Alcan G3 aluminium refinery expansion and the forthcoming Waterfront Development also have created demand for extra labour for periods of time. Although many of this transient population do not directly participate in the transfer of real estate, their demand for rental properties does impact on the demand for investment properties in the area. Additionally, in the case of the defence force, the long term DHA leases that are on offer, also provide the opportunity for secure investment, which further impacts on housing demand and hence on price..

All of these factors affect the overall economic stability of a city in general and impact on the real estate market in particular. Because of the transient nature of the local population and the observation that the

Darwin residential property market has shown a rising trend in price over the last five years, the time period that has been chosen for this study is the 2001 calendar year. The reason for this choice is two-fold. First, the availability of accurate census data by means of the 2001 census statistics and secondly, because of the mixed demographic 'within' suburbs that is observed throughout Darwin. This is a function of the pockets of Housing Commission and ex-Housing Commission dwellings that are found scattered within suburbs. The use of the CD as an independent variable in the study was aimed at creating a more complete picture of each area's social structure and hypothesized as producing a more accurate explanation of price. Both these reasons mean that this study is a departure from other work of this nature as most previous analysis has been carried out at suburb level.

Data

The 2001 census data for the local government areas of Darwin and Palmerston was the basis for determining the CDs that were used in this study. The Australian Bureau of Statistics has broken each suburb down into CDs ranging in number from about one to nine per suburb with a total of 145 CDs being used for this study. As GIS information is not available for the Darwin and Palmerston LGAs, data for the study was extracted from the Easy Access Sales Database Version 4.1. This database contains information of registered property transactions in the Northern Territory. The information it provides is the full street address of the property, the suburb it is located in, the land area, the sale date and price, zoning and improvement type. Additional information such as the last previous sale date and price, vendor and purchaser information and unimproved capital value is also available, but was not used for the purposes of this study. The information available about the improvement type is limited. Ex government built dwellings usually have accurate coded style information, but privately built dwellings have typically less information and if alterations have been made to the dwelling since the time the database was created, the information is at best unreliable. For those properties with specific information, dummy variables were created. These were: number of bedrooms, house style (two storey/elevated/ground level/split level), room under, double carport, carport, inground pool, pool, tennis court, addition, spa and shed. For the primary analysis, the data set used was limited to transactions for properties with detailed information. This reduced the number of sales included in the original analysis from an initial 7790 recorded transfers to 1241 sales used in the analysis. For the fore mentioned reasons, the specific information available is potentially questionable, so a secondary analysis was carried out utilising the median house prices for each CD, to ascertain whether an accurate model for the Darwin and Palmerston LGAs could be obtained utilising aggregate data. For this analysis, all the original 7790 recorded transfers were included in the analysis. For both these analyses, vacant land sales were excluded from all the analyses as far as could be determined, as were properties of 2 hectare and greater land areas and transactions which appeared obviously to have not been at arm's length.

Analysis

This research is based on regression analysis using data from property transactions within Darwin and its satellite city of Palmerston over the 2001 calendar year. This year specifically has been chosen to enable a snapshot glance at the Darwin property market at a point in time where there is precise and directly related census data available.

First principal components analysis (PCA) was carried out, by means of factor analysis, to identify relationships between sale price and the population demographics obtained through the census data statistics for each CD. This was undertaken to expose the core components or factors that cumulatively help to explain the social fabric of each CD. For the primary analysis, the original factor scores for each CD for each factor were retained and then regressed against transacted sale price. Dummy variables were created to represent the property characteristics available for each sale and these were added as additional independent variables. A simple grid and CD allocation method was also to allocate an x and y coordinate to each sale. These coordinates were regressed against sale price to give a basic trend surface. As this simple linear equation generally produces a weak model, the x and y coordinates were

raised to successive powers and added as additional independent variables with the objective of producing a stronger model. Multiple regression analysis was then carried out using the factor scores, property characteristics as dummy variables and trend surface analysis scores as independent variables at linear, quadratic, cubic and quartic levels with sale price as the dependent variable. For the secondary analysis, the complete data set of established houses was averaged and then the same set of regressions were repeated using the median house price data for each CD to test whether aggregate data could be used to obtain equally predictive models.

Factor Analysis

Factor analysis is a statistically objective multivariate analysis technique that is used to interpret multidimensional relationships. It is used to identify the underlying factors that the independent variables share in common. The most basic form of factor analysis is a principal components analysis (PCA), which assumes that all variation in a data set is able to be explained away through the identification of a smaller subset of factors or core components. As a tool, it endeavours to summarise and find patterns within a data set and in doing so, to reveal the correlations between the original variables and to then reduce them to a manageable set of core components that explains the neighbourhood dynamics that exist within a spatial unit such as a CD. Sometimes the output of the PCA shows the individual variables not to be aligned strongly with any one factor. This makes interpretation difficult. To minimise this effect, the factors are submitted to a successive rotation relative to the original variables until a minimum number of factors is achieved which explain the maximum amount of variation in the data set. The resulting factor loadings represent the strength of the relationship between the original variables and the identified factors or core components. This has the effect of establishing a positive or negative relationship between the individual factors and the variables, thereby allowing for a clearer interpretation of the factors. The variables with the highest factor loadings , whether they be positive or negative, provide the key to identifying the resulting factor. Each factor is then assigned a label which is determined to best representing those variables most strongly aligned with it.

The objective of this study is to explain as much of the variation in sale price with the smallest number of factors. The most common method of determining the number of factors to use is the eigenvalue criteria. The eigenvalue of each factor is the sum of the variance of the factor loading scores. It is used to determine how useful the factor is in explaining the original data set. Only factors with eigenvalues greater than 1 are included under this criteria. A basic scree test, which is a visual plot of the eigenvalues against the factors, is an easy medium by which the number of factors to use can be determioned. .

From the numerous studies that have been carried out around the globe, three factors have been shown to be consistently represented in most areas. These factors are: socio-economic status, family status and ethnicity.

Trend Surface Analysis (TSA)

Trend surface analysis is a simple regression analysis that can be used to identify the relationship between a dependent variable (sale price) and an independent variable (location). It is the most commonly used and effective spatial analysis tool.

For this study, a simple grid and CD allocation method was employed to assign an x and y coordinate to each established house sale.

The basic TSA linear regression equation takes the form:

$$z = \beta_0 + \beta_1 Xcord + \beta_2 YCord + \varepsilon$$

Where z is equal to sale price, β_0 is equal to a constant and β_1 and β_2 representing the resulting coefficients that relate to the x and y coordinates (independent variables) and ε is a stochastic error.

By interpretation, sale price is influenced by distance, measured along the x and y axes. However this is too simplistic a model to explain the complex spatial nature of property values and as such, the linear equation generally produces a weak model. To better explain the effect of location on sale price and to further increase the strength of the model, the original linear equation is subjected to a polynomial expansion. For this, the variables remain unchanged, but are raised to successive powers. This transforms the model from a linear to a non-linear one and is a medium for determining whether sale price reveals any location dependent pattern when the sales are analysed over a two or three dimensional surface. For example the quadratic expansion becomes

$$z = \beta_0 + \beta_1 Xcord + \beta_2 XCord^2 + \beta_3 XcordYcord + \beta_4 Ycord + \beta_5 Ycord^2 + \varepsilon$$

For this study, quadratic, cubic and quartic expansions were employed.

Multiple Regression Analysis (MRA)

Multiple regression analysis examines the relationship between one dependent variable and two or more dependent variables. The basic model implies that any increase in X_n will result in a linear increase in the value of y. Therefore y (the dependent variable) is a function of the cumulative independent variables impacting on it.

It has the standard form:

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 ..... \beta_n X_n + \varepsilon$$

With y being the dependent variable, sale price, β_0 is equal to a constant and β_1 to β_n are the coefficients that relate to the array of independent variables (characteristics) X_1 to X_n and ε is a stochastic error.

In this study, the dependent variable used was transacted sale price for both the primary and secondary analyses, and the independent variables used in cumulative combinations were:

1. Factor scores
2. Property characteristics
3. TSA scores

Accordingly, sale price is a function of neighbourhood dynamics, property characteristics and location.

In the primary 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 regressed against sale price. To build on the model created through this equation, dummy variables were created for the property characteristics and added as additional independent variables and the MRA was repeated. To add a trend surface component to the analysis, the TSA scores were also added as uncorrelated independent variables and a third series of regressions were undertaken.

To ascertain whether aggregate data would be able to produce an equally accurate prediction model a secondary analysis was carried out. The complete set of established house sale data set was averaged and the regression series was repeated with the median value of transacted sale prices for each CD being regressed against sale price as the dependent variable.

Results

Factor Analysis

The results of the principal components analysis are shown in Appendix 1. The rotated components analysis identified six factors, or social constructs that contributed to 68.8% of the variation in house prices at CD level. The results of this analysis are shown in Appendix B. This was supported by the eigenvalue criteria. The scree plot which supports the selection of these six factors is shown in Appendix M. Labels were assigned to each factor by examining the loadings of those variables most closely associated with each principal component,.

The six factors identified were as follows in descending order of the strength of the relationship to sale price:

1.	Family	21.98%
2.	Mobility	11.90%
3.	Socio-Economic Status	11.76%
4.	Low to Middle Skilled	9.65%
5.	Owned Outright	6.81%
6.	Ethnicity	6.70%

Family – represents high correlations to price at the positive end for couples with families with children, people under 15 years of age, people aged 0-4 years of age, dwellings being purchased and people born in Australia. High correlations at the negative end were found for couples without children, people living alone, people aged 60-64 and people aged 65-69.

At the positive end, this represents the typical nuclear family set up with couples with children and at the negative end, the singles sector and the elderly living alone.

Mobility – represents high correlations to price for people living in the same address 5 years ago, people aged 60-64 years and dwellings fully owned. High negative correlations were found for people aged 20-24 and 25-29 and for dwellings being rented.

This highlights the afore mentioned transience of the Darwin population with equal proportions of residents that stay in the same place over a 5 year period to those that move around. The relationship of this construct to sale price has not been so marked in other cities studied. This is seen to be representative of the strong rental market associated with the transient population.

Socio-Economic Status – represents high correlations to price at the positive end for incomes of more than $1000-$1499 per week, incomes over $1500 per week and dwellings with loan repayments of over $2000 per month. Positive correlations were also found for people with a Bachelor's degree, people occupied as managers and administrators and people occupied as professionals. High correlations at the negative end were found for one parent families.

One parent families were seen to typically represent a lower socio-economic group. Possibly if the cut off for the display of factor loadings had been reduced from 0.5 to 0.4, other variables would have appeared to strengthen the negative end of the socio-economic relationship to price.

Low to Middle Skilled – represents high correlations to price at the positive end for people with a Year 8 education or below, people occupied as labourers and related workers and people with incomes of $200-$299 per week. High negative correlations were found for people with incomes of $700-$799 per week.

This factor may be indicative of the general attitude to education in Darwin. As the size of the population simply doesn't afford an extensive choice of courses being offered at tertiary level, a large sector of people choosing tertiary education will move interstate for better opportunities and broader options. This means that there is a significant sector of Darwin residents who simply don't see up-skilling as important or as much of a norm, in the same way they do in other States.

Outright Owners – represents high correlations to price at the positive end for one parent families and people who speak English only. High correlations at the negative end of the spectrum were found for dwellings fully owned.

There is a large proportion of baby boom age Darwinians that have owned property purchased a long time ago when prices were very affordable which are owned outright. On the negative end, it is showing that there is a strong relationship between one parent families and not owning property.

Ethnicity – represents high correlations to price at the positive end of the spectrum for people born overseas and for people who speak other languages.

The 2001 Census found that of the 79.3% of the population state that English was the only language spoken at home. Of the remaining 20.7%, the three most common languages spoken at home other than English were Greek, Chinese languages and Australian Indigenous languages. There is a notable Greek presence observable in Darwin, which a large number of second and third generation Greek families who have made their mark on the property market. Darwin's proximity to Asia is also evident in the population and indicative of the Chinese language component. The Northern Territory is also well known for its Indigenous population with 8.9% of the population identifying as being of Indigenous origin in the 2001 Census.

Trend Surface Analysis

The linear TSA revealed only a weak relationship between TSA scores and transacted sale price. The model that was produced explained only 11.1% of the variation in sale price, which is seen as being almost a negligible trend. When the x and y coordinates were raised to successive powers, the strength of the model increased, but not to a satisfactory level. The results of the polynomial expansions are show in Appendices C-G. The best result achieved came from the variables being raised to the quartic level, or a 4th order polynomial expansion, shown in Appendix G, and even this resulted in a model that only explained 29.4% of the variation in sale price.

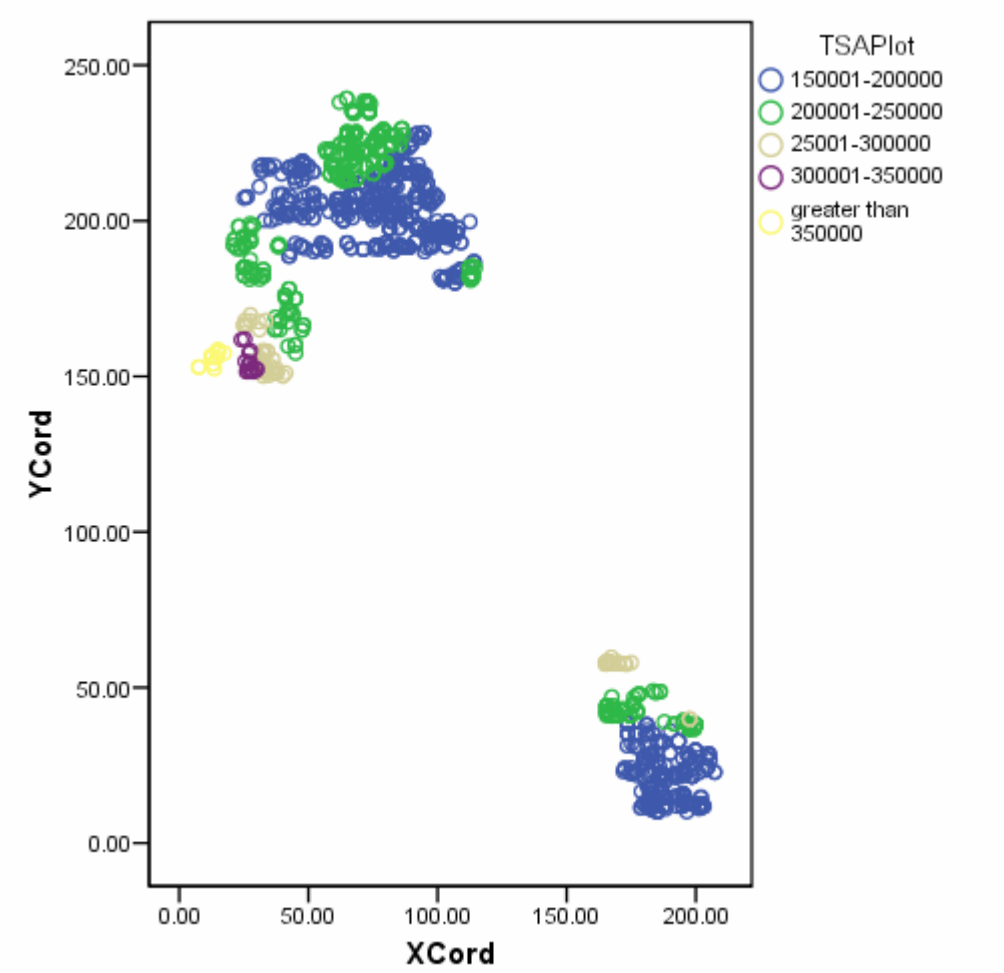

Figure 1 - Trend Surface Analysis Plot - Primary Analysis Actual House Sales, N=1241

Figure 1 shows the TSA plot of the actual house sale data that form the primary analysis over a one dimensional surface.

Multiple Regression Analysis

The multiple regression models were estimated using ordinary least squares. The results of each model are shown in Appendices H-L and summarised in Table 1. An effective test of goodness of fit is the percentage reduction in the sum of squares. This is equivalent to the R-squared statistic that is produced in the regression output and can be used to make an objective assessment of the effectiveness of the analysis in identifying a trend. As the results from the primary and secondary analyses cannot be compared directly due to the difference in sample numbers, they have to be viewed independently.

Primary Analysis	*R Square*
INDIVIDUAL HOUSE SALE DATA	
Factor Scores against Sale Price	0.513
Cubic TSA Scores agains Sale Price	0.254
Quartic TSA Scores against Sale Price	0.294
TSA Scores & Property Characteristics against Sale Price	0.485
TSA Scores, Property Characteristics & Factor Scores against Sale Price	0.681
Secondary Analysis	
AGGREGATE HOUSE SALE DATA	
Factor Scores against Mean Sale Price	0.714
TSA Scores against Mean Sale Price	0.519
TSA Scores & Factor Scores against Mean Sale Price	0.800

Table 1 - Regression Model Comparative Results

Individual House Sales

For the individual data set, the linear TSA models revealed a weak model. When polynomial expansion was employed, the strongest relationship was found at quartic level with still only 29.4% of the variation in sale price able to be explained through a basic trend surface. When factor scores alone were regressed against sale price 51.3% of the variation in sale price was found to be explained from the 1241 transacted sales sampled. When TSA scores and property characteristics were regressed against price, only 48.5% of the variation in price was found to be explained. What is significant to note though is that through the addition of factor scores to the latter model, the explanation power of the variation in sale price was increased by 19.6% to 68.1%.

Aggregate Data

TSA scores against median sale price produced a model that explained 51.9% of the variation in sale price. Factor scores against median sale price produced a model that explained 71.4% of the variation in sale price. The combination of the two models produced a model that explains 80% of the variation in sale price. At face value, this combination would appear to produce the most accurate prediction model. This should be viewed with caution however, as with aggregate data, the errors are averaged out, so the model can appear stronger than it really is.

	Primary Analysis	***Secondary Analysis***
	Beta	*Beta*
Family	-0.267	-0.260
Mobility	-0.057	-0.181
Socio-Economic Status	0.630	0.710
Low to Middle Skilled	0.054	0.059
Owned Outright	-0.124	-0.139
Ethnicity	-0.100	-0.079

Table 2 - Beta Coefficients for Factor Scores Regressed against Sale Price

Table 2 shows the resulting coefficients from the factors scores being regressed against sale price at both the individual sales and at aggregate level. The results of each are very similar with socio-economic status representing the only real positive impact on sale price in both instances.

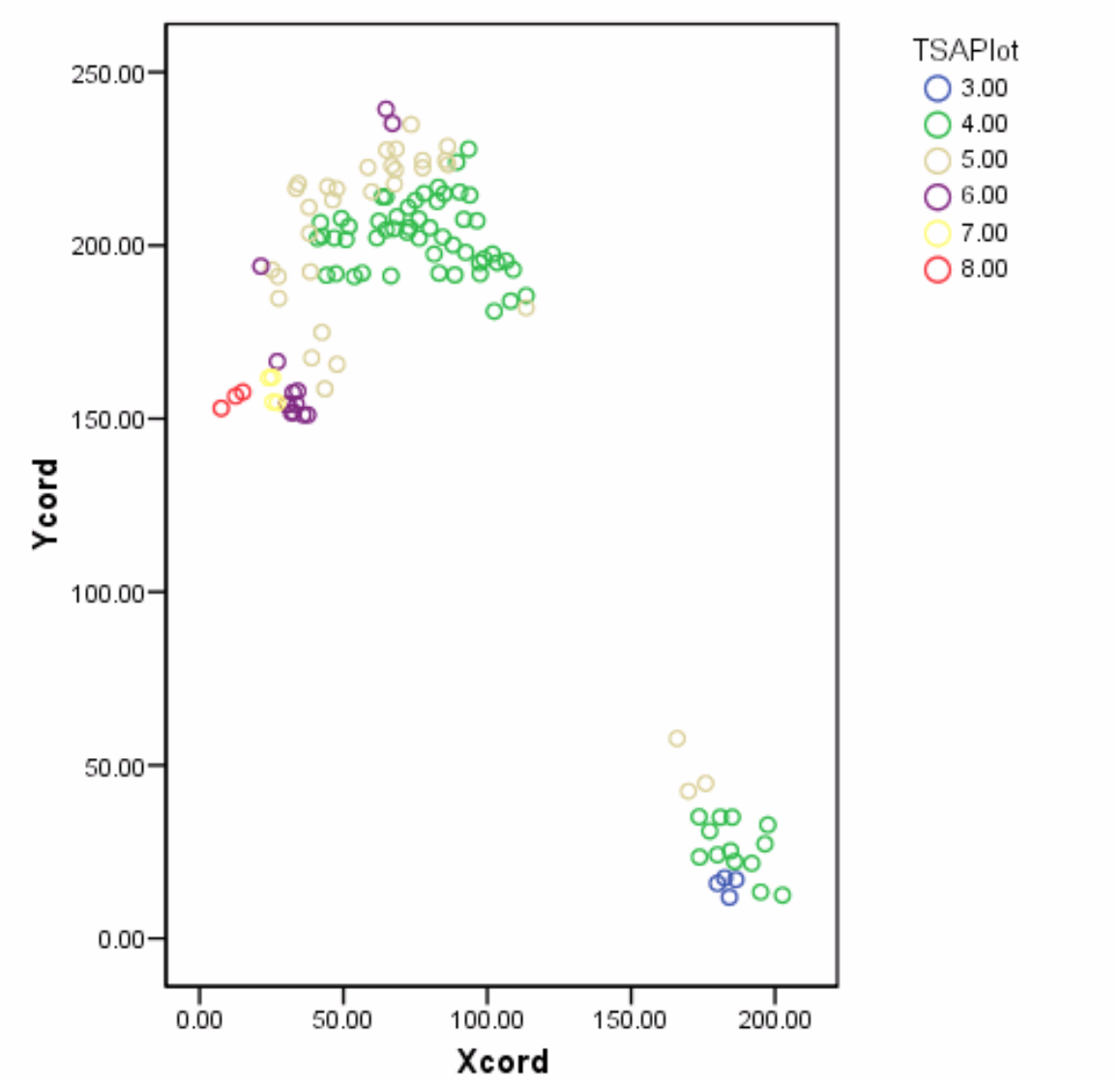

Figure 2 - Trend Surface Analysis Plot - Secondary Analysis Median House Prices, N=7790

Figure 2 shows the TSA plot of the median house price data that form the secondary analysis over a one dimensional surface. It is immediately apparent that the plot is very similar to that obtained through using the primary analysis.

Discussion

The purpose of this paper was to build on the existing research in the field of social area analysis, add the dimension of location with census district as a mode of analysis, and ultimately further understand the dynamics of the residential property market with relation to the demographic breakdown of each neighbourhood. The results of the analyses confirm Shevky and Bell's original proposition that social area analysis can be broken down into the three dimensions of socio-economic status, family and ethnicity, while adding mobility as being equally, if not more important to the equation than socio-economic status for Darwin. The most recent research to have been published in Australia has been carried out by Reed for Brisbane (2001), and for Melbourne (2002). The results of his research identified socio-economic status being the most significant factor impacting on house prices, followed by family and to a much lesser degree ethnicity. The current study found that family, mobility and socio-economic status were the three most significant factors impacting house prices in Darwin. Reed also found that 'age' was a factor that was playing an increasing role in explaining the variation in house price. This was not supported by the findings of the current study, but this is most likely because Darwin possesses a comparatively young population with the estimated median age of the residents in the Darwin LGA in 2004 as being 33.3 years and only 28.6 years for the Palmerston LGA (ABS, 2006). Shevky and Bell displayed their constructs by means of maps suggesting that location is a central component to their 'social-geographic space' model. Although Reed acknowledged this throughout his work, none of his research factored any kind of locational analysis into the model. The current paper therefore takes his work further by doing so. Appendix N shows the results of this analysis in map form.

The first of the maps shows the locational distribution of the median house prices over the Darwin and Palmerston areas. There are few surprises in the outcome, with the highest priced properties being observed to be located adjacent to the water and/or with close proximity to the city or golf courses. The following six maps that make up Appendix N represent the locational distribution of the factor scores for each identified construct. This is to further understand how geographical location may also interplay in the price determination equation and help to analyse this on a factor by factor basis. If the maps are viewed layered, some generalisations can be observed. This study found family to be the strongest determinant of house price in the Darwin and Palmerston areas. This represents the even divide between the typical nuclear family units and the single dwellers that are a feature of the Darwin population. Typical family units are found predominantly in the Northern Suburbs, Larrakeyah and Palmerston. This is representative of the mortgage belt that is the Northern Suburbs and the defence force families that make up a large percentage of the population in Palmerston and the established Larrakeyah single residences due to their proximity to the army bases. The mobility map corroborates this with the mortgage belt showing very little mobility with the Larrakeyah and Palmerston areas showing significant transience. Those exhibiting the highest socio-economic status are not surprisingly living in the areas shown to have the highest median prices. The low to middle skilled factor was ambiguous and possibly could have been better defined with less stringent factor analysis constraints. Generally, the middle skilled sector seems to be residing in the northern suburbs and the newer areas of Palmerston, most likely due to their affordability. This group also comprises much of the mortgage belt. The low skilled demographic is shown to live in low cost housing in the form of small unit developments that were more than likely still owned or in the process of a gradual sell off, by the Northern Territory Housing Commission in 2001. The owned outright construct is seen to represent those second and third generation Darwin property owners that have purchased properties a long time ago and sat on their investment. Because of the large Greek demographic and their general tendency to accumulate, a speculation could be made that a significant proportion of this group are comprised of this demographic. This is evidenced by the large ethnic component found to live in the northern suburbs and their notable absence from the Palmerston area. The only exception to this rule is the observation that Larrakeyah was shown as being predominantly owned outright. This section of Larrakeyah is reclaimed land that has been developed adjacent to a marina and is owned by a variety of cashed up, financially secure owner occupiers or investors.

Conclusions

This paper shows that demographic factors as measured by social constsructs do play a role in price determination at CD level as the most accurate models created included the factor scores as independent variables. It would seem then that socio-economic status has the most positive impact on sale price and surprise surprise, rich people tend to live in expensive houses! Socio-economic status has been shown to be a major factor in the determination of current market value and therefore it is suggested, should be incorporated into any predictive model. For Darwin, resident mobility has been shown to be a strong underlying factor in house price determination, much more so than in other cities studied. This has been attributed to the large transient population that is a feature of Darwin and this has a resounding impact on house price values from an investment point of view with a very strong rental market commanding premium returns and long term DHA leases providing secure investment opportunities. From a market value perspective, it would seem that the inclusion of neighbourhood dynamics as independent variables be an important consideration in the development of future automated valuation models (AVMs). For Darwin, it would also seem that the use of aggregate data in model estimation is a viable option and that property characteristics have limited impact on sale price. The latter finding may however be due to the uncertainty as to the reliability of the property characteristic information available and the proposal is put forward that procedures are implemented to increase the accuracy and detail of property specific information available for properties within the Northern Territory.

It is therefore concluded that socio-economic factors do influence the price of houses in the Darwin and Palmerston LGAs. The question stands however as to whether it is the property value that impact on the demographics of a neighbourhood or the demographics that impact on property values. Reed's assertion appears to be the latter proposition, while this paper puts forward the suggestion that it may be the former, being that it is the price of properties in an area that includes or precludes a certain type of resident, as opposed to the reverse situation. The answer more than likely lies in the challenge that instigated the current research…that the housing market is complex and impacted by a number of different factors working together simultaneously. The objective is to acknowledge and identify as many of them as is possible and incorporate them into an all-inclusive predictive model.

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Appendix A: - Factor Scores By CD District – Primary Analysis

CD	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	CD	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
7010101	0.04433	0.48717	-0.99356	0.18477	0.14776	1.01159	*7011901*	-1.04968	-0.69804	0.96259	-0.23549	0.60342	0.76359
7010102	-0.13533	0.74061	-0.30161	-0.66404	-0.05896	0.44808	*7011902*	0.62333	1.1177	1.25636	0.14578	0.20232	-0.82799
7010103	0.17942	0.99399	-0.75775	-0.04962	1.21448	0.47026	*7011903*	-0.22732	-0.08563	1.06094	-0.59086	0.71303	0.51949
7010104	-0.07937	0.33362	-0.19944	-0.39825	-0.30861	0.34155	*7011904*	-0.34219	-0.51311	0.3153	-0.16959	1.05842	0.92221
7010201	0.69391	0.65227	0.08011	-0.76217	-0.3074	0.18155	*7011905*	-0.49729	-0.94774	0.58507	-0.15388	0.68307	0.41542
7010202	0.74205	0.88606	-0.55784	-0.72356	-0.04996	-0.33932	*7011906*	-0.2672	1.62638	0.94114	0.20404	0.47269	-0.03247
7010203	0.68968	0.57583	-0.51732	-0.77526	-0.34757	0.57574	*7011907*	0.08504	1.0171	0.71553	-0.51746	-0.51449	0.27993
7010301	-1.53072	-2.23869	-1.11913	-0.49689	-0.16633	1.77582	*7011908*	-2.48176	0.01753	0.01406	0.07537	3.5287	0.55802
7010302	0.44186	0.53058	2.07614	0.08168	-1.21887	1.54348	*7012001*	-1.58252	0.27961	0.17673	0.28646	0.90915	-0.56077
7010401	-2.25481	0.79939	1.36194	0.68374	-0.68895	-1.31658	*7012002*	-0.84181	1.37774	1.11455	0.20659	-0.18956	-1.05315
7010402	-2.47581	0.48224	0.34709	-0.2062	-1.51608	-0.88356	*7012003*	-0.35919	0.56553	0.90211	-0.20658	1.66042	-0.224
7010403	-1.64462	-0.70238	2.14673	0.47235	-0.91049	-0.65535	*7012004*	-0.10114	-0.74105	0.29949	-0.31058	0.93275	0.50083
7010404	-2.69569	0.59343	-0.67623	-0.09516	-0.68673	-0.92668	*7012101*	0.06022	0.55662	1.10528	-0.04468	0.24572	0.13756
7010501	-0.51286	-0.71783	0.03445	-0.02638	0.25862	1.11825	*7012102*	-1.27495	-0.73106	-0.25503	-0.68633	1.47567	0.35913
7010502	-0.87168	0.25468	-0.93649	1.38464	1.84399	-0.01017	*7012103*	0.1017	0.50169	0.79709	-0.43797	0.85179	0.21431
7010503	-0.98934	-0.00648	-0.40577	-0.31168	0.54483	0.00937	*7012104*	0.294	0.60858	-0.29853	-0.1275	0.41812	-0.39322
7010504	-1.12719	-0.44702	-0.22066	0.45544	1.21818	0.04167	*7012105*	0.53806	0.84667	0.17499	-0.55796	0.66017	0.02218
7010601	-0.54726	-0.04106	1.689	-0.29639	0.91323	-0.72605	*7012106*	-1.46318	-1.20969	0.71951	-1.50265	0.89952	0.19349
7010603	-1.94686	0.47591	-1.82706	3.38728	1.72089	-0.44997	*7012107*	-1.79791	-2.04038	-0.47902	-1.65381	1.14931	0.74891
7010604	0.46399	1.50005	2.33244	-0.03151	0.11362	-0.49888	*7012201*	-1.40942	-0.7619	0.26211	-0.66819	-0.53635	-0.68177
7010605	-0.63926	0.38227	2.68484	0.40517	-0.36317	0.42566	*7012202*	-1.16409	-2.15779	-0.28712	-0.94052	-0.74946	0.47679
7010607	-0.65883	-1.21116	1.68961	-0.04506	0.21307	0.04002	*7012203*	-0.73011	-0.17916	0.47802	-0.07091	0.32263	0.35877
7010701	0.81652	0.42698	0.22857	-0.04012	-0.19158	0.0695	*7012204*	-0.99634	-1.40962	-0.20197	-0.27206	-0.16786	0.04605
7010702	0.44729	0.81411	-0.5419	-0.31765	-0.33373	-0.15036	*7012205*	-0.55212	0.82504	0.8183	-0.27777	0.38423	0.91768
7010703	0.39398	1.2186	0.15006	-0.83651	-0.35523	-0.37635	*7012206*	-0.73831	0.88724	1.67088	0.35077	-0.82279	0.08716
7010704	-0.62526	1.98256	-0.12338	-0.72792	-0.65765	-0.6577	*7012208*	0.74186	-0.94159	3.1742	0.3073	-0.88154	-0.35598
7010801	0.98153	0.21357	-1.03516	0.58147	-0.69657	1.41633	*7012301*	-1.14817	-0.23256	0.88869	-0.13416	0.4488	-0.32066
7010802	1.19541	0.17797	-0.12052	0.6131	-0.65269	0.71083	*7012401*	-1.2092	-1.63638	1.65839	1.41188	1.56408	1.25269
7010803	0.72808	0.38801	-0.58887	-0.1429	-0.7045	0.60467	*7012402*	0.27241	0.92797	-0.1988	-0.21688	-0.09926	0.41628
7010804	0.13267	0.49561	-0.61537	0.55816	0.4639	0.60599	*7012403*	0.5714	0.38873	-0.03459	-0.23451	-0.44684	0.68526
7010805	0.41092	0.06932	-0.65013	-0.18155	-0.11857	-0.0478	*7012404*	0.63205	0.61252	-0.63461	-0.33801	-0.21668	0.35535
7010806	0.54283	0.06602	-1.33615	0.23108	0.64597	1.24701	*7012405*	0.04663	-1.28406	0.69388	-0.1369	0.67195	1.36726
7010807	1.0568	0.43017	-0.20477	0.38284	-0.56383	1.86654	*7012501*	0.48792	0.46917	-0.52903	0.88812	-0.50448	2.56519
7010808	-0.16328	-0.22243	-0.952	-0.06155	0.56786	-0.23661	*7012502*	0.57521	1.10433	-0.42906	-0.194	-0.18369	0.66995
7010901	0.16629	0.18612	3.07503	1.30193	-0.09604	-0.25776	*7012503*	0.55052	0.66155	-0.24051	0.34036	-0.31896	0.6774
7010902	-1.78489	-1.31777	-0.19956	-0.94814	-0.58176	0.11785	*7012504*	-0.13396	-0.61321	-0.56266	1.26758	-0.16209	3.2371
7010903	-1.88397	-1.74282	0.00807	-0.44493	0.66379	0.80037	*7012601*	0.33134	0.3101	0.0915	0.07874	-0.14234	1.09996
7010904	-0.68165	-0.40573	1.27231	0.34134	-0.9845	-0.3922	*7012602*	0.56558	0.88358	0.03063	-0.75862	-0.35553	0.92486
7010905	1.07132	-2.46959	0.42834	-0.20143	-0.41577	-1.50648	*7012701*	-1.94067	0.44695	-0.97139	0.58927	-1.81868	-1.52193
7010906	-0.50269	-0.38313	3.2075	0.21366	-0.92761	-1.1009	*7012702*	-2.32382	2.20799	-1.15724	-0.0934	-1.29174	-2.28854
7011001	1.36595	0.68153	1.19609	0.58537	-1.26918	1.38005	*7012801*	0.62929	0.21368	-0.46639	-0.88926	0.00819	-0.33982
7011002	0.49011	-0.28484	0.64201	-0.5282	-0.04724	0.08709	*7012802*	0.72175	0.56732	-0.20163	-0.62971	-0.35662	-0.73249
7011003	1.15502	0.30634	0.68137	-0.01322	-1.0525	1.92021	*7012803*	0.95565	-0.27588	-0.31106	-0.00635	-0.47885	0.15277
7011004	-0.15193	-0.43353	0.05335	-0.28388	-0.19668	0.54053	*7012901*	0.92677	-3.03971	-0.35559	-0.60083	-0.56559	-1.80582
7011005	-0.64964	-1.0609	-1.05453	-1.04369	0.43645	-0.19031	*7012902*	0.38521	-3.37699	-0.63419	-0.49039	-1.37304	-1.1616
7011006	0.87772	0.27536	0.13995	0.20111	-0.77799	0.50656	*7012903*	-0.30064	-0.01412	0.26874	2.2138	-0.47711	0.99302
7011007	1.11346	0.36163	0.34258	-0.2721	-0.45337	0.31675	*7013001*	-2.81472	-1.01615	-3.01975	1.43503	-7.62376	0.74992
7011008	0.84798	0.52919	0.5974	-0.47678	-0.28177	0.0349	*7013101*	0.384	-1.38323	-0.20942	0.04971	0.17427	-1.23549
7011101	-2.19896	3.7585	-0.50637	-0.14668	-0.35012	-2.58486	*7013102*	0.91711	0.36504	-0.41697	-1.17938	0.28594	-0.62681
7011201	0.09523	0.38805	-0.26266	-0.1663	-0.14755	0.14223	*7013103*	0.84712	0.28264	-1.1534	-0.70105	0.72216	-0.93818
7011202	1.44072	-1.29978	0.54769	8.69127	-0.33926	-1.52594	*7013104*	0.9703	0.16514	-0.85002	-0.02277	-0.19404	-0.99567
7011203	-0.14864	0.23092	0.3829	-0.65777	0.28374	-0.7636	*7013201*	0.2299	-0.12219	-1.01384	0.73489	1.19755	-0.85101
7011301	-0.86622	-0.08178	-1.03407	1.59017	1.72814	0.86174	*7013202*	1.12749	0.12113	-0.35505	-0.14472	-0.06655	-1.48258
7011302	1.02281	0.31933	-0.5149	-0.59236	-0.60437	1.01107	*7013203*	0.06232	0.04901	-1.29529	1.0272	2.07875	-0.47254
7011303	1.1507	0.28661	-0.52609	0.41525	-0.45326	0.75659	*7013204*	0.86105	-0.48985	-0.81073	1.37573	0.57045	-0.51888
7011304	0.77413	0.37507	-0.61475	-0.12273	0.11337	1.36663	*7013205*	0.59473	-0.08825	-0.71885	-0.34372	-0.03303	-1.12804
7011305	0.53146	0.27157	-0.20502	-0.54947	-0.08175	1.0306	*7013301*	0.41793	0.02291	-1.33946	1.35366	1.34314	-1.22874
7011306	0.81904	-0.02592	-0.84265	0.50108	0.51948	0.50283	*7013302*	1.17936	-0.26566	-1.01189	0.8947	0.11396	-1.39477
7011401	-0.04599	-0.12808	0.35855	-0.75147	-0.23707	-0.5365	*7013303*	1.1675	-0.03606	-0.82857	0.50734	0.56598	-0.807
7011402	-0.78399	1.48028	-0.03474	-0.28611	0.06041	-1.39519	*7013304*	1.09506	0.183	-1.50802	-0.26287	0.56143	-1.29383
7011501	-0.63388	-0.59454	-1.21391	-0.23887	0.48496	0.73493	*7013401*	1.08556	-0.36944	-0.4838	-0.19949	-0.05182	-1.1739
7011502	0.19617	0.31944	0.25727	-0.01819	-0.10493	0.10158	*7013402*	0.75003	-0.22403	-0.94911	-0.29426	0.35896	-1.68921
7011503	-0.14077	0.32657	-0.89228	-0.10646	0.52526	0.54438	*7013403*	1.25115	0.19364	-0.80401	-0.35818	0.14243	-1.26218
7011504	0.66108	1.09592	-0.7765	0.36422	0.05996	0.30577	*7013404*	0.28851	0.41821	-0.91184	0.40197	1.14662	-1.01396
7011505	-0.7019	-0.24482	-0.29571	-0.12435	0.14248	0.73475	*7013503*	0.87507	-1.28309	-1.34266	-1.11719	0.06473	-0.87459
7011601	0.22581	0.59699	0.64531	-0.94317	-0.79411	-0.1094	*7013505*	1.56963	-1.39278	1.46108	0.10937	-0.22333	-1.3118
7011602	0.25007	1.07477	-0.9087	-0.0907	-0.3237	0.10938	*7013506*	1.16335	1.3318	0.38699	-1.06569	-0.22605	-1.42241
7011603	0.14089	0.20644	-0.53245	0.18808	0.75316	0.76383	*7013507*	1.42518	-1.88741	0.7853	-0.41963	-0.30971	-1.36377
7011604	0.44589	0.70345	-0.24087	-0.27752	-0.2483	0.29736	*7013508*	1.8149	-1.50619	1.63634	-0.41146	-0.08978	-1.05627
7011701	0.14946	0.16921	-0.1976	-0.32631	0.05126	2.6264	*7013509*	0.70288	-1.54849	-0.81212	-0.8565	-0.80259	-0.9711
7011702	0.44552	0.25806	-0.14222	0.00395	-0.57949	2.11545	*7013510*	1.05592	-1.35487	0.27704	-0.37854	-0.25991	-1.26155
7011703	0.59177	0.5665	0.8276	-0.33727	-0.91528	0.97782	*7013513*	0.38548	-1.78197	-1.26491	-1.21126	0.25377	-1.1393
7011801	-0.48633	0.80693	-0.18229	0.17815	0.56209	-0.4078							

Appendix B: - Factors Scores By CD District – Secondary Analysis

CD	Mean Price	Mean Y	Mean X	Fac1	Fac2	Fac3	Fac4	Fac5	Fac6
7011401	260000	197.5	81.5	-0.04599	-0.12808	0.35855	-0.75147	-0.23707	-0.5365
7011402	271000	198	92.5	-0.78399	1.48028	-0.03474	-0.28611	0.06041	-1.39519
7012004	232500	151.1	37.6	-0.10114	-0.74105	0.29949	-0.31058	0.93275	0.50083
7012208	411250	158.6	43.55	0.74186	-0.94159	3.1742	0.3073	-0.88154	-0.35598
7011203	207000	167.55	38.95	-0.14864	0.23092	0.3829	-0.65777	0.28374	-0.7636
7012203	271500	151.95	32.5	-0.73011	-0.17916	0.47802	-0.07091	0.32263	0.35877
7012003	243750	154.15	33.6	-0.35919	0.56553	0.90211	-0.20658	1.66042	-0.224
7010604	335000	166.5	27	0.46399	1.50005	2.33244	-0.03151	0.11362	-0.49888
7010901	380000	157.7	15	0.16629	0.18612	3.07503	1.30193	-0.09604	-0.25776
7010906	510000	156.5	12.5	-0.50269	-0.38313	3.2075	0.21366	-0.92761	-1.1009
7012001	298750	153.95	30.4	-1.58252	0.27961	0.17673	0.28646	0.90915	-0.56077
7011201	205500	174.9	42.5	0.09523	0.38805	-0.26266	-0.1663	-0.14755	0.14223
7010605	380000	154.6	27	-0.63926	0.38227	2.68484	0.40517	-0.36317	0.42566
7010905	490000	153	7.5	1.07132	-2.46959	0.42834	-0.20143	-0.41577	-1.50648
7012205	250000	157.5	32.5	-0.55212	0.82504	0.8183	-0.27777	0.38423	0.91768
7011801	190000	165.7	47.75	-0.48633	0.80693	-0.18229	0.17815	0.56209	-0.4078
7012204	269000	154.25	30.6	-0.99634	-1.40962	-0.20197	-0.27206	-0.16786	0.04605
7012002	295000	151.1	36	-0.84181	1.37774	1.11455	0.20659	-0.18956	-1.05315
7012206	254000	158	34.1	-0.73831	0.88724	1.67088	0.35077	-0.82279	0.08716
7010601	365000	161.8	24	-0.54726	-0.04106	1.689	-0.29639	0.91323	-0.72605
7012301	215000	154.8	25.5	-1.14817	-0.23256	0.88869	-0.13416	0.4488	-0.32066
7012201	258000	151.7	32	-1.40942	-0.7619	0.26211	-0.66819	-0.53635	-0.68177
7010607	360000	162	25.3	-0.65883	-1.21116	1.68961	-0.04506	0.21307	0.04002
7012504	177000	213	75	-0.13396	-0.61321	-0.56266	1.26758	-0.16209	3.2371
7010703	215000	207	62.3	0.39398	1.2186	0.15006	-0.83651	-0.35523	-0.37635
7011703	239000	227.5	65	0.59177	0.5665	0.8276	-0.33727	-0.91528	0.97782
7011906	274500	203.5	38.2	-0.2672	1.62638	0.94114	0.20404	0.47269	-0.03247
7011701	175000	227.8	68.3	0.14946	0.16921	-0.1976	-0.32631	0.05126	2.6264
7010103	162000	214	63.5	0.17942	0.99399	-0.75775	-0.04962	1.21448	0.47026
7010702	176000	204.5	64.8	0.44729	0.81411	-0.5419	-0.31765	-0.33373	-0.15036
7012404	166500	234.9	73.5	0.63205	0.61252	-0.63461	-0.33801	-0.21668	0.35535
7010104	190500	215.5	59.8	-0.07937	0.33362	-0.19944	-0.39825	-0.30861	0.34155
7012101	250000	217	44.5	0.06022	0.55662	1.10528	-0.04468	0.24572	0.13756
7010302	393950	222.5	58.5	0.44186	0.53058	2.07614	0.08168	-1.21887	1.54348
7011601	210000	204.8	67.5	0.22581	0.59699	0.64531	-0.94317	-0.79411	-0.1094
7012103	226000	216.3	47.7	0.1017	0.50169	0.79709	-0.43797	0.85179	0.21431
7012502	175000	202.1	76.3	0.57521	1.10433	-0.42906	-0.194	-0.18369	0.66995
7011907	202500	202.65	42.65	0.08504	1.0171	0.71553	-0.51746	-0.51449	0.27993
7011702	205000	223	66.8	0.44552	0.25806	-0.14222	0.00395	-0.57949	2.11545
7012501	162678	211	72.5	0.48792	0.46917	-0.52903	0.88812	-0.50448	2.56519
7012105	206750	201.7	50.9	0.53806	0.84667	0.17499	-0.55796	0.66017	0.02218
7012403	165700	221.8	68	0.5714	0.38873	-0.03459	-0.23451	-0.44684	0.68526
7012601	203000	224.5	77.5	0.33134	0.3101	0.0915	0.07874	-0.14234	1.09996
7011903	267000	217.8	34.3	-0.22732	-0.08563	1.06094	-0.59086	0.71303	0.51949
7011602	172000	208.3	68.6	0.25007	1.07477	-0.9087	-0.0907	-0.3237	0.10938
7011604	177500	203.8	72.15	0.44589	0.70345	-0.24087	-0.27752	-0.2483	0.29736
7012602	194500	222.4	77.5	0.56558	0.88358	0.03063	-0.75862	-0.35553	0.92486
7012503	152500	215	78	0.55052	0.66155	-0.24051	0.34036	-0.31896	0.6774
7010101	164500	217.7	67.7	0.04433	0.48717	-0.99356	0.18477	0.14776	1.01159
7010704	225000	191.2	66.5	-0.62526	1.98256	-0.12338	-0.72792	-0.65765	-0.6577
7010701	165500	202.2	61.6	0.81652	0.42698	0.22857	-0.04012	-0.19158	0.0695
7010502	215500	206.6	42	-0.87168	0.25468	-0.93649	1.38464	1.84399	-0.01017
7011901	317500	216.45	33.5	-1.04968	-0.69804	0.96259	-0.23549	0.60342	0.76359
7010501	255000	192.4	38.5	-0.51286	-0.71783	0.03445	-0.02638	0.25862	1.11825
7010102	150250	214	64.75	-0.13533	0.74061	-0.30161	-0.66404	-0.05896	0.44808
7012402	172000	235.2	67	0.27241	0.92797	-0.1988	-0.21688	-0.09926	0.41628
7011502	155000	205.5	51.9	0.19617	0.31944	0.25727	-0.01819	-0.10493	0.10158
7012102	286250	213.1	46.25	-1.27495	-0.73106	-0.25503	-0.68633	1.47567	0.35913
7010504	170000	191.4	44.1	-1.12719	-0.44702	-0.22066	0.45544	1.21818	0.04167
7012104	203500	202.15	46.8	0.294	0.60858	-0.29853	-0.1275	0.41812	-0.39322
7011503	149500	191	53.8	-0.14077	0.32657	-0.89228	-0.10646	0.52526	0.54438
7011603	182500	205.1	73	0.14089	0.20644	-0.53245	0.18808	0.75316	0.76383
7011902	277500	211	38	0.62333	1.1177	1.25636	0.14578	0.20232	-0.82799
7012106	213750	202	41	-1.46318	-1.20969	0.71951	-1.50265	0.89952	0.19349
7011505	172500	191.8	47.4	-0.7019	-0.24482	-0.29571	-0.12435	0.14248	0.73475
7011501	178500	207.75	49.3	-0.63388	-0.59454	-1.21391	-0.23887	0.48496	0.73493
7011504	147236	192	56.5	0.66108	1.09592	-0.7765	0.36422	0.05996	0.30577
7012405	194500	239.3	64.8	0.04663	-1.28406	0.69388	-0.1369	0.67195	1.36726
7013507	245000	57.7	166	1.42518	-1.88741	0.7853	-0.41963	-0.30971	-1.36377
7013304	140000	184.7	27.5	1.09506	0.183	-1.50802	-0.26287	0.56143	-1.29383
7013505	247500	44.75	175.9	1.56963	-1.39278	1.46108	0.10937	-0.22333	-1.3118
7013503	159000	12.5	202.6	0.87507	-1.28309	-1.34266	-1.11719	0.06473	-0.87459
7013205	152500	21.7	191.9	0.59473	-0.08825	-0.71885	-0.34372	-0.03303	-1.12804
7013203	148500	22.2	186	0.06232	0.04901	-1.29529	1.0272	2.07875	-0.47254

Appendix C: - Rotated Component Matrix of Identified Social Constructs 1-6

Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6
@_People_Aged_15_years_and_under	.932					
@_Dwellings__Separate_houses	.873					
@_People_aged_59	.871					
@_Couples_families_with_children	.867					
@_People_aged_1014	.810					
@_Couples_families_without_children	-.804					
@_People_living_alone	-.733					
@_People_aged_04	.731					
@_Dwellings__Being_Purchased	.679					
@_People_Born_in_Australia	.658					
@_People_aged_6569	-.510					
@_People_with_income_$40$79						
People_aged_7579						
@_People_aged_2529		-.831				
@_Persons__same_address_5_years_ago		.785				
Persons__different_address_5_years_ago		-.785				
@_People_aged_2024		-.719				
@_Dwellings__being_rented		-.656				
@_People_aged_6064	-.553	.579				
@_People_with_income_$1500_or_more			.846			
@_Dwellings__loan_payment_$2000_or_more			.752			
@_People_with_Bachelor_Degree			.723			
@_People_occupied_as_Manager_and_Administrator			.712			
@_People_with_income_$1000$1499			.663			
@_People_occupied_as_Professional			.582			
@_Dwellings__loan_payment_$1800$1999						
@_People_occupied_as_Elementray_Clerical_Sales_and_Service_work						
@_Persons_with_a_Year_8_education_or_below				.763		
@_People_occupied_as_Labourers_and_Related_workers				.745		
@_People_with_income_$200$299				.733		
@_People_with_income_$700$799				-.569		
@_Dwellings__Fully_Owned		.541			-.562	
@_One_parent_Families			-.508		.530	
@_People_who_speak_English_only					.520	
@_Dwellings__Flat_unit_or_apartment						
@_Dwellings__loan_payment_$400$599						
@_People_with_income_$300$399						
@_People_born_overseas						.852
People_who_speak_other_languages						.770

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 11 iterations.

Appendix D: Linear TSA Scores Against Sale Price – Primary Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.334[a]	.111	.110	**********

a. Predictors: (Constant), YCord, XCord

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6E+011	2	3.180E+011	77.304	.000[a]
	Residual	5E+012	1235	4113497382		
	Total	6E+012	1237			

a. Predictors: (Constant), YCord, XCord

b. Dependent Variable: SalePrice

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	345695.0	13576.812		25.462	.000
	XCord	-792.917	66.258	-.667	-11.967	.000
	YCord	-415.168	46.822	-.494	-8.867	.000

a. Dependent Variable: SalePrice

Appendix E: Quadratic TSA Scores Against Sale Price – Primary Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.450[a]	.202	.199	**********

a. Predictors: (Constant), XbyY, XCord, YSqd, XSqd, YCord

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1E+012	5	2.310E+011	62.411	.000[a]
	Residual	5E+012	1232	3702035146		
	Total	6E+012	1237			

a. Predictors: (Constant), XbyY, XCord, YSqd, XSqd, YCord

b. Dependent Variable: SalePrice

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1068411	82143.690		13.007	.000
	XCord	-9145.424	776.257	-7.696	-11.781	.000
	YCord	-5600.613	684.292	-6.669	-8.185	.000
	XSqd	23.508	2.231	4.743	10.536	.000
	YSqd	8.867	1.474	2.534	6.015	.000
	XbyY	29.090	2.790	2.613	10.428	.000

a. Dependent Variable: SalePrice

Appendix F: Cubic TSA Scores Against Sale Price – Primary Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.504[a]	.254	.250	**********

a. Predictors: (Constant), XSqdYSqd, XCord, YCubed, XSqdY, XCubed, XbyY, YCord, YSqdX

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1E+012	8	1.818E+011	52.426	.000[a]
	Residual	4E+012	1229	3467685659		
	Total	6E+012	1237			

a. Predictors: (Constant), XSqdYSqd, XCord, YCubed, XSqdY, XCubed, XbyY, YCord, YSqdX

b. Dependent Variable: SalePrice

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1308308	131359.3		9.960	.000
	XCord	-8737.564	1212.354	-7.353	-7.207	.000
	YCord	-6647.736	1205.785	-7.916	-5.513	.000
	XbyY	19.951	26.628	1.792	.749	.454
	YSqdX	.098	.106	2.282	.932	.351
	XSqdY	.170	.110	1.457	1.546	.122
	XCubed	.068	.015	2.800	4.484	.000
	YCubed	.032	.014	2.031	2.244	.025
	XSqdYSqd	-.001	.001	-1.960	-1.830	.068

a. Dependent Variable: SalePrice

Appendix G: Quartic TSA Scores Against Sale Price – Primary Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.542[a]	.294	.288	**********

a. Predictors: (Constant), YQuart, XSqdY, XQuart, XSqdYCub, XCord, XbyY, XCubYSqd, XCubY, YSqd, YCubX

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2E+012	10	1.681E+011	51.098	.000[a]
	Residual	4E+012	1227	3288954654		
	Total	6E+012	1237			

a. Predictors: (Constant), YQuart, XSqdY, XQuart, XSqdYCub, XCord, XbyY, XCubYSq XCubY, YSqd, YCubX

b. Dependent Variable: SalePrice

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	905297.1	46766.286		19.358	.000
	XCord	-5600.033	485.117	-4.713	-11.544	.000
	YSqd	-13.546	3.119	-3.872	-4.343	.000
	XbyY	-106.045	15.284	-9.524	-6.939	.000
	XSqdY	1.300	.159	11.143	8.183	.000
	XCubYSqd	1.798E-05	.000	3.511	5.870	.000
	XSqdYCub	-3.0E-005	.000	-13.518	-7.867	.000
	YCubX	.003	.000	16.160	7.124	.000
	XCubY	-.004	.001	-5.016	-7.394	.000
	XQuart	.000	.000	2.145	6.748	.000
	YQuart	-8.4E-005	.000	-1.179	-1.272	.204

a. Dependent Variable: SalePrice

Appendix H: TSA Scores, Property Characteristics Against Sale Price – Primary Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.696[a]	.485	.466	**********

a. Predictors: (Constant), SPA, XCord, ROOMUNDER, XCubYSqd, BEDROOM, PropertyAreaSqm, INGROUNDPOOL, ELEVATED, YQuart, XCubY, XbyY, XQuart, XSqdYCub, YSqd, XSqdY

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8E+011	15	5.077E+010	26.324	.000[a]
	Residual	8E+011	420	1928830408		
	Total	2E+012	435			

a. Predictors: (Constant), SPA, XCord, ROOMUNDER, XCubYSqd, BEDROOM, PropertyAreaSqm, INGROUNDPOOL, ELEVATED, YQuart, XCubY, XbyY, XQuart, XSqdYCub, YSqd, XSqdY

b. Dependent Variable: SalePrice

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	289847.8	85083.777		3.407	.001		
	PropertyAreaSqm	147.620	19.507	.291	7.568	.000	.831	1.203
	XCord	-3269.545	750.555	-2.568	-4.356	.000	.004	283.215
	YSqd	-16.468	3.744	-4.718	-4.399	.000	.001	937.451
	XbyY	30.039	13.837	2.952	2.171	.030	.001	1506.182
	XSqdY	-.157	.260	-1.499	-.606	.545	.000	4987.426
	XCubYSqd	3.955E-06	.000	.897	1.505	.133	.003	289.571
	XSqdYCub	-1.2E-006	.000	-.597	-.900	.368	.003	358.019
	XCubY	7.069E-05	.001	.077	.070	.944	.001	996.509
	XQuart	.000	.000	1.409	3.367	.001	.007	142.792
	YQuart	.000	.000	2.433	3.454	.001	.002	404.490
	INGROUNDPOOL	47038.922	7008.388	.250	6.712	.000	.887	1.127
	BEDROOM	29667.123	5548.437	.201	5.347	.000	.869	1.150
	ELEVATED	16449.191	5495.801	.123	2.993	.003	.723	1.383
	ROOMUNDER	28260.957	9031.585	.126	3.129	.002	.754	1.326
	SPA	16540.798	7906.416	.075	2.092	.037	.959	1.043

a. Dependent Variable: SalePrice

Appendix I: Factor Scores, TSA Scores, Property Characteristics, Against Sale Price – Secondary Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.825[a]	.681	.665	**********

a. Predictors: (Constant), Fac6, PropertyAreaSqm, ROOMUNDER, SPA, BEDROOM, XCubY, Fac4, INGROUNDPOOL, Fac2, Fac1, ELEVATED, Fac3, XQuart, Fac5, YQuart, XSqdYCub, XCord, XbyY, XCubYSqd, YSqd, XSqdY

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5E+011	16	2.950E+010	25.950	.000[a]
	Residual	1E+011	104	1136808845		
	Total	6E+011	120			

a. Predictors: (Constant), YQuart, Fac3, Fac4, Fac1, Fac2, XCubYSqd, Fac5, Fac6, Xcord, XCubY, XbyY, XQuart, XSqdYCub, YSqd, XSqdY, YCubX

b. Dependent Variable: MedianPrice

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	197784.2	68859.233		2.872	.004		
	PropertyAreaSqm	90.964	16.050	.179	5.668	.000	.771	1.298
	XCord	-1634.307	634.785	-1.284	-2.575	.010	.003	322.718
	YSqd	1.937	3.524	.555	.550	.583	.001	1322.967
	XbyY	-41.145	13.273	-4.043	-3.100	.002	.000	2207.904
	XSqdY	.697	.220	6.641	3.169	.002	.000	5701.932
	XCubYSqd	-4.7E-006	.000	-1.064	-1.989	.047	.003	371.240
	XSqdYCub	4.277E-07	.000	.214	.377	.706	.002	415.888
	XCubY	-.002	.001	-2.502	-2.776	.006	.001	1054.525
	XQuart	.000	.000	1.054	2.908	.004	.006	170.332
	YQuart	-4.6E-006	.000	-.068	-.108	.914	.002	510.884
	INGROUNDPOOL	33676.952	5644.667	.179	5.966	.000	.858	1.165
	BEDROOM	15513.426	4528.797	.105	3.426	.001	.819	1.221
	ELEVATED	16867.785	4409.604	.126	3.825	.000	.705	1.418
	ROOMUNDER	19193.492	7227.661	.086	2.656	.008	.739	1.353
	SPA	11210.429	6332.687	.051	1.770	.077	.938	1.066
	Fac1	-26349.4	5201.473	-.208	-5.066	.000	.455	2.199
	Fac2	4877.465	4131.969	.046	1.180	.239	.516	1.938
	Fac3	42552.467	3271.508	.515	13.007	.000	.491	2.036
	Fac4	-2097.312	4186.035	-.018	-.501	.617	.572	1.748
	Fac5	-15531.8	4808.312	-.152	-3.230	.001	.348	2.871
	Fac6	-43.806	2965.903	-.001	-.015	.988	.357	2.801

a. Dependent Variable: SalePrice

Appendix J: Factor Scores Against Median Sale Price – Secondary Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.845[a]	.714	.699	38457.72246

a. Predictors: (Constant), Fac6, Fac3, Fac4, Fac1, Fac2, Fac5

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4E+011	6	7.027E+010	47.514	.000[a]
	Residual	2E+011	114	1478996417		
	Total	6E+011	120			

a. Predictors: (Constant), Fac6, Fac3, Fac4, Fac1, Fac2, Fac5

b. Dependent Variable: MedianPrice

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	221451.2	4274.406		51.809	.000
	Fac1	-25393.0	5961.166	-.260	-4.260	.000
	Fac2	-16214.2	4632.260	-.181	-3.500	.001
	Fac3	51111.375	4138.744	.710	12.349	.000
	Fac4	7230.301	6638.314	.059	1.089	.278
	Fac5	-15192.2	7352.877	-.139	-2.066	.041
	Fac6	-5845.668	4097.978	-.079	-1.426	.156

a. Dependent Variable: MedianPrice

Appendix K: TSA Scores Against Median Sale Price – Secondary Analysis

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.721[a]	.519	.476	50777.85373

a. Predictors: (Constant), YQuart, XCubY, XQuart, XSqdYCub, Xcord, XbyY, XCubYSqd, YSqd, XSqdY, YCubX

b. Dependent Variable: MedianPrice

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3E+011	10	3.066E+010	11.892	.000[a]
	Residual	3E+011	110	2578390429		
	Total	6E+011	120			

a. Predictors: (Constant), YQuart, XCubY, XQuart, XSqdYCub, Xcord, XbyY, XCubYSqd, YSqd, XSqdY, YCubX

b. Dependent Variable: MedianPrice

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	908802.8	122246.6		7.434	.000
	Xcord	-6320.807	1431.595	-4.644	-4.415	.000
	YSqd	-19.447	8.503	-4.573	-2.287	.024
	XbyY	-64.570	36.122	-5.538	-1.788	.077
	XSqdY	1.184	.364	10.760	3.250	.002
	XCubYSqd	9.516E-06	.000	1.887	1.003	.318
	XSqdYCub	-1.6E-005	.000	-7.106	-1.510	.134
	YCubX	.001	.001	6.689	1.129	.261
	XCubY	-.004	.002	-4.926	-2.742	.007
	XQuart	.000	.000	2.044	2.580	.011
	YQuart	.000	.000	1.848	.784	.435

a. Dependent Variable: MedianPrice

Appendix L: TSA Scores & Factor Scores Against Median Sale Price – Secondary Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.894[a]	.800	.769	33716.59599

a. Predictors: (Constant), YQuart, Fac3, Fac4, Fac1, Fac2, XCubYSqd, Fac5, Fac6, Xcord, XCubY, XbyY, XQuart, XSqdYCub, YSqd, XSqdY, YCubX

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5E+011	16	2.950E+010	25.950	.000[a]
	Residual	1E+011	104	1136808845		
	Total	6E+011	120			

a. Predictors: (Constant), YQuart, Fac3, Fac4, Fac1, Fac2, XCubYSqd, Fac5, Fac6, Xcord, XCubY, XbyY, XQuart, XSqdYCub, YSqd, XSqdY, YCubX

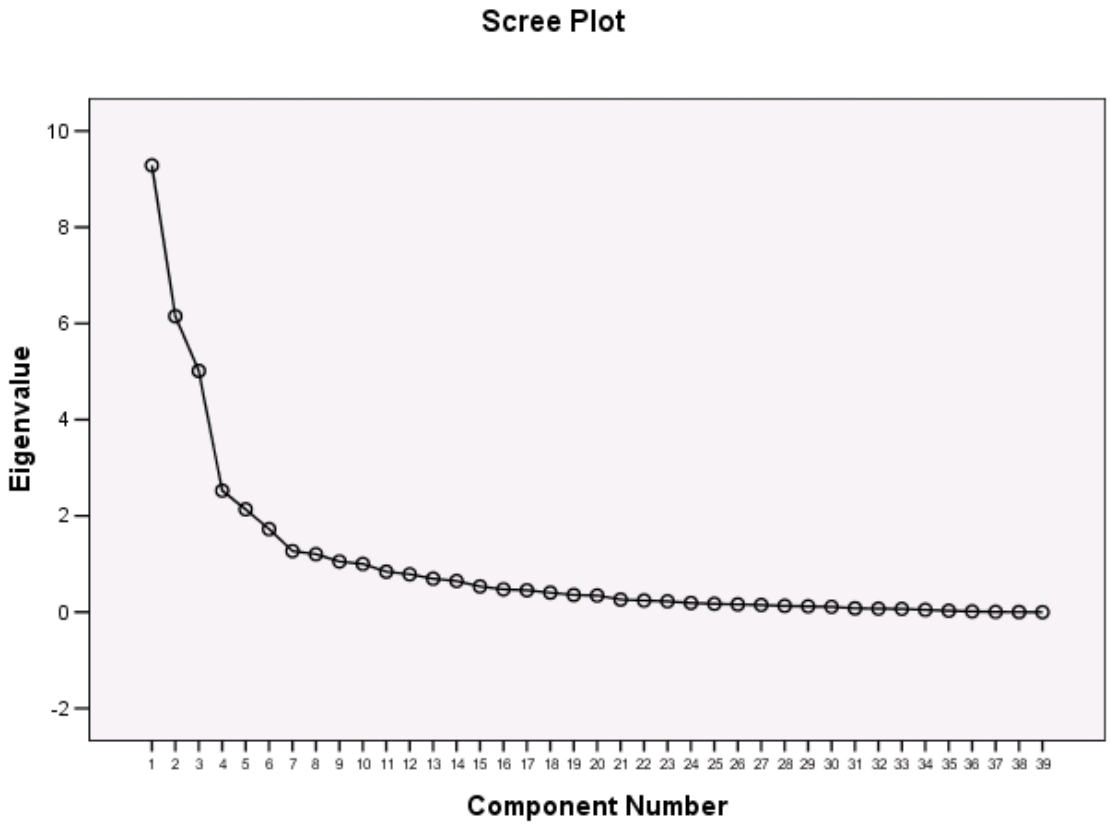
b. Dependent Variable: MedianPrice

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	411220.5	93719.775		4.388	.000
	Xcord	-1865.904	1060.733	-1.371	-1.759	.082
	Fac1	-23136.2	6555.149	-.237	-3.529	.001
	Fac2	-9361.068	5247.095	-.104	-1.784	.077
	Fac3	45457.966	4517.343	.631	10.063	.000
	Fac4	-4904.725	6586.326	-.040	-.745	.458
	Fac5	-8344.127	7124.256	-.076	-1.171	.244
	Fac6	-1631.322	5242.042	-.022	-.311	.756
	YSqd	3.248	6.138	.764	.529	.598
	XbyY	-82.122	25.198	-7.044	-3.259	.002
	XSqdY	1.145	.259	10.404	4.418	.000
	XCubYSqd	2.875E-06	.000	.570	.431	.667
	XSqdYCub	-1.0E-005	.000	-4.490	-1.375	.172
	YCubX	.001	.001	4.910	1.206	.231
	XCubY	-.004	.001	-4.381	-3.569	.001
	XQuart	.000	.000	.793	1.419	.159
	YQuart	-8.3E-005	.000	-1.023	-.632	.528

a. Dependent Variable: MedianPrice

Appendix M: Eigenvalue Scores For Principal Components Analysis (PCA)



Appendix N: Maps Of Darwin & Palmerston Collection District Boundaries

These maps are too large to include in this document – You can view copies at the following addresses.

http://www.unisanet.unisa.edu.au/staff/peterrossini/Darwinmaps/Ethnicity.png

http://www.unisanet.unisa.edu.au/staff/peterrossini/Darwinmaps/Familism.png

http://www.unisanet.unisa.edu.au/staff/peterrossini/Darwinmaps/Median-Prices.png

http://www.unisanet.unisa.edu.au/staff/peterrossini/Darwinmaps/Mobility.png

http://www.unisanet.unisa.edu.au/staff/peterrossini/Darwinmaps/Outright-Owners.png

http://www.unisanet.unisa.edu.au/staff/peterrossini/Darwinmaps/Socio-economic-Status.png