Local Parameters of Housing Prices:
A Case Study of the Melbourne Residential Property Market

A thesis submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy

Yixin XU

Master of Property – University of Melbourne
Bachelor of Planning and Environment – University of Melbourne

School of Property Construction and Project Management
College of Design and Social Context
RMIT University

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DECLARATION

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

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Yixin Xu
16th September 2017
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**ABBREVIATIONS AND ACRONYMS**

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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
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<tr>
<td>BRT</td>
<td>Bus Rapid Transit</td>
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<tr>
<td>CEE</td>
<td>Central and Eastern Europe</td>
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<tr>
<td>CBD</td>
<td>Central Business District</td>
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<td>CPI</td>
<td>Consumer Price Index</td>
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<tr>
<td>DEECD</td>
<td>Department of Education and Early Childhood Development</td>
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<tr>
<td>GARCH</td>
<td>Generalized Autoregressive Conditional Heteroscedastic</td>
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<tr>
<td>GFC</td>
<td>Global Financial Crisis</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>HIA</td>
<td>Housing Industry Association</td>
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<tr>
<td>LGA</td>
<td>Local Government Areas</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<td>REIV</td>
<td>Real Estate Institute of Victoria</td>
</tr>
<tr>
<td>RBA</td>
<td>Reserve Bank of Australia</td>
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<tr>
<td>SD</td>
<td>Standard Deviation</td>
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<tr>
<td>UK</td>
<td>United Kingdom</td>
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<td>US</td>
<td>United States</td>
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<tr>
<td>UGB</td>
<td>Urban Growth Boundary</td>
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<td>VAR</td>
<td>Vector Auto Regression</td>
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<td>VSG</td>
<td>Victorian State Government</td>
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ABSTRACT

Housing as an aspect of consumption and as an asset is important to both the economy and individuals. Due to this, housing price performance has drawn significant attention from policy makers, investors, home owners and researchers. House prices are often reported on a country, city and local level. At a country and city level, there have been extensive studies on house prices and macroeconomic determinants that show house price movements are closely related to a common set of macroeconomic variables and market specific conditions. At a local level, there has been an improved understanding of housing markets assisted by identifying and understanding individual factors influencing housing decisions, including transportation, neighbourhood characteristics, social characteristics, schools and planning regulations. At a local level, existing studies focused on examining one or two factors of house price performance of a city or a suburb, with nominal attention to elaborating the combination of all factors and how those factors would have a different effect in different locations, especially locations that are close to each other.

This research is aimed at identifying and examining house price determinants at a local level to understand why house prices vary across different locations and the factors influencing such price differentiation. This research has adopted explanatory mixed research methods (QUAN -> QUAL) where quantitative analysis is used in the first stage to examine the Melbourne housing market and its performance at different levels. The research found there were certain periods where local house prices do not perform in line with either country, city or other local housing markets. Interestingly, suburbs located next to each other could have a difference in price performance over time. Based on the quantitative results, eight representative case studies (four pairs) that had different price performance histories were selected across different locations of Metropolitan Melbourne and compared in pairs namely: Hawthorn vs Kew; Broadmeadows vs Glenroy; Altona Meadows vs Laverton and Box Hill vs Mont Albert. This research further examined the relationship between each case study and macroeconomic variables such as interest rate, household income, GDP etc. and concluded that macroeconomic factors overall had a limited effect on local house price performance.

The results are also in line with suggestions from the literature review that there is a degree of price heterogeneity in regional housing markets and that housing markets at a sub-national level are highly segmented. Regional and local house prices can deviate from their equilibrium
values for certain periods of time and the deviation can be driven by specific circumstances rather than national factors. Therefore, a national housing price model would fail to represent housing price dynamics of regional cities. This research has extended the theory and further concluded that the macroeconomic factors had an overall limited effect on local house price performance. The results also highlighted house prices were segmented at the local level and the local house price difference is unexplainable by macroeconomic factors. It is suggested that microeconomic factors could be the key to local house price differences.

This research has then used qualitative analysis of in-depth interviews to understand the phenomenon resulting from quantitative data and investigates factors influencing local house price differentiation for each case study. It has cross examined factors including transportation, neighbourhood characteristics, social characteristics, schools and planning regulations. Based on qualitative analysis, this research has found each local factor can contribute to the performance of house price directly or co-effect with other factors. However, the results varied between locations and each factor contributed differently to local house price performance depending on the nature and characteristics of the suburb. Based on the results from interviews from each case study, this research cross examined local factors with price measurements to further demonstrate the effect of each factor on median house price performance, average annual price returns and price volatility.

The findings concluded that median house prices are positively affected by high ranking schools and better neighbourhood environments. If two locations comprise different socio economic demographics, median house prices are positively affected by higher socio economic demographic as people with high socio economic demographics would pay a premium to live in a location with similar social background to themselves. Median house price is also positively affected by a combination of factors, such as high ranking schools and transportation. For example, if a suburb does not provide a high ranking school, then the location that can provide direct transportation access to a high ranking school located in nearby suburbs would attract more demand.

The median house prices are negatively affected by neighbourhood environment factors such as low quality of street appeal or being located in close proximity to an undesirable facilities (e.g. industrial sites). In addition, if a location comprises a low socio economic demographic, then median house prices are adversely affected. The median house prices are also negatively
affected by a combination of factors, such as social and school factors. Low socio economics would put pressure on school factors as parents would try to avoid living in a location that has low socio economic demographic because they would want their children to go to the same schools as other children who have a similar social background. Although school in this case, does not have a direct negative effect on house prices, the hesitation from parents for a location with low socio economic demographics would adversely affect demand for that location.

Unlike the number of factors affecting median house price performance, the number of factors that were identified to influence average annual price returns and price volatility in this research are rather limited. This research concluded no single factor explains the difference in average annual price returns, rather a combination of two factors – planning regulations and transportation. If local council encourages high density development for a location, then that location would have a development opportunity which will lead to a higher price return because the land is worth more if multi-unit dwellings can be built for that piece of land. This research found such development potential tends to be closely linked with transportation. From a price volatility point of view, if there are undesirable facilities such as industrial sites developed in a nearby location, then the proximity to undesirable facilities would have an adverse effect on median house prices and further affect price volatility. For example, Laverton North experienced rapid industrial development due to the opening of the Western Ring Road and as result Laverton, a nearby suburb experienced a more volatile price performance. The impact seems to have affected purchasing activity. Demand from owner occupiers was diminished by the proximity to industrial activity, whereas investors continue to purchase property as a consequence of the negative impact on prices which in turn resulted in improved yield returns.

Most importantly, in order to provide a comprehensive understanding of local house price differences, this research cross referenced the census data with interview results and further triangulated the outcomes with price correlation results, and found the significant differences in local house price performance between two locations for a particular period of time could be the result of changing local factors. For example, a change in neighbourhood facilities including proximity to undesirable industrial sites would decrease the demand for that location and further influence price volatility. Furthermore, a positive change in socio demographics would increase the demand for that location and hence positively affect price growth. If a suburb experienced an increase in the concentration of high socio demographic population, a restrictive planning policy limiting high density development would also positively affect price
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growth. In addition, for other suburbs, change in local planning policy to encourage high
density development may increase house prices and enhance price growth.

This research is aimed at examining the interrelationship between local determinants and
housing prices, not quantifying the impact of each determinants on housing price movement.
Nevertheless, the findings from this research form an important insight into local house price
determinants, in particular, it lends strong support to the hypothesis that microeconomic factors
cause local price differentiation. The multidisciplinary approach to the study reflected the
complexity of household decisions and the way submarkets are segmented based on a variety
of microeconomic factors. This research provides a platform for understanding the influences
on buyers and investors’ decision making based on historical data and ultimately improves the
understanding of key price determinants at a local level. A better understanding of the
relationship between local factors and house price performance will help buyers and investors
to identify and address issues that were attributable to residential property market performance
and so make better investment decisions.
CHAPTER ONE

INTRODUCTION

1.1 Background

Housing as both a consumption good and as an asset is important at two levels – economic and individual. At the economic level, housing contributes to Gross Domestic Product (GDP) covering construction of new homes, improvements and alterations as well as financial market transactions including mortgages and broker commissions on sales of new and existing homes. In Australia, the housing sector accounts for around 14% of total GDP, including approximately 10% from housing construction, 2% from improvements and alterations and 2% from ownership transfer costs (ABS 2016, Sachs 2012). The contribution has been remarkably stable through recent changes in economic conditions. According to the Australian Bureau of Statistics’ (ABS) national accounts data, residential construction accounted for approximately 10% of the country’s GDP in 2005 and slightly dropped to 9% during the Global Financial Crisis (GFC). It is still the second largest contributor to Australia’s GDP in 2016 at approximately 9% following the financial and insurance services sector at 9.8% with mining activity ranked third at 7.7% contribution to GDP (ABS 2005, ABS 2016). Given the proportion of direct GDP contribution, housing is a central component to Australia’s long term economic success and not surprisingly, GDP generally closely tracks the housing cycle. As Andrew Harvey, senior economist from the Housing Industry Association (HIA) quotes “it is impossible to have a strong economy without a strong housing industry” (HIA 2012 pp 2).

At an individual level, housing is recognised as the second most essential human need after food (Maslow 1943) and is considered as a major investment and a significant financial asset. On an individual perspective, when house prices are rising, the value of the owning householder’s balance sheet improves. This may encourage home owners to release some of the wealth to fund extra consumption which would benefit the economy (Sachs 2012).
Alternatively if house price fall, householders become more cautious, especially if negative equity occurs, the home owner will be forced to refrain from spending more than otherwise might. Accordingly, households commonly plan their spending based on the value of their assets, especially housing assets (Iacoviello 2011).

The performance of the housing market plays an important role in the economy and is recognised by many as a barometer of economic confidence. Changes in levels of confidence can result in over-optimism on future housing market performance which may lead to market collapse when there is an unpredicted downturn. For example, in many European countries (e.g. Greece, Ireland and Spain) there were major housing booms before the GFC, where confidence levels were very high. Because of the confidence in the housing market, consumer borrowing rose against income leading to the household saving ratio dropping prior to the GFC (Hiebert 2006). In late 2008, when the GFC spread worldwide with falls in asset and equity values, there appears to have been a more significant change in attitudes and behaviour which led to increases in saving ratios following the onset of the GFC (Mehta 2013).

In Australia, almost 70% of the total of Australian household assets is in the form of housing which accounted for $5.90 trillion Australian dollars in 2015 (RBA 2015). The country has a relatively high homeownership rate at approximately 68% (ABS 2015) compared to United Kingdom (UK) at 64%, United States (US) at 63% and France at 64% (Gopal 2016, Osborne 2016, Trading Economics 2015). The debt associated with housing has increased dramatically over the past 26 years from less than 5% of household income in 1990 to more than 180% in 2016. This increase in housing debt is largely driven by rising housing prices since the late 1990s (ABS 2014, ABS 2016a). Given the increasing trend of total household debt and a high proportion of owner occupation in the housing market, home owners are spending more of their income to service their debts. The average home costs around seven times the average annual wage in 2016 compared to about four times the average annual wage ten years ago (HIA 2016).

Thus, home owners became more sensitive to interest rate changes – interest being the major item in the household budget. When the cash rate in 1989-90 reached 10%, roughly 9% of the average Australian disposable income was being used to pay interest. However, just before the GFC, with a cash rate of 7.25%, almost 14% of income was used to pay interest, an increase of 56% (ABS 2014). With interest payments taking a larger slice of household incomes from increased household debt, the major consequence of significant property price rise has become
housing affordability. According to the 13\textsuperscript{th} Annual Demographia International Housing Affordability Survey published in 2016, major cities in Australia, such as Melbourne and Sydney have been ranked as having one of the most expensive housing markets across 337 selected cities (Demographia 2016).

Given the significant influence of the housing sector on the economy and individuals, housing has been a target for government fiscal policy aimed at achieving low inflation, low unemployment and balanced growth. With significant housing price changes over the past decade, it has attracted interest from real estate developers, banks and policy makers. Policy makers in major countries have tried to control house prices by using fiscal policies (China) and monetary policy (US, UK and Australia) with mixed success (Musso \textit{et al.} 2011, Schulz and Werwatz 2004).

To illustrate this, in China, to control overvaluation of the housing markets, the Central Government proposed policies of enforcing personal income tax of 20\% on profits from home sales and increased down payments and higher mortgage rates on loans for second-home buyers (Dunaway and Fdelino 2006). Similarly, in the US, during the GFC, the Federal Reserve cut the interest rate to a record low of 0.25\% to boost economic spending and a housing market lead recovery (Lothian 2009).

Likewise, in Australia, the Reserve Bank of Australia (RBA) increased the official cash rate to 7.25\% in 2008, the highest level since 1996. This was after 11 consecutive increases in the official cash rate to control inflation, slow the strong Australian economy and reduce housing price appreciation. Post the GFC, the RBA has cut cash rates six times to 3\% between September 2008 and April 2009 in an effort to support the economy and housing investment market. In addition, the State Revenue Office of Victoria increased First Home Owner Grant to first home buyers in 2008 to stimulate the housing and construction industry (ABC News 2008, RBA 2016a, State Revenue Office of Victoria 2012).

\textbf{Melbourne – the Case Study}

At a city level, Melbourne, as one of the major Australian capital cities has experienced significant growth in house prices over the past two decades. The Melbourne median house price moved from $136,000 in 1992 to $826,000 in 2017, a total increase of 507\% (REIV 2017).
Prior to the GFC, between 2002 and 2008, Melbourne house prices increased by 175% with an average annual increase of 12.5% compared to Sydney at 7.3%, Canberra at 9.0% and Adelaide at 8.9% (ABS 2008). After the GFC, from 2015 onwards, Melbourne started to experience another significant growth in the median house price. In the year of 2015 and 2016, Melbourne median house prices increased by 22.0% with an average annual increase of more than 10.0%. This is significant higher than the median house price growth rate between 2010 and 2015. For the five years to 2015, the median house price only increased by 12.0% with an average annual growth of approximately 3.0% (ABS 2016b).

The strong performance of Melbourne’s housing market has attracted many investors both locally and internationally. The number of foreign investment approvals has increased in recent years, which has coincided with strong property price growth, especially in Sydney and Melbourne. This has been driven largely by applications from Chinese nationals, which rose from around 50% of total foreign investment approvals in early-2010 to around 70% in 2015. Among all major capital cities, Melbourne in 2015 received the most foreign investment approvals (Wokker and Swieringa 2016). With the popularity of Melbourne’s property market, this research has selected the city as a case study to understand the price growth of its property market and price performance profile.

Significant house price movement in Melbourne has often been accompanied with changes of economic conditions, such as population, household income, interest rates, supply and demand as well as planning policy. Figure 1.1 shows the population growth for Metropolitan Melbourne between 1996 and 2015.
As Figure 1.1 shows, Melbourne population has increased from 3.30 million in 1996 to 4.40 million in 2015 which represents a total increase of 33%. Average population growth in Melbourne is approximately 1.78% per annum with the highest population growth in 2011/2012 at approximately 2.70% per annum (ABS 1996, ABS 2016b). Melbourne’s largest population growth continued to occur in the outer suburban areas. According to ABS, in 2016, the top four fastest growing suburbs in Melbourne are South Morang (northern fringe), Cranbourne East (southern fringe), Point Cook (western fringe) and Epping (northern fringe).

Interest rates as one of the major economic factors has changed significantly over the past two decades. RBA is Australia’s central bank who set the overnight cash rate to meet an agreed medium-term inflation target, working to maintain a strong financial system and efficient payments system. The cash rate published by RBA is the benchmark for financial institutions to set their interest rate (RBA 2016). Figure 1.2 shows the RBA cash rate between 1990 and 2016.

As Figure 1.2 shows, from January 1992 to July 1994 cash rate decreased from 7.50% to 4.75% and then peaked at 7.50% in December 1994 and remained unchanged till July 1996. Between 1997 and 2001 cash rate fluctuated between 4.75% and 6.25%. From December 2001 to August 2008, just before GFC, cash rate increased from 4.25% twelve consecutive times to 7.25%, the highest level in years from 1997 to control significant house price growth. In reacting to the GFC, the RBA immediately decreased the cash rate from 7.25% in August 2008 to 3.00% in April 2009. Between October 2009 and October 2011, the cash rate increased from 3.25% to 4.75%. From November 2011, the cash rate decreased from 4.75% twelve consecutive times.
to 1.50% in August 2016. The cash rate in 2016 is recorded as the lowest rate since the 1990s (RBA 2016b). A recent increase in the Melbourne median house price is seen in part as the result of low interest rates (Wilson 2017).

A key factor for the Melbourne housing market boom is the difference between supply and demand that is caused by population growth (Macro Business 2011). From 2003 and 2008, the number of dwellings commenced to population has decreased from 0.65 per person to 0.54 per person which represents a 17% decrease. This is mainly due to the rate of supply of new homes which has barely grown in the last 10 years while demand for houses has substantially increased due to significant population growth (ABS 2008). Before 2002, Melbourne’s population increased at an average rate of 0.57% per annum. From 2002 to 2008, the population increased at an average rate of 1.60% per annum. This almost tripled its previous annual growth (ABS 2011). However, the total number of dwellings commenced in Melbourne increased by 7% between 2002 and 2008 whilst population increased by almost 10%, a significantly larger growth than dwelling supply (ABS 2008, ABS 2011).

Specifically, there were nearly 378,000 persons added to Melbourne’s population between 2002 and 2008, as compared to a little more than 210,000 persons during the same period in the previous decade. Yet the building industry added 0.6 dwelling units per new resident between 2002 and 2008 compared to 0.80 in 1992-1998 (ABS 2008, ABS 2011, Silva et al. 2011). After the GFC, the number of houses commenced per person has peaked in 2010 at 0.65 per person due to the introduction of doubling the first home grant by State Revenue Office of Victoria and reduced cash rate by RBA which were both aimed to support the housing market. Then the house commenced per person began an upward trend from 2013 and reached its highest level in 15 years at 0.75 in 2016 (ABS 2016b, ABS 2016c).

With significant population growth over the past two decades, Melbourne has been expanding and new state government planning policies were introduced along the way to assist urban sprawl. Figure 1.3 shows the Melbourne’s growth pattern since the 1880s.
As Figure 1.3 presents, Melbourne’s growth patterns started experiencing significant expansion after 1954. In 2002, the Victorian State Government (VSG) introduced Melbourne 2030 to accommodate an additional one million residents in Melbourne between 2000 and 2030. In the past, Melbourne has grown by extension of the suburban frontier, rather than by the intensification of housing within established urban areas. Melbourne 2030’s initial objectives are to reshape the city away from its low density heritage towards a more ‘compact’ or consolidated urban form by restricting the city’s spread and aiming to reduce greenfield development on the fringe (VSG 2012).

As the population continued to grow in an unprecedented fashion with high demand for houses, in 2008, the VSG introduced Melbourne@5million, a planning update of Melbourne 2030 to provide for an extended growth boundary and reinforced the aim of a multi-centre metropolitan area by designating six new Central Activities Districts with Central Business District (CBD)-like functions being Box Hill, Broadmeadows, Dandenong, Footscray, Frankston and Ringwood. Melbourne@5million encouraged high density and ‘mixed use’ developments for suburbs identified as Central Activities Districts. From 2002 when Melbourne 2030 was introduced to 2012, the Melbourne growth boundary has been extended four times to accommodate rapid population growth (VSG 2013).
In 2014, the VSG introduced Plan Melbourne 2014 which further enhanced developments and expansions around suburbs identified as Central Activities Districts. In order to maintain the quality of living in some heritage areas and increase effective growth of Melbourne, VSG released new Residential Zones in 2014 including a Residential Growth Zone for areas that had been identified for growth, such as Central Activities Districts, a General Residential Zone which aims to respect and preserve urban character and allow modest housing growth while respecting urban amenity and a Neighbourhood Residential Zone for heritage areas with existing amenity and streetscapes which need to be protected by restrictions on subdivision and high density development (VSG 2014).

Recently, the VSG introduced Melbourne 2017-2050 which is aimed to grow Melbourne effectively including increasing minimum private open spaces for different lot sizes, provide sequenced and staged development in growth areas as well as use surplus government land to boost social housing supply. As a result of this, the West Gate Tunnel which links western suburbs and the Melbourne CBD will be constructed from 2018 and 17 new suburbs are introduced across the Melbourne fringe which will provide 100,000 lots within two years. Most of the new suburbs are located on the northern and western urban fringe (VSG 2017).

Melbourne, as one of Australia’s major cities has experienced significant house price growth caused by rapid population growth over the past two decades. However, the house price performance in different suburbs shows a degree of inconsistency. Figure 1.4 shows the median house price across Metropolitan of Melbourne as at 2016.
Figure 1.4 shows that the median house price tends to vary across different locations around Melbourne with most expensive houses located in the inner city and bayside areas. Median house prices decrease as distance from the Melbourne CBD increases. However, there are cases where two suburbs located next to each other have a different median house price. For example, Niddrie and Keilor East are two suburbs that are both located 14 kilometres north-west of the Melbourne CBD. However, as at 2016, the median house price for Niddrie was $1,020,000 while the median house price for Keilor East was $672,800 which represents a $347,200 difference in median house price (REIV 2016).

1.2 Statement of the Problem

Given the significance of the housing market, the performance of housing prices has drawn significant attention from the policy makers, investors, and researchers. Therefore, it is important to understand the house price determinants which are often reported at either macroeconomic level or microeconomic level.

There have been extensive studies on house price determinants at a macroeconomic level. The studies suggested house price movements at a macroeconomic level are closely related to a common set of macroeconomic variables and market specific conditions. However, no fixed
set of price determinants has been identified and each country has a unique set of price
determinants based on its economic structure and conditions (Stepanyan et al. 2010). Most
importantly, existing studies suggested, in relation to house price changes, there is a degree of
price heterogeneity in local housing markets and such deviation cannot be explained by
national housing price models (Adair et al. 1996, Mark and Goldberg 1998). In addition, based
on the characteristics of housing markets, the markets are segmented at submarket level,
therefore, estimating house prices using a national price model will produce the estimations
subject to aggregation bias (OECD 2005).

At a microeconomic level, there has been an improved understanding of housing markets
assisted by identifying and understanding individual factors influencing housing decisions
(Boris et al. 2009, Yates 2008). There have been studies to examine the relationship between
local factors and house prices across the globe. When microeconomic variables are discussed,
past studies focused on five themes: transportation, neighbourhood characteristics, social
characteristics, schools and planning regulation. Amongst research on a local price level,
existing studies suggested the effect of different local factors on house price performance varies
(Cheshire and Sheppard 2004, Efthymiou and Antoniou 2013, Kupke et al. 2012, Machin and
Salyanes 2010, McDonald and Osuji 1995, Munoz-Raskin 2009, Rouwendal and Van Der

Although there have been studies conducted at an international level, nominal attention has
been placed on examining local house price movements in Melbourne except three studies.
Bourassa and Hendershot (1995) examined house price performance of both Sydney and
Melbourne local government areas in 1991 and found there was a submarket evident in Sydney
and Melbourne, however the influence of location variables to house price performance tended
and confirmed that a relationship existed between established house values and social
constructs. Boymal et al. (2013) examined the relationship between public transportation and
Melbourne home values in 2009 and concluded that proximity to train stations has an overall
positive effect on property values. However, existing studies only focused on examining one
or two factors affecting the house price performance of a city or a suburb, with nominal
attention on eliciting the combination of all factors and how those factors would have a
different effect in different locations, especially locations that are close to each other, but have
a different price performance.
1.3 Research Aim and Objectives

The aim of this research is to investigate the local housing markets to determine key price determinants. When evaluating the price determinants, it is necessary to investigate a particular local market as vehicle to develop influences of housing choice decisions. For this research, Melbourne is selected as a case study.

This research explores the performance of Melbourne local markets and uses sub case studies of individual suburbs to analyse drivers for local house price performance. The results are to understand why house prices vary across different locations and what are the factors influencing such price differentiation.

The objectives for the research are:

- **To examine the relationship of house prices at different levels – local to country/city/local level.** First, to examine the house price performance at different levels and then to compare the price performance between each level to determine if house price at different level perform differently. Most importantly, to identify if there is an existence of price differentiation between locations that are geographically similar.

- **To investigate the relationship of local house prices and macroeconomic factors.** Examine and compare the performance of macroeconomic factors on the performance of house prices at a local level to determine if local house prices perform in line with the performance of macroeconomic factors.

- **To identify and analyse key local housing market drivers.** Establish the effect of local factors identified in the literature review on the performance of local house prices. This is aimed to identify drivers causing local house price differences and also demonstrate if the effect varies across locations.

- **To understand better key housing price determinants at a local level.** Discuss the research results and model developed for this research with existing studies to provide better understanding of key price determinants at the local level.
1.4 Research Design and Methodology

To achieve the research aim, the research adopts both quantitative and qualitative research methodologies which constitutes a mixed methods research design (Amaratunga et al. 2002). The execution of the research design is separated into two distinct phases with quantitative followed by qualitative, thus is classified as a sequential explanatory mixed method design (Creswell and Clark 2011).

The research design aims to utilise qualitative data to validate and explain the quantitative results and further provide in-depth perspective of the research. First, this research uses quantitative analysis to examine the house price performance across different suburbs of Melbourne using a correlation coefficient test and GARCH model. Data from 547 Melbourne suburbs over 20 year period (1996-2016) are collected and analysed. This level of local sales data created a point of difference from previous research pages which focused on national/city markets. Based on the results, this research selects suburbs that are located next to each other but have different price performance. After the case studies are identified, the second stage of the research uses the qualitative method through in-depth interviews to investigate the reasons and to explain and understand phenomena resulting from the quantitative data. The benefits of using the mixed method for this research is the ability to support research objectives and the ability to triangulate the data and assure its validity and reliability.

1.5 Scope and Limitations

The performance of housing prices has drawn significant attention from the policy makers, investors and researchers. House prices often are reported at either macroeconomic level or microeconomic level. At microeconomic level, there has been nominal attention on examining the effect of local factors on house price performance at a local level, especially locations that are located close to each other.

In order to examine the house price determinates at a local level, variables including both macroeconomic factors, such as interest rate, household income and GDP and microeconomic factors such as schools, social characteristics, neighbourhood characteristics and transportation are analysed and incorporated with the performance of Melbourne local house price. This research covers the years 1996 to 2016 to include growing and inevitable globalization of the
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world economy. The series data will be analysed at a local level to determine the relationship between house price determinants and local house price differences. However, this research will not quantify the impact of each determinants on housing price movement.

There are limitations associated with this study. The timeframe and the number of variables included in the research are necessarily limited. The thesis examined the house price performance from 1992 which included the most prolonged price growth (1996-2008). However, the significant house price growth was started from 1971 to 1974 (Abelson and Chung 2005). To test the accuracy of the hypothesis and to compare them with historical trend, a longer timeframe is suggested for future analysis.

The research aim was achieved from historical data or past decisions made based on economic situations and individual preferences at that time, therefore, the research results can only be seen as reference and guidance for future price movements, not actual prediction of house prices as the economic growth outlook remains uncertain.

This research covered only the geographical area of Metropolitan Melbourne. The scope was therefore limited to specific locations. However, data sourced from public and property organizations presented sufficient explanation on selected determinants. It is recommended that a study of greater magnitude could be undertaken at a later stage. Nominal research has been done on local housing market in Melbourne and this research should be treated as an initial step and it would be interesting to undertake this process in different cities which have a range of social and economic structure.

The method used for this research provided findings with an explanation of parameters affecting local house prices across various locations. However, as stated earlier, to test accuracy of the results, it is necessary to develop the model using different statistical techniques, data composition and research models.

This research is aimed at examining the interrelationship between local determinants and housing price performance, not quantifying the impact of each determinants to housing price movement. The quantification impact can be examined and investigated in future research.
1.6 Contribution to Knowledge

The findings from this research form an important insight into local house price determinants. The proposed multidisciplinary approach to the study reflected the complexity of household decisions and the way submarkets segmented based on a variety of microeconomic factors. This thesis therefore contributed to an understanding of house prices at a local level in two main areas: contribution to body of knowledge; and practical contribution to property industry expertise.

i. Contribution to body of knowledge

As noted in the literature review (chapter 2), there are limited studies on house price determinants at a local level, especially in Australia. International studies appear to focus on examining one or two local factors on house price performance with nominal attention on examining the combination of local factors. In review of all identified local factors to the effect of house price performance, the results of this research expanded the body of knowledge and provided a better understanding of local market operation and determinants. In addition, by further examining the relationship between local house price performance and macroeconomic factors, this research provided insights into local housing market dynamics, in particular, it lends strong support to the hypothesis that microeconomic factors cause local house price differentiation.

The research is unique in its access to the extensive REIV data base. The sales information collected include number of transactions and median house prices on a quarterly basis for 547 Melbourne suburbs from 1996-2016. This level of local sales data created a point of difference from previous research pages which focused on national/city markets.

The quantitative investigation included extensive data analysis which covered detailed visual, descriptive analysis and correction modelling. This extensive and time consuming approach highlighted interesting performance differences across local markets which appeared not to be covered in previous academic research.
To further support the research, risk measurements were undertaken to divide the local Melbourne residential markets into different performance profiles based on the standard deviation statistics. The variations in local residential market performance have not previously been examined in the housing literature.

ii. Contribution to buyers/investors

Housing is often considered as a major investment and a significant financial asset. It is important to understand determinants of local house prices in respect to individual buyers and investors as the latter becomes a relatively high proportion of the population owning residential property. In Australia, almost 70% of the total of Australian household assets is in the housing form. Australia also has relatively high homeownership rates in the world at 68% (ABS 2015, RBA 2015). This research provides a platform for understanding the influences on buyers and investors’ decisions based on historical data and ultimately improved recording of key price determinants at a local level.

In highlighting different risk profiles of local residential markets, special focus was made on variation between markets in close vicinity to each other. The research explored four residential market pairs with diverse risk profiles. The in-depth understanding of house price determinants in these case studies was achieved through interviews with local government planners, valuers and real estate agents with expert knowledge on the selected paired housing market.

It is no doubt that a better understanding of the relationship between local factors and house price performance will help buyers or investors to identify and address issues that were attributable as factors to residential property house performance and hence making better investment decisions.

1.7 Thesis Structure

The thesis outline is presented in Figure 1.5 and detailed chapter descriptions are as follow:
Chapter 1: Introduction

Chapter 2: Housing Price Performance and Determinants

Chapter 3: Research Methodology

Stage 1
Define Research (Chapter 1, 2, 3)

Stage 2
Quantitative Analysis (Chapter 4)

Stage 3
Qualitative Analysis (Chapter 5)

Stage 4
Discussion and Implementation (Chapter 6)

Adopted Yin (2012) Case Study Research pp50
Chapter 1 provides the background to the research and introduces the research problem. The research aim and objectives are presented and the thesis structure is outlined.

Chapter 2 is organized in two sections. First is to provide background study on housing price performance in Australia at both country, city and local level. Then, the chapter moves on to examine existing empirical studies in the field to identify the knowledge gap in order to reflect the purpose of conducting the research. Findings in the chapter provide theoretical foundation for the research.

Chapter 3 articulates the research design for this research, including methodology, data collection, data analysis and criteria for case selection. The research design provides the framework and process of conducting research and data analysis.

Chapter 4 reports the result of the quantitative analysis including examinations of the performance of Melbourne housing market and conducts the descriptive analysis for the local suburbs. The purpose of descriptive analysis is to provide the foundation for case selection in the following chapter (chapter 5). Most importantly, this chapter investigates the relationship of house price performance at different levels and identifies if macroeconomic factors are the key to the local house price differences.

Chapter 5 reports the result of the qualitative analysis including providing detailed analysis of representative cases using holistic multiple-case designs and investigates local price determinants through in-depth interviews of real estate professionals, e.g. real estate agents, property valuers and town planners. This chapter aims to provide reasons behind the phenomena seen in the quantitative analysis (chapter 4).

Chapter 6 summaries and discusses the findings from both chapter 4 and 5 and relates the findings to the research objectives established at the beginning of the research. It then outlines the implementation and recommendations for future research.
CHAPTER TWO

HOUSING PRICE PERFORMANCE AND DETERMINANTS

2.1 Introduction

Housing is a unique asset class as it has a dual role, it can be regarded as an investment and importantly it can offer social and consumption features. Housing is acknowledged as the second essential human need after food (Maslow 1943). Internationally, housing is recognized as a factor for the assessment of human development and societal civilization (UNO 1976). Hayakawa (1983 page 4) noted that

“Housing which does not provide space of contemplation will not allow for the growth and development of individuality. Thus, housing not only contributes to the development of man physically and mentally, but also contributes to the growth of culture and human morals.”

In a broader sense, housing profoundly affects family and community life and wellbeing.

In addition, housing is an issue that not only touches the life of an individual, but is also considered as an important asset for households. In Australia, almost 70% of all household assets is in the form of housing. The country has a relatively high homeownership rate at around 68% (ABS 2015, RBA 2015) compared to the US at 64%, UK at 63% and France at 64% (Gopal 2016, Osborne 2016, Trading Economics 2015).

From an investment point of view, the Australian Taxation Office made an announcement in 2015 that over 8% of the population had an investment property (Chapman 2015). Property as an investment is evident by past long term growth performance. Properties in major cities like Melbourne and Sydney have increased in value at an average of almost 10% per annum between 2002 and 2016 compared to stock market of 7% (ABS 2016d, ASX 2015). Historically,
residential property has been relatively stable and unlike companies, land retains a physical presence in an economic downturn or through poor management. Property as an investment also has tax benefits including deductible expenses such as interest on loans, repairs, maintenance, depreciation and negative gearing to reduce tax (Chapman 2015).

Housing is fundamental as it offers social and consumption features and is also considered as an important asset for households. Therefore, it is important to monitor the housing market conditions and most importantly the drivers affecting house prices. This chapter examines house price performance at different levels and reviews the literature on house price determinants. Figure 2.1 illustrates the structure of this chapter.

As Figure 2.1 shows, the chapter is organised in three parts. The first part is a background study which includes discussion on the importance of the housing market to the economy and individuals and an overview of house price performance at different levels. The background study aims to provide an overview of historical performance of the housing market both nationally and locally in order to introduce the existence of inconsistency between different price levels. This part specifically focuses on the Australian housing market and its performance at country, city and local levels.
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The second part of the chapter reviews empirical evidence of house price concepts and the associated determinants. This includes explanation of the relationship between macroeconomic factors and house price performance; and microeconomic factors and house price performance. At each level, this research places emphasis on international literature and then narrows down to the literature to the Australian market. The aim of this stage is to provide understanding of house price determinates from past empirical analyses.

The final part of the chapter summarises key findings and details the knowledge research gap.

2.2 Why is Housing Important?

The performance of the housing market plays an important role in the economy and is recognised by many as a barometer of economic confidence. Changes in levels of confidence can result in over-optimism about future housing market performance and can lead to market collapse when there is an unpredicted downturn (Mehta 2013). For example, in some European countries (e.g. Greece, Ireland and Spain) there were major housing booms before the GFC due to high confidence about future housing performance. With high confidence in the housing market, consumer borrowing rose against income which leads to household saving ratio dropping (Hiebert 2006). After late 2008, when the GFC spread worldwide with falls in assets and equity value, there appears to have been a more significant change in attitudes and behaviour which leads to an increase in the saving ratio due to low conformance about future housing market. Those were often seen as factors causing weak housing performance after GFC (Mehta 2013).

The changes in house price performance has attracted interest from real estate developers, banks and policy makers (Schulz and Werwatz 2004). Therefore, it is critical to understand the impact of the housing sector to the economic environment at different levels, specifically housing and the economy and housing and the individuals.

2.2.1 Housing and The Economy

According to Mankiw (2007), total value in an economy is determined by aggregate demand including consumption, investment, savings and net trade. The sum of these values provides an overall indication of the economy’s size and performance. In highlighting the important role
housing plays in the economy, the value of the housing market is based on supply and demand related value. Supply related value includes construction, transaction costs and commission, where demand related value includes consumption impact such as interest rates on loan repayments, which all accounts for a significant portion of the total value in an economy. Therefore, changes in housing market value and market performance can influence a country’s prosperity (Mankiw (2007). The influences are to a variety of sectors including direct GDP contribution, household saving, consumption impact and government policy interaction which are discussed in following sections.

I. Direct GDP Contribution

Contribution of the housing sector to GDP includes construction of new homes, alterations and additions to existing home and ownership transfer costs such as broker commissions on sales of new and existing homes. Figure 2.2 shows the contribution of the housing sector to total Australian GDP between 2002 and 2016.

![Figure 2.2 Contribution of the Housing Sector to Australian GDP](source: ABS(2016))

As Figure 2.2 presents, the overall housing sector to GDP contribution has been relatively stable through recent changes in economic conditions. In Australia on average, the housing sector accounts for 15% of total GDP between 2002 and 2016 including approximately 10% from housing construction, 2% from alterations and 2% from ownership transfer costs, albeit the slight decrease in 2009/2010 to approximately 13% and slight increase in 2015 and 2016 to approximately 17% in total contribution (ABS 2016).
According to ABS (2016) national accounts data, construction accounted for an average 9.26% of the country’s GDP. It was the second largest contribution to Australian GDP following the financial and insurance services sector at 11.50%, with mining activity ranked third at 8.87%. Given the proportion of housing sector to the direct GDP contribution, housing is a central component to Australia’s long-term economic success and not surprisingly, GDP generally tracks the housing cycle. Figure 2.3 illustrates the relationship between total housing commitments and GDP performance.

Figure 2.3 illustrates the contribution of Australian housing commitments to GDP growth between 2002 and 2016. Total Australian house commitments include owner occupied housing and investment housing. Owner occupied housing includes construction of dwellings, purchase of new dwellings, refinancing of established dwellings. Residential investment housing includes construction of new dwellings and residential renovation for investment purposes (ABS 2016, ABS 2016c).

In 2005 and 2006, total housing commitments contributed to 2% of GDP growth for 2 years and then increased to 10.0% in the boom year of 2007 which caused GDP to increase by 8.2% compared to a 7.8% in the previous year. However, during the economic recession, the housing sector was a significant drag on GDP growth. In 2008, there was a total 20.0% decrease in contribution from owner occupied housing and investment housing section which lead in part to weak GDP growth of only 0.7% compared to 9.2% in the previous year (ABS 2016, ABS 2016c).
After 2008 (post-GFC), there were supportive housing market policies including lower interest rates and increases in the First Home Owner Grant which resulted in total housing commitments increasing by almost 20.0% within a year in 2009. This significant increase in housing contribution caused the GDP to grow by 9.4%. However, due to excess supply of existing inventory produced in 2009 and lack of market confidence after the GFC, total housing commitments to GDP dropped significantly by almost 20.0% in 2010 with another 5.0% decrease in 2011. The GDP growth followed the commitment drop in 2010 and 2011 and slowed down to a 5.4% increase in 2010 and 2% increase in 2011 (ABS 2016, ABS 2016c, Kannan et al. 2009).

Between 2012 and 2014, housing market has gradually recovered with increased house sales and investment, specifically as part of housing GDP contribution. Total housing commitments grew slightly in 2012 by 2% and then the contribution increased dramatically in 2013 by almost 20% and then followed by additional 18% increase in 2014. Figure 2.3 summarises the positive relationship between housing sector and GDP growth. A strong housing market can boost GDP growth and as Andrew Harvey, senior economist from HIA quotes: ‘It is impossible to have a strong economy without a strong housing industry.’ (HIA 2012 pp2)

II. Consumption Impact

A major part of total economic consumption is personal (household) consumption. As at 2016 household consumption formed up to 69% of the US economy, 45% of the UK economy, 56% of the Japanese economy and 57% of the Australian economy. For those countries, amongst all household consumption, housing related spending such as repayments on loans, maintenance and utilities formed 20% to 30% of total household spending (ABS 2016a, Economic Research 2016, European Commission Statistics 2016, The World Bank 2013).

As Sachs (2012) explained, consumption impact includes changes in housing wealth, active mortgage withdrawal and home equity borrowing. On an individual perspective, when house prices are rising, the value of the householder’s physical assets improve. This may encourage home owners to release some of the wealth to fund extra consumption which may be spent to benefit the economy. Alternatively if house price fall, householders become more cautious especially if negative equity occurs, the home owner will be forced to refrain from spending more than otherwise might. Accordingly, households commonly plan their spending based on
the value of their assets, especially housing assets (Iacoviello 2011). Figure 2.4 demonstrates the relationship between housing market performance and the household saving ratio.

As Figure 2.4 shows, the household saving ratio was relatively low between 2002 and 2006 at only 0.20% due to the introduction of capital gains on housing assets as people were willing to spend more and save less (ABS 2016a, ABS 2016d, Finlay and Price 2014).

From 2006 to 2008, Australian house prices started to increase at an average annual growth rate of around 10% compared to only 5% per annum in previous three years. Increases in house price performance was accompanied by increases in household saving ratio which increased sharply from 2006 as modest household consumption growth and interest rates rose eight consecutive times from March 2005 to control the booming market. The increase in household saving during that time reflected a change in households’ attitudes towards debt and financial vulnerability, after a long period with lower interest rates, financial deregulation and strong housing market performance that caused an increase in household borrowings (ABS 2016a, ABS 2016d, Finlay and Price 2014).

The saving ratio continued to increase as the GFC spread around the world and assets and equity values started to decrease between 2008 and 2009. Due to the GFC, household’s attitudes and behaviour has changed. According to RBA (2016b), an increased share of households believed that bank deposits and paying down debt were the ‘wisest place for savings’. The modest rate of increase in household indebtedness suggested that household behaviour remained cautious. With a slowing domestic economy and general increases in
uncertainty about the market, the household saving ratio reached its highest level over 20 years to 7% in mid-2009 (ABS 2016a, ABS 2016d, Finlay and Price 2014).

As the housing market was recovering from the GFC and the introduction of new policies including increasing the First Home Owner’s Grant boosted house prices in 2010. Due to this, household saving ratio dropped in 2010 to reflect household’s confidence about the housing market. However, the household savings ratio increased again in 2011 and remained at relatively high level until 2013 as a reflection of the weak housing prices and uncertainty about future market performance. From 2014 onwards, household saving started to decline due to strong housing market performance at an average increase of almost 10% per annum and record low cash rate at only 1.50% (ABS 2016a, ABS 2016d, RBA 2016).

Figure 2.4 demonstrates household saving ratio is closely linked with the performance of housing markets. Changes in economic conditions or housing price performance can affect household behaviour and attitudes towards debt and financial vulnerability.

III. Multiplier Effects – Employment

Beside direct GDP contribution and consumption impact, the performance of the housing market is also linked to the performance of other economic sectors. Multiplier effects include the effect of changes in housing investment or housing wealth to labour market, bank balance sheets, consumer confidence and adjacent sectors such as furniture purchases.

For example, in the US, nearly 13% of jobs were estimated to be related to the housing industry during the boom years between 2002 and 2006, which includes jobs linked to housing finance such as mortgage brokers and sale and renting services such as real estate agents and property managers. In India, the real estate industry is the second largest employer in the country and it employs about 15% of the educated workforce (Bhate 2009, Veiga 2013).

Similarly, in Australia, housing has a broad multiplier reach through to the wider economy in terms of activity and employment including construction and property services and associated sectors such as retail and manufacturing. Figure 2.5 presents the number of people hired in the housing industry between 2000 and 2016 including housing construction employment and property services employment.
As Figure 2.5 shows, over the past 15 years, the growth trend between the number of people employed in housing construction and property services is similar. Employment in Australian housing construction industry has been growing steadily at an average rate of 4% per annum. In the growth years between 2005 and 2008, housing construction employment improved by almost 6% per annum as results of significant 8% increases in a number of dwellings constructed (ABS 2016c, ABS 2016e).

During the GFC in 2008/2009, the number of property services employees decreased by almost 10% from the previous year. Although the Australian economy slowed down, the housing construction industry was not affected by the recession as much as other western countries like the US and the UK. This was mainly due to stimulus measures implemented to combat the GFC. The Australian government doubled the grant for first-home owners on new dwellings as stimulus packages to support housing construction and other industries post-recession were introduced. Total of 45,000 dwellings were constructed within 6 months (2009/2010) nationwide after the stimulus package was introduced. It quickly reflected in a 2% increase in total construction workers equivalent to 24,000 additional construction workers employed. This was reflected in 2010’s housing industry employment where the numbers employed increased to its pre-GFC level (ABS 2016c, ABS 2016e).

However, the consequences of housing over supply due to the government stimulus packages introduced during the GFC made the Australian residential housing market experience its second recession for four years between 2010 to 2014. There was an immediate 5% decrease...
in housing industry employment in 2010 and additional 6% decrease in 2011 and remained at the same level during 2012 and 2013. Housing starts in the March 2012 quarter fell to their lowest annualised level since the new home building recession of 2000-2001, considerably passing along the way the milder recession mark of 2008-2009. With supply decreasing, consequently job losses in the sector were mounting; Over 40,000 jobs were lost as result of direct property industry recession post GFC (ABS 2016e, Australian Construction Resources 2013).

From 2013 onward, as the performance of the housing market strengthened, the number of housing industry employment increased significantly. Between 2013 and 2016, there was 28% increase in total number of employment added which reflects the additional 110,000 employments (ABS 2016e). Overall, housing industry employment is closely linked to the performance of housing market.

IV. Government Policy Interaction

Given the significant influence of the housing sector on the economy, housing has been a target of government fiscal policy aimed at achieving low inflation, mitigating unemployment and balancing growth. The significant housing price changes over the past decade has attracted the interest from real estate developers, banks and policy makers. Policy makers in major countries have tried to control house prices by using fiscal policies (China) and monetary policy (US and UK) with mixed results (Lothian 2009, Schulz and Werwatz 2004, Zhang 2009).

In China, to control overvaluation of the housing markets, the Central Government proposed policies of enforcing personal income tax of 20% on profits from home sales and increased down payments and higher mortgage rates on loans for second-home buyers (Dunaway and Fdelino 2006). In Hong Kong, to curb speculation of property prices, the Central Government introduced a 15% tax on property purchases made by foreigners. Also the government raised special transaction taxes to 20% on houses sold within three years of purchase (Zhang 2009). Likewise, in Australia, the RBA increased the official cash rate to 7.25% in March 2008, the highest level since 1996. This was after 12 consecutive increases in the official cash rate to control inflation, slow the strong Australian economy and reduce housing price appreciation (ABC News 2008, RBA 2016a, State Revenue Office of Victoria 2012).
During the GFC, China introduced temporary policies in 2008, including cutting interest rates, lower bank reserve requirement ratios and removing quota controls on lending strategies to reduce to the credit crunch and encourage banks to increase lending to prevent the Chinese housing market collapsing (Zhang 2009). In the US, the Federal Reserve cut the interest rate to a record low of 0.25% in 2008 to boost economic spending and a housing market lead recovery (Lothian 2009). In Australia, the RBA has cut the cash rates six times to 3% between September 2008 and April 2009 in an effort to support the economy and housing investment market. In addition, the State Revenue Office of Victoria also increased the First Home Owner’s Grant from $7,000 to $26,000 to first home buyers in 2008 to stimulate the housing and construction industry (ABC News 2008, Kwek 2012, RBA 2016a, State Revenue Office of Victoria 2012). In order to support the confidence in the housing market, RBA has held the cash rate at ‘record low’ at 1.50% since August 2016 (RBA 2016a).

2.2.2 Housing and the Individuals

At an individual level, housing is important for a sense of security and privacy and one critical aspect of security is the wealth of owner occupiers. Statistically, in Australia, housing accounts for 40% of total household assets in 2016, therefore, house prices have a critical impact on household financial wellbeing and spending in many aspects, specifically household debt and affordability (ABS 2016a).

I. Household Debt

Household debt increased considerably in many advanced economies such as the UK, US, Canada and France during the boom years, between 2002 and 2007. The ratio of household debt to income also rose from an average of 39% to 138% globally and peaked at more than 200% in the Netherlands and Norway in 2007 (Thornton 2013).

In Australia, almost 70% of the total of Australian household assets is in the form of housing and the country has relatively high homeownership rate at around 68% (ABS 2015, RBA 2015) compared to the US at 64%, UK at 63% and France at 64% (Gopal 2016, Osborne 2016, Trading Economics 2015). Due to the nature of homeownership, the debt associated with housing has increased dramatically over past the 20 years from less than 5% of household income in 1990 to more than 140% in 2016. This increase in housing debt is largely driven by
rising housing prices since the late 1990s (ABS 2014, ABS 2016a). Given the increasing trend of total household debt and the high proportion of owner-occupied properties in the housing market, home owners became sensitive to house price changes. Figure 2.6 illustrates the relationship between house prices and household debt between 2001 and 2016.

Figure 2.6 shows there is a close relationship between household debt and housing price performance. From 2001, household debt to income increased significantly and reached 140% in 2003/2004 accompanied with 62% of property price growth between 2001 and 2004. This is mainly reflective of strong housing market growth, interest rates trending down, increased access to debt due to financial competition and relatively stable economic conditions. The rapid increase in house prices gave households the confidence of future market performance and has been a catalyst to facilitate households to holding large debt (ABS 2016d, ABS 2016f, Oliver 2012).

Between 2005 and 2008 (prior to the GFC), house prices increased by 29% and the RBA raised the cash rate 8 times to 7.25%, its highest level in over 10 years in order to control the significant house price increases. The household debt during that period decreased as it cost the householders an increased portion of income to repay their loans as interest rates raised (ABS 2016d, ABS 2016f).

The International Monetary Fund reported in April 2012 that “Household debt soared in the years leading up to the Great Recession in 2008/2009” (International Money Fund 2012 page 89). When house prices declined ushering in the GFC in late 2008, many households saw their...
wealth shrink relative to their debt and with less income and more unemployment, they found it harder to meet their mortgage repayment. The GFC has brought a more cautious attitude to debt on the households, with weaker asset prices, households limited their borrowing to assets prices which were reflected by immediate 11.7% decrease in household debt within a year from 2007/2008 (pre-GFC) to 2008/2009 (during-GFC) (ABS 2016f, International Money Fund 2012, Oliver 2012a).

In reacting to the GFC and prevent housing market collapse, the government introduced numerous policies to encourage new buyers to borrow additional credit and bid up the prices of houses and resulted in a 15% increase in house price from late 2008 to end of 2009 (ABS 2016d, ABS 2016f). Although the poor performance of the housing market during the GFC directly affected household confidence, when the value of housing increased, the wealth effect from consumer and investor confidence improved (Berry 2006). Due to this, household debt spiked in 2009 to its pre-GFC level (ABS 2016d, ABS 2016f).

As house prices continue to perform strongly from 2012, the household debts started to increase again. Between 2012 and 2016, household debt to income ratios increased from 120% to 140% being its 2nd highest level in 15 years as result of a 40% increase in house price growth during the same period (ABS 2016d).

II.    Affordability

In Australia, household debt is classified into three categories: Owner-occupier housing debt, investment housing debt and other personal debt. Along all types of debts, owner-occupier housing debt accounts for more than half of total household debt which means a major part of household borrowings are spent on maintaining their own homes, e.g. interest repayment (Worthington 2006).

As at December 2016, Australian household debt totalled $2.80 trillion Australian dollars, of this, $2.10 trillion is for housing related debt whilst only $0.70 trillion is for personal related debt (ABS 2016f). Given the increasing trend of total household debt and high proportion of owner-occupied housing debt, home owners were spending more of their income to service their debts. The average home cost around seven times the annual wage in 2016 compared to about four times the average annual wage in 2006 (ABS 2016f, Davies 2010). Thus, home
owners became more sensitive to interest rate changes - the major spending of home cost. When the cash rate reached 10.50% in 1991, roughly 9.00% of the average Australian household income was being used to repay for interest. However, just before the recession in 2008, with cash rate of 7.25%, almost 14.00% of income was used to repay interest, an increase of 56.00% (ABS 2014).

With increased interest payment ratio resulting from increased household debt, the major consequence of significant property price rises; housing affordability has become critical issue in recent years. According to the 13th Annual Demographia International Housing Affordability Survey published in 2016, Australian cities, such as Sydney and Melbourne have been ranked as having one of the most expensive housing markets across 337 selected cities (Demographia 2016). Figure 2.7 presents the changes in Australian housing affordability between 2001 and 2016. Australian housing affordability is calculated based on Median home price, interest rate, monthly payment and average/qualifying annual household income (Commonwealth Bank of Australia 2016).

Figure 2.7 shows affordability started to decrease from 2002 where house prices began to accelerate and affordability dropped to its lowest point in 2008 resulted from up trended household debt and increases in interest rates from 2002 for 12 consecutive times to its highest level in March 2008 since 1998 (Commonwealth Bank of Australia 2015, Pallisco 2010, RBA 2016).
As the GFC spread to Australia in 2008/2009, the affordability spiked in 2009 being the highest level since 2003. This reflects Australia’s falling house prices and the low interest rate policies introduced by RBA to support a market recovery (RBA 2016).

As the housing market was recovering from the GFC and the cash rate decreased from 2011 for 12 continuous times to 1.50% in 2016, affordability started to increase again from 2011 and reached its highest level in 2013/2015 since 2002. Although the affordability of Australia’s housing market has increased over recent years, the overall affordability still remains low compared to other counties like the US and the UK (Demographia 2016).

2.3 Level of Housing Performance

A house has become an important component of society, as it provides a place of comfort and security for individuals and families. Alongside the social benefits, there are now major financial considerations. For many Australians, housing is a large component of household wealth and serves a unique dual role as an investment vehicle and a durable good from which consumption services are derived (Kohler and Van Der Merwe 2015). Therefore, households’ net worth is primarily linked to the dynamics of the housing market.

Given the housing sector is important to a country’s economy and individual’s wealth, it is therefore critical to examine the performance of the housing sector. As the Productivity Commission (2004) observed, most Australians have an abiding interest in house prices, but they have not been well served with information about house prices or known why house prices moved as they do. Unlike alternative asset classes (such as equity and bonds), detailed knowledge on the performance of the housing market is restricted as there is limited transparency and no central trading-place. House price indices depend on the collection of sales data to provide measurement of performance which is reported at different levels. This section provides an overview of house price performance at different levels, namely country level, city level and local level.

2.3.1 Country Level

The global population has reached 7.5 billion in 2017 which is an almost 200% increase from 1950 compared to the same length of period previously, the global population only increased
by 80% between 1880 and 1950 (The World Bank 2016). As the result of rapid population growth, house price performance has experienced a significant movement in the past decade. Figure 2.8 illustrates quarterly house price index movement of leading global economies between 2000 and 2016.

Figure 2.8 shows the house price performance of eight leading economies in the world. In general terms, between 2000 and the mid-2008, just before the GFC, house prices almost doubled for major economies like Canada, Australia, France, UK and Hong Kong. Although Hong Kong house prices decreased slightly in 2003, it soon started to increase at a dramatic rate. Most noticeably, house prices across leading economies increased significantly between 2003 and 2008. For example, between 2003 and 2008, Canada, France and Australia house prices rose by more than 60% while New Zealand rose by 79% and Hong Kong rose by 70%. The growth was significantly higher than previous 5 years. Between1998 to 2003, house price rose by 50% in Australia, 20% in New Zealand and negative 55% in Hong Kong (Abelson and Chung 2005, ABS 2016d, RBNZ 2016, RV 2016, Statistics Canada 2016).

However, with the GFC, house prices retreated in several locations by more than 10% in a single year like Canada, France, UK, Hong Kong and New Zealand. By far the worst was the US housing market which collapsed with a 22% drop in house prices and followed with continuous negative returns for almost 4 years from mid-2007 to mid-2011 (Federal Housing Finance Agency 2016).
Even as the world economy was slowly recovering between 2009 to 2011, housing markets were still facing the difficult position of recovering to pre-GFC levels. In the US, based on house prices to rents ratio, in 2011 houses were still 7% undervalued and more if judged by the price to income ratio, they are 20% below fair value (The Economist 2016). This compares to the Hong Kong housing market which has recovered strongly since the GFC, with a significant 8% increase in prices in 2009 immediately after a 12% price fall caused by the GFC in 2008. The Hong Kong housing market continues to move upwards since 2009, with house prices advancing by more than 127% between 2009 and 2016 (Global Property Guide 2013, RV 2016). From 2013 onward, most of the world house prices started to increase steadily except for the Euro area. The house prices for the Euro area barely changed between 2013 and 2016 with only a 2% increase compared to Australia (25%), New Zealand (24%) and Canada (32%) (ABS 2016d, Eurostat 2016, RBNZ 2016, Statistics Canada 2016).

Compared with other advanced economies, Australia is often reported as having experienced relatively rapid growth in house prices over the past 16 years since 2000. Between 2000 and 2004, Australia had the third highest rate of house price inflation among the Organisation for Economic Co-operation and Development (OECD) countries, ranking behind only Britain and Spain (OECD 2005). Significant house price appreciation often accompanied national economic conditions, such as GDP, population and household income (Zappone 2010). Figure 2.9 demonstrates the performance of Australian economic conditions and house prices between 2002 and 2016.

Figure 2.9 Performance of Economic Conditions and House Price Performance


Figure 2.9 shows between 2002 and 2016, house prices in Australia increased by more than 130% at an average annual growth of almost 10% per year. Increases in Australian house prices
are often explained by population growth which has been higher than other advanced economies, driven mainly by strong immigration. Between 2002 and 2016, the population increased at an average growth rate of 1.50% per annum and almost half of Australia’s population growth are permanent or temporary immigrants. Between 2005 and 2008, Australia experienced rapid population growth averaging approximately 2% per annum and reached its highest level in 2008 at 2.4% per annum where overseas migration contributed 66% of population growth respectively. This is almost twice the rate at which the global population is increasing during the same period. This period is considered the fastest population growth experienced by Australia since 1969 (ABS 2017). The strong population growth between 2005 and 2008 was often considered as a major boost for the housing market. Australian house prices increased by 23% during the same period.

In addition, house price performance is also linked with household income. Average annual household income increased by 1.5% between 2002 and 2016. This was well above the average annual increase in the 20 years to 1995 of just 1.1% (ABS 2016, Yates 2011). The growth of household income peaked in 2008 just before GFC at 2.3% compared to previous years since 2002. Strengthening in household income also contributed to strong house price performance before the GFC (Yates 2011). Beside population and income factors, other factors, such as availability of property finance and increasing scarcity of land and shrinking in household size also played major role in Australian property price growth prior to the GFC (Hanover 2010, ABS 2016).

Between 2012 and 2016, the relationship between income and house price performance is considered nominal and the strong house price performance occurred is believed to be related to steady population growth and decreased cash rate (Emerge Capital 2015, RBA 2016).

Figures 2.8 and 2.9 show that the house price performed differently across different countries throughout the years and their rate of growing is different depending on their market conditions. For example, the population in Australia has grown significantly since the mid-2000s and this was caused by much higher net immigration. Dramatic increase in population and increase in household income are often seen as the reasons for house price increase in Australia prior to the GFC (Kohler and Van Der Merwe 2015). However, when the global economy was in serious recession, house prices for all countries were affected, but the degree of impact was different. For example, US dropped 22% during GFC compared to other economies such as
Hong Kong at 12%, New Zealand at 14% and Australia at 10% (Abelson and Chung 2005, ABS 2016d, RBNZ 2016, RV 2016). Again, after the GFC, house prices recovered at various rates in different countries depending on their market conditions and economic policy.

### 2.3.2 City Level

Within a country, when all cities are under the same monetary conditions, the performance of each city may vary. In general, house prices for all Australian capital cities have increased significantly between 2006 and 2016 with Darwin increasing by 65% and Brisbane and Adelaide increasing by 57%. Amongst all, cities like Sydney and Melbourne have the highest price growth rate almost doubling between 2006 and 2016 with Sydney growing by 97% whilst Melbourne growing by 103% (ABS 2016d). Figure 2.10 illustrates quarterly house price movement of Australian eight capital cities from 2006 to 2016.

**Figure 2.10** Quarterly Price Index of Australia Eight Capital Cities

![Quarterly Price Index of Australia Eight Capital Cities](source: ABS(2016d))

Figure 2.10 shows, from 2006-2008 (before the GFC), all Australian capital cities’ house prices increased at approximately 10% per annum. Most noticeably Perth house prices increased significantly in 2006 with 14% in the 3rd quarter and additional 11% in the 4th quarter with combined growth for the year was more than 30%. Interestingly, for the same period, Sydney-Australia’s financial centre had the lowest house prices growth of just 5% per annum (ABS 2016d).
The strength of Australia’ housing market has surprised many economists, who had predicted that Australia would suffer one of the worst housing market crashes, because of a perceived house price overvaluation (Delmendo 2016). Yet, during the GFC, house prices of most cities dropped by an average 5% with the lowest decrease in Darwin at 1% and the highest decrease in Perth at 8%. This is much lower than previously explained falls in Hong Kong (12%), the US (22%) and New Zealand (14%). The Australian capital cities experienced a limited downturn from the GFC mainly due to the national housing shortages, population growth and lower household sizes (Street 2011).

After the GFC, capital cities performed similarly between 2009 and 2012 with an average increase of 3% per annum and then slightly decreased by 1% between 2010 and 2012. After 2012, the house price in each capital city started to increase significantly, but again at different rates with Sydney’s house price increased the most by 58% between 2012 and 2016. Other capital cities increased less, such as Brisbane which increased by 18% and Adelaide increased by 14%. Interestingly, there were only two cities that did not follow the trend of others. Both Perth and Darwin house price peaked in 2014 with a 4% increase between 2012 and 2014 and then decreased by 7% between 2015 and 2016 (ABS 2016d).

Figure 2.10 summarises although all capital cities were under the same national economic conditions, the performance of each city was different and such differentiation depended on supply and demand fundamentals and impact from diverse financial and economic drivers. For example, the significant house price growth in Sydney and Melbourne is greatly affected by dramatic population growth. Sydney and Melbourne are always seen as Australia’s most popular capital cities for living. According to 2016 Australian census data, 21% of Australian residents live in Greater Sydney with a further 19% residing in Greater Melbourne. The two cities accounted for 40% of the Australian population (ABS 2017).

Between 2008 and 2015, Sydney was recorded as having the greatest population increase. Based on the new 2016 census data, Melbourne has just become the fastest growing capital. The rapid population growth in Sydney and Melbourne is considered the results of significant overseas migration (ABS 2017). Perth and Darwin house prices seemed to be linked to the resources sector. The recent decrease in house prices for Perth and Darwin between 2014 and 2016 was effected by mining investment downturn. Western Australia had experienced the greatest population growth of all states and territories over the mining boom earlier in the 2000s.
and as the projects finished in Western Australia and Northern Territory, the population was seen to decrease which caused Perth and Darwin to have a different price performance than other capital cities (Powell 2017).

Beside population growth, a key factor for Melbourne’s housing market growth is the difference between supply and demand (Macro Business 2011). Figure 2.11 presents the relationship between Melbourne housing supply and demand.

![Figure 2.11: Melbourne Housing Commencement to Population Growth](source: ABS (2008, 2011, 2016c))

Figure 2.11 indicates the number of dwellings added to population growth. From 2003 and 2009, the number of dwelling commencements to population decreased from 0.65 per person to 0.53 per person which represents 19% decrease. This is mainly due to the supply of new homes barely growing between 2003 and 2009 while demand for houses has substantially increased due to significant population growth (ABS 2008).

Between 1995 and 2002, Melbourne’s population increased at average rate of 0.57% per annum. From 2002 to 2008, the population increased at an average rate of 1.60% per annum, a 180.00% increase per annum (ABS 2011). However, total number of dwellings commenced in Melbourne increased by 7% between 2002 and 2008 whilst population increased by 10%, a significant larger growth than dwelling supply (ABS 2008, ABS 2011).

Specifically, there were nearly 378,000 persons added to Melbourne’s population between 2002 and 2008, as compared to a little more than 210,000 persons in the previous 6 years. Yet the building industry added 0.6 dwelling units per new resident compared to 0.80 in 1990-1999.
Population growth and lack of supply in Melbourne provided a strong underlying effect on house price boom prior to the GFC (Silva et al. 2011).

After the GFC, the number of house commencements per population peaked in 2010 at 0.65 per person due to policies introduced during the GFC to support the recovery of the housing market including doubling the First Home Owner’s Grant by State Revenue Office of Victoria and lower interest rates by RBA. Between 2013 and 2016, the house commencements per population increased significantly and reached its highest level in 15 years at 0.76 in 2016 (ABS 2016b, ABS 2016c).

Figure 2.10 concludes although under one national economy, house price in each city would perform differently. Some cities grew at a higher rate than others during an economic upturn and some cities were less affected than others during economic recession. The effect of price difference at a city level could be the difference in city level specific market conditions, such as population growth and city level supply and demand.

2.3.3 Local Level

Narrowing down the price performance within the Metropolitan Melbourne, each suburb tends to grow at different rate than others. Figures 2.12, 2.13 and 2.14 show the house price performance of three Melbourne suburbs located in different parts of Metropolitan Melbourne between 1996 and 2016.

Figure 2.12 House Price Performance of Toorak (Inner Melbourne Suburb)

Sources: REIV (2016)
Figure 2.12 states the house price performance for Toorak, an inner Melbourne suburb. Overall, house prices for Toorak increased at an average of 14.3% per annum over the 20 year period and throughout the years, the price movement is quite volatile with 93% increase in 2007 and then an 11% decrease in 2008.

Figure 2.13 illustrates the price performance for Blackrock, a middle Melbourne suburb. Overall, the house prices for Blackrock increased at an average of 10% per annum over 20 year period. Again the house price tended to perform differently throughout the years with some time a significant increase, such as 83% increase in 2009 and sometimes a significant decrease, such as a 16% decrease immediately following the increase in 2010.

Figure 2.14 shows the price performance for Warrandyte, an outer Melbourne suburb. Overall the house prices for Warrandyte increased at an average of 14% per annum over 20 year period. When compared to Toorak and Blackrock house prices, Warrandyte house price is less volatile
with most of the growth ranging between -20% to 40% albeit with the price increase in 2003 at 55% and in 2016 at 62%.

Figures 2.12, 2.13 and 2.14 demonstrate that the price performance for each suburb tends to be different throughout the years with sometimes positive growth and sometimes negative growth and this results suggested the existence of price difference at a local level.

In summary, house prices can perform differently at different levels, from country level, city level to local level. To further illustrate the relationship between house price performances at different levels, the following sections analyse and compare the price performance between each level, namely local to country level; local to city level and local to local level.

2.3.4 Local to Country Level

Figures 2.15 to 2.17 present the 3 year moving correlation between each individual suburb (local level) and Australian house price (national level). Price correlation measures how two variables move in relation to each other and it ranges between -1 and +1. Perfect positive correlation (+1) implies that as one variable moves, the other variable will move in a same trend. Perfect negative correlation (-1) means one variable moves in the opposite direction to the other variable. If the correlation is 0, it means two variables have no correlation. For correlations which fall between -0.5 to 0.5 ranges, relationship between two variables is considered low (Davis and Garces 2010). Figure 2.15 shows the three years moving correlation between Toorak house prices and Australian house price between 1999 and 2016.

Figure 2.15 Moving Correlation between Toorak House Prices and Australian House Prices

Sources: REIV (2016)
Figure 2.15 indicates the price correlation between Toorak and Australian house price varied throughout the years. Notably, between 2003 and 2006, the price correlation reached its lowest point being negative 1 which means the price performance between Toorak and Australia was perfectly negatively correlated. Negative correlation means if Toorak house prices decrease, Australian house prices increase or vice versa. For example, in 2003, when Toorak house prices decreased by 22.21% compared to previous year, Australian house prices increased by 7.19%. In 2005, when Toorak house prices decreased by 37.34%, Australian house prices increased by 2.53%.

Immediately after 2006, the price correlation between Toorak and Australia increased significantly to a positive 0.4 correlation. During the GFC, Toorak house price performance followed the trend of Australian house prices, but in a more dramatic term. In 2008, when the GFC hit Australia, the Australian house prices dropped by 0.28% whilst Toorak house prices dropped by 11.13%. In 2010, when Australian house prices increased by 0.96%, Toorak house prices increased by 14.98%.

Figure 2.16 shows the 3 year moving correlation between Blackrock house prices and Australian house prices. Between 1999 and 2011, the price correlation moved between 0.5 and +1 which means Blackrock house prices followed the performance of Australian house prices closely. However, between 2012 and 2014, the price correlation decreased significantly to negative 1 which means two house prices performed in the opposite direction from each other. For example, in 2013, when Australian house prices increased by 1.5%, Blackrock house prices decreased by 21.0%, the second largest decrease followed by 29.0% decrease which occurred...
in 2009 during the GFC. In 2014, Australian house prices increased by another 1.9% whilst Blackrock house prices further decreased by 13.0%.

Figure 2.17 shows the 3 year moving correlation between Warrandyte house prices and Australian house prices. Overall, the house price performance between the two were positively correlated throughout the years except for 2002, 2006/2007 and 2016 where the price correlation decreased significantly to 0, -0.4 and -0.8 respectively. In 2002, when Australian house prices increased by 2.6%, Warrandyte house prices decreased by a significant 23.0% which was the highest price decrease over the period. In 2006, when Australian house prices increased by 3.2%, the Warrandyte house prices decreased by 9.0%.

Figures 2.15 to 2.17 showed that there were certain times where house price performance at local level moved differently to that at country level with sometimes positive correlated or negative correlated and such differences varies between locations.

2.3.5 Local to City Level

Using the same method of analysis, this section further examines the price correlation between suburbs at local level and city level. Figures 2.18 to 2.20 demonstrate the results of 3 year moving correlations between each individual suburbs (local level) and Melbourne house prices (city level).
Figure 2.18 shows the 3 year moving correlation between Toorak house prices and Melbourne house prices. Again, the price correlation between 2003 and 2006 reached almost negative 1 which means Toorak house prices and Melbourne house prices were almost perfectly negatively correlated. This is similar to the correlation results between Toorak and the Australian house prices from the previous section. For example in 2003, when Melbourne house prices increased by 3.5%, Toorak house price decreased by 22.2%. Immediately after the negative price correlation between 2003 and 2006, in 2007 the price correlation between Toorak house prices and Melbourne house prices jumped from -1 to a positive 0.6, the 2nd highest level in correlation over the period. Specifically, in 2007, Melbourne house prices increased by 3.4% whilst Toorak house prices increased by 93.2% which is the highest price growth over the period. However, from 2008 onward, the price correlation between the two started to decrease gradually. For example, in 2011, when Melbourne house prices decreased by 1.1%, Toorak house prices increased by 1.2%. In 2012, when Melbourne house prices increased by 1.7%, Toorak house prices decreased by 14.7%.
Figure 2.19 shows the 3 year moving correlation between Blackrock house prices and Melbourne house prices. Overall, the price performance between the two followed each other throughout the years with price correlation ranged from 0.50 to +1. However, there were two periods where price correlation dropped significantly between Blackrock house prices and Melbourne house prices. In 2007, the price correlation decreased to -0.40 from a positive 0.98 in previous year. In percentage terms, the Melbourne house prices increased by 3.4% whilst Blackrock house prices decreased by 4.0%. From 2012 onward, the price correlation between Blackrock house prices and Melbourne house prices started to decrease from a positive correlation in 2012 to a negative correlation in 2013. For example, in 2013, when Melbourne house prices increased by 4.3%, Blackrock house prices decreased by 21.0%. In 2014, when Melbourne house prices further increased by 1.5%, Blackrock house prices further decreased by 13.0%.

Figure 2.20 Moving Correlation between Warrandyte House Prices and Melbourne House Prices

Sources: REIV (2016)

Figure 2.20 shows the 3 year moving correlation between Warrandyte house prices and Melbourne house prices. The results were similar to the correlation results of Warrandyte house prices and Australian house prices in the previous section. In both 2002 and 2006, the price correlation decreased significantly to a negative 0.93 and negative 0.29 respectively. In addition to 2002, 2006 price correlation drop, 2015 was another year with low price correlation between Warrandyte house prices and Melbourne house prices. In 2015, Melbourne house prices remained unchanged while Warrandyte house prices increased by 26.0%.

The comparison between price performance of local level and city level showed that individual suburbs tend to perform at different growth rates than that at city level which caused the price
correlation to vary throughout the years with certain periods being negatively correlated, positively correlated or with no correlation at all.

2.3.6 Local to Local Level

After comparing the house price performance of local level to country and city level, this section further analyses the price performance at local level between different locations to identify if there is an existence of differentiation in house price performance between locations. Two Melbourne suburbs are selected to demonstrate the price performance. Figure 2.21 shows the location of Altona and Brighton. Altona is located 13 kilometres south-west of Melbourne’s CBD and Brighton is located 11 kilometres south-east of Melbourne’s CBD. Both suburbs are located within the similar distance to Melbourne CBD, Port Philip Bay and both have a train station.

When comparing two suburbs in general terms, between 1996 and 2016, the median house price in Altona increased by 383% from $121,000 to $585,000 and the median house price in Brighton increased by 305% from $382,000 to $1,547,500. During the period, Altona had an average annual price growth of 19% compared to average annual price growth of 15% for Brighton. When applying the three year correlation coefficient test between two suburbs, the results are mixed. Figure 2.22 shows the 3 year moving correlation between Altona house prices and Brighton house prices (local to local level).
Figure 2.22 shows the price correlation between Altona house prices and Brighton house prices varied throughout the years. There were two periods where the price correlation was relatively low. Between 2001 and 2004, the price correlation between the two suburbs was between -0.50 and -1 which means the house prices for two suburbs performed in the opposite direction from each other. In 2002, Brighton house prices achieved 10% growth. In the same year, Altona house prices decreased by 10%. In 2004, Brighton house prices increased by 23% whilst Altona house prices decreased by 7%.

Between 2005 and 2012, the house price performance of Altona and Brighton started to move closely to each other with a positive correlation between 0.50 and +1 and reached almost positive 1 in correlation between 2007 and 2009. From 2013 onward, the price correlation decreased dramatically from an almost positive 1 in price correlation to a negative 1 in price correlation. In 2013, when Brighton house prices increased by 10%, Altona house prices decreased by 16%. In 2014, when Brighton house prices decreased by 14%, Altona house prices increased by 2%. Figure 2.22 highlights the price performance between different locations at a local level could vary throughout the years even though they are surrounded by similar features.

In summary, housing as a consumption and investment asset is important at two levels – economy and individual. Given the importance of housing to a nation’s economy and individual households, it is critical to understand housing price performance.

House price performance often is reported at three levels, namely country level, city level and local level. At country level, each country tended to perform differently from each other.
throughout the years depending on their national economic conditions and by tracking the performance of Australian house prices, there is evidence of macroeconomic factors affecting national price movement such as population and household income. Narrowing down the price performance at a city level, even under the same national economic conditions, each city could perform differently to each other depending on their city level market conditions and by tracking the performance of Melbourne house prices, the price changes at a city level can be explained by city’s population growth and the differences between supply and demand. Finally, the house price performance at different local geographic areas is also found to be different to the house price performance at country level, city level and other local level throughout the years.

Part one of the chapter is a background study aimed to provide an overview on historic performance of housing markets at different levels. Based on the analysis, there is an existence of house price differentiation between different levels. The next stage of the chapter is empirical evidence on house price concepts and associated determinants.

2.4 Understanding Property Prices Determinants

Part two of the chapter is to review empirical evidence on house price concepts and the associated determinants to provide understanding of house price determinants in theory and to show the current research gap. Figure 2.23 introduces the concept of house price determinants.

Figure 2.23 Structure of House Prices Determinants

Mackmin (1985) summarises that house prices are often determined by ‘internal’ and ‘external’ factors. The house price variables which are internal to a house are primarily quantitative in nature and comprise house size, number of bedrooms, number of bathrooms, lot size. These can be both specified and measured with some of these characteristics increasing the housing market values while others may have an adverse effect (Portnov, Odish and Fleishman 2005). The house price variables which are external to a house are traditionally categorised by two broad areas – macroeconomic factors and microeconomic factors.

At the macroeconomic level, house price is determined by the general level of house values within an urban area. This broad market environment is usually categorised in terms of demand and supply. The demand side of macroeconomic determinants include household income, housing loan charges, financial wealth, demographics, labour market factors, financial innovation on the mortgage and housing loan markets, while the supply side of macroeconomic determinants include real cost of construction, wages of construction workers and material costs (Egert and Mihaljek 2007, Mackmin 1985).

At a microeconomic level, the theory of house price formation examines location as a composite effect of a set of locational attributes. The attributes are primarily qualitative in nature, such as distance variables, environmental quality, attractiveness of the area, quality of neighbouring houses and social characteristics. Each reflects the particular local circumstances of a location and contributes to the overall desirability of a residential area. These are either positive or negative externalities that contribute to a certain amenity effect, which are internalised in house values within a much broader range. The external factors that are related to a microeconomic level are more difficult to specify and measure as they include consumer behaviour and locality factors (Adair et al. 1996, Almond 1999, Jenkins 1992, Kauko 2003).

A detailed discussion of the relationship between macroeconomic and microeconomic characters to house price performance are discussed in the following sections. For each section, this research will place emphasis on international literature first and then narrow down to the literature published in Australia to demonstrate the research gap.
2.4.1 Macroeconomic Fundamentals

At the macroeconomic level, the relationship of house prices and associated determinants can be explained by standard economic theory. The most common basic price model is the Econometric Model of supply and demand (See Figure 2.24). Theoretically, the housing market operates like all other markets where the market adjusts towards an equilibrium price. It suggests from the long-term perspective, the equilibrium price and what a household is willing to pay should be equal to the price at which the suppliers are willing to sell. When the price drifts away from the equilibrium point, like excess demand or supply, equilibrium will be adjusted to balance and will result in a price rise or fall (Glindro et al. 2008).

Figure 2.24 demonstrates the principle of the Econometric Model where the X-axis illustrates the unit quantity while Y-axis illustrates the unit price. The demand curve represents the quantity individuals are willing to trade at any unit price, and is downward sloping since the higher the price, the less people will want to buy. The supply curve describes the relationship between unit price and total quantity offered by producers, and is upward sloping as quantity increases if unit price increases. The intersection of the two curves is the equilibrium point where supply equals demand (Guisan 2005, Parkin 2003).

Like other commodity prices, house prices are also mainly determined on the Economic Model of demand and supply factors. According to standard economic theory, when demand exceeds
supply, house price rises and vice versa (Rahman 2010). Therefore, based on standard
economic theory, house price changes can be expressed by the following equation (Abelson et
al. 2005)

Equation 1

\[ P_t - P_{t-1} = \alpha (D_t - S_t) \]

Where \( P \) is the price of housing, \( D \) is the estimated demand (consumption and investment
demand) for housing, \( S \) is the supply of housing, \( \alpha \) is the coefficient, and subscript \( t \) refers to
the time period. If \( D_t > S_t \), house prices in the period \( t \) will increase. If \( D_t < S_t \), house prices in
period \( t \) will decrease (Abelson et al. 2005).

**Econometric Model – Supply (S)**

According to the economic theory discussed previously, the long-term equilibrium of housing
price should be determined by the supply and demand factors like all other commodities. Muth
(1960) was one of the first researchers to explore the statistical connection between house
prices and housing production; however, the findings were inconclusive. The results were later
confirmed by Follain (1979), that supply was entirely inelastic and it operated independently
of house prices.

The reason is that there are time lags between changes in price and increases in the supply of
new properties becoming available, or before other homeowners decide to place their properties
onto the market. The long-term impact of time lags on price depends on the length of time for
the supply response, which in turn is determined by the price elasticity of supply (DiPasquale
1999). Similar results were found by Kenny (1999) who concluded the market housing price is
always against the long-term market clearing price due to the time lag from high transaction
fees and the slow adjustment on the housing supply. In the short run, the supply of the houses
is almost fixed while it is more flexible in the long run. Draper (2000) also suggested the supply
of new housing is relatively inelastic in the short term because the supply of housing primarily
depends on the stock of housing, and the stock does not change much from year to year.
Therefore, housing supply is inelastic.

From a practical point of view, Weston (2002) who studied the response of English building
contractors in relation to the shortage of housing supply concluded that building contractors
rather than raising the quantity of production, place more expensive homes on the market because a contractor’s first concern is maximization of profits. Moreover, housing supply is also affected by the costs of building. The intention of the government and its policies with regard to housing and land release may also significantly affect the housing supply and housing price (Bodman and Crosby 2004, Bourassa and Hendershott 1995).

As Stepanyan et al. (2010) suggested, the shortage of land for housing and the time needed for new construction to be completed will cause the supply side of the market to be more rigid. Consequently, though causality between price and production can be formulated as a theory, it is in practice difficult to prove with statistical models. Due to these considerations, most of the studies in empirical literature focus on the demand side when estimating house price determinants.

**Econometric Model – Demand (D)**

The demand for housing is driven by fundamentals such as household’s wealth, population growth, availability of credit, interest rates and the unemployment rate. Many of these factors could change rapidly with the economy, particularly in the case of developing and transition economies. The factors affecting demand in housing market can be expressed as following:

\[ Q_d = f (P_{n-1}, P, Y, G, Z) \]  

*Equation 2*

Qd refers to the quality of demand and it is equal to a function of price (rent) of a property \( P_n \), the price of other forms of tenure \( P_{n-1} \), the level of income \( Y \), government policy \( G \) and a sum of other factors \( Z \) (Myers 2011). The equation \( Q_d \) often is adopted and extended to present various factors in empirical studies including:

- Interest rates and disposable income

Hofman (2005) studied the Dutch housing market and found the equilibrium price of housing can change quite rapidly with developments in income and interest rates. If interest rates were to rise substantially in the period ahead, house prices may still fall. This is supported by Hunt and Badia (2005) who analysed the UK housing market and found housing and consumption demand in the UK are sensitive to movements in short-term interest rates. When short-term
interest rates are low because monetary policy is attempting to support economic recovery, the aggregate demand and housing demand will rise together due to larger portion of household disposable income is available to finance consumption expenditure. As a result of that house price starts to increase.

- Inflation

There are a number of ways house prices can be affected by real activity and inflation. A rise in housing prices could raise the ability of households to borrow when there are imperfections in the credit market, by raising the value of collateral (Bernanke, Gertler and Gilchrist 1999). Annett et al. (2005) suggested across 8 Euro-countries, there is a positive relationship between house prices and inflation. Tsatsaronis and Zhu (2004) suggested there is a strong and long-lasting link between inflation and housing prices. The link suggests that long periods of elevated inflation followed by a sharp deceleration of price growth may, in the short term, breed misalignments between house prices and longer-term determinants of residential real estate values.

- Stock Market

There is a relationship between performance of stock market and house prices. Changes in the perceived return-risk on specific assets will generate investment portfolio restructuring which would also effect the demand for housing through changes in the related user cost. For example, if the return on alternative investments have greater risk (stock market investment for instance), then people tend to invest in less risker asset such as property, but this also depends on an investor’s risk tolerance (Ayuso et al. 2006).

- Real Credit

It would appear that the provision of greater levels of credit (in terms of loan to income ratios) will contribute to the rate of growth. Thus, while fundamental factors continue to experience favorable conditions (low interest rates, steady income growth rates etc.), the housing market is likely to continue to experience some price growth. However, in an equilibrium context, if the market is subject to a significant income and/or interest rate shock and credit institutions,
consequently, revise their credit to income ratios downwards, this will result in an initial price declines being exacerbated (Fitzpatrick and McQuinn 2004). A greater level of credit availability means that, mortgage holders have outstanding loans that are greater than what they otherwise would have been if availability had been curtailed. If an increasing proportion of their loans are to borrowers with a higher loan to value ratio, then they will have less of a comfort margin in the event of a decline in residential property prices (Algieri 2013).

- Population growth

Population growth is seen as playing an increasing role in explaining housing price growth. The rate of household formation is a contributing factor to population and increase in population will provide higher demand for property. With inelasticity of supply, house prices will increase due to an increase in demand (Kohler and Van Der Merwe 2015).

Many of the above mentioned factors could change rapidly with the economy (OECD 2005, Stepanyan et al. 2010) and housing price movements can differ substantially across sectors (Tsatsaronis and Zhu 2004). The effect of those factors on house price movements have been examined by existing literature across different countries. The following section will discuss the empirical studies on how house prices have been affected by different factors across different countries.

With analysis of combining countries, Sutton (2002) examined house price fluctuations in six advanced economies namely, the US, UK, Canada, Ireland, the Netherlands and Australia. He suggested that a decrease in the real interest rate and increase in national income lead over time to increases in house prices. Egert and Mihaljek (2007) focused on house prices in Central and Eastern Europe (CEE) and found that house prices in eight CEE economies were to a large extent driven by GDP per capita, real interest rate, housing credit availability, and demographic factors. Likewise, Iossifov et al. (2008) focused on house prices in 20 advanced countries in Western Europe and Asia covering data from 1980-2007 and found, for the sampled countries, that house prices were aligned with fundamentals, such as real per capital GDP, interest rates, unemployment and population.

However, Tsatsaronis and Zhu (2004) applied a structural Vector Auto Regression (VAR) to a sample of 17 developed countries and concluded that GDP had very little explanatory power
over house price movements, while inflation and variables related to mortgage finance had the most influence on house prices. Similar Annett et al. (2005) also showed that real income per capita was not a major determinant for short-run house price dynamics in the panel of EU-15 countries and was significant only in some countries (Germany, Ireland and Finland).

In recent years, Andrews (2010) analysed real house prices in a panel of the OECD countries using the “Hausman test” and found real house price movement was associated with real household incomes, structural unemployment, real interest rates, leverage rates and the process of mortgage market deregulation. Madsen (2011) developed a “Tobin’s q model” of house prices and analysed data from seven industrial countries and found changes in interest rates and demography and income had only temporary effects on house prices while in the long run, house prices were determined by prices of developed land, value added taxes, stamp duties and construction costs. Algieri (2013) examined the key drivers of real house prices in the five main Euro area countries (Germany, France, Italy, Spain and the Netherlands) and the Anglo-Saxon economies (UK and US) from 1970 to 2010 and found changes in real income, long term interest rates, stock prices and inflation had a significant role in explaining real house price movements.

When it comes to individual country house price performance, there have been extensive studies conducted examining determinants of house prices at country level. For the US housing market, in earlier years, Mankiw and Weil (1989) demonstrated that the entry of the baby boomers (population cohort) into home-buying years was the major cause of the increase in house prices resulting from increased demand in the US since the 1970s. For the period 1980-1990, the significant changes of 39 US cities’ housing demand was the result of shifts in household income (Poterba 1991). Case and Shiller (1990) demonstrated that both population and real income had influences on US house prices and the results were supported also by Jud and Winkler (2002) after analysing 130 American cities house prices from 1984 to 1998 and found that housing prices were influenced by the restrictive policies on land management. Meen (2002) showed that, in the long run, house prices in the US were very elastic to changes in income which also has been supported by Mikhed and Zemcik (2007) who analysed panel data for US regions and concluded that income growth had statistically significant effects on house prices.
However, Gallin (2003) used standard tests to show that there was little evidence for cointegration of house prices and income at the national level by examining 95 US metropolitan areas over 23 years. Gallin (2003) suggested the result did not mean that fundamentals do not affect house prices, but it did mean that the level of house prices did not appear to be tied to the fundamentals. Thus, the regressions found in the literature were likely spurious, and the associated error-correction models maybe inappropriate.

For the UK housing market, Stern (1992) found that disposable income was the most important variable affecting the UK housing market. This was supported by Meen and Mark (1998) after investigating the 1990s British housing market and concluded interest rates, credit availability, tax structure, housing supply and demographic structure were also factors affecting the UK housing market. Munro and Tu (1996) examined the dynamics of the UK housing market using the Johansen co-integration technique and found that the UK housing market was influenced by the household income, real mortgage rates and housing completions at the national level.

For the Australian housing market, Bourassa and Hendershott (1995) found that Australian capital cities’ real house prices were driven by the real wage income and the growth in population. Later, Abelson et al. (2005) analysed 33 years of data on 8 capital cities in Australia and concluded that house price was negatively affected by mortgage rate, unemployment rate, equity prices and the housing stock, while positively affected by disposable income and inflation in the long run. In more recent times, Rahman (2010) analysed the Australian housing market and investigated the causes and effects of rising house price from a socio economic point of view by referring to works done by Berry and Dalton (2004) and concluded factors that were considered responsible for the housing price rise in Australia can be divided into three categories: short term/cyclical, institutional and long term/fundamental. The short term factors included lower interest rates, high investment demand and positive economic climate. The institutional factors included financial deregulation and innovation, land supply and the land-use planning system and government taxes, levies and charges. The long term/fundamental factors were population growth, economic growth and the increased wealth effect.

Furthermore, Bodman and Crosby (2003) applied a multiple regression framework to examine Australian major capital city house prices and found real house price movement appeared to be affected by demographic factors and growth in input costs, not interest rates and real per
capital income. Also based on the multiple regression framework, Tu (2000) showed that the real weekly earnings, nominal mortgage rates, unemployment rates and housing construction activities were the key factors affecting the Australian housing market. More importantly, this study highlighted the importance of analysing the regional housing markets in which the Australian housing markets at subnational level are highly segmented. In other words, a national housing price model would fail to represent the housing price dynamics of regional cities.

A similar suggestion was also made by Otto (2007) where the research examined Australian’s 8 capital cities with a “User Cost Model” and found the mortgage rate had an important influence on house prices while other economic variables were less systemic. It was suggested in the research that apart from the mortgage rate, it was not possible to identify successfully a common set of economic factors to explain house price growth rate on a national level, therefore, there is a degree of price heterogeneity in regional housing markets. This supports the contention that individual models for each city is needed.

Klyuev (2008) used both “User Cost Model” and “Asset Pricing Approach” to study development of house price changes on Australian house price performance. The research identified real construction cost, average household size, real disposable income, real mortgage rate and unemployment rates were important variables. Under the “Asset Pricing Approach”, the linkage for price change was real rents and interest rates. Nevertheless, both methods suggested house prices can deviate from their equilibrium values for certain periods of time and the deviation is affected rather than macroeconomic factors such as income and interest rate.

There has been limited literature in Australia on examining house price determinants at city level. Peng and Chen (2015) examined house price performance of 8 capital cities in Australia from 1985 and 2011 using a dynamic panel model and found unemployment rate, introduction of GST (Goods and Service Tax), the real mortgage rate and the price to rent ratio were the factors affecting city house price difference. More importantly, this is one of the few studies that attempted to take housing and living environment quality into account in analysing house prices at city level in Australia. The results suggested housing quality and overall crime rate also had statistical effects on house prices.
Also on analysis house price performance at city level, Ge and Williams (2015) investigated the main determinants of house prices in Sydney and examined the exogenous and endogenous factors that contribute to house price movements by adopting quarterly data for the period from March 1994 to June 2014 using multiple regression analysis. The statistical results suggested that the lack of house supply, mortgage rate and net overseas migration are the main attributes of house price appreciation in Sydney.

Overall, previous research suggests house prices are broadly in line with the identified macroeconomic determinants. However, no fixed set of price determinants has been identified and each country has a unique set of price determinants based on its economic structure and conditions (Stepanyan et al. 2010). Most importantly, several studies suggested that in relating to house price changes, there is degree of price heterogeneity in local housing markets and such deviation cannot be explained by a national housing price model (Adair et al. 1996, Mark and Goldberg 1998). In addition, based on the characteristics of housing markets, the markets are segmented at the submarket level (Figure 2.25). Therefore, by estimating house prices using a national price model, it will produce the estimations subject to aggregation bias (OECD 2005).

Figure 2.25 Local Property Prices and National Mean Property Prices

![Diagram showing the relationship between individual local house prices and national mean house prices.](source: De Vries and Boelhouwer (2005))

Figure 2.25 shows the relationship between individual local house prices and national mean house prices along the timeline. National mean house prices present the average house price movement among all locations and in general, it increases along the timeline. In the long-run, individual local house prices will follow the trend of national house prices, where the national house price serves as a benchmark in the valuation process. However, at certain times, individual local house prices can perform either above the national mean or below the mean and such differences tend to be varied across locations. It suggested the differences can be
influenced by quality of the housing and its surroundings (De Vries and Boelhouwer 2005). Existence of price variations at local levels was supported by Simons et al. (1998) research. The following section provides a detailed discussion of existing literature on house price determinants at the microeconomic level.

2.4.2 Microeconomic Fundamentals

The housing value assessment may examine broader economic variables which influence the market from a macroeconomic perspective, such as interest rate changes, inflation, and the cost of construction. Although such variables affect market perceptions, there are limitations to the effect on house prices. For example, only homeowners with a mortgage are adversely affected by higher mortgage rates, although the indirect effect on the broader marketplace is acknowledged. Other factors such as the type of housing and geographical location of the land area related to microeconomic perspective are also relevant to a housing value assessment (Hughes 2003, Liu et al. 2008). At a microeconomic level, over the last decades, a vast body of literature has been published identifying the relevant parameters and comprehensive estimations of each localised characteristic variables.

The detection of a relationship between house prices and a locational externality effect within well-specified locational boundaries is referred to as attributes impact analysis. House prices have been reported to be effected by outcomes from a wide range of non-economic factors, such as household desires for racial or religious segregation (Guo and Bhat 2006, Stringer et al. 1991, Toussaint-Comeau and Rhine 2004), educational achievement, deviant behaviour, social exclusion and health accessibility (Dietz 2002, Durlauf 2004, Ellen and Turner 1997, Galster 2002). People’s expectations of quality of life are toward the locations that deliver high social and environmental functions and such systems create living conditions for humans by catering to the biological and social needs that have been shaped throughout evolution (Cellmer et al. 2012, Kauko 2003).

To put theory into a pricing model, Rosen (1974) was the first to develop the Hedonic Pricing Model (HPM). This estimated microeconomic foundations for pricing housing, following the direction of Lancaster (1966) who focused on consumer theory, which suggested that a good possesses a myriad of attributes that combine to form bundles of utility-affecting attributes that
a consumer values. However this theory was not limited to the housing markets and can apply to diverse topics such as financial assets and the demand for money.

The Hedonic Price Model relates house prices to local amenities of interest by analysing the demand and supply of composite locations. In market equilibrium, for given consumer preferences, the marginal benefit of improving any part of a surrounding environment (e.g. better quality school, good neighbourhood) is equal to the utility costs of the additional expenditure involved (Rosen 1974). This is supported by Cebula (2009) as describing the basic premise, that property represents a bundle of both desirable and undesirable attributes to utility-maximizing consumers, all of which contribute to the market value of the house.

In general, the Hedonic Price Model aims at disentangling the attributes of a location from one another for the purpose of estimating implicit prices (Matthews and Turnbull 2007). Based on the model, the market prices of the property can, therefore, be expressed as:

\[ P = f(S, M) \]

*Equation 3*

The Hedonic Price Model suggests, residential properties (P) are multidimensional commodities characterised by structural attributes (S) and microeconomic attributes (M), which encompass both quantitative and qualitative attributes (Goodman 1989, Williams 1991).

Rosen (1974) noted that partial derivative of Equation 3 hedonic function with respect to any attribute is the implicit marginal attribute price. This implicit price of the housing attribute is revealed in the regression coefficient. All buyers perceive the amounts of attributes embodied in the housing product to be identical, but their subjective valuations of each component attribute may differ. The price of the house, then is the sum of the implicit prices for the attributes that are contained in it. Therefore, the house prices at different locations should reflect the qualities of its neighbourhood attributes and preference of buyers to certain desired areas.

The principle of the Hedonic Price Model is supported by studies using different models. Hunt *et al.* (1994) used Stated Preference (SP) experiments to modelling residential location choices and found influence of residential location choice can be classified according to attributes of the dwelling unit and attributes of the locations. The factors related to attributes of the dwelling
unit includes dwelling type, number of bedrooms and building period (Schellekens and Timmermans 1997). The factors related to attributes of the location include crime rate, prestige and air quality (Clarke et al. 1991).

By using other price models, such as ordinal values measurement (Brasington 1999), standard linear regression model, Geographic Information System, Geo-index and Artificial Neural Network Models (Din et al. 2001), all concluded house prices are influenced by the quality of the housing and the microeconomic factors offered by the property’s location (Jud and Watts 1981, Kain and Quigley 1974, Mingche and Brown 1980).

Hedonic Price Models have been widely cited and employed to assess the impacts local factors have on house values (Coffin 1989, Coulson and Lahr 2005, Ford 1989). However, application of the Hedonic Price Model to the housing market rests on several key assumptions:

i) Assume the market operates under perfect competition.  
   *However, in practice, buyers and developers are deemed to have freedom to enter and exit the market.*

ii) Assume the buyers and sellers have perfect information concerning housing product.  
   *However, perfect knowledge is impossible to achieve in reality.*

iii) Assume the model only works under the assumption of market equilibrium.  
   *However, the market seldom if ever demonstrates perfect equilibrium.*

*Source: Dusse and Jones (1998), Freeman (1979)*

These features in the real world property market are not plausible due to market imperfections. As observed by Freeman (1979), the data may be inadequate and definitions of empirical variables are seldom precise, but do not render the technique invalid for empirical purposes. The same is also suggested by Webster and Lai (2003) who extended the theory to spatial economics in a way that explicitly takes dynamic processes and imperfect information into account and found from such a dynamic standpoint, empirical hedonic price models do not produce stable estimates of equilibrium prices, but rather snapshots of transitional conditions.
For this research, analysis will only be focused on microeconomic attributes of the Hedonic Price Model given there were a large number of property transactions involved over the examined periods (1996-2016) and it is unrealistic to include the physical characters of each transaction.

When the influence of microeconomic variables to house price performance are discussed, existing studies did not elaborate on how to carry out the estimation of each microeconomic characteristic variable and it is unrealistic to include all relevant parameters and comprehensive estimations of each of them. Existing literature reveals that many past studies focused on five major themes, specifically: Transportation, Neighbourhood Characteristics, Social Characteristics, Schools and Planning Regulations.

This research will focus on the identified themes and the following sections highlighting empirical studies on the five major themes:

I. Transportation

According to Alonso (1964), people will seek to minimise commuting costs by selecting a housing location which provides greater accessibility to their workplace, alternatively they may accept increased commuting costs in exchange for less expensive housing further from employment or transportation (utility maximisation). With this behaviour, Cervero and Landis (1993) who reported evidence from California, suggested there was some degree of capitalization benefits along transport service line and over the long run, could be expected to induce clustering around rail stations. Ingram et al. (1998) later on supported the same results by examining the experience with new subways in Montreal, San Francisco, Toronto and Washington D.C. and found transport services have very modest effect on metropolitan development patterns.

There are ways in which the impacts of transportation could be used in appraising house prices. Eliasson and Mattsson (2000) have developed a model for integrated analysis of household location and travel choices and have investigated it from a theoretical point of view. They suggested each household makes a joint choice of location (zone and house type) and travel pattern that maximizes utility subject to budget and time constraints. If housing markets are
efficient, house prices should capture all the benefits and costs to commuters that a location offers (Zhang and Shing 2006).

Putting theory into practice, Walmsley and Perrett (1992) studied and reviewed the effects of 14 rapid transit systems in the UK, France, US and Canada and found that in Washington D.C. homes near stations appreciated at a faster rate than similar homes further away. Similarly, the Transport Research Laboratory (1993) found housing markets tend to have a localized effect in a few areas, where in general, properties near the Metro gained and maintained a slightly higher value compared with properties further away, as attractiveness (demand) of housing decreased. By and large, it is well documented that property prices are higher near to transport infrastructures, in particular near urban rail systems (McDonald and Osuji 1995, Voith 1993).

A more recent study by Kim et al. (2005) found for Oxfordshire, UK, transport factors were important determinants for people’s location choice. People would prefer a location with a combination of shorter commuting time and lower transport costs which would lead to an increase in demand for that location, hence an increase in house price. Andersson (2008) who studied the regional enlargement of the Stockholm region in Sweden also found that the radius of the price-distance gradient increased as a result of improved rail accessibility.

The most comprehensive studies of rail networks have been conducted in the Netherlands in a number of theoretical and empirical studies by Debrezion et al. (2007). Unlike other authors, they have adopted a multiregional perspective that extends to the Netherlands as a whole. Debrezion et al. (2007) used a Hedonic Pricing Model to analyse the impact of the railroad network on house prices in the Netherlands. They use several access variables, including station accessibility, train service frequency and track proximity. Among other findings, they estimated that housing in close proximity to railroad stations command market prices that are about 25% more expensive than equivalent housing at a distance of 15 kilometres or more from a station.

By using the same pricing model, Hess and Almeida (2007) examined the value for residential properties within half a mile of 14 light rail stations in Buffalo, New York with independent variables, such as neighbourhood characteristics and locational amenities. The results suggested for homes located in the study area, with one feet closer to a light rail station, there was an increases of $2.31 per foot in average property value. Consequently, a home located
within one quarter of a mile radius of a light rail station can earn a premium of $1,300-3,000 per house, or 2.5% of the city’s median home value.

However, in their studies, they also suggested, depending on the types of railway, not all transportation have positive effect on property prices. Likewise, in a study of Toronto, Canada, there are findings of positive results for subway and negative results for highways (Haider and Miller 2000). Similarly, Debrezion et al. (2007), RICS (2002), and Smith and Gihring (2006) together provided a major review of over 100 international studies on the impact of public transport (heavy rail, metro and light rail projects) and found the impacts on house prices to be mixed. This is also supported by a more recent study conducted by Efthymiou and Antoniou (2013) who examined the effect of transportation infrastructure and house price in Greece and found metro tram, suburban railway and bus stations affect the prices positively whilst the old urban railway and national rail stations and airports have a negative effect.

Bowes and Ihlanfeldt (2001) suggest that possible countering the effects being close to railroad are negative externalities such as noise and better access for criminals. This is also been supported by Armstrong and Rodriguez (2006) who estimated accessibility benefits of rail services in eastern Massachusetts including multimodal accessibility to commuter rail stations and distance from the rail right of way. The results were inconclusive, except that proximity to commuter rail right of way produced a significant negative effect on property values, which probably reflects negative externalities such as noise.

Bus-based infrastructure to land values uplift is a new research area, with both Rodriguez and Targa (2004) and Munoz-Raskin (2009) studying impact of Bus Rapid Transit (BRT) in a large city in a developing country context and found housing market placed value premiums on residential properties in the immediate walking proximity of feeder lines to the BRT service. More recently, Des Rosiers et al. (2010) investigated the impact of bus services on residential property values in Quebec, Canada and found differing uplifts for houses price to regular routes and express routes.

Beside the effect of existing transportation facilities on house prices, in the literature, the contribution of improved/new or proposed facilities also have effect on house price. McDonald and Osuji (1995) presented results from a similar study of Sheppard and Stover (1995) and analysed the effect of an 11 mile long freeway between Chicago’s Centre and its airport, which
was finished in 1993. The results indicated that the land value started to increase before the freeway opened and rose a total of 17% in real terms.

Similar findings were suggested by McMillen and McDonald (2004) who found that the housing market in Chicago capitalised the impact of a new rapid transit line 6 years before its opening. Likewise, Yiu and Wong (2005) who studied a temporal sequence in their analysis of the land price effects from a proposed tunnel project in Hong Kong. Their results show that expectations of improved accessibility had been capitalised in house prices to a substantial extent well before the completion of the tunnel. They suggest that such expectation effects may enable governments to fund infrastructure investments by selling land in areas with contingent accessibility benefits. In a more recent study, Dube et al. (2011) examined the effect of new commuter train service in Montreal Canada and found opening of a new commuter train service generated a location premium for houses located in the stations’ vicinity.

The impact of transportation characteristics has been widely studied in the international context, however, there has been limited research undertaken in this area in Australia. Romakaew (2012), who used a Hedonic Pricing Model to examine the effect of the established infrastructure as well as social and culture services on house values in Camberwell and found transportation (Train and Tram) is an important housing attribute in determining price, however, he suggested that different attributes are valued differently when combined with other attributes. Boymal et al. (2013) examined the relationship between train stations and Melbourne house prices and found proximity to train stations has an overall positive effect on property values.

In general, all other things being equal, being located 1 kilometre further out from a train station is associated with a 2% discount in sale price. The magnitude of this relationship is most clearly stable up to 5 kilometres from a train station. No dis-amenity effect on sale price for properties in close proximity to a train station was found. Mulley and Tsai (2017) examined the impact of a Bus Rapid Transit (BRT) system on residential housing prices in Sydney and found that the sales price of residential properties within 400 metres of BRT stops are marginally higher than those outside of the BRT service area.

In summary, the relationship between public transportation and home values has proven to be complex, with studies providing divergent findings. While proximity to a railway station may affect property values positively through increased accessibility to the CBD, it may be offset by negative effects such as noise, congestion and crime for those dwellings that are particularly
Local Parameters of Housing Prices: Melbourne Residential Market

close. Furthermore, the value of proximity to public transport may differ amongst households of different sizes (Duncan 2008) and different income levels (Bowes and Ihlandfeldt 2001, Immergluck 2009). While those in higher paid occupations concentrated in the CBD may find public transportation particularly valuable, it is also possible that public transportation may increase employment opportunities for those located in lower income suburbs. For an Australian context, there has been a positive relationship between house price performance and transportation such as train, tram and bus.

II. Neighbourhood Characteristics

When neighbourhood character was discussed in relation to house price in existing literature, it has been explained by understanding buyer’s choice of a location. According to ‘Tiebout Hypothesis’ named after the seminal article by Tiebout (1956), the main factor influencing household choice is quality and cost of municipal services and households maximizing utility by sorting into neighbourhoods with the most preferred combination of amenities. The central idea is that the housing consumers weighing up the house value based on local services (John et al. 1995) including public libraries, health services, education, refuse collection and street cleaning, leisure services, social services and law enforcement (Dowding et al. 2002). In other words, house price is related to the subjective appreciation for its surroundings and neighbourhood characters. However, not all neighbourhood characters are weighted the same. Depending on buyer’s individual preferences, there is propriety of selection on neighbourhood characters when choosing a location to live.

Numerous studies have found that local amenities such as lower traffic flow or improved design can affect people’s choice for a location. However, whether neighbourhood characters have an effect on house price alone is inconclusive with studies suggesting people’s choice and desire for neighbourhood facilities varies and changes across different demographic groups over time. The following sections will provide a separate discussion on existing studies who conclude neighbourhood character will affect house price and studies who conclude the effect of neighbourhood character on house price may change over time. Studies suggested that neighbourhood character could affect house price include Tse and Love (2000) who studied the relationship between neighbourhood character such as shopping centres, sport facilities and cemetery views using hedonic analysis and found the attribute of a cemetery view has a negative influence on house prices. However, the accessibility to a shopping centre
is not a favorable housing attribute for small/medium units in determining house prices. Turnbull and Matthews (2007) analysed the price effect of proximity to retail uses on house price performance while controlling for the layout and connectivity attributes of different neighbourhood settings. It found there are areas where proximity to retail sites has a significant effect on residential values and there are areas where the effect of proximity is insignificant. In those areas where proximity to retail significantly affects house value, the positive effect of accessibility tends to outweigh the negative externality effect from retail sites. In those areas where there is no retail proximity effect, its absence appears to arise from highly segregated land uses and the resultant greater travel distances. Lee (2010) studied the impact of facilities of leisure and sports on housing prices in Taiwan using Hierarchical Linear Modelling and found that facilities of leisure and sports significantly influence the average housing price.

In relation to undesirable facilities, Farber (1998) found undesirable facilities such as landfills, waste sites and manufacturing facilities reduced property values in their direct vicinity. This is also supported by Debrezion et al. (2006) and Rouwendal and Van Der Straaten (2008) who concluded dis-amenities like the presence of industrial land and highway nearness affected the prices negatively. Likewise, Vor and Groot (2009) examined the impact of industrial sites on residential property values using a Hedonic Pricing Model and suggested distance to an industrial site had a statistically significant negative effect on the value of residential properties. However, the effect was largely localized within a relatively short distance from the nearest industrial site and such effect varied based on the size of an industrial site. The adverse impacts of undesirable facilities on values ranging from as low as 0.24% to as high as 25.00% depending on the extent of pollution and location of the property (Mendelsohn et al. 1992, Smolen et al. 1991).

Studies that suggested the effect of neighbourhood character on house price can change and vary across different demographic groups over time include Wenning (1995) who used life-course model to analyse mobility and suggested different age groups with different household characteristics have different desires for their residences, and that these preferences change over the life course. Higher income households may be willing to pay more for housing to maintain neighbourhood homogeneity (Goodman and Thibodeau 1995). Accordingly, individuals’ abilities to pay for a property determine the composition of the neighbourhood. Differences in income lead to differences in neighbourhood composition.
Krizek and Waddell (2003) also addressed the possibility that different lifestyles may create different demands or different behaviours in the households’ desirability for related activities in choosing a residential location. As example, Colwell et al. (2002) explored the connection between preferences for recreation and the tendency for people to choose a residential location in close proximity to the recreation site. They claimed that consumer preference for recreation had influence over residential location; the stronger the taste for recreation the more likely a person is to locate close to recreation sites.

Furthermore, quality of life is another important factor for neighbourhood characteristics. Quality of life relates to people’s preferred lifestyles, preferences for leisure and recreation, familial connections, aesthetics of surroundings and feelings of safety and security. Brueckner et al. (1999) specified that cities have a natural geographically and topographically determined endowment of some amenities, including where the best views and the natural amenities such as river frontage are available or where the air quality is better. Given all the characters that location can offer, buyers are likely to consider both the functional and symbolic aspects of the housing decisions when making housing decisions (Sirgy et al. 2005).

From symbolic aspects, Kaplan and Austin (2004) and Vogt and Marans (2004) studied buyers attitudes in Detroit, Michigan US and provided evidence that the desire to be ‘close to nature’ plays a significant role in housing decisions for households. Anderson and West (2006) found price paid for access to parks or open space of a given character appears to vary with the density of the neighbourhood, household incomes and local crime levels. The results are supported by Troy and Grove (2008) who found that in relatively low crime areas, the value of open space was substantially positive, but as crime rates rose, the value of open space added to house price declined until, in high crime rate neighbourhoods, open space will negatively affect the house value.

Many authors also suggest that housing prices and neighbourhood choice maybe affected by crime rates. Strong relationships are not always found in the empirical literature. Follain and Malpezzi (1981) and Bradbury et al. (1982) found no significant effects of crime on house prices or urban decentralization respectively. Whilst Thaler (1978), Sampson and Wooldredge (1986) and Cullen and Levit (1996) found there is a negative relationships between crime rate and house price performance. However, it is difficult to isolate the effect of crime since crime tends to be correlated with poverty rates and other measures of socio economic status.
Another factor relates to neighbourhood characteristics is neighbourhood settings and designs. Neighbourhood street layout significantly affects property value. The effects, however are sensitive to the way street layout is measured. In earlier years, Simons et al. (1998) analysed the hypothesis by examining connections between presenting a new building in an existing neighbourhood and found there was a positive effect on the price for the existing housing because new building is associated with an attractive environment.

Later research by Morrow-Jones et al. (2004) analysed consumer preferences for new urbanised neighbourhood designs by using a stated preference experimental design which allows researchers to control for factors like school quality, safety, access to public open space etc. and such approach has advantage to examine the preferences for housing options that are not currently available in the market. The results suggested there was a distinct preference for lower density among a sample of homeowners in Franklin Country, Ohio US. However, such approach is questioned by Walker et al. (2002) who considered whether the respondents can imagine truly the hypothetical neighbourhoods with which they are presented. Moreover, he also suggested, the stated preference approach can be subject to several forms of falsity as households may not actually behave in the way they claim they will or households answer in a particular way in order to bring about certain policy outcomes.

In summary, with regard to the relationship between neighbourhood character and house prices, several factors were studied in existing literature, such as access to shopping and recreational facilities, access to open space, proximity to industrial sites and street layout. The results are mixed with some factors having positive effects, whilst others have negative effects and such factors tend to vary across different demographic ages, backgrounds and individual preferences. However, the studies for the Australian context are limited in this instance.

III. Social Characteristics

In existing literature, social characteristics are classified and discussed as residential segregation. Household sorting has often been considered an underlying cause of segregation. That is households are drawn to communities that provide particular levels of housing, community, and local public services that best match their preferences (Tiebout 1956). Accordingly, individuals’ abilities to acquire property in a particular location determine the
composition of the neighbourhood so that differences in income lead to differences in neighbourhood composition.

There has been literature exploring the causes and consequences of residential segregation by citing factors such as income distribution, poverty, education, capital formation, preferences for racial homogeneity and religion.

“People tend to feel most comfortable in a particular type of place, its values, and image” and the place preference determines a person’s settlement identity which is often shaped by past or childhood experiences (Marcus 1995 page 25). Marcus’ (1995) concept of ‘settlement identity’ is then supported by Lindstrom (1997) who emphasized the importance of shared values and ‘cultural worlds’ in housing location choices.

Likewise, South and Crowder (1997) found that desire for segregation in which higher-class households relocated to separate themselves from lower-class households. Recent empirical works continue to point out the influence of these factors. Sirgy et al. (2005) suggested social stratification and homogeneity was important to residential location choices. Similarly, Winstanley et al. (2002) claimed that many people were reluctant to leave familiar and convenient surroundings to which they have grown accustomed and become attached. This theory was supported by the principle of residential mobility studies conducted by Burgess and Skeltys (1992) who suggested many people tend to move together to achieve their social attachment. People are more comfortable to live with others who have similar social background.

Based on social segregation, house location can be identified using lifestyle classifications. Gans (1968) identified and concluded there was a link between long term decisions about residential location and short term decisions about travel behaviour. Based on this, he identified eleven lifestyle classifications - ‘retirees’, ‘single’, ‘busy urbanists’, ‘elderly homebodies’, ‘urbanists with higher income’, ‘transit users’, ‘suburban errand runners’, ‘family and activity-orientated participants’, ‘suburban workaholics’, ‘exurban’ and ‘family commuters’.

Based on the theory, Meen (2006) addressed the issue by examining population movement in London between 1970 and 2001 and found many of the same cities with the incidence of spatially segregated neighbourhoods measured on 1971 data, reappeared in 2001, and such
substantial stability in the pattern suggested the existence of social segmentation. Meen et al. (2007) later tested the theory based on the London household’s income levels and concluded many of the London neighbourhoods amongst the poorest in 1881 were still amongst the poorest in 2001. Similarly, Harsman (2006) documents the stability of patterns in Stockholm and noticed there was increased trend of social segregation along income lines over the past 20 years. Influence of ethnic segregation is also pointed by Toussaint-Comeau and Rhine (2004) in their study for Hispanic immigrants in the US and highlighted people tend to locate themselves in ‘ethnic enclaves’. Later, Guo and Bhat (2006) examined the household structures in the US and found households with similar household structure and household size tended to locate in the same area. With an example, Musterd (2006) showed that highly skilled workers in different services choose different types of neighbourhood. Workers in Information Communication Technologies, financial services and banking choose to concentrate in the suburban areas of Amsterdam, Netherlands while skilled workers in the creative industries are selectively concentrated in central neighbourhoods.

Although there is extensive literature confirming the existence of social attachment and segmentation, there has been limited literature on how social factors affecting house prices.

Interestingly, Galster (1982), Kain and Quigley (1974) and Clark (1991) found evidence that different ethnic groups tend to pay higher prices for properties located in a similar ethnic background in the US. This is supported by Brasington et al. (2014) who found ethnic segregation is positively related to house prices, whilst income and educational segregation reduce housing values.

In Australia, Kupke et al. (2012) successfully used factor analysis to identify the impact of medium density development on housing investment and population structure across a number of capital cities in Australia. A more current application of factor analysis by Randolph and Tice (2013) determined that the profiles of apartment-dwellers in Sydney and Melbourne were very different and confirmed the existence of a spatially discontinuous market within the apartment sector. Finally, Reed (2013) has produced recent factor analysis study of Melbourne over three census periods which highlights the close relationship between house prices, income and age and confirmed that a relationship existed between established house values and social constructs in Melbourne during 1996, 2001 and 2006.
In summary, existing literature suggests people tend to live close to people of similar social background and house prices can be affected by social segregation and social background. However, the literature in this case is rather limited.

IV. Schools

Schools are often specified as services that can only be consumed by living in the defined catchment area and ability to buy houses that gain access to good schools is not chiefly determined by absolute income, but income relative to others who are competing for the same schools. In defining ‘good’ schools, there are many dimensions, including physical appearance, library facilities, and quality of teachers which the performance of these areas is difficult to measure, so in evaluating the relationship between schools and property prices, researchers judged the school quality by academic achievement (Cheshire and Sheppard 2004).

In early years, Oates (1969) studied the effect of public school expenditure on house prices and suggested if, according to the Tiebout (1956) model, individuals consider the quality of local public services in making locational decisions, then an increase in public school expenditure should result in higher property values, by estimating other features (e.g. neighbourhood character) equal across communities. He tested the Tiebout (1956) model and concluded variation in school expenditure per pupil partially reflected the variation in the property prices. Sonstelie and Portney (1980) supported Oates’ findings and suggested there is a positive relationship between school spending and house prices.

Similarly, King (1973) used the responses from a survey of home buyers on neighbourhood character in New Haven and the survey included questions on the quality of local schools combined with other neighbourhood characters, such as crime rate and street design. He found quality of schools were the most important factors over all neighbourhood characteristics and found there is a positive relationship between good schools and house price performance. Similarly, Haurin and Brasington (1996) used this theoretical framework to test whether school quality has a positive influence on housing prices. The study was based on primary source data from the six largest metropolitan areas in Ohio US. The results suggested school quality, along with arts and recreational opportunities was found to have a positive influence on real estate prices. With more recent studies, Cheshire and Sheppard (2004) used a multivariate regression
approach and reported that there is a significant connection between house prices and school quality as parents tend to choose a location with better school quality.

In figures, Bogart and Cromwell (1997) found differences of $5,600, $10,900 and $12,000 in property prices for quality of schools in the Cleveland Metropolitan area. Gibbons and Machin (2003) analysed English primary schools and concluded houses that located near schools that ranked on top of the league tables attract a premium of around 12.00% relative to ones ranked at the bottom. For secondary schools in England, researchers concluded the school quality affected property price at range between 0.05% and 2.00% (Cheshire and Sheppard 2004, Rosenthal 2003). Similarly, for the US, the effect varies across different locations and can be up to 14.00% in price differences in Chicago (Downes and Zable 2002).

In more recent studies, Fack and Grenet (2010) examined the best schools in Paris in 2004 and found the best schools attracted a premium of up to €17,500 on property price compared to the properties located in other areas. Likewise, Machin and Salvanes (2010) examined the quality of school in Oslo in 1997/1998 from an admissions policy point of view and found there was a significant 2.00% - 4.00% increase in prices for a one standard deviation increase in school average pupil marks.

When examining and comparing the effect of schools to house price performance with other microeconomic factors. People tended to weigh school factors over other factors such as transportation. Giuliano and Small (1993) suggested households tend to choose a location with a preference of good schools and low crime rates over distance to work and other accessibility factors, such as public transit availability and commercial activity accessibility. Likewise, OHRN (1994) examined the major reasons for mobility in Ohio’s seven largest metropolitan areas by using survey questions, and concluded households preferred to live in a neighbourhood with good quality of schools and safety over accessibility issues such as the proximity of workplaces, friends and family, and retail centres. Similarly, Kim and Morrow-Jones (2005) who used a survey of home buyers and found considerations of housing characteristics and school quality played a role in residential location decisions. However, factors like distance to work was relatively unimportant.

However, Masnick (2003) disagreed and examining the US population found even if one demographic group focuses on distance to work, others might not, and the group’s own
preferences might change with time and stage of the lifecycle. One phenomenon noted there was a dramatic reduction in the importance of school quality in location decisions as people age. Because older people weigh the importance of access to public transport and the road network more highly than quality of the schools.

In the analysis of school quality, researchers have often applied the Hedonic Pricing Model developed by Rosen (1974). Based on the principle of the model, the value of a house is a function of its comparable characteristics (e.g. number of bedrooms, square footage) and measure of school quality and set of neighbourhood characters. The estimated coefficients represent the capitalization of the different components into house values.

However, Black (1999) challenged the Hedonic Pricing Model by omitting the variable bias, such as failure to separate the correlation between school quality and associated neighbourhood characters. She argued that better schools may be bundled with better neighbourhoods characters, which could independently contribute to higher house prices. The argument also featured in a study by Kain and Quigley (1970), who found only marginally significant effects of school quality on house prices and suggested this may be due to correlation between school character and neighbourhood attributes. Likewise, Kane et al. (2005) concluded in their study for Mecklenburg, Carolina between 1994 and 2001 as homebuyers who enjoy amenities tend to congregate together. It is difficult to disentangle the valuation of the schools themselves from the valuation of other neighbourhood qualities.

To circumvent issues with the Hedonic Pricing Model, Black (1999) restricted the sample of Boston metropolitan area to houses near the boundaries between school attendance zones and controlling for neighbourhood character. The idea of the boundary discontinuity approach has been criticized in recent studies by Leech and Campos (2003) and Cheshire and Sheppard (2004), who all examined the relationship between quality of school and property prices by restricting observations to neighbourhoods with various characteristics and found there is a positive relationship between school factors and house price performance.

In recent studies, researchers have sought to improve identification of boundary fixed effects methods when measuring the relationship between housing price levels and school quality. For example, Ries and Somerville (2010) using repeated home sales found that higher income families respond most to rezoning induced school quality changes. However, they do not
investigate the effect of constant school quality levels on appreciation rates. Hoang and Yinger (2011) have implemented structural models and found house values rise by below 4% for a one-standard deviation increase in student test scores.

In summary, existing literature has identified that there is a relationship between house price performance and quality of schools and people tend to weigh school factors more highly than other microeconomic factors such as transportation when choosing a location. However, some researchers believe it is difficult to separate the effect of school factors from other neighbourhood factors when examining their relationship with house price performance as people tend to bundle more than one factor when locating themselves to an area. More recent studies have improved identification of boundary fixed effects method when measuring the relationship between house price levels and school quality. However, the studies for the Australian context are limited in this stance.

V. Planning Regulations

Economic literature and academics have argued that zoning regulation and their administration are a main reason for land price increase. Cheshire and Sheppard (1989) concluded that the process of development control does in fact restrict the supply of land for particular uses including housing and that it does consequently raise both, the price of land, and the cost of buildings developed on the land. They also found however, that the overall impact of the planning system on house prices was “significant but not enormous”.

When putting theory into practice, the results for determining the relationship between planning regulation and house price performance are mixed with some believing planning regulation contributes to house price appreciation, whilst other believes the relationship is limited. Based on existing literatures, planning regulation that can have a positive effect on house price performance include i) restricted supply policy, ii) better living environment caused by restriction on subdivision and iii) development opportunities.

i) Restricted supply policy

Segal and Srinivasan (1985) gathered data from planning officials, and estimated the amount of land taken out of production because of land use regulation and found that a lower supply
of available land had a material impact on both land and housing prices and concluded that reduction in land supply due to zoning and planning restrictions did produce higher housing prices. A similar effect was found by Dawkins and Nelson (2002) in their review of UK studies surmising that England’s policy of containment has had a measurable impact on land availability for housing which consequently resulted in higher housing prices.

Likewise, White and Allmendinger (2003) provided an overview of land use planning and house markets in the UK and the US and concluded constrained supply because of restrictive land regulation plays an increasingly important role and planning constraints raise prices, reduce supply and increase densities. These results are also in line with several other analyses in the literature including Lauridsen et al. (2013) who analysed house prices from 1992 to 2011 in the metropolitan area of Copenhagen for the influence of land regulation on development and found indications of an upward pressure on house prices from restrictive land regulation at the municipal level.

ii) Better living environment

A positive relationship between planning regulation and house price performance is also due to a better living environment caused by restrictions on subdivision. Katz and Rosen (1987) found that land use growth controls increased San Francisco Bay’s house prices. According to Katz and Rosen (1987), zoning ordinances that restrict minimum lot sizes and floor space controls stipulating higher administrative requirements, increase the cost of building new housing as well as the price of residentially zoned land. Likewise, Wachter and Cho (1991) sampled 781 sales of single-family houses in 15 suburban locations around Boston and employed multiple regressions to estimate hedonic housing prices and found that when zoning was more restrictive in adjacent areas, it also increased detached housing prices in those areas. They suggested that residential property owners benefited from restrictive local land use controls through a direct pricing effect. They found that the values of land sites, zoned for given housing densities, were increased by restrictive zoning, impacting on local housing prices in two ways. Firstly, tighter controls created a better living environment, which became capitalised in higher housing prices. Also, land use restrictions, by setting the housing supply at below equilibrium levels, created scarcity, thus increasing demand in the local housing market. They also found that land use controls had both interjurisdictional as well as intra
jurisdictional effects on housing prices but were unable to discover how such growth and land use controls and restrictive regulation, actually raised housing prices.

In addition, Groves and Helland (2000) looked at zoning’s effects on land values through an empirical analysis of Harris County, Texas over the period 1988 to 1997. They concluded that zoning raised the value of properties best suited to residential use, by protecting them from the threat of nearby, future commercial development.

iii) Development opportunities

White (1988) argued that property value is created if a lot can be made legally subdivisible into multiple lots. Peterson (1974) studied prices of undeveloped farmland, without the distortion of having houses on the land, and concluded that for broad acre farmland price was inversely proportional to minimum allowable lot size. This is an endorsement of the view that increased lot density increases land value as expressed in the Zoning Value Equation. Likewise, Munroe et al. (2005) explored land use patterns near Bloomington, Indiana, where urban and suburban development was expanding into formerly agricultural and forested areas. They found that both diversity of land use and values were higher in areas that were rezoned to allow for the highest housing densities and smallest lot sizes.

However, several studies have suggested that the linkage between planning regulation and house price performance are highly complex and limited. For example, Jud (1980) reviewed the work of Maser et al. (1977) and concluded that there was no evidence that zoning affected real estate prices. Dowall and Landis (1982) analysed the effects of various zoning techniques and land use controls on the price of single family dwellings and concluded that if higher future allowable densities could be permitted by the authorities, the practice would lead to lower new housing prices. However, such effects tended to be small and widely varied across different housing submarkets and they also argued that there was little supporting empirical evidence linking development control and higher home prices. Likewise, Colwell and Sirmans (1993) examined the relationship between land value and parcel size and explored the impact of zoning on market outcomes. They could not reach a definitive conclusion on a link between zoning and land value. Epple and Platt (1998) approached the zoning debate from a more theoretical angle through elaborate mathematical model and they could not give any definitive zoning or land pricing outcomes.
The results also supported by later studies include Isakson (2004) who analysed sales data over a 20 year period in a US Midwestern county and found that the effect of zoning on land values was not clear. Munneke (2005) studied empirically the role of land prices in the decision to rezone vacant land from one land use to another and concluded that the external effect of zoning on land values was too complex to measure.


Gurran et al. (2007) writing in the Australian context, believed that enforcement was an essential prerequisite but that it was the rezoning of the land itself that created the windfall gains for land owners and that the land experiencing rezoning undergoes an immediate increase in land value, often occurring at the “stroke of a bureaucratic pen”. She also asked the all-important question of whether zoning restrictions diminish land values, or whether land values were actually enhanced by the certainty of knowing what will occur on a property and its surrounds. Zoning not only increases values but what began as a tool to preserve local amenity and possibly property values has, according to Gurran et al., become an effective means of excluding many groups from certain locales.

Also in the Australian setting, Stein (2008) believed that not just zoning but also development approvals affected property values because rezoning and other statutory approvals can be passed on to subsequent buyers and “run with the land” and that such development consents increased land value. Many of these studies do not recognise an important point however: land values are not used to allocate zones to land. It is the reverse that occurs. Zoning is allocated on planning or performance principles, and market forces; supply and demand patterns and the general economic status of the market subsequently equilibrates the land price.

For Melbourne, Taylor (2011) studied Melbourne suburbs that located within and near the Urban Growth Boundary (UGB) by utilising a land price model, based on a detailed sample of property level transactions in land parcels. The analysis used a hedonic regression model to estimate the drivers of sale prices for large land parcels on Melbourne’s urban fringe.
Controlling for other property characteristics, the price of rezoned land inside the UGB is 73.8% higher than rural zoned land parcels with similar characteristics outside the UGB. This estimated betterment value was then used to estimate price premiums for landowners resulting from having their land rezoned for urban development.

In summary, the existing literature found the effect of planning regulation on house prices are having ‘mixed’ results with some concluded planning control has positive effect on house prices due to restricting supply, providing better living environment that cause by subdivision restriction and maximizing development opportunity. Whilst others believed planning has a limited and complex effect on house prices. In the Australian context, existing studies suggested there is a positive relationship between planning regulation and house prices if such regulation provide development opportunity for the land caused by rezoning. This is supported by example studies on change in UGB of Melbourne.

2.5 Summary - Key Findings and Research Gap

In summary, the housing sector as a consumption and investment asset is important at two levels – economy and individual. At the economic level, the housing market has a direct GDP contribution and the performance of the housing market would have an impact on household consumption as well as construction and employment market. Policy makers often interfere with the housing market as part of a strategy to achieve low inflation, low unemployment and balanced growth. At an individual level, households are sensitive to housing market performance as a larger portion of their income is used to serve housing related debt, such as interest rate repayment and because of that, affordability issues also has become more and more important in recent years.

Given the importance of the housing sector to the nation’s economy and individual households, it is critical to understand the housing price performance. The first part of the chapter has focused on examining the historical performance of the housing market in order to improve the understanding of house price performance at different levels, namely country level, city level and local level.

At country level, each country tended to perform differently from each other throughout the years depending on their national economic conditions and by tracking the performance of
Australian house price prices, there is evidence of macroeconomic factors such as population and household income, affecting national price movement. When narrowing down the price performance at city level, even under the same national economic conditions, each city could perform differently to each other depending on their city level market conditions and by tracking the performance Melbourne house price, the price changes can be explained by city’s population growth and difference between supply and demand. Finally, the house price performance at different local geographic areas is also found to be different to the house price performance at country level, city level and other local level throughout the years.

Part two of the chapter reviewed empirical evidence on house price concepts and the associated determinants. This was aimed to provide understanding of house price determinants in theory at large. Figure 2.26 presents the house price determinants summarised from existing studies.

Based on an econometric model of supply and demand, house price is determined and affected by the amount of supply available and demand needed for a property. Existing literature suggested because housing supply is inelastic, most of the studies in empirical literature focus on the demand side of the effect when examining house price determinants. From the demand side, the house price is determined by internal condition (i.e. the physical structure of the house itself) and external condition which refers to macroeconomic factors and microeconomic factors.
At a macroeconomic level, previous research suggests house prices are broadly in line with the identified macroeconomic determinants including real income, employment rate and interest rate. However, no fixed set of price determinants has been identified and each country has a unique set of price determinants based on its economic structure and conditions. Most importantly, several studies suggested in relation to house price changes, there is a degree of price heterogeneity in local housing markets and such deviation cannot be explained by a national housing price model. In addition, based on the characteristics of housing markets, the markets are segmented at submarket level, therefore, by estimating house prices using a national price model, it will produce the estimations subject to aggregation bias.

At a microeconomic level, there have been studies conducted over past decades. However existing studies did not elaborate on how to carry out the estimation of each microeconomic characteristic variable and it is unrealistic to include all relevant parameters and comprehensive estimations of each of them. Existing literature reveals that many past studies focused on five major themes, specifically: Transportation, Neighbourhood Characteristics, Social Characteristics, Schools and Planning Regulations. Amongst research on local price level, existing studies suggested the effect of different local factors on house price performance varies with some factors having positive effects and others having negative effects.

**Research Gap**

Existing studies have concluded that there is a relationship between house price at country level with macroeconomic factors; and house price at local level with microeconomic factors. At a local level, although there have been studies conducted at international level, it appears that examination for Melbourne was not adequate.

**Gap 1** There have been few studies examining the local house price determinants in Melbourne, especially at a local level.

**Gap 2** Existing studies focused on examining one or two factors on house price performance with nominal attention on elaborating on the combination of all factors and how those factors would have a different effect in different locations.
Gap 3 Existing studies placed limited attention on the effect of local factors for locations that are located close to each other, but have different price performance profiles.

The conceptual framework that will guide this research has been developed from the literature review. It will focus on the relationship between local factors and Melbourne’s local housing market.

Four objectives have been developed from the identified gaps that are articulated below:

I. To examine the relationship of house prices at different levels – local to country/city/local level. First, to examine the house price performance at different levels and then to compare the price performance between each level to demonstrate if house price at different level performs differently. Most importantly, to identify if there is an existence of price differentiation between locations that are geographically similar.

II. To investigate the relationship of local house prices and macroeconomic factors. Examine and compare the performance of macroeconomic factors to the performance of house prices at local level to determine if local house prices perform in line with the performance of macroeconomic factors.

III. To identify and analyse key local housing market drivers. Establish the effect of local factors identified in the literature review on the performance of local house prices. This is aimed to identify drivers causing local house price differences and also demonstrate if the effect varies across locations.

IV. To understand better key housing price determinants at a local level. Discuss the research results and model developed for this research with existing studies to provide better understanding of key price determinants at the local level.
CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The previous chapters have explained that there is a difference in house price performance at different price levels and that the house price determinants at a local level are nominal, specifically for Melbourne residential markets. The main objective of this chapter is to articulate the research methodology designed to achieve the research aim: to examine the drivers of local house price performance, specifically in two locations that are located close to each other but have different performance profiles.

This chapter has seven sections. Subsequent to section one ‘Introduction’, section two outlines the research methodology which is aimed to ensure consistency in examining the drivers of local house price performance. Following on from this, section three explains the research method. Section four and five details the research approaches for quantitative analysis and qualitative analysis including data collection and data analysis process for each approach. Section six presents the entire research design with associated chapters. Finally, section seven summarises the chapter.

3.2 Research Methodology

Only by the use of appropriate research methodologies can the body of knowledge for the Built Environment be established and advanced with confidence (Amaratunga et al. 2002). Research can be conducted through three approaches – Quantitative, Qualitative and Mixed Methods. (Creswell and Tashakkori 2007, Denzin and Lincoln 1988, Hanson et al. 2005, Maykut and Morehouse 1994). The following section provides detailed discussion of each approach.
i) Quantitative methods are used when one begins with a theory (or hypothesis) and tests for confirmation or disconfirmation of that hypothesis. Quantitative methods include experimental studies, quasi-experimental studies, pre-test/post-test designs and others where control of variables, randomisation and valid and reliable measures are required and where generalisability from the sample to the population is the aim. Quantitative methods involve counting and measuring the relationships between variables by using statistical analysis (Newman and Benz 1998).

ii) The qualitative method is a systematic process to make things known that are currently unknown by examining phenomena multiple times and in multiple ways. Qualitative methods are concerned with subjective assessment of attitudes, opinions and behaviours and seek to discover new knowledge by retaining complexities as they exist in natural settings. The techniques for qualitative methods include observation and interviews (O’Dwyer and Bernauer 2014).

iii) The mixed method is a combination of both quantitative and qualitative methods to answer a particular question or set of questions. This combination of methods involves the collection, analysis and integration of quantitative and qualitative data in a single or, multiphase study (Creswell and Tashakkori 2007).

Mixed methods research in a single research project has experienced a strong increase in popularity in the social, behavioural and related science area in recent years. “Because of its logical and intuitive appeal, mixed method provides a bridge between the qualitative and quantitative paradigms” (Leech and Onwueguzie, 2006 pp 474).

The mixed method design has been differentiated by the level of prioritisation of one form of data over the other, by the combination of data forms in the research process and by the timing of data collection, to determine whether quantitative and qualitative phases take place concurrently or sequentially (Creswell et al. 2004, Tashakkori and Teddlie 2003). Table 3.1 lists four major types of mixed method research design, the process and the prospective outcome.
Table 3.1 | Types of Mixed Method Research Design

<table>
<thead>
<tr>
<th>Design Type</th>
<th>Notation</th>
<th>Outcome</th>
<th>Process</th>
</tr>
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<tbody>
<tr>
<td>Convergent Design</td>
<td>QUAN+QUAL</td>
<td>Converge Results</td>
<td>- Implement the quantitative and qualitative strands at the same time.</td>
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<td></td>
<td></td>
<td></td>
<td>- Both strands had equal emphasis</td>
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<td></td>
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<td></td>
<td>- Results of the separate strands were converged</td>
</tr>
<tr>
<td>Explanatory Design</td>
<td>QUAN -&gt; qual</td>
<td>Explain Results</td>
<td>- Implement the two strands in a sequence</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- The quantitative methods occurred first and had</td>
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<td></td>
<td></td>
<td></td>
<td>a greater emphasis in addressing the study’s purpose</td>
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<td></td>
<td></td>
<td></td>
<td>- The qualitative methods followed to help</td>
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<td></td>
<td></td>
<td>explain the quantitative results</td>
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<tr>
<td>Exploratory Design</td>
<td>QUAL -&gt; quan</td>
<td>Generalize Findings</td>
<td>- Implement the two strands in a sequence</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- The qualitative methods occurred first and had</td>
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<td></td>
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<td>a greater emphasis in addressing the study’s purpose</td>
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<td></td>
<td>- The quantitative methods followed to assess the extent to which the initial qualitative findings generalize to a population</td>
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<tr>
<td>Embedded Design</td>
<td>QUAN (+qual)</td>
<td>Enhance Experiment</td>
<td>- Implement a secondary qualitative strand</td>
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<td></td>
<td></td>
<td></td>
<td>within a larger quantitative experiment</td>
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<td></td>
<td></td>
<td></td>
<td>- The qualitative methods occurred during the conduct of the experiment</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>- The qualitative strand enhanced the conduct and understanding of the experiment</td>
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</table>

Adopted Creswell (2005) pp 110

Table 3.1 summarises that in mixed methods research, qualitative and quantitative data may be equally weighted (QUAL+ QUAN), or one may be emphasised over another (example Qual -> Quan or Quan-> Qual). The ‘+’ symbol denotes both quantitative and qualitative data are collected at the same time. The symbol ‘->’ indicates a sequential form of data collection. The capitalised notation (for example ‘QUAN’) denotes a weight or priority to one method over another.

The Convergent Design allows the researcher to simultaneously collect both quantitative and qualitative data, merge that data and use the results to understand a research problem. The
design takes the weakness of quantitative research (generalisation), and complements it with
the strengths of qualitative research (emerging design). Embedded design is where the research
has primarily focused on one type of data, supported by the other type of data. In other words,
researchers insert a qualitative component within a quantitative design. The explanatory design
features the merit of the qualitative data which will help explain initial quantitative results and
provide an in-depth perspective of the research. The exploratory design is similar to the
exploratory design in that it is also a two-phase method in which qualitative results are obtained
first, followed by quantitative data that informs the qualitative data results (Creswell and Clark

The strengths of mixed-methods design have been widely discussed in the literature. According
to Migiro and Magangi (2011), the benefit of mixed method techniques is the ability to match
the purpose of the method to the need in the study and the ability to triangulate the data and
assure its validity and level of variance can also be invaluable. Also the addition of a
supplemental data set bolsters the effectiveness of the research. Most importantly, a
combination of methods provides a better understanding than either the quantitative or
qualitative method alone (Creswell 2009, Driscoll 2007).

This research is aimed to first analyse and compare house price performance at difference levels
(quantitative analysis) and based on the results to select locations that are located close to each
other, but have a different price performance to further examine drivers for local house price
differences through semi-structured interviews (qualitative analysis). The rationale is that the
quantitative data and their subsequent analysis provide a general understanding of the research
problem. The qualitative data and their analysis refines and explains those statistical results by
exploring participants’ views in more depth (Creswell et al. 2004, Tashakkori and Teddlie
2003). The second qualitative phase builds on the first quantitative phase and the two phases
are connected in the intermediate stage in the research (Ivankova et al. 2006). The explanatory
type of mixed method design is adopted for this research and according to Creswell and Clark
(2011), there are three major steps for the application of explanatory mixed method design:

Step 1: Collection and analysis of quantitative data to explore a phenomenon. First part of the
research is to examine and compare house price performance at different levels to demonstrate
if there is a difference in house price performance at different levels. Based on the quantitative
analysis results, suburbs that are located close to each other, but have different price
performance are selected and are formed as case studies. The reason for collecting the quantitative data first is to provide validity and reliability of the evidence through systematic procedures for the in-depth analysis of selected case studies at the qualitative phase.

Step 2: Use the results from the quantitative phase to identify variables or stating propositions for testing based on an emergent theory or framework. After case studies are selected, various macroeconomic indicators such as interest rate, Consumer Price Index (CPI) and GDP were collected. Those ‘QUAN’ data were analysed to assess the relationship between local house price performance and the performance of macroeconomic factors to demonstrate the effect of macroeconomic factors on local house prices. The findings of this ‘QUAN’ research phase provides the much needed rationale and direction for the subsequent selection of participants and structured interviews.

Step 3: Implements the qualitative strand of the study to examine the salient variables. Once the case studies are identified, they formed the pillars for the subsequent qualitative investigation to help explain, or elaborate on, the quantitative results obtained in the first phase. ‘QUAL’ analysis for each case study is conducted through interviews and during the interviews, the impact of five microeconomic factors including public transportation, neighbourhood characteristics, social characteristics, schools and planning regulations on local house price performance are investigated. The results are cross examined between cases to provide better understanding of house price differences at a local level.

### 3.3 Research Method

There are various methods for the research, including experiment, archival analysis, history and case study. Each has a different way of collecting and analysing empirical evidence based on the research aim and objectives - Exploratory, Descriptive or Explanatory. The choice of method for the research depends on the foundation of research, past and present events with the desired degree of control events embedded (Yin 2003). Table 3.2 lists the types of research methods and its conditions.
Table 3.2: Types of Research Methods and Its Conditions

<table>
<thead>
<tr>
<th>Method</th>
<th>Form of Research Question</th>
<th>Control of Behavioural Events</th>
<th>Contemporary Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>How? Why?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Survey</td>
<td>Who? What? Where?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Archival analysis</td>
<td>Who? What? Where?</td>
<td>No</td>
<td>Yes/No</td>
</tr>
<tr>
<td>History</td>
<td>How? Why?</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Case Study</td>
<td>How? Why?</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Adopted Yin (2003) Page 38

Table 3.2 displays five major types of research methods, those being: experiments; surveys; archival analysis; history; and case studies. Depending on the research questions, aim and objectives, the appropriate research method is selected based on three conditions, namely: form of research question; controllability of behavioural events; and type of events (Yin 2003). The following section details the selection process of the method adopted for this research.

**Condition i: Type of the research question posed**

In order to select the most appropriate research method, the research must define the research questions and objectives and to determine whether the research questions contains ‘who’, ‘what’, ‘where’, ‘how’ and ‘why’ questions.

This research aimed to investigate the local housing markets to determine: What factors influence local house price differences? Why house prices vary across different locations? What are the better ways of improving the understanding of price determinants at a local level for future investment decisions?

When a ‘what’ question is exploratory and the goal is to develop pertinent hypotheses and propositions for the inquiry, any of the five research methods can be used. However, if a ‘how’ and ‘why’ question is asked, an explanatory research method, such as ‘case studies’, ‘history’ and ‘experiments’ are used as a preferred research method (Yin 2003).
Condition ii: The extent of control an investigator has over actual behavioural events

A further distinction among ‘history’, ‘case study’ and ‘experiment’ research methods is the extent of the investigator’s control over the access to actual behavioural events. This research is aimed to examine and analyse house price performance based on historical secondary data collected from third parties. Therefore, price changes in the past cannot be controlled and the ‘experiment’ method is not suitable for this research.

Condition iii: The degree of focus on contemporary as opposed to historical events

The ‘case study’ method depends on many of the same techniques as a ‘history’ method, but it adds two sources of evidence not usually included in the historian’s repertoire: direct observation of the events being studied and interviews of the persons involved in the events. The case study’s unique strength is its ability to deal with a full variety of evidence, such as documents, artefacts, interviews and observations beyond what might be available in a conventional historical study. The case study is preferred in examining contemporary events where the relevant behaviours cannot be manipulated (Yin 2003).

Based on the condition of each research method discussed previously and the aim and objective of this research, Figure 3.1 presents the selection process for the research method of this research.

Figure 3.1: Process and Reasons for Selecting Case Study

Figure 3.1 presents ‘case study’ is the most appropriate research method for this research based on the condition of each method. The case study method is an effective approach to studying a social phenomenon through a thorough analysis of an individual case (Yin 2003).
All data relevant to the case study are gathered and organised in terms of the ‘case’. It provides an opportunity for the intensive analysis of many specific details often overlooked by other methods. This approach depends on the assumption that the case being studied is typical of cases of a certain type so that, through intensive analysis, generalisations may be made that will be applicable to other cases of the same type. This research is aimed to explain drivers causing local house price differentiation. The case study approach seeks to understand the problem being investigated. It provides the opportunity to ask penetrating questions and to capture the behaviour (Kumar 2005).

**Case Study Designs**

According to Yin (2003), there are four types of case study designs and every type of design will include the desire to analyse contextual conditions in relation to the ‘case’. The research design can be classified into two categories, single vs multiple cases and holistic vs embedded design. Figure 3.2 lists the type of case study designs.

![Case Study Designs](image)

*Adopted Yin (2003) page 45*

Figure 3.2 demonstrates the type of design for a case study. Depending on the outcome the research is seeking to achieve, it can be either single case designs or multiple case designs and for each design it can be either holistic or embedded. The following sections discuss each type of design.
**Single vs Multiple Case**

Single case design is often referred to as single subject design, is an evaluation method that can be used to test rigorously the success of an intervention or treatment on a particular case and is to provide evidence also about the general effectiveness of an intervention using a relatively small sample size. Single case designs are a diverse and powerful set of procedures useful for demonstrating causal relations among phenomena (Nock et al. 2007).

A multiple case design examines several cases to understand the similarities and differences between the cases. A multiple case design enables exploration of differences within and between cases. The goal is to replicate findings across cases. Given that comparisons will be drawn, it is imperative that the cases are chosen carefully so that predication can be made to cases with similar results, or provide contrasting results based on a theory (Yin 2003).

Although there is no common understanding of how to integrate separate single case studies into a joint multiple case design, it is important to note every case should serve a specific purpose within the overall scope of inquiry (Roland 2002, Yin 2003).

This research uses multiple case designs. As Yin (2003) suggested single case studies are appropriate if the objective of the research is to explore a previously un-researched subject, whereas multiple case designs are desirable when the intent of the research is description, theory building, or theory testing. This research is aimed to examine the drivers behind local house price differences across different locations, therefore, more than one case is established for this research and multiple case designs allow for cross case analysis and the extension of theory (Benbasat et al. 1987).

Multiple case study design has its advantages and disadvantages. It is usually more difficult to implement than a single case design, but ensuing data can provide greater confidence in the findings. Overall, the evidence created from multiple case design is considered robust and reliable, but it can also be extremely time consuming and expensive to conduct (Yin 2012).
Holistic vs Embedded

A holistic case study is shaped by a thoroughly qualitative approach that depends on narrative and phenomenological descriptions. Themes and hypotheses may be important but should remain subordinate to the understanding of the case (Stake 1995). Whilst embedded, case studies involve more than one unit, or object, of analysis and usually are not limited to qualitative analysis alone. The multiplicity of evidence is investigated at least partly in sub-units, which focus on different salient aspects of the case.

This research is aimed to examine the drivers for local house price differences across different locations. As more than one location is selected, multiple case study design is preferable to test various factors in different locations and there is only one unit of analysis for each case as no logical sub-units are identified. Therefore, the holistic design is advantageous in this instance.

The following sections provide detailed discussion of the data collection process and data analysis strategies for this research.

3.4 Quantitative Analysis

Quantitative research uses defined analysis techniques to address specific research questions. The research questions in the quantitative study are directional because they state either a relationship between two or more independent variables with the dependant variables or a comparison between the two variable groups. Quantitative analysis can accommodate a single or multiple combination of descriptive, correlational, quasi-experimental and experimental research design.

For this research, quantitative analysis is conducted first, analysing house price performance at different levels (country level, city level and local level) to establish if there is a difference in house price performance at different levels. Then, it analyses the relationship between local house price performance and identified macroeconomic factors to investigate if there is a relationship between local house price performance and macroeconomic factors. In other words, can localised house price differences be explained by macroeconomic factors? The second aim of quantitative analysis for this research is to use quantitative results to select representative case studies for qualitative analysis.
3.4.1 Data Collection

The quantitative analysis phase in this research is based on secondary data. Secondary data refers to data which has been collected and collated and such data can be extracted for the purpose of the research. Some of the secondary sources can be found from government or semi-government publications, earlier research, personal records and mass media (Kumar 2005). This research sources secondary data from public records or archived databases to enable an objective modelling of Australia’s residential house price performance at different levels and its relationship with macroeconomic factors.

When obtaining secondary data, it is important ensure the validity and reliability of the data and understand the availability, format and context of the data (Kumar 2005). The subsequent sections involve discussion on various public records and achieved databases used to form the key data sources utilised in this research. Based on the objective of quantitative analysis discussed earlier, this section involves two sources of data – residential property performance data and various macroeconomic variables.

The Residential Property Performance Data

House price data at country level

House price data at a country level are collected from the Australian Bureau of Statistics (ABS). ABS collects and publishes various data including house price data, macroeconomic data and demographic data. ABS also conducts the Australian census every five years. The ABS Data Quality Framework is internationally recognised and is based on the Statistics Canada Quality Assurance Framework and European Statistics Code of Practice (ABS 2013).

House price data at city and local level

House price data at city and local level both are collected by the Real Estate Institute of Victoria (REIV). REIV is the peak professional body for the Victorian real estate agency industry with a current membership of over 7,000 in Victoria including corporate members and real estate professionals. Members specialise in residential/commercial sales and property management. The REIV gathers most of its data online from agents submitting their sales results
electronically plus a dedicated call centre to collect property sales results at the time of contract. REIV data used for this research include median house price for Melbourne as a whole and median house prices for each individual Melbourne suburb. All REIV data are presented on a quarterly basis for the research time span of 20 years from 1996 to 2016.

REIV data was the only database available for the research. In order to avoid skewed sale data and the challenges with data input error, local locations with limited sales evidence were discarded using standard deviation modelling and medium house prices measured. This is further discussed in Chapter 4 (Quantitative Analysis).

House price data collected for the residential property market is used to examine the house price performance at different locational levels and compare the results between each level to determine if there is a house price difference between levels over time.

**Macroeconomic Variables**

The type of macroeconomic variables for this research were identified from the literature review on Chapter 2. Table 3.3 summarises the types and sources of the data collected for this research.

<table>
<thead>
<tr>
<th>Types of Data</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>Consumer Price Index (CPI all groups)</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>Housing Loan Rate</td>
<td>Reserve Bank of Australia</td>
</tr>
<tr>
<td>Population Growth Rate</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>Household income</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>Housing Supply</td>
<td>Australian Bureau of Statistics</td>
</tr>
</tbody>
</table>

According to Table 3.3, macroeconomic data is collected from two major sources: ABS and RBA. ABS data has been discussed in a previous section. The other data is collected from the RBA which is Australia’s central bank and derives its functions and powers from the Reserve Bank Act (1959). The RBA determines the cash rate on a monthly basis (except January) and
Local Parameters of Housing Prices: Melbourne Residential Market

publishes the outcome on the RBA website (RBA 2016). All ABS and RBA data are presented on either a monthly or quarterly basis and for this research all macroeconomic variables are collected over the 20 year period from 1996 to 2016.

The data collected for macroeconomic variables are used to examine the relationship between local house prices and national factors to determine if local house price performance can be explained by macroeconomic variables.

3.4.2 Data Analysis (Descriptive Analysis)

Quantitative data analysis comprises mainly the analysis of numerical data using a variety of statistical methods with specific reference to descriptive and inferential techniques. Burns (1997) and Bryman (2006) explained that descriptive statistics allows researchers to summarise large quantities of data with the intention of discovering trends and patterns. Microsoft Excel Software is adopted for this research to analyse quantitative data. Excel functions such as standard deviation and correlation coefficient are applied to house prices and macroeconomic data. Outcomes of descriptive analysis mainly comprise performance results and correlations that are generally used to confirm or disconfirm the results obtained from the descriptive results. The outcomes of quantitative analysis for this research are used as a basis for selecting case studies - the foundation of the research theory. A measurement cannot be valid unless it is reliable; it must be both valid and reliable if it is to be depended upon as an accurate representation of a concept (Wan 2002). Therefore, it is important to ensure the data analysis process is validated, so that results and findings for this research are reliable. Based on the research objectives, the data analysis process for the quantitative stage of the research is formed in two sections which are listed below.

Section 1: examine and compare the price performance at different levels

The first part of quantitative analysis aims to examine and compare price performance at different levels. To achieve this, the analysis process is listed in five steps to ensure the data for quantitative analysis is reliable and the analysed results are validated.
Step 1: Filter out suburbs that have low transaction numbers

The data collected from REIV comprises quarterly median house prices and numbers of transactions occurring within each quarter. Some suburbs located on the fringe of Melbourne had limited transaction numbers and the insufficient data could provide inaccurate and unreliable evidence. Therefore, suburbs with a low number of sales were excluded from analysis to avoid misleading information in order to ensure the descriptive analysis in later steps is analysed using reliable evidence. Detailed discussion of the data eliminating process is presented in Chapter 4 (Quantitative Analysis).

Step 2: Categorise Melbourne suburbs based on distance from the Melbourne CBD

The second step of descriptive analysis is to categorise suburbs based on their distance from the Melbourne CBD in order to control the distance variable and isolate other independent variables that may cause price differences, for example macroeconomic or microeconomic factors. Out of total 547 Melbourne suburbs, there were 202 suburbs which had sufficient sales transactions. The 202 suburbs were then categorised into three radii, namely ‘inner city suburbs’ (less than 10 kilometres from the Melbourne CBD); ‘middle city suburbs’ (between 10 kilometres and 20 kilometres from the Melbourne CBD), ‘outer city suburbs’ (between 20 kilometres and 30 kilometres from the Melbourne CBD) and ‘urban fringe’ (greater than 30 kilometres from the Melbourne CBD).

Step 3: House price analysis (performance, return and volatility)

After categorising Melbourne suburbs based on their distance from the Melbourne CBD, standard deviation is used to analyse house price performance for each category to determine suburbs that performed outside a ‘normal range’. A normal range for standard deviation (SD) is defined as results between SD -1 and SD 1. Therefore, any results that below SD-1 or above SD 1 are considered outside of a ‘normal range’. The price analysis includes the analysis of median house price performance, average annual price return and price volatility to provide a comprehensive examination of house price performance. House price analysis was applied to 202 Melbourne suburbs over the 20 year period from 1996 to 2016.
Step 4: Select case study

The case study selection process requires consideration of both the logic of experimental design and the concept of sampling. This research is aimed to identify determinants of local housing prices by comparing price performance between suburbs. In choosing subjects, it is important to control the experimental groups in terms of their distribution on a number of variables that are considered confounding (Brecher and Harvey 2013, Gagnon 2009).

The case study selection process must allow for systematic stratification in terms of confounding variables, and in terms of the independent variables. When examining the hypotheses about the relationship between two subjects, it is important to ensure that makeup of the sample is proportional to the distribution of confounding variables. Therefore, cases can be selected to test independent variables by controlling confounding variables (Swanborn 2010).

Based on a standard deviation analysis in the previous step, suburbs that perform outside of the ‘normal range’ are plotted on a Melbourne map to provide an overview of the location of out of ‘normal range’ suburbs. Figure 3.3 shows the criteria for selecting representative cases for this research.

Figure 3.3 Criteria for Selecting Representative Cases

- Are two cases (suburbs) located close to each other?
  - Yes
    - Do two cases have different median house price performance
    - Do two cases have different annual price return
    - Do two cases have different price volatility
  - No
    - A case is selected, if any of the above questions are "Yes"
Figure 3.3 shows the selection process for a case study. The selection process is formed in two steps. First, is to select suburbs that are located close to each other and have similar distance to the Melbourne CBD in order to control independent variables (i.e. distance to the Melbourne CBD) and compare other independent variables, such as availability of transportation, social characteristics, and neighbourhood environment etc. This is aimed to test the impact of the independent variable on house price performance without interference from the distance variable.

The second stage is to select suburbs that have a significant difference in house price performance over time. House price performance includes average annual price return, price volatility and median house price. Detailed discussion on how each price performance is calculated are presented in the quantitative chapter (chapter 5). The key strategy for selecting case studies is to select two suburbs that are located close to each other, but have a different house price performance profile. This is aimed to emphasize the hypothesis that the impact of local factors is the key to local house price difference. The selected case studies form the foundation for qualitative analysis in the next phase.

Step 5: Compare house price performance at different levels

After the case studies are selected, the final step is to compare house price performance between different levels. A correlation coefficient test is applied at different price levels to compare the price performance between each level. First is to compare the relationship between the case studies and Australian house prices (local to country level), then compare to Melbourne house prices (local to city level). Finally compare to close-by locations (local to local level). The aim of this step is to examine if local house prices performed in line with country, city and/or local levels to further determine if there is a difference in house price performance between levels.

Section 2: examine the relationship between local house price and macroeconomic variables

The final section of quantitative analysis is to examine the relationship between selected suburbs and macroeconomic variables. A correlation coefficient test is applied between the price performance of each case study and the performance of macroeconomic variables. The aim of this section is to examine if local house price performance is in line with the performance
of macroeconomic variables. In other words, can localised house price differences be explained by macroeconomic factors?

Quantitative analysis provides an overview of house price performance at different levels and based on the results, case studies are selected. Most importantly, it examines the relationship between local house price and macroeconomic variables. The results from the quantitative analysis presents a statistical foundation and ground for qualitative analysis.

3.5 Qualitative Analysis

Qualitative analysis for this research is aimed to seek insights and explanation for results concluded from quantitative analysis i.e. why two suburbs which are located close to each other, have different price performance profile.

3.5.1 Data Collection

Two types of data are collected for qualitative analysis – background data for each case study and primary data for qualitative analysis.

**Background data for each case study**

After the case studies are selected, background data for each case study are collected from various public and government records. The background data includes information on transportation, neighbourhood, demographic, schools and planning regulation which are concluded from the literature review. The background overview provides an understanding of the selected local areas and can assist in-depth interviews. This also supports the interview results for consistency as well as contradictions that need to be explored and explained. Table 3.4 lists the types of the background data and their sources.

<table>
<thead>
<tr>
<th>Types of Data</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation</td>
<td>Public Transport Victoria</td>
</tr>
<tr>
<td>Neighbourhood</td>
<td>Various Local Council Websites</td>
</tr>
<tr>
<td>Social</td>
<td>REIV</td>
</tr>
<tr>
<td>Schools</td>
<td>Various Local Council Websites</td>
</tr>
<tr>
<td>Planning Regulation</td>
<td>Various Local Council Websites</td>
</tr>
</tbody>
</table>
According to Table 3.4, the types of data are summarised from the results of the literature review and the data are obtained from local authorities. Information on the REIV database has been discussed in section 3.4.1 and information on other sources of data is detailed below.

Public Transport Victoria

Public Transport Victoria is a statutory authority that manages Victoria’s train, tram and bus services. It provides a single contact point for customers to gain information on public transport services, fares, tickets and initiatives. The location of each train, tram and bus stops are listed on the website of Public Transport Victoria. The availability of different types of public transportation for each case study is obtained from the Public Transport Victoria website (Public Transport Victoria 2016).

Various Local Council Websites

Each suburb is situated in a municipality which provides services administered by an elected Council such as community, leisure services and strategic planning for developments within its local council areas. The municipality also collects revenue from its occupants including rates from the land owners in its jurisdiction. Information such as availability of neighbourhood facilities, schools and planning regulations are published on each Council’s website. Different case study suburbs are situated in different Council’s jurisdictions. For example, Box Hill and Mont Albert are in the City of Whitehorse, Kew and Hawthorn are in the City of Boroondara, Laverton and Altona Meadows are in the City of Hobsons Bay, Broadmeadows is in the City of Hume whilst Glenroy is in the City of Moreland. Information on the type of neighbourhood facilities, schools and planning strategies for each study is collected from Council’s website.

Primary data for qualitative analysis

Qualitative data is obtained from a primary source. This provides first-hand testimony or direct evidence concerning a topic under investigation. According to Kumar (2005), primary data can be collected through observation, interviewing and questionnaire. Qualitative analysis for this research is aimed to provide reasons behind phenomena resulting from the quantitative analysis, i.e. what are the drivers causing local house price differences? In-depth interviews are used to collect primary data as they allow the researcher to select which profession can provide the
best information to achieve the objective of the study and at the same time to see the research topic from the perspective of the interviewee and to understand how and why he or she comes to have this particular perspective (King et al. 1994, Teddlie and Yu 2007).

Selection of the most appropriate interviewees is a key feature of this research phase. Only a selected group of Australian property professionals, such as real estate agents, valuers and town planners is targeted as interviewees for this research. The selection of interviewees is based on experience in the residential property market in the selected case study locations. The qualitative analysis helps determine and validate the drivers of local house price difference.

Tashakkori and Teddlie (2003) explained that there are no rules for sample size in qualitative studies and typically, purposive samples are small. For this research, the minimal sample size required is 6 participants per case study totalling 24 participants comprising a wide range of property experts. For each case study, 6 participants are made of 3 real estate agents, 2 valuers and 1 town planner. Each participant has to have minimal of 5 years’ experience in property industry in the location of each case study. The real estate agents are directors from well-known local real estate agencies. Valuers are from valuation firms who cover the valuations of the studied locations. Town planners are from local Councils who are responsible for the strategic planning of the studied locations. Participants are recruited through the Australian Property Institute, local Councils, the researcher’s contacts and internet searches. As all interviews are anonymous, names and titles of participants are not disclosed.

The interviews are undertaken at the interviewee’s place of work, lasting between 30 and 45 minutes covering the effect of transportation, neighbourhood, social, schools and planning regulation and possible other factors on local house price performance. Ethics approval was obtained from RMIT University Design and Social Context College Human Ethics Advisory Network (CHEAN) on the 14th October 2012.

Interviews enable face to face discussion with human subjects. There are two types of interview recording – either or both (i) taking notes or (ii) audio/video recording. Audio recording is used for this research due to extensive discussions were expected. Each participant is provided with a copy of a recording consent form. All audio recordings are transcribed and stored in a safe locker at RMIT.
The interview questions can be either closed or open ended or a mixture of both (Wisker 2007). A detailed discussion of the different type of interview questions is below.

**Closed questions** tend to be used for asking and receiving answers about fixed facts and the participants do not require speculation and they tend to produce short answers. With closed questions, a small selection of possible answers is normally given to the participants to choose. However, the problem with closed questions is that they limit the response the participants can give and do not enable them to think deeply or test their real feelings or values (King 1994).

**Open ended questions** enable participants to think and talk for longer and so show their feelings and views more fully. However, it is very difficult to quantify the results. Therefore, it is important to categorise the comments or merely report them in their diversity and make the general statements (Teddlie and Yu 2007).

For this research, an open ended semi-structured interview technique is adopted as it allows participants to express their opinions and at the same time allows the interviewer to control the interview, but also allow for flexibility in terms of the participants’ responses (Yin 2012). The qualitative analysis replies on expert opinions that form the sample data in search of the drivers for local house price difference. The identification of the determinants for local house price difference is constructed through feedback and discussions with professional bodies including real estate agents, property valuers and town planners.

The qualitative semi-structured interview for this research has the following aims:

i. To understand the effect of local factors identified in the literature review on local house price performance concluded from the quantitative chapter.

ii. To identify other factors not mentioned in the literature review that may cause price difference at a local level.

iii. To examine how local factors have contributed to price difference at a local level during a specific time period.
3.5.2 Data Analysis

For this research, data collected from semi-structured interviews are used to explain findings from the quantitative analysis and discover the drivers of local house price differences. Establishing effective communication in interviews with participants is crucial for the success of qualitative research and a planned systematic interview approach is critical to ensure the best responses are obtained from the experts in their field to achieve the objective of this research (Tashakkori and Teddlie 2003). Figure 3.4 illustrates the interview and data analysis process for qualitative analysis.

Figure 3.4 shows the interview and data analysis process for qualitative analysis after developing the semi-structured interview questions based on research objectives established earlier in the research. The researcher then conducts the interview with selected professionals for each case study. 3 real estate agents, 2 valuers and 1 town planner totalling six participants per case study were recruited for the qualitative analysis. During the case study interviews, examination and questions on how each identified local factor contributes to local house price differences were asked and the professionals’ opinions were recorded. A copy of semi-structured interview questions are attached in Appendix.
After the interview is conducted, cross case examination between case studies is analysed. The analysis process is first to summarise the interview results based on the effect of each factor to house price differences. This is to provide an overview of the impact of each factor on house price performance through the evidence of each case study. Summarisation process is conducted manually by researcher rather than through software due to small sample size. The results are then co-referenced with median house price performance, average annual price return and price volatility to provide a comprehensive analysis on price performance profile. The analysis results aim to identify drivers and determinants for local price differences.

3.6 Research Design

The findings from the literature review have concluded that when examining local house price performance existing studies only focused on examining one or two factors with nominal attention on the combination of all factors and how those factors would have a different effect in different locations, especially locations that are located next to each other. In addition, there has been nominal attention on examining Melbourne house price determinants, especially at a suburb level. Therefore, an examination of drivers for house price performance at Melbourne local level is required. Based on the research aims and research methodology discussed in the earlier sections, the following research design features are established (Figure 3.5).
Stage 1
Define Research (Chapter 1, 2, 3)

Stage 2
Quantitative Analysis (Chapter 4)

Stage 3
Qualitative Analysis (Chapter 5)

Stage 4
Discussion and Implementation (Chapter 6)

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Figure 3.5 exhibits the four key stages of this research and associated chapters for each stage. As it is important to examine the research’s objective with a corresponding research design plan and undertakings to ensure effectiveness of the study, the following sections discuss the research objectives associated at each stage in detail.

i) Stage 1 Research Background, Literature Review and Research Methodology

Stage 1 starts with an overview of the research including introducing the research problem, research methodology and outcomes (chapter 1). It continues with an overview of house price performance and its importance to economy and individuals. Then it provides empirical studies on house price determinants and identifies a knowledge gap to reflect the purpose of conducting this research (chapter 2). Findings of the literature review provide a theoretical foundation for the research. Stage 1 also involves the design of the research (chapter 3), including research method, data collection, data analysis process and criteria for case study selection. Research design provides the framework and process of conducting research and data analysis. Based on the research aim and objectives, the mixed use method is established for this research.

ii) Stage 2: Quantitative Analysis

This stage involves quantitative analysis (chapter 4) which provides examinations of local house price performances comparing the results with Australian and Melbourne house price performance. This is to achieve research objective: to examine the relationship of house prices at different levels – local to country/city/local level. Based on the results, two suburbs that are located next to each other but have a different price performance are selected as case studies. Then correlation coefficient testing is applied to examine the relationship between each case study and macroeconomic factors to achieve the research objective: to investigate the relationship of local house prices and macroeconomic factors to determinate if local house price differences can be explained by macroeconomic factors.

iii) Stage 3: Qualitative Analysis

This stage involves qualitative analysis (chapter 5) which is aimed to explain the results behind the phenomena identified in quantitative analysis. This stage reports the results of the qualitative analysis including providing detailed analysis of representative cases using holistic
multiple-case designs and investigates local price determinants through in-depth interviews of local professionals. This is to achieve the research objective: to analyse key local housing market drivers.

iv) Stage 4: Conclusions, Implementation and Recommendations

This stage details conclusions, implementation and recommendations (chapter 6), including analyses and discusses the findings from both quantitative analysis and qualitative analysis and relate the findings to the research objectives established at the beginning of the research. It then outlines the implementation and recommendations for future research. This is to achieve research objective: to provide better understanding of residential price determinants at a local level.

3.7 Summary

This chapter establishes the research method, design and technique for data collection and data analysis process. For research methodology, this research uses explanatory mixed methods (Quan -> Qual) in which the quantitative and qualitative data analysis strategies are combined. Quantitative analysis is adopted in the first stage of the research to examine and compare the house price performance at different levels and then analyse the relationship between local house price performance and macroeconomic factors to demonstrate if local house price can explained by macroeconomic factors. The second stage of the research uses qualitative analysis to explain drivers for local house price differences. The mixed methods data analysis techniques are both statistical and thematic in nature in order to solicit better understanding of the multifaceted house price performance and their drivers (Greene 2008, Tashakkori and Teddlie 2003).

This research adopts case study research method as the research strategy. Case study explains a social phenomenon through a thorough analysis of an individual case which cooperate with the research aim. As more than one case study was selected and no sub-unit is identified for each case study, the holistic multiple case design was adopted for this research.

Based on the intended mixed method explanatory design for this research, the secondary data for quantitative analysis are collected from public and private reputed agencies including ABS,
REIV and RBA for the period between 1996 and 2016. The standard deviation and correlation analysis are both used to analyse the performance of house price at different levels. Qualitative analysis is developed subsequent to the quantitative research outcomes and elaborates the results interpreted (Creswell and Clark 2011, Ivankova et al. 2006). The primary data collected for qualitative analysis are obtained from a semi-structured interview of property professionals. The data analysis process is organised from conducting individual case interviews to cross-case examination after the interviews. The qualitative analysis supports, validates and explains the quantitative results.

The next chapter provides the analysis and resultant discussion of the quantitative analysis.
CHAPTER FOUR

QUANTITATIVE ANALYSIS:
MELBOURNE RESIDENTIAL PROPERTY MARKET

4.1 Introduction

There are 547 suburbs in the Metropolitan Melbourne (DEECD 2009). This chapter reports the quantitative analysis conducted on these suburbs and identifies the case studies for this research. This chapter also establishes the relationship and interactions between traditional key economic indicators (macroeconomic factors) and performance of house prices for the selected locations. This is achieved through the implementation of statistical techniques as discussed in chapter 3 – standard deviation to identify ‘unique’ suburbs; and a correlation coefficient to test relationships between macroeconomic factors and house price performance of individual locations. This allows the researcher to analyse the house prices in different locations and ensure consistency and systematic research implementation.

The chapter is structured as follows: after the introduction (section one), section two of the quantitative analysis involves identification of suburbs across Metropolitan Melbourne that have ‘sufficient’ transactions between 1996 and 2016 to ensure the reliability of statistical analysis for section three. Section three involves categorising suburbs according to their distance from the Melbourne CBD to control for the distance variable and allow the researcher to compare independent variables. In section four, house price performance for the suburbs with reliable data is analysed descriptively to examine their historical performance for the period between 1996 and 2016. Three common price performance measurements adopted for the descriptive analysis include median house price performance, average annual price return and price volatility. This is aimed to provide a comprehensive examination of house price...
performance profile across locations. Next, the standard deviation is applied to each aforementioned price measurement which is followed by plotting the ‘out of normal’ suburbs on a map to allow the researcher to identify the location of the ‘unique’ suburbs.

The result of this part of the study is to select the case studies for qualitative analysis by implementing the research objective – ‘to select suburbs that are located close to each other, but have different price performance profiles’ (section five). After case studies are selected, section six of the quantitative analysis is to compare price performance of each selected location to the price performance at country level (Australian house prices), city level (Melbourne house prices) and local level (adjoining suburb house prices). This part is undertaken by using a correlation coefficient test and the results enabled the researcher to demonstrate the inconsistencies in price performance between each level across selected locations. Section seven of the quantitative phase involves utilizing the descriptive analysis on various traditional economic data (macroeconomic factors) and comparing them with house price performance in the selected cases. The objective of this investigation is to establish if macroeconomic factors were influencing determinants on house price difference at a local level. Finally, the chapter concludes with the results and key summaries for the quantitative analysis phase.

4.2 Suburbs with Sufficient Data

The price data used for this research was provided by REIV and it includes the median house price for each Melbourne suburb on a quarterly basis between 1996 and 2016. The data also include the number of transactions which occurred in that quarter for each suburb.

For the quantitative analysis approach, reliability and validity are tools of an essentially positivist epistemology (Joppe 2000). The aim of this selection is to identify suburbs across the metropolitan area that have ‘sufficient’ transactions between 1996 and 2016 to ensure the reliability of statistical analysis. According to Joppe (2000), consistency is the main measure of reliability. Therefore, this research has limited the data to include sales evidence of single family residences only (i.e. dwellings) for reasons of comparability and to minimize residential property heterogeneity.
Morgan and Waring (2004) concluded that data is sufficiently reliable for engagement purposes when there is a review of related information and the initial testing provides assurance that the likelihood of significant errors or incompleteness is minimal and the use of the data would not lead to an incorrect or unintentional message. It is possible to have some problems with or uncertainties about the data, but they need to be minor, given the research question (objective) and intended use of the data (Waring 2004).

According to the Department of Education and Early Childhood Development (DEECD), there are 547 suburbs located within 31 Local Government Areas (LGA) of Metropolitan Melbourne. Table 4.1 lists the number of suburbs located within each LGA.

<table>
<thead>
<tr>
<th>LGA Suburbs</th>
<th>Suburbs</th>
<th>LGA Suburbs</th>
<th>Suburbs</th>
<th>LGA Suburbs</th>
<th>Suburbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banyule</td>
<td>20</td>
<td>Bayside</td>
<td>9</td>
<td>Boroondara</td>
<td>12</td>
</tr>
<tr>
<td>Brimbank</td>
<td>24</td>
<td>Cardinia</td>
<td>47</td>
<td>Casey</td>
<td>29</td>
</tr>
<tr>
<td>Darebin</td>
<td>9</td>
<td>Frankston</td>
<td>9</td>
<td>Glen Eira</td>
<td>14</td>
</tr>
<tr>
<td>Greater Dandenong</td>
<td>10</td>
<td>Hobsons Bay</td>
<td>12</td>
<td>Hume</td>
<td>25</td>
</tr>
<tr>
<td>Kingston</td>
<td>23</td>
<td>Knox</td>
<td>11</td>
<td>Manningham</td>
<td>10</td>
</tr>
<tr>
<td>Maribyrong</td>
<td>9</td>
<td>Marrondah</td>
<td>11</td>
<td>Melbourne</td>
<td>15</td>
</tr>
<tr>
<td>Melton</td>
<td>1</td>
<td>Monash</td>
<td>14</td>
<td>Moonee Valley</td>
<td>14</td>
</tr>
<tr>
<td>Moreland</td>
<td>12</td>
<td>Morington Peninsula</td>
<td>40</td>
<td>Nillumbik</td>
<td>25</td>
</tr>
<tr>
<td>Port Phillip</td>
<td>13</td>
<td>Stonnington</td>
<td>9</td>
<td>Whitehorse</td>
<td>17</td>
</tr>
<tr>
<td>Whittlesea</td>
<td>8</td>
<td>Wyndham</td>
<td>17</td>
<td>Yarra</td>
<td>12</td>
</tr>
<tr>
<td>Yarra Ranges</td>
<td>66</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: DEECD (2009) and Various Council’s Websites (2016)

This research has applied standard deviation to the number of residential transactions of each 547 of Melbourne’s suburbs on a quarterly basis between 1996 and 2016 to remove suburbs with transactions which lie outside the normal standard deviation range.

Standard deviation (SD) is the spread of data from a mean value. The mean and standard deviation are two statistics that determine differences and similarities in groups that are being researched. Standard deviation is the most widely used measure of dispersion for quantitative research (White and Millar 2014). The normal standard deviation range lies between SD -1 and SD+1. Suburbs that are considered to have paucity of transactions have been removed from descriptive analysis in order to control price performance fluctuation that may have been caused by limited numbers of sales transactions. 345 suburbs with insufficient transaction data were
filtered out from the total of 547 Melbourne suburbs. The results from this section provide a more accurate basis for price comparison for later sections.

4.3 Categorises Suburbs Based on Distance from the Melbourne CBD

Quantitative research is designed to quantify relationships between independent and dependent variable. Cramer and Howitt (2004) defined dependent variables as the variable that depends on other factors that are measured. These variables are expected to change as a result of an experimental manipulation of the independent variable or variables. Independent variable means the variable that is stable and unaffected by the other measured variables. For this research, distance to the Melbourne CBD and microeconomic factors such as schools and socio demographics are all independent variables.

Brueckner (1987) and Kulish et al. (2011) concluded that in equilibrium, similar households must have equal utility regardless of location and (by assumption) all jobs are in the CBD, house prices must fall with increases in commuting costs inclusive of fares (or motor vehicle costs) and travel time costs. If travel costs rise non-linearly with a falling marginal travel cost, then conversely house prices fall non-linearly with distance from the CBD. Based on the same principle, Abelson et al. (2012) demonstrated the distribution of median house prices versus distance from the CBD (Figure 4.1).

![Figure 4.1 House Price and Distance from the CBD](source: Abelson et al. (2012))

Figure 4.1 shows the average suburb house prices are higher within 10 kilometres from the CBD and generally decrease as distance from the CBD increases. This has also been supported
by Atack and Margo (1989) who analysed the spatial variation in land values and recorded the asking prices for vacant lots in New York City. Using the City Hall as the base point for their distance calculations, they estimated a simple negative exponential function with the natural logarithm of sales price per square foot as the dependent variable and distance from the CBD as the explanatory variable. Land values are estimated to decline by approximately 8% with each additional mile from the CBD, but the gradient declines markedly over time as New York’s public transportation system was improved.

McMillen (2003) evaluated the return of centralization in Chicago using a repeat sales model, and concluded that housing prices declined by more than 8% for every mile from the CBD. Another investigation of spatial variation in housing prices was implemented by De Bruyne and Van Hove (2006), in which the data sample represented every municipality in Belgium. An increase in travel distance by one kilometre was found to lower the housing price by 2%. Combining several sources of vacant land sales, Ahlfeldt and Wendland (2009) estimate land value functions for Berlin for 1890 to 1936 and also found estimated land value gradients declined over time as distance from the CBD increases.

With this in mind, this research has categorised suburbs according to their distance from the Melbourne CBD to manage distance variables and examine influence of other independent variables such as schools and socio demographics factors. By doing so, data ‘validity’ is provided in quantitative research. According to Seliger and Shohamy (1989), validity determines whether the research truly measures that which it was intended to measure or how realistic the research results appear. Validity is one of the main concerns with research. Figure 4.2 shows the boundary of Metropolitan Melbourne and each LGAs and their distance from the Melbourne CBD.
Figure 4.2 shows the boundary of Metropolitan Melbourne and the LGAs as well as their distance from the Melbourne CBD. A total of 202 Melbourne suburbs that have sufficient transactions are separated into three categories based to their distance from the Melbourne CBD, namely:

i. ‘inner city suburbs’ (0-10 kilometres) – total 61 suburbs.
ii. ‘middle city suburbs’ (10-20 kilometres) – total 81 suburbs.
iii. ‘outer city suburbs’ (20-30 kilometres) – total 60 suburbs.
iv. ‘Urban fringe’ (> 30 kilometres) – total 0 suburbs.

After suburbs are categorised, the median house price for each radius is analysed and recorded across the 20 year period. For quantitative analysis, house price performance of individual suburbs is only compared to the median house price performance of their located radius rather than Melbourne’s median house price in general to control the house price differentiation that may be caused by distance variables. For example, this research compares suburbs that are located in the ‘0-10’ kilometres radius to the median house price of that radius over the 20 year period. The results provided a more accurate benchmark for comparison purposes.
4.4 Descriptive Analysis

This section aims to accomplish the following objective:

“To analyse and compare house price performance using statistical analysis to provide systematic procedures through validity and reliability of the evidence for the in-depth analysis of selected case studies in the next stage.”

In order to achieve the objective, median house prices (from REIV) on 202 Melbourne suburbs are analysed descriptively to examine their historical performance for the period from 1996 to 2016. When measuring house prices, three economic terms are often used – median house price performance, average annual price return and price volatility. This research analyses the house price performance in three steps to provide a comprehensive examination of house price performance across locations and most importantly, to provide a solid foundation for case selection.

Step 1: examine median house price performance for each Melbourne suburb
Step 2: examine average annual price returns for each Melbourne suburb
Step 3: examine price volatility for each Melbourne suburb

The standard deviation analysis is then applied to 202 suburbs over the 20 year period through all 3 steps to compare the performance of each suburb and to distinguish suburbs that ‘fall out’ of the standard deviation ‘normal range’. ‘Out of normal range’ is defined as suburbs with price performance below standard deviation -1 or above standard deviation +1.

Based on the results from the standard deviation analysis, this research then plots ‘out of normal range’ suburbs on a map to allow the researcher to identify the location of the ‘unique’ suburbs in order to establish if there is inconsistency in house price performance between suburbs that are located next to each other. The following sections summarise the results for each step.

4.4.1 Median House Price Performance of Melbourne Suburbs

Median house price performance measures the performance of recorded median house prices across Melbourne suburbs on a yearly basis. Standard deviation is applied to the median house
price of 202 Melbourne suburbs and compared with the median benchmark of their located radius. The analysis process is repeated over the 20 year period from 1996 to 2016. Figure 4.3 presents the results of median house price performance analysis.

Figure 4.3 Location of ‘Out of Normal Range’ Suburbs for Median House Price Performance

Figure 4.3 shows the location of suburbs with median house price performance outside of ‘normal price range’ over 20 year period by applying a standard deviation test. Of 202 examined Melbourne suburbs, there are 12 suburbs which performed above standard deviation +2, 10 suburbs between standard deviation +1 and +2, 9 suburbs between standard deviation -1 and -2 and none below standard deviation -2. In general, differentiation in median house price performance is spread across inner and middle city locations with limited differentiation across outer city areas. More particularly, suburbs with high median house prices (i.e. above SD+1/+2) are located on the eastern and south-eastern side of Melbourne, whilst low priced suburbs (i.e. below SD-1) are located on the western side of Melbourne.

Interestingly, suburbs located next to each other can have a different median house price performance. For example, for the inner city concentric zone, Heidelberg West and Ivanhoe are two adjoining suburbs located approximately 10 kilometres north of the Melbourne CBD. However, the median house price performance is different between the two locations. Table 4.2 shows the median house price of Heidelberg West and Ivanhoe from 1996 to 2016 on a 5 year basis.
Table 4.2  Median House Price of Heidelberg West and Ivanhoe

<table>
<thead>
<tr>
<th></th>
<th>Heidelberg West</th>
<th>Ivanhoe</th>
<th>Benchmark Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>$103,750</td>
<td>$130,500</td>
<td>$191,059</td>
</tr>
<tr>
<td>2001</td>
<td>$152,000</td>
<td>$320,000</td>
<td>$330,000</td>
</tr>
<tr>
<td>2006</td>
<td>$235,000</td>
<td>$560,000</td>
<td>$510,000</td>
</tr>
<tr>
<td>2011</td>
<td>$414,000</td>
<td>$1,115,000</td>
<td>$1,017,000</td>
</tr>
<tr>
<td>2016</td>
<td>$603,000</td>
<td>$1,505,500</td>
<td>$1,255,000</td>
</tr>
</tbody>
</table>

Table 4.2 shows over a 20 year period, Ivanhoe has an overall higher median house price performance than Heidelberg West. Comparing each suburb with the benchmark mean, Heidelberg West is considered as having one of the lowest median house prices for that radius (0-10 kilometres) over the 20 year period with a standard deviation below -1, whilst Ivanhoe is considered within the normal standard deviation range being between standard deviation 0 and +1.

For the middle city concentric zone, Mont Albert and Box Hill are two adjoining suburbs located approximately 15 kilometres east of the Melbourne CBD. Again, the median house price performance is different between these two suburbs. Table 4.3 shows the median house price of Mont Albert and Box Hill from 1996 to 2016 on a 5 year basis.

Table 4.3  Median House Price of Mont Albert and Box Hill

<table>
<thead>
<tr>
<th></th>
<th>Mont Albert</th>
<th>Box Hill</th>
<th>Benchmark Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>$260,000</td>
<td>$147,500</td>
<td>$151,000</td>
</tr>
<tr>
<td>2001</td>
<td>$499,000</td>
<td>$285,000</td>
<td>$140,260</td>
</tr>
<tr>
<td>2006</td>
<td>$671,000</td>
<td>$456,250</td>
<td>$387,670</td>
</tr>
<tr>
<td>2011</td>
<td>$1,392,000</td>
<td>$873,500</td>
<td>$711,712</td>
</tr>
<tr>
<td>2016</td>
<td>$1,210,000</td>
<td>$805,000</td>
<td>$644,711</td>
</tr>
</tbody>
</table>

Table 4.3 shows over a 20 year period, Mont Albert maintains an overall higher median house price than Box Hill. Comparing each suburb with a benchmark mean, Mont Albert is considered as having one of the highest median house prices for that radius (10-20 kilometres) over the 20 year period with a standard deviation above +2, whilst Box Hill is considered within the normal standard deviation range being between standard deviation 0 and +1.

For the outer city concentric zone, Wheelers Hill and Mulgrave are two adjoining suburbs located approximately 25 kilometres south-east of the Melbourne CBD. However, again the
median house price performance is different. Table 4.4 shows the median house price of Wheelers Hill and Mulgrave from 1996 to 2016 on a 5 year basis.

<table>
<thead>
<tr>
<th>Year</th>
<th>Wheelers Hill</th>
<th>Mulgrave</th>
<th>Benchmark Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>$215,000</td>
<td>$137,000</td>
<td>$140,519</td>
</tr>
<tr>
<td>2001</td>
<td>$174,000</td>
<td>$180,000</td>
<td>$208,508</td>
</tr>
<tr>
<td>2006</td>
<td>$383,000</td>
<td>$294,000</td>
<td>$348,085</td>
</tr>
<tr>
<td>2011</td>
<td>$650,000</td>
<td>$530,000</td>
<td>$562,154</td>
</tr>
<tr>
<td>2016</td>
<td>$974,500</td>
<td>$720,000</td>
<td>$734,513</td>
</tr>
</tbody>
</table>

Table 4.4 shows over a 20 year period, Wheelers Hill has an overall higher median house price than Mulgrave. Comparing each suburb with a benchmark mean, Wheelers Hill is considered as having one of the highest median house price for that radius (20-30 kilometres) over the 20 year period with a standard deviation above +2, whilst Mulgrave is within the normal standard deviation range being between standard deviation 0 and +1.

In summary, although two suburbs are located close to each other, the median house price performance can be different with one location being significantly higher or lower than adjoining suburbs. The results suggest there is an existence of house price difference at a local level.

### 4.4.2 Average Annual House Price Return of Melbourne Suburbs

Average annual house price return measures the average rate of the median house price growth on a yearly basis and it is used to demonstrate the percentage increase or decrease from the previous year over the 20 year period from 1996 to 2016. Again, a standard deviation test is applied on the average annual return of 202 Melbourne suburbs and compared with the mean return of the suburb’s located radius. Figure 4.4 presents the results for average annual price return analysis.
Figure 4.4 shows the location of suburbs with average annual price return outside of a normal standard deviation return range over 20 year period. Of 202 examined Melbourne suburbs, there are 4 suburbs which performed above standard deviation +2, 18 suburbs between standard deviation +1 and +2, 15 suburbs between standard deviation -1 and -2 and none below standard deviation -2. In general terms, again, most of the high price return suburbs are spread across southern and south-eastern side of Melbourne. However, there are some exceptions, such as Keilor which is located on the western side of Melbourne and has achieved a price return above standard deviation +1.

Similar results are also found in this section that two suburbs located next to each other may have a different price return profile. To give an example, for an inner city concentric zone, Malvern and Glen Iris are two adjoining suburbs located approximately 8 kilometres south-east of the Melbourne CBD. However, the average annual price return is different between the two locations. Compared to the overall average annual return mean of 10.7%, Malvern has an overall average annual return of 14.0% which is above standard deviation +1. Whilst Glen Iris has an average annual price return of 11.0% which is within the standard deviation normal range. Overall, Malvern is considered as having the 2nd highest average annual price return for that radius (0-10 kilometres) over the 20 year period.

Likewise, for middle city concentric zone, Keilor and Keilor Downs are two adjoining suburbs located approximately 15 kilometres north-west of the Melbourne CBD. Again, a
differentiation in average annual price return occurred between the two locations. Compared to the overall average annual return mean of 9.3%, Keilor has an overall average annual return of 11.9% which is above standard deviation +1, while an average annual price return of 7% was recorded for Keilor Downs which is below standard deviation -1. Overall, Keilor is considered as having the 3rd highest average annual price return for that radius (10-20 kilometres) over the 20 year period, whilst Keilor Downs is considered as having one of lowest average annual price returns for that radius.

In addition, for the outer city concentric zone, Bayswater and Boronia are two adjoining suburbs that are located approximately 25 kilometres south-east of the Melbourne CBD. Again, compared to the overall average annual return mean of 8.1%, Bayswater has an average annual price return of 6.6% which is below standard deviation -1, whilst the average annual price return for Boronia was recorded at 8.2% which is within the normal standard deviation range. Overall, Bayswater is considered as having one of the lowest average annual price returns for that radius (20-30 kilometres) over the 20 year period.

In summary, similar to the results concluded from previous section, this section found suburbs that are located next to each other may have a different average annual price return and this also suggested there is an existence of house price difference at a local level.

4.4.3 Price Volatility of Melbourne Suburbs

In financial markets, volatility has become an increasing concern for investors and it is considered as one critical measurement for understanding house price performance (Brailsford et al. 2004). Especially after the recent Global Financial Crisis which has further increased the volatility of housing and drawn the attention of policy makers and investors towards the importance of housing price volatility (Lee 2009). Therefore, beside median house price performance and average annual price return, this research has also included analysis on price volatility to provide a comprehensive analysis of house price performance and importantly, to provide additional statistical grounds for the case selection process in later stages of the research.

House price volatility measures the amplitude of house price returns over a time period. Volatility indicates the pricing behavior of the market and helps estimate the fluctuations for a
selected period of time (Dolde and Tiritoglu 2002). To measure price volatility, the Generalized Autoregressive Conditional Heteroscedastic (GARCH) model development by Bollerslev (1986) is widely used in existing literature for modelling and forecasting of economic and financial series including stock return data, interest rate data and foreign exchange data. For the housing price sector, there has been much literature examining housing market volatility using the GARCH model including Crawford and Fratantoni (2003) who focused on the nonlinear price dynamics in the housing market stemming from the California housing market. Miller and Peng (2006) examined the house price volatility of Metropolitan Statistical Areas in the US this model.

For this research, price volatility is calculated for 202 Melbourne suburbs using excel GARCH modelling over the 20 year period from 1996 to 2016. Then standard deviation is applied to the volatility results and compared with the mean volatility of that suburb’s location radius. Figure 4.5 presents the results for house price volatility analysis.

Figure 4.5 shows the location of suburbs with price volatility outside of normal price volatility range using GARCH modeling over 20 year period. Of 202 examined Melbourne suburbs, there are 10 suburbs which performed above standard deviation +2, 7 suburbs between standard deviation +1 and +2, 8 suburbs between standard deviation -1 and -2 and none below standard deviation -2. In general terms, most of the volatile suburbs are located in southern and south-
eastern side of Melbourne. However, there are exceptions like Sunshine West which is located on the western side of Melbourne and considered as having one of the highest price volatilities for that radius.

To give an example, for inner city concentric zone, Carlton and North Melbourne are two adjoining suburbs located approximately 3 kilometres north of the Melbourne CBD. The price volatility between the two suburbs are very different. Compared to a volatility mean of 0.13, Carlton has a price volatility of 0.21 which is above standard deviation +2, while the price volatility for North Melbourne is 0.16 which is considered within the normal price volatility range. Overall, Carlton is considered as having one of highest price volatilities for that radius (0-10 kilometres) over the 20 year period.

For middle city concentric zone, Sunshine West and St. Albans are two adjoining suburbs located approximately 12 kilometres west of the Melbourne CBD. The price volatility between the two locations are also different. Compared to the volatility mean of 0.10, Sunshine West has a price volatility of 0.26 which is above standard deviation +2, whilst St. Albans has a price volatility of 0.06 which is below standard deviation -1. Overall, Sunshine West is considered as having the 2nd highest price volatility for that radius (10-20 kilometres) over the 20 year period, whilst St. Albans is considered having one of the lowest price volatilities for that radius.

In summary, based on the descriptive analysis resulting from analysis of median house price performance, average annual price return and price volatility, suburbs that are located close to each other may have a different price performance profile over time and those differences may vary between locations. The next section of the research involves selection of case studies for qualitative analysis. The strategy for selecting a case study is to select two suburbs located next to each other, but have different median house price performance, average annual price return and/or price volatility.

4.5 Selection of Case Studies

Based on the results from house price performance analysis and the location of suburbs that performed outside of normal standard deviation range, the suburbs with ‘unique performance’ are easily identified. This section of research is aimed at selecting suburbs located close to each other, but which have different price performance profile. According to the statistical analysis
results and the research objectives, a total of eight suburbs are selected from 202 analysed Melbourne suburbs to form four case studies and compare in pairs. Figure 4.6 demonstrates the location of each case study.

Figure 4.6 Location of the Case Studies

Figure 4.6 shows the location of the selected case studies. Hawthorn and Kew are two adjoining suburbs both located 7 kilometres east of the Melbourne CBD. Glenroy and Broadmeadows are two adjoining suburbs both located 11 kilometres north of the Melbourne CBD. Altona Meadows and Laverton are two adjoining suburbs both located 13 kilometres west of the Melbourne CBD. Mount Albert and Box Hill are two adjoining suburbs both located 15 kilometres east of the Melbourne CBD. Based on descriptive analysis, Table 4.5 summarises the price performance profile for each case study.

<table>
<thead>
<tr>
<th>Table 4.5 Summary of Price Performance Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Median House Price</strong></td>
</tr>
<tr>
<td>Kew</td>
</tr>
<tr>
<td>One of the <strong>highest</strong> median price suburbs</td>
</tr>
<tr>
<td>+2 SD</td>
</tr>
<tr>
<td>Hawthorn</td>
</tr>
<tr>
<td>Within normal median price range</td>
</tr>
<tr>
<td>+/- 1 SD</td>
</tr>
<tr>
<td><strong>Average Annual Price Return</strong></td>
</tr>
<tr>
<td>Kew</td>
</tr>
<tr>
<td>One of the <strong>highest</strong> annual price growth suburbs</td>
</tr>
<tr>
<td>+2 SD</td>
</tr>
<tr>
<td>Hawthorn</td>
</tr>
<tr>
<td>One of the <strong>highest</strong> annual price growth suburbs</td>
</tr>
<tr>
<td>+1 SD</td>
</tr>
<tr>
<td><strong>Price Volatility</strong></td>
</tr>
<tr>
<td>Kew</td>
</tr>
<tr>
<td>One of the <strong>highest</strong> price volatility suburbs</td>
</tr>
<tr>
<td>+2 SD</td>
</tr>
<tr>
<td>Hawthorn</td>
</tr>
<tr>
<td>Within normal price volatility range</td>
</tr>
<tr>
<td>+/- 1 SD</td>
</tr>
<tr>
<td>Suburb</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Box Hill</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Mont Albert</td>
</tr>
<tr>
<td></td>
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<tr>
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<td>Laverton</td>
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<td>Altona Meadows</td>
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<td>Glenroy</td>
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<td>Broadmeadows</td>
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Table 4.5 summarises the median price performance, average annual price return and price volatility for each suburb. Suburbs that highlighted in the same colour are located adjoining to each other. As Table 4.5 shows, although two suburbs are located next to each other, the median price performance, average annual price return and/or price volatility can be very different.

For example, the median price performance and price volatility are significantly different between Kew and Hawthorn, whilst average annual price return is less different as both suburbs have an above average annual price return. For median house price performance, Kew has one of the highest median house prices across the 20 year period and its overall price volatility is ranked as 3rd highest for its radius. However, Hawthorn has a less expensive median house price and the price performance is less volatile. A similar trend was also found between Box Hill and Mont Albert where Box Hill has a higher annual price return, whilst Mont Albert has a higher median house price and the price performance is more volatile.

Another interesting example is Laverton and Altona Meadows where Laverton has one of the lowest median house prices over the 20 year period, but its average annual return is ranked at 5th highest and price volatility ranked at 6th highest for its radius. However, Altona Meadows
has a normal median house price and price volatility, but the average annual growth is considered one of the lowest for its radius. The difference in house price performance between Glenroy and Broadmeadows is less dramatic compared to the other case studies. The average annual return and price volatility for the two suburbs are similar which are all within the normal standard deviation range. However, there is a difference in the median house price performance. Broadmeadows has one of the lowest median house price performance for its radius over the 20 year period, while the median house price for Glenroy is within the normal standard deviation range.

4.6 Descriptive Analysis of House Price at Three Levels

This section analyses and compares house price performance of case studies with country, city and local level to demonstrate if local house price performs in line with house prices at different levels. A moving correlation coefficient test on a 3 year period is applied to different levels with the aim to compare the price relationship between each level. The correlation coefficient is a measure that determines the degree to which two variables’ movements are associated. The range of values for the correlation coefficient is -1.0 to 1.0 where -1.0 being perfectly negatively correlated and 1.0 being perfectly positively correlated (Sharma 2005). This section is organised in three parts:

i. First is to compare the price relationship between each case study and the Australian house prices. This is aimed to examine if local house prices performed in line with house prices at country level.

ii. Then to compare the price relationship between each case study and the Melbourne house prices. This is aimed to examine if local house prices performed in line with house prices at city level.

iii. Finally to compare the price relationship between two suburbs within each case study. This is aimed to examine if local house prices performed in line with another local house prices.

The following sections illustrate the results of house price performance at different levels.
4.6.1 Country Level

A moving correlation coefficient test is used to examine and compare price correlation between median house prices of selected case studies (local level) and the Australian median house prices (country level). This research has adopted moving correlation on a 3 year basis (3 point) to provide a trend of price correlation over 20 year period. Figure 4.7 presents the results of the correlation test at country level.

Figure 4.7 Price Correlation between Each Case Study and the Australian Median House Prices
Figure 4.7 shows the moving correlation between the median house price of each case study and the Australian median house prices. Overall, the price correlation between each suburb and Australian house prices is volatile throughout the years with certain periods showing positive correlation and certain periods showing negative correlation. Each suburb has a different correlation profile over time which means each individual suburb performs differently to the Australian house prices overtime even though those suburbs are located next to each other.

For example, for Hawthorn and Kew, Kew experienced a decrease in price correlation from 0.8 in 1998 to 0.4 in 2001, whilst during the same time, the price correlation between Hawthorn and the Australian house prices has remained constant at 0.7. This has also been seen between Mont Albert and Box Hill where Mont Albert experienced a decrease in price correlation from 0.6 in 1999 to 0.5 in 2001, whilst during the same period, Box Hill has experienced a steady price correlation at 0.8.

For Altona Meadows and Laverton, there was a decrease in price correlation for Laverton and the Australian median house prices from 0.8 in 2000 to a negative -0.1 in 2002, whilst during the same time, the price correlation for Altona Meadows remained at a historical high of 0.9. For Glenroy and Broadmeadows, between 1996 and 1998, Broadmeadows experienced a decrease in price correlation from 0.3 in 1996 to 0.1 in 1998 and then the price correlation started to increase after 1999. However, during the same period, the price correlation for Glenroy was on the increase trend from 0 in 1996 to 0.5 in 1998.

For a more recent price correlation example, the price correlation in Kew decreased from 0.7 in 2009 to 0.4 in 2010 and then increased back to 0.7 in 2011. However, during the same period, price correlation for Hawthorn was steady at 0.7. Another example is Altona Meadows and Laverton where the price correlation in Altona Meadows decreased significantly from 0.8 in
2012 to -0.4 in 2014, whilst the price correlation in Laverton only decreased from 0.8 in 2012 to 0.5 in 2014 which is less dramatic.

Interestingly, between 2004 and 2006 (prior to the GFC), there was a significant decrease in price correlation between individual suburbs and Australian house prices across all case studies. For example, Hawthorn decreased from 0.8 to -0, Kew decreased from 0.8 to 0.4, Box Hill decreased from 0.4 to 0.3, Mont Albert decreased from 0.6 to 0, Altona Meadows decreased from 0.9 to 0, Laverton decreased from 0.6 to 0.3, Glenroy decreased from 0.8 to 0.3 and Broadmeadows decreased from 0.8 to 0.4. During and after the GFC, the price correlation started to increase dramatically across all case studies. Between 2007 to 2008, Hawthorn increased from 0.5 to 0.9, Kew increased from 0.4 to 0.8, Box Hill increased from 0.6 to 0.9, Mont Albert increased from 0.2 to 0.8, Altona Meadows increased from 0.3 to 0.9, Laverton increased from 0.3 to 0.9, Glenroy increased from 0.5 to 0.9 and Broadmeadows increased from 0.3 to 0.8. This suggests the price correlation between individual suburbs and Australian house prices were less correlated before the GFC and highly correlated during and after the GFC.

In summary, the price correlation between individual suburbs and Australian house prices changed over time and each suburb tended to have a different overall correlation trend. Even though two suburbs are located next to each other, the price correlation between each location can be different. Interestingly, when the housing market is under significant changes such as during and after the GFC, the price performance of individual suburbs tended to perform similarly with Australian house prices and the price correlation between the two are highly correlated. The correlation results for this section suggest local house prices can be highly negatively and highly positively correlated to Australian house prices (country level) during certain periods.

4.6.2 City Level

This section uses a moving correlation coefficient test to examine and compare price correlation between case studies (local level) and Melbourne median house prices (city level) by adopting the same analysis from the previous section which is a 3 year moving correlation (3 points) test over the 20 year period. Figure 4.8 presents the results of the correlation test at city level.
Figure 4.8   Price Correlation between Each Case Study and the Melbourne Median House Prices
Figure 4.8 shows the moving correlation between each case study and the Melbourne median house prices. Again overall, the price correlation between each suburb and the Melbourne median house prices is volatile throughout the years which is similar to the results from country level. Each suburb has a different trend of correlation results over time which means each individual suburb performed differently to the Melbourne median house prices overtime even though those suburbs are located next to each other.

There are certain times when correlations between individual suburbs and the Melbourne median house prices are different to the correlation results from country level. For example, between 1996 and 2002, price correlation for Kew increased from 0.4 in 1996 to 0.9 in 1998 and decreased to 0.4 in 2002, while during the same period, price correlation for Hawthorn is more volatile. For Box Hill and Mont Albert, the price correlation for Box Hill started at 0.2 in 1996 and increased to 0.6 in 1997. However, during the same time, Mont Albert experienced the opposite with price correlation starting at 0.5 in 1996 and then decreased to -0.1 in 1997.

Interestingly, the price correlation trend before and after the GFC between individual suburbs and Melbourne house prices is similar to the correlation trend from country level where price correlation started to decrease between 2005 and 2006 and increased to almost 1 in 2007 and 2008. This also suggests that price correlation between individual suburbs and the Melbourne median house prices were highly correlated during and after the GFC and less correlated prior to the GFC.

In summary, price correlation between individual suburbs and Melbourne median house prices changed over time and each suburb tended to have a different trend of correlation overall which is consistent with the findings from the previous section. However, there are certain periods where price correlation between individual suburbs and Melbourne house prices is different to price correlation resulting from country level. Again, when the housing market is undergoing significant change such as during and after the GFC, the price performance of individual suburbs tended to perform in line with Melbourne house prices. The correlation results for this section further suggest local house prices can perform differently to Melbourne house prices (city level) during certain periods even through two suburbs are located next to each other.
4.6.3 Local Level

After examining the price correlation between each case study and country/city level, this research found that the house prices at a local level tends to perform differently to that at country and city level. The research then moves on to examine the correlation between the price performance of two locations within each case study (local level) by applying the same correlation coefficient test over the 20 year period to demonstrate if local house prices performed differently between two suburbs located next to each other. Figure 4.9 to 4.12 presents the results of correlation tests at the local level.

Figure 4.9 Price Correlation between Hawthorn and Kew

Figure 4.9 shows the 3 year moving correlation (3 points) over the 20 year period for Hawthorn and Kew. Overall, there was a positive price correlation, however, the correlation tended to fluctuate throughout the years with some times being highly correlated such as in 1998, 2004 and 2008 and sometimes being less correlated such as in 2006.

In detail, 2006 is where the price correlation between two suburbs reached their lowest level. For example, during the analysed period of 2003 and 2006, the median house price for Kew increased from $790,000 to $940,000 which represents a total increase of 19% whilst the median house price for Hawthorn increased from $700,000 to $749,500 which represents a total increase of 7%. The 12% difference in house price growth is considered the largest over the 20 year period which is the cause for the low price correlation between two locations in 2006.
There are 3 years where the price correlation between the two suburbs was at its highest level which are 1998, 2004 and 2008, all at a correlation of 0.9. For example, during the analysed period of 2001 and 2004, the median house price for Kew increased from $500,000 to $790,000 which represents a total increase of 58%, whilst the median house price for Hawthorn increased from $433,000 to $700,000 which represents a total increase of 62%. This result is consistent with the price correlation in 2008. During the period of 2005 to 2008, the median house price for Kew increased from $850,000 to $1,200,000 which represents a total increase of 41%, whilst the median house price for Hawthorn increased from $840,000 to $1,260,000 which represents a total increase of 50%. The growth rates between two locations during those periods are relatively similar.

From 2012 to 2015, the price correlation between the two suburbs is stable between 0.5 and 0.7. During the period of 2009 and 2015, the median house price for Kew increased from $1,561,250 to $2,140,000 which represents a total increase of 37%, whilst the median house price for Hawthorn increased from $1,385,000 to $2,015,625 which represents a total increase of 46%.

In summary, the price performance between Kew and Hawthorn is positively correlated during the examined 20 year period where generally the median house price in Hawthorn increases, the median house price in Kew increases as well. However, there are certain periods, such as in 2006 where the price performance between two suburbs are different and such difference is caused by different price growth rates.
Figure 4.10 shows the 3 year moving correlation (3 points) over the 20 year period for Box Hill and Mont Albert. Overall, the price correlation is volatile throughout the years with price growth sometimes positively correlated and sometimes negatively correlated. For example, in 1996, the price correlation between two locations was at negative 0.5. During the period of 1993 to 1996, the median house price for Box Hill decreased from $147,500 to $137,500 which represents a total decrease of 7%, whilst the median house price for Mont Albert increased from $217,500 to $287,500 which represents a total increase of 32%.

After 1996, the price correlation started to increase with four periods where the price correlation peaked at 0.8 (1999, 2002/2003, 2007 and 2015). For example, for the period between 2000 and 2003, the median house price for Box Hill increased from $344,000 to $432,750 which represents a total increase of 26%, whilst the median house price for Mont Albert increased from $490,000 to $625,000 which represents a total increase of 28%. This result is consistent with the price correlation in 2008. During the period of 2005 to 2008, the median house price for Box Hill increased from $582,500 to $800,200 which represents a total increase of 37%, whilst the median house price for Mont Albert increased from $831,000 to $1,100,000 which represents a total increase of 32%. The growth rates between two locations during those periods are relatively similar.

Between 1999 and 2016, there are three periods where the price correlation dropped to its lowest point at 0.2 in 2005, 2013 and 2016. During the period of 2010 and 2013, the median house price for Box Hill remained unchanged at $850,000, whilst the median house price for Mont Albert increased from $1,226,000 to $1,450,000 which represents a total increase of 18%. The difference in price growth between two locations is the cause for low price correlation in 2013.

In summary, similar results were found between Box Hill and Mont Albert where the price correlation fluctuated throughout years with certain periods being positively correlated and certain periods being negatively correlated. This suggests the price performance of Box Hill does not follow the price performance of Mont Albert during certain periods even though they are located next to each other.
Figure 4.11  
Price Correlation between Altona Meadows and Laverton

By repeating the same correlation test, Figure 4.11 shows the 3 year moving correlation (3 points) over the 20 year period for Altona Meadows and Laverton. Overall the price correlation between two suburbs is more volatile than the previous two case studies. There are three periods where negative correlation occurred. For example, during the period of 1999 and 2002, the median house price for Altona Meadows increased from $167,000 to $205,500 which represents a total increase of 23%, whilst the median house price for Laverton decreased from $162,000 to $157,250 which represents a total decrease of 3%. The different trend of price performance caused the price correlation between two locations dropped to -0.2 in 2002.

Similar results are also found in 2014, during the period of 2011 and 2014, the median house price for Altona Meadows decreased from $426,450 to $425,500 which represents a total change of -0.2%, whilst the median house price for Laverton increased from $297,500 to $360,000 which represents a total increase of 21%. The different price growth caused the two suburbs to have a negative price correlation in 2014.

Interestingly, during and after the GFC, the price correlation between the two suburbs reached its highest point at 0.9 between 2008 and 2011. During the period of 2008 and 2011, the median house price for Altona Meadows increased from $331,000 to $426,450 which represents a total increase of 29%, whilst the median house price of Laverton increased from $250,000 to $329,000 which represents a total increase of 32%. The similar growth rate for the two suburbs suggests during that period, the price performance of Altona Meadows is in line with the price performance of Laverton.

In summary, the price correlation results for Altona Meadows and Laverton is similar to the price correlation results of Box Hill and Mont Albert where both cases experienced negative
and positive correlation. However, the correlation results for Altona Meadows and Laverton are more dramatic than Box Hill and Mont Albert. Again the results suggest, during certain periods, the price performance between two local suburbs can be different even though they are located next to each other.

Figure 4.12 shows the 3 year moving correlation (3 points) over the 20 year period for Glenroy and Broadmeadows. Overall the price correlation between the two suburbs is relatively high with most years having price correlation between 0.7 to 0.9. However, there are two periods where the price correlation dropped below 0.5. For example, in 1997, the price correlation between the two suburbs is at 0. During the period of 1995 to 1997, the median house price for Glenroy increased from $91,500 to $120,000 which represents a total increase of 31%, whilst the median house price for Broadmeadows was unchanged at $70,000.

Similarly, in 2007, during the analysed period of 2005 and 2007, the median house price for Glenroy increased from $275,625 to $380,500 which represents a total increase of 38%, whilst the median house price for Broadmeadows increased from $203,750 to $236,500 which represents a total increase of 16%. The 22% difference in median house price growth is considered the cause for the low price correlation between two locations in 2007.

In summary, price correlation between each location within the case studies tend to fluctuate and perform differently to each other throughout the years - sometimes positively correlated and sometimes negatively correlated. Interestingly, across all cases, when the housing market is undergoing significant change such during and after the GFC, the price correlation at the local level reached its highest level and this suggests the price performance of individual
suburbs tended to perform in line with the suburbs next to them during seismic market changes. This is consistent with the results concluded from country and city level.

Based on the analysis, the results highlight there is an existence of differentiation in house price performance between different levels. During certain periods, the house price at local level can perform differently to that at country, city and other local level, even though those locations are next to each other. The next section examines the relationship between house price at local level and macroeconomic factors to demonstrate if local house price differences can be explained by macroeconomic factors.

4.7 Local House Price and Macroeconomic Factors

This section is aimed at examining the relationship between local house prices and macroeconomic factors to identify if macroeconomic factors can explain the local house price differences. A correlation coefficient test is applied between performance of each case study and eight economic variables on a yearly basis over the 20 year period. These economic variables were derived from the literature reviews. Table 4.6 presents the results on the correlation test.

<table>
<thead>
<tr>
<th>Economic Variables</th>
<th>Kew</th>
<th>Hawthorn</th>
<th>Mont Albert</th>
<th>Box Hill</th>
<th>Glenroy</th>
<th>Broadmeadows</th>
<th>Altona Meadows</th>
<th>Laverton</th>
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</thead>
<tbody>
<tr>
<td>GDP</td>
<td>+0.06</td>
<td>+0.11</td>
<td>+0.25</td>
<td>+0.42</td>
<td>-0.07</td>
<td>+0.04</td>
<td>-0.21</td>
<td>+0.08</td>
</tr>
<tr>
<td>CPI Growth Rate</td>
<td>-0.47</td>
<td>0.00</td>
<td>+0.08</td>
<td>-0.17</td>
<td>-0.21</td>
<td>-0.09</td>
<td>0.00</td>
<td>-0.15</td>
</tr>
<tr>
<td>Income to debt</td>
<td>-0.18</td>
<td>+0.02</td>
<td>+0.22</td>
<td>-0.09</td>
<td>+0.02</td>
<td>-0.43</td>
<td>-0.06</td>
<td>-0.04</td>
</tr>
<tr>
<td>Population Growth Rate</td>
<td>-0.13</td>
<td>0.00</td>
<td>-0.30</td>
<td>-0.23</td>
<td>-0.09</td>
<td>-0.28</td>
<td>-0.11</td>
<td>0.00</td>
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<tr>
<td>Unemployment Rate</td>
<td>-0.08</td>
<td>-0.22</td>
<td>-0.16</td>
<td>-0.18</td>
<td>-0.20</td>
<td>-0.27</td>
<td>-0.17</td>
<td>-0.18</td>
</tr>
<tr>
<td>Weekly Earning Rate</td>
<td>+0.07</td>
<td>0.23</td>
<td>-0.15</td>
<td>0.34</td>
<td>-0.14</td>
<td>-0.32</td>
<td>0.23</td>
<td>-0.34</td>
</tr>
<tr>
<td>Housing Supply</td>
<td>-0.21</td>
<td>-0.37</td>
<td>-0.12</td>
<td>-0.41</td>
<td>0.01</td>
<td>-0.05</td>
<td>-0.23</td>
<td>+0.32</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>-0.01</td>
<td>+0.12</td>
<td>+0.11</td>
<td>-0.02</td>
<td>+0.14</td>
<td>-0.45</td>
<td>-0.08</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Table 4.6 lists the correlation results between individual suburbs and macroeconomic factors. Overall, the correlation between each macroeconomic factor and local house prices is different - sometimes positively correlated and sometimes negatively correlated. In addition, the correlation is different between each macroeconomic factor and suburbs that are located next to each other. For example, the correlation results between Kew’s median house price and income to debt is at -0.18, whilst the correlation results between Hawthorn’s median house price and income to debt is +0.00.
price and income to debt is at 0.02. Likewise, the correlation results between Box Hill’s median house price and income to debt is at -0.09, whilst the correlation results between Mont Albert’s median house price and income to debt is at 0.22.

Nevertheless, the overall correlation results between macroeconomic factors and local house prices are ranged between -0.5 to +0.5 which is considered weak (Sharma 2005). The results highlight the relationship between local house price performance and the performance of macroeconomic factors is nominal.

4.8 Summary

The aim of this research is to examine drivers for local house price performance and this chapter explored and compared the relationship between house price performances at different levels. The chapter involved collecting and analysing historical secondary data to identify house price performance and its relationship with macroeconomic factors using descriptive analysis. Two statistical analyses, namely standard deviation and the correlation coefficient test were used to first identify the representative case studies by using standard deviation to highlight the suburbs that performed outside of normal standard deviation range and then plotted them on the map to provide an overview of the location of ‘unusual’ suburbs. This identified the suburbs located next to each other, which have different price performance profiles. After case studies were selected, this chapter used a 3 year moving correlation coefficient test to examine and compare the relationship of house price performance at different levels, namely local to country level, local to city level and local to local level. This was to identify if there is an existence of differences in house price performance at different levels. Finally, this chapter used the same correlation coefficient test to examine the relationship between local house price performance and macroeconomic factors to demonstrate if local house price difference can be explained by macroeconomic factors.

Based on quantitative analysis results, this chapter highlighted that house price performance tends to vary between different levels. Interestingly, across all cases, when the housing market was under significant changes such as during and after the GFC, the price performance of individual suburbs (local level) tended to perform in line and tended to be highly correlated with Australian house prices (country level), Melbourne house prices (city level) and house prices in adjoining suburbs (local level). However, for the periods prior to GFC and after GFC,
the price correlation between local and country/city are relatively low. This suggests during certain periods, the house prices at local level could be affected by factors other than national market conditions.

Furthermore, by examining the relationship between local house price and macroeconomic factors, this chapter indicated that the correlation between each macroeconomic factor and local house price is different and this differentiation tended to vary across different locations. Nevertheless, the overall price correlation between macroeconomic factors and local house prices ranged between -0.5 to +0.5 which is considered weak. The results highlighted the relationship between local house price and macroeconomic factors is nominal which suggested microeconomic factors could be the reasons causing local house price differences.

Once the house price performance and correlation tests are analysed, this information formed the foundation for the subsequent qualitative investigations to help explain, or elaborate the quantitative results obtained. The findings of this ‘QUAN’ analysis provided rationales and direction for the subsequent semi-structured interviews. The analysed data from both quantitative and qualitative analysis will assist in identifying the drivers for local house price performance.
CHAPTER FIVE

QUALITATIVE ANALYSIS

LOCAL HOUSE PRICE DETERMINANTS

5.1 Introduction

Chapter 4 used quantitative analysis to examine and compare house price performance profiles between different local suburbs and based on the results, four case studies were selected. Chapter 4 discussed the findings that local house prices performed differently to that at country, city and alternative locational local level. This chapter explains reasons for local house price differences by using qualitative analysis through in-depth interviews with real estate industry experts. This qualitative research section aims to seek information and insights on the quantitative analysis results, i.e. why two suburbs located close to each other have different house price performance profiles. According to McNamara (1999), interviews are particularly useful for getting the story behind a participant’s experiences and to pursue in-depth information around the topic.

A semi-structured interview technique has been selected for this research as this method allows for a focus on a particular unit of analysis rather than the collection and analysis of data (Yin 2012). The objective is to see the research topic from the perspective of the interviewee, and to understand how and why the individual came to their particular perspective (King et al. 1994 and Opdenakker 2006). The qualitative semi-structured interview in this research was carried out with the following aims:

i. To understand the effect of local factors on local house price performance resulting from the quantitative analysis.

ii. To identify other factors not mentioned in literature that may cause the residential price difference at the local level.
iii. To examine how local factors have contributed to house price differences at the local level.

Local real estate professionals are targeted as interviewees for each selected location to provide opinions on local house price determinants for each selected case study area. The selection of interviewees is based upon their involvement and experience in the local residential property industry. Tashakkori and Teddlie (2003) explained that there are no rules for sample size in qualitative studies and typically purposive samples are small. For this research, the sample size required is 6 participants per case study totalling 24 participants comprising a wide range of property experts. For each case study, 6 participants are made of 3 real estate agents, 2 valuers and 1 town planner. Each participant has to have minimal of 5 years’ experience in property industry in the location of each case study. The real estate agents are directors from well-known local real estate agencies. Valuers are from valuation firms who cover the valuations of the studied locations. Town planners are from local Councils who are responsible for the strategic planning of the studied locations. Participants are recruited through the Australian Property Institute, local Councils, the researcher’s contacts and internet searches. As all interviews are anonymous, names and titles of participants are not disclosed.

This chapter provides qualitative analysis by cross examining the relationship between microeconomic factors and house price performance profiles based interview results of each case study. Figure 5.1 shows the interview process for each case study.

Figure 5.1 Interview Process for Each Case Study
Figure 5.1 illustrates the potential impact of independent variables on price performance for each case study. Based on the literature review (Chapter 2), five major themes (independent variables) were identified at a microeconomic level, namely transportation, neighbourhood characteristics, social characteristics, schools, and planning regulation. During the interviews for each case study, questions on the effect of those factors on local house price differences (price measurement) are tabled. The professionals’ opinions are then recorded for each case study. Figure 5.2 shows the interview and data analysis process for the qualitative analysis.

As Figure 5.2 presents, after the interviews were conducted, cross case examination between case studies was undertaken. The analysis process summarises the interview results based on the effect of each factor and compares the effect between case studies. This is to provide an overview of the effect of each factor on house price performance through the evidence of each case study. The results are co-referenced with median house price performance, price return and price volatility to reflect the research objective: drivers for local house price differences.

This chapter has nine sections. Subsequent to section one ‘Introduction’, section two provides a background study and overview of each case study at a microeconomic level. Then the
remaining chapters are organised by microeconomic factors, namely transportation (section three), neighbourhood characteristics (section four), social characteristics (section five), schools (section six) and planning regulations (section seven). For each section, the effect of each microeconomic factor to the house price performance is discussed across all case studies. Then section eight cross-references the results with house price performance profiles. Finally, section nine summarises the qualitative results and outcomes.

5.2 Background of Case Studies

A background study on each case at a local level is discussed based on microeconomic factors summarised from the literature review, namely public transportation, neighbourhood characteristics, social characteristics and schools. This is aimed to provide an overview of each location at a microeconomic level to better understand the facilities, characteristic and demographic structure of each case study.

5.2.1 Hawthorn and Kew (Case 1)

Public Transportation

Both Hawthorn and Kew are well serviced by public transportation. Hawthorn has Hawthorn railway station which provides access to both Melbourne CBD as well as eastern Melbourne suburbs. Although Kew does not have a railway station, it is well serviced by tram services that provide similar services as train. For example, tram route 16, 48 and 109 provide services from Kew to Melbourne CBD including RMIT University and Melbourne University as well as some eastern outer suburbs. Both suburbs are also serviced by bus, including route 200, 207, 548, 624 and 966 which services from Kew to Melbourne CBD, northern suburbs including La Trobe University, south-eastern suburbs including Monash University and Chadstone Shopping Centre and other eastern suburbs, whilst tram route 16 and bus route 609 service between Hawthorn and Fairfield, running through Kew (Public Transport Victoria 2016).
Neighbourhood Characteristics

Kew and Hawthorn are two adjoining suburbs that were established at a similar time. The areas were first settled in the late 1830s and expanded post gold-rush. Most of the houses located in both suburbs are of an older style such as Californian Bungalow style, Edwardian style or Victorian style residences. From a location and street appearance point of view, the suburbs are similar (City of Boroondara 2016).

In terms of neighbourhood facilities, both suburbs have well established shopping and recreation facilities. Hawthorn has shopping strip centres located along Glenferrie Road and Burwood Road, whilst Kew has Kew Junction shopping centre and a shopping strip centre located along Cotham Road. For recreation facilities, both suburbs have access to Hawthorn Aquatic and Leisure Centre, Kew Recreation Centre, Hawthorn Library and Kew Library as well as public parks and reserves including Glenferrie Sports Ground, Central Gardens and Alexandra Gardens (City of Boroondara 2016).

Social Characteristics

Table 5.1 shows the summary of the socio demographic backgrounds for Hawthorn and Kew between 1996 and 2016 based on Australian census data. The Australian Census is conducted every five years by the Australian Bureau of Statistics (ABS) and collects data on metrics such as population, demographic structures, income, employment, household debt and housing density for each Australian suburb. The ABS Data Quality Framework is internationally recognised and is based on the Statistics Canada Quality Assurance Framework and European Statistics Code of Practice (ABS 2016).

<table>
<thead>
<tr>
<th></th>
<th>Hawthorn</th>
<th>Kew</th>
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<tbody>
<tr>
<td>Birthplace (majority)</td>
<td>Au70% Uk5%</td>
<td>Au67% Uk4%</td>
</tr>
</tbody>
</table>
As Table 5.1 shows, both suburbs are considered to have a similar social background measured by most metrics. The age group between the two locations are slightly different with largest cohorts of population in Kew between 20-24 and 40-44, whilst the largest cohorts of population in Hawthorn being between 20-29 suggesting it has a younger population than Kew. Table 5.1 shows that the number of owner occupiers in Kew is higher than Hawthorn throughout the years and is probably related to the respective age cohorts.

In addition, the number of people who earn more than $1,500 per week in Kew increased from 12% in 2001 to 23% in 2006. Whilst for the same period, that number only changed from 12% to 16% for Hawthorn. Likewise, the number of people who earn more than $1,500 per week in Hawthorn jumped from 16% in 2006 to 24% in 2011. Whilst that number in Kew is only slightly increased. This suggests there is an increase in high socio demographic population occurred in Kew in 2006 and in Hawthorn in 2011.

Interestingly, the density of houses in Hawthorn decreased dramatically from 2001 to 2006. In 2001, 50% of the houses in Hawthorn are dwellings which has decreased to 39% in 2006.
Whilst the density of houses in Kew remained unchanged at 60%. This suggests more apartments/units were developed between 2001 and 2006 in Hawthorn than in Kew. Moreover, the number of people who used public transportation to go to work from Hawthorn increased from 18% in 1996 to 27% in 2011, compared to Kew which only slightly increased from 12% in 1996 to 16% in 2011 (ABS 1996, 2001, 2006, 2011).

Schools

The availability of high ranking schools between two suburbs is different. Hawthorn has Swinburne University of Technology which offers university and TAFE courses and some private schools including Erasmus School of Primary Education, St. Josephs Primary School, Rossbourne School and Scotch College. Whilst Kew has Melbourne’s best private and public primary and secondary schools including Kew Primary School, Sacred Heart Primary School, Methodist Ladies’ College, Preshil, Trinity Grammar School, Xavier College, Kew High School, Ruyton Girl’s School and Genazzano College (Better Education 2016, City of Boroondara 2016).

5.2.2 Box Hill and Mont Albert (Case 2)

Public Transportation

Both Box Hill and Mont Albert are well served by public transportation with both suburbs having their own train station – Box Hill railway station and Mont Albert railway station which provide access to both Melbourne CBD as well as eastern Melbourne suburbs. Beside train services, both suburbs are also serviced by tram and bus services. Tram route 68 and 109 and bus route 285, 302 and 304 services both Box Hill and Mont Albert to Melbourne CBD and outer eastern suburbs, whilst bus route 766 provides services between two suburbs (Public Transport Victoria 2016).

Neighbourhood Characteristics

Box Hill and Mont Albert are two adjoining suburbs that were established at a different time. Mont Albert was first formed in 1830s and then developed and grew with land subdivision in 1880s. Majority of houses were built from the Victorian, Edwardian and inter-war periods and
the characteristics of the precinct includes relatively wide street frontages, Edwardian style, Victorian style residence and Californian Bungalow style that constructed between 1882 and 1930. However, Box Hill was formed and expanded the massive development in 1963 as part of post war housing expansion included a Housing Commission estate in Box Hill South and so has less housing character than in Mont Albert (City of Whitehorse 2016).

In terms of neighbourhood facilities, both suburbs have well established shopping and recreation facilities. Box Hill has Box Hill Shopping Centre that is located in the centre of Box Hill and several shopping strip centres that located along Whitehorse Road and Station Street, whilst Mont Albert has Union Road shopping strip centre. For recreation facilities, both suburbs have access to Aqualink Box Hill Leisure Centre, Healthways Recreation and Aquatic Centres and Box Hill Library as well as public parks and reserves including Surrey Park, Melbourne Baseball Club and Box Hill Gardens (City of Whitehorse 2016).

Social Characteristics

Table 5.2 shows the summary of socio demographic background for Mont Albert and Box Hill between 2001 and 2011 based on the Australian census data.

<table>
<thead>
<tr>
<th></th>
<th>Mont Albert</th>
<th>Box Hill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>n/a 4,201 4,419 4,954</td>
<td>n/a 8,329 8,619 9,762</td>
</tr>
<tr>
<td>Birthplace (majority)</td>
<td>n/a Au77% Uk4%</td>
<td>n/a Au86% China6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Au73% Uk 5% Au69% China6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (two largest cohorts)</td>
<td>n/a 35-39 40-44 45-49</td>
<td>n/a 20-24 25-29 20-24 25-29</td>
</tr>
<tr>
<td></td>
<td>40-44 45-49</td>
<td>30-34 25-29</td>
</tr>
<tr>
<td></td>
<td>20-24 45-49</td>
<td>20-24 25-29</td>
</tr>
<tr>
<td>Married</td>
<td>n/a 52% 52% 53%</td>
<td>n/a 42% 41% 41%</td>
</tr>
<tr>
<td>Education (University)</td>
<td>n/a 10% 25%</td>
<td>n/a 8% 29% 33%</td>
</tr>
<tr>
<td></td>
<td>96% 95%</td>
<td>93% 92% 92%</td>
</tr>
<tr>
<td>Employment Professionals</td>
<td>n/a 20% 14% 15%</td>
<td>n/a 17% 12% 13%</td>
</tr>
</tbody>
</table>
Table 5.2 shows overall, Box Hill and Mont Albert is considered to have a different social background. Looking at marriage, education, employment, type of transportation for work and professional background, both suburbs are similar. However, the age group between two locations are different with largest cohorts of population in Mont Albert between 40-44, whilst the largest cohorts of population in Box Hill being between 20-29.

Table 5.2 also presents the number of owner occupiers who live in Mont Albert is higher than Box Hill and number of person who earn more than $1,500 per week is also higher than population in Box Hill. This suggests Mont Albert consists of a higher socio demographic population than Box Hill. Interestingly, the second largest population who live in Box Hill are from China and this population has increased signification from 2001 of 6% to 2011 of 20%. Likewise, the second majority of population who live in Mont Albert changed from born in UK (in 2001 and 2006) to China (in 2011).

Moreover, the density of houses for Box Hill has decreased significantly from 2006 of 44% to 33% in 2011 which represents an 11% decrease, whilst during the same period, the density of houses for Mont Albert only dropped from 61% in 2006 to 55% in 2011 which represents a 6% decrease. This suggested more apartments/units were developed and built between 2006 and 2011 in Box Hill than in Mont Albert (ABS 2001, 2006, 2011).
Schools

There are several primary and secondary public and private schools that are available in both Box Hill and Mont Albert. For Box Hill, it has Box Hill High School, Koonung Secondary College, Kingswood College, Box Hill Institute of TAFE and for Mont Albert, it has Mont Albert Primary School, Chatham Primary School and Our Holy Redeemer School (Better Education 2016, City of Whitehorse 2016).

5.2.3 Laverton and Altona Meadows (Case 3)

Public Transportation

Unlike the two case studies in the previous section (5.2.1 and 5.2.2), Laverton and Altona Meadows provide transportation options which are not similar to each other. Laverton has two railway stations – Laverton railway station and Aircraft railway station both of which provide access to Melbourne CBD and the western suburbs of Melbourne, whilst Altona Meadows has no railway station. Neither offers tram services. Bus routes 400, 411, 414, 417, 496 and 498 provide services between Laverton and surrounding suburbs including Sunshine, Hoppers Crossing and Sanctuary Lakes, whilst bus routes 412 and 415 provide services between Altona Meadows and surrounding suburbs. However no public transportation in Altona Meadows provides direct access to Melbourne CBD (Public Transport Victoria 2016).

Neighbourhood Characteristics

Laverton and Altona Meadows are two adjoining suburbs that were established at different times. Laverton was developed in the period after World War II including housing constructed by the Victorian Housing Commission. The distinctive layout of the Laverton residential area, with its curving streets, courts and central open spaces, is common to public housing estates of that era. As the number of families living in the area grew, further residential development began in the 1950s. The majority of houses in Laverton were built as commission houses to accommodate the post war population expansion. Altona Meadows on the other hand was formed as part of Altona which was developed in the 1880s. In the mid-1980s, Altona Meadows was separated from Altona and started its re-development afterwards (City of Hobsons Bay 2016).
In terms of neighbourhood facilities, both suburbs have well established shopping facilities including Williams Landing Shopping Centre for Laverton and Central Square Shopping Centre for Altona Meadows. For recreation facilities, both suburbs have access to Laverton Swim and Fitness Centre, Altona Meadows Community Centre, Altona Meadows Library and Learning Centre as well as public parks and reserves including Truganina Park, Kooringal Golf Club and Lawrie Emmins Reserve (City of Hobsons Bay 2016).

Social Characteristics

Table 5.3 shows the summary of socio demographic background of Laverton and Altona Meadows between 2001 and 2011 based on Australian census data.

Table 5.3  
Socio Demographic Background for Laverton and Altona Meadows

<table>
<thead>
<tr>
<th></th>
<th>Laverton</th>
<th></th>
<th></th>
<th></th>
<th>Altona Meadows</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>n/a</td>
<td>4,757</td>
<td>4,508</td>
<td>5,351</td>
<td>n/a</td>
<td>18,765</td>
<td>18,842</td>
<td>18,846</td>
</tr>
<tr>
<td>Birthplace (majority)</td>
<td>n/a</td>
<td>Au64%</td>
<td>Au57%</td>
<td>Au 48%</td>
<td>n/a</td>
<td>Au61%</td>
<td>Au61%</td>
<td>Au59%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Uk7%</td>
<td>Uk 5%</td>
<td>India14%</td>
<td></td>
<td>Uk 4%</td>
<td>Uk 4%</td>
<td>Uk 4%</td>
</tr>
<tr>
<td>Age (two largest cohorts)</td>
<td>n/a</td>
<td>33-34</td>
<td>25-29</td>
<td>25-29</td>
<td>n/a</td>
<td>30-34</td>
<td>30-34</td>
<td>45-49</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35-39</td>
<td>40-44</td>
<td>30-34</td>
<td></td>
<td>40-44</td>
<td>45-49</td>
<td>50-54</td>
</tr>
<tr>
<td>Married</td>
<td>n/a</td>
<td>43%</td>
<td>38%</td>
<td>42%</td>
<td>n/a</td>
<td>55%</td>
<td>50%</td>
<td>48%</td>
</tr>
<tr>
<td>Education (University)</td>
<td>n/a</td>
<td>10%</td>
<td>21%</td>
<td>17%</td>
<td>n/a</td>
<td>10%</td>
<td>28%</td>
<td>24%</td>
</tr>
<tr>
<td>Employment</td>
<td>n/a</td>
<td>89%</td>
<td>89%</td>
<td>90%</td>
<td>n/a</td>
<td>93%</td>
<td>94%</td>
<td>94%</td>
</tr>
<tr>
<td>Professionals (Manufacturing)</td>
<td>n/a</td>
<td>20%</td>
<td>18%</td>
<td>12%</td>
<td>n/a</td>
<td>23%</td>
<td>17%</td>
<td>14%</td>
</tr>
<tr>
<td>Owner vs Renter</td>
<td>n/a</td>
<td>71% vs 29%</td>
<td>56% vs 44%</td>
<td>48% vs 52%</td>
<td>n/a</td>
<td>73% vs 27%</td>
<td>73% vs 27%</td>
<td>72% vs 28%</td>
</tr>
<tr>
<td>Density for houses</td>
<td>n/a</td>
<td>93%</td>
<td>91%</td>
<td>77%</td>
<td>n/a</td>
<td>83%</td>
<td>83%</td>
<td>83%</td>
</tr>
<tr>
<td>Income ($1500+/pw)</td>
<td>n/a</td>
<td>1%</td>
<td>3%</td>
<td>6%</td>
<td>n/a</td>
<td>2%</td>
<td>6%</td>
<td>8%</td>
</tr>
<tr>
<td>Go to work Public vs Car</td>
<td>n/a</td>
<td>9% vs 91%</td>
<td>9% vs 91%</td>
<td>17% vs 83%</td>
<td>n/a</td>
<td>5% vs 95%</td>
<td>5% vs 95%</td>
<td>9% vs 91%</td>
</tr>
</tbody>
</table>

Source: Australian Census Data (2001, 2006 and 2011)
Table 5.3 shows overall, Laverton and Altona Meadows are to have different social backgrounds. The age group between two locations are slightly different with the largest cohorts of population in Altona Meadows between 40-54, whilst the largest cohorts of population in Laverton being between 35-39 suggesting it has a younger population than Altona Meadows. Table 5.3 also shows that the number of owner occupiers who live in Altona Meadows is higher than Laverton which suggests Laverton comprises more renters.

Interestingly, the second largest population living in Laverton has changed from UK in 2001 and 2006 to India in 2011, whilst Altona Meadows remained unchanged. Moreover, the density of houses for Laverton has decreased significantly from 2006 of 91% to 77% in 2011 which represents a 14% decrease, whilst during the same period, the density of houses for Altona Meadows remained unchanged. This suggests more apartments/units were developed and built between 2006 and 2011 in Laverton than in Altona Meadows. In addition, the number of people who use public transportation to work from Laverton has increased from 9% in 2006 to 17% in 2011, compared to Altona Meadows which only slightly increased from 5% in 2006 to 9% in 2011 (ABS 2001, 2006, 2011).

Schools

Schools located in those two suburbs include St Martin De Porres Primary School and Laverton College for Laverton and Altona Meadows Primary School, Queen of Peace Parish Primary School and Altona Green Primary School for Altona Meadows. However, none of the schools located in either suburb is highly ranked in Melbourne (Better Education 2016, City of Hobsons Bay 2016).

5.2.4 Glenroy and Broadmeadows (Case 4)

Public Transportation

Both Glenroy and Broadmeadows are well serviced by public transportation with both suburbs having their own train station – Glenroy railway station and Broadmeadows railway station which provide access to both Melbourne CBD as well as the northern Melbourne suburbs. Beside train services, both suburbs are also serviced by bus services. Bus routes 477, 484, 513, 534, 536, 538, 540 and 542 provide services between the two locations and surrounding
northern suburbs. However, neither of the suburbs have tram services (Public Transport Victoria 2016).

Neighbourhood Characteristics

Glenroy and Broadmeadows are two adjoining suburbs which were established at a similar time, but the purpose of development was different. Glenroy neighbourhood was developed in the 1950s. Between 1953 and 1958, the Housing Commission built 1,719 houses in Glenroy North; many others built their own homes in Glenroy. Therefore, the house characters are mixed for Glenroy with areas located on the northern side of Glenroy having typical commission style houses and other areas having Art Deco or Californian Bungalow style houses that were built by owners of that time. Broadmeadows on the other hand was built as housing commission area with a 2,226 hectare estate developed in 1949. Houses built at that time were typically less appealing but were to accommodate the population expansion (City of Hume 2016, City of Moreland 2016).

In terms of neighbourhood facilities, the two suburbs are slightly different. Broadmeadows has Broadmeadows Shopping Centre, whilst Glenroy has no shopping centre, but local shops situated along Pascoe Vale Road near Glenroy railway station. For recreation facilities, both suburbs have access to Broadmeadows Aquatic and Leisure Centre, The Age Broadmeadows Library, Glenroy Neighbourhood Learning Centre and Glenroy Library as well as public parks and reserves including the Northern Golf Club, Anderson Reserve, Gervase Avenue Reserve and Rotary Park (City of Hume 2016, City of Moreland 2016).

Social Characteristics

Table 5.4 shows the summary of socio demographic background of Broadmeadows and Glenroy between 2001 and 2011 based on Australian census data.

<table>
<thead>
<tr>
<th></th>
<th>Broadmeadows</th>
<th>Glenroy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>n/a 10,028 9,983 10,578</td>
<td>n/a 18,602 18,892 19,664</td>
</tr>
<tr>
<td>Birthplace</td>
<td>n/a Au56% Au52% Au 47%</td>
<td>n/a Au61% Au58% Au54%</td>
</tr>
</tbody>
</table>
Table 5.4 shows overall, Broadmeadows and Glenroy are considered to have a different social backgrounds. Firstly, the age group between two locations are slightly different with largest cohorts of population in Broadmeadows being between 40-44, whilst the largest cohorts of the population in Glenroy being between 30-34 suggesting it has a younger population than Broadmeadows. Moreover, the number of owner occupiers and employment rate in Glenroy has been higher than Broadmeadows throughout the years. The number of people who earn more than $1,500 per week is also higher in Glenroy than population in Broadmeadows.

Interestingly, the second largest population who live in Broadmeadows has changed from Lebanon in 2001 to Iraq in 2006 and 2011, whilst the second largest population who live in Glenroy has changed from Italy in 2001 and 2006 to India in 2011. In addition, the density of houses for Glenroy has decreased significantly from 2006 of 77% to 68% in 2011 which represents a 9% decrease, whilst during the same period, the density of houses for Broadmeadows decreased from 80% to 76% which represents a 4% decrease. This suggested
more apartments/units were developed and built between 2006 and 2011 in Glenroy than in Broadmeadows. Moreover, the number of population who use public transportation to go to work from Glenroy has increased from 8% in 2001 to 14% in 2011, compared to Broadmeadows which only increased from 6% in 2001 to 9% in 2011 (ABS 2001, 2006, 2011).

Schools

Schools located within those two suburbs include Glenroy College, Glenroy West Primary School, Broadmeadows Valley Primary School and Broadmeadows Primary School and none of the schools located in either suburb is highly ranked in Melbourne (Better Education 2016, City of Hume 2016, City of Moreland 2016).

The following sections provide qualitative results on the effect of each identified microeconomic factor to local house price performance.

5.3 Transportation

Same Service Coverage

The effect of transportation on house price performance varies across each case study. For suburbs well serviced by public transport, the effect of transportation on house price performance is not considered important, simply because residents can access the same transportation regardless of which suburb they live in. This can be seen for example in the Glenroy and Broadmeadows case study.

Glenroy and Broadmeadows

Both Glenroy and Broadmeadows have train and bus services providing access to Melbourne CBD as well as surrounding suburbs. Therefore, transportation is not seen as a major factor affecting house prices.

“No, I don’t think transportation is a factor here.” (Case 4 Real Estate Agent 1)
“Both suburbs have a train station and no matter which suburbs you live in, you can have access to Melbourne CBD if you want to take the train. So I don’t think that would matter here.” (Case 4 Property Valuer 1)

Even though sometimes the type of public transportation services may vary (i.e. bus, tram and train), as long as the coverage provided by such services are identical, then the transportation is not considered as a major factor for the house price performance differences. This can be seen in the Kew and Hawthorn case study.

**Kew and Hawthorn**

Hawthorn has tram, bus and train services, whilst Kew does not have a train service, but the availability of tram and bus services in Kew provide similar coverage as train services in Hawthorn. Because of this, house price is not affected by differentiation in type of public transportation, in this case the lack of train services in Kew.

“The train does affect professionals that work in the CBD that do like to take that into town. Having said that, the 109 tram (in Kew) that runs along Cotham Road also takes you straight into the City. I don’t think necessarily that (lack of train station) would affect house price.” (Case 1 Real Estate Agent 2)

“So I don’t think having, maybe a little margin makes a bit more marketability for Hawthorn. But shouldn’t make a great deal of difference.” (Case 1 Property Valuer 2)

“Transportation is not a factor here (for the price performance difference between Hawthorn and Kew.” (Case 1 Town planner 1)

In addition, the preponderance of private vehicles in both Hawthorn and Kew also provide alternative options for local residents to travel. Therefore, public transportation is not a major reason affecting house price difference between the two locations and has a limited effect on people’s choice of buying property in Hawthorn rather than Kew because of Hawthorn’s train station.
"No, I don’t think public transport plays a major role here. I think that residents in Kew predominantly use private vehicles anyway, because Kew residents are generally older population, so they do a lot of driving back and forth, and they park at the train station to take the train into the City. I don’t think that (house price) really has to do with it." (Case 1 Real Estate Agent 3)

This results are also supported by Australian census data. Table 5.5 presents number of people in Hawthorn and Kew who use public transportation for commuting to work between 1996 and 2011.

Table 5.5 Public Transportation vs Private Vehicle for Kew and Hawthorn

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Go to work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public vs Car</td>
<td>18% vs 22% vs 24% vs 27% vs 12% vs 11% vs 15% vs 16% vs</td>
<td>82% vs 78% vs 76% vs 73% vs 88% vs 89% vs 85% vs 84% vs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


As Table 5.5 shows the percentage of Kew and Hawthorn population who use private vehicle for commuting to work are relatively similar between 1996 and 2011 ranging from 70% to 90%.

Transportation and Social Factors

If there is a difference in availability of public transportation, it may still not be a factor affecting house price between locations because there are other factors that are considered more important to residents when they choose a location to live, such as social factors. However, this only applies when there is a significant difference in social economic background between locations and accessibility to transportation in neighbouring suburbs is convenient. Then having additional public transportation in a location is not considered a major advantage in contributing to house price performance. This is seen in the Altona Meadow and Laverton case study.
Altona Meadow and Laverton

Even though Laverton has two train stations and Altona Meadows has none, the availability of additional public transportation in Laverton did not add a price premium to Laverton’s house price performance, because the social background between the two suburbs are completely different with Laverton considered to have a lower socio economic demographic than Altona Meadows. In addition, Altona Meadows comprises mostly of owner occupiers whilst Laverton is dominated by renters or investors. Interviewees concluded if there is a huge difference between social backgrounds of two locations, the residents would place a higher weight to social characteristics than public transportation when choosing a location to live, simply due to desirability for quality of lifestyle.

“Because as an owner occupier, you would want to go to Altona Meadows, it is a better lifestyle and different demographic.” (Case 3 Property Valuer 2)

“If you can afford it, they would go (live) in Altona Meadows. If you want living lifestyle such as better neighbourhood, doesn’t matter if I drive to train station or walk to train station.” (Case 3 Real Estate Agent 3)

This results are also supported by Australian census data. Table 5.6 presents number of population in Laverton and Altona Meadows that are owner occupiers between 2001 and 2011.

<table>
<thead>
<tr>
<th></th>
<th>Owner vs Renter</th>
<th>Laverton</th>
<th>Altona Meadows</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/a</td>
<td>71% vs 29%</td>
<td>56% vs 44%</td>
</tr>
</tbody>
</table>

Source: Australian Census Data (2001, 2006 and 2011)

As Table 5.6 shows, the percentage of owner occupied population in Altona Meadows remained unchanged between 2001 and 2011 at approximately 73%, whilst the owner occupiers in Laverton has decreased from 71% in 2001 to 48% in 2011. This suggests that there was a decrease of owner occupiers in Laverton and a higher proportion of the population in Laverton are renters.
However, this theory only applies when the accessibility to transportation is convenient in nearby suburb. The train stations in Laverton are located within a reasonable distance from Altona Meadows and residents who live in Altona Meadows can travel to Laverton’s train station by private vehicle and park the vehicle near the train station, then travel to work using public transportation. Therefore, the lack of public transportation in Altona Meadows has a minimal effect on the house price difference between these two suburbs.

“In peak hours in the mornings, these two train stations (in Laverton) are packed with cars. So you can tell that people are driving to these train stations to use them and it is not too far away (from Altona Meadows), only two minute drive.” (Case 3 Town Planner 3)

“Train station does appeal, but it’s not too far from Altona Meadows to the actual Laverton train station…. especially top (northern) pocket of Altona Meadows, there is a little bridge and people just go (and walk to train station) and a lot of people do drive to train stations.” (Case 3 Real Estate Agent 1)

Save Travelling Time

Transportation is considered as a factor affecting house price performance when such transportation can save travelling time for local residents. This is seen in the Mont Albert and Box Hill case study.

Box Hill and Mont Albert

Mont Albert and Box Hill are two suburbs well serviced by train, tram and bus services. However, Box Hill has Box Hill Centre which is considered as a central hub for public transportation including ‘express’ trains to the Melbourne CBD which save commuting time during rush hours for city workers. Therefore, for city workers, demand for transportation in Box Hill is higher because the ‘express’ train provides less travel time.

“Box Hill has a hub for buses and trains. Because of the Box Hill central, there’s still a lot of people use that as an easy way to get in and off or go into the City, because they can get express (services) from the City.” (Case 2 Property Valuer 2)
“Trains run express from Box Hill, Camberwell, Richmond going into the City, whereas at Mont Albert they then stop at all stations.” (Case 2 Real Estate Agent 3)

Transportation and Schools

In addition, house price can be affected by transportation if such transportation provides direct access to universities or high ranking education facilities. Preference and demand for such locations can be different depending on requirement for the type of education. This is seen in Box Hill and Mont Albert case study.

Box Hill and Mont Albert

Several tram services in Mont Albert provide direct access to high ranking primary/secondary schools located in surrounding suburbs, like Methodist Ladies’ College, Trinity, Scotch, Xavier located in Kew and Canterbury Girls, Camberwell Boys, Canterbury Girls High located in Canterbury and Camberwell. To be able to travel safely and directly to good schools without driving children would typically be desirable. This contention supports suburbs along the public transportation corridors and such factors contribute to the house price premium for Mont Albert.

“Because from here (Mont Albert) they (public transportation) can feed through to all of the private grammar schools and then on top of that, they also have access to the City. A lot of the buyers that we’re seeing are looking at the private schools…. Therefore, they are looking for anywhere along the tram routes, the train routes or the bus routes to be able to. So that’s why they’re buying into those areas (Mont Albert). It is a strong reason for those areas.” (Case 2 Real Estate Agent 2)

“A lot of the buyers and parents looking for anywhere along the tram routes and have access to good primary/secondary schools, the train routes or the bus routes to be able to. So that’s why they’re buying into those areas. Particularly in Mont Albert, that’s a strong factor in Mont Albert.” (Case 2 Town Planner 1)
“Train (in Mont Albert) would be for schools to some destinations like MLC, Trinity, Scotch, Xavier, possibly also with connection to Carey Baptist Grammar School in Kew. For the others, the tram for Canterbury Girls Secondary College, Canterbury Girls High School in Canterbury and Camberwell Grammar School in Camberwell. Parents want their kids to be able to travel safely and not have to drive so that’s why they look for those corridors with public transport.” (Case 2 Property Valuer 2)

There are a lot of students who live in Box Hill and many purpose built apartments are for students because of its proximity to Deakin University and other universities located in the Melbourne CBD such as University of Melbourne, Royal Melbourne Institute of Technology (RMIT) and Victoria University. Buses in Box Hill provide direct access for students to get to the Deakin University campus, whilst tram and train provide direct access to other universities in the Melbourne CBD.

“Most of the buildings and the population there (Box Hill) now are students. A lot of the development has been geared towards students so they need bus to Deakin (University), they need the tram or train into the City to get to the (other) Universities, so that’s one of the key factors effecting house price.” (Case 2 Real Estate Agent 1)

“Box Hill wouldn’t exist without the students and the students have bought in the accommodation because they need somewhere to stay. Because it’s tram central hub, easy access to everything, it’s made it a very easy point to live away from the universities but still within close proximity. So the schools have definitely driven that.” (Case 2 Real Estate Agent 3)

These results are also supported by Australian census data. Table 5.7 presents age and residential data for Mont Albert and Box Hill between 2001 and 2011.

<table>
<thead>
<tr>
<th>Age (majority)</th>
<th>Mont Albert</th>
<th>Box Hill</th>
</tr>
</thead>
<tbody>
<tr>
<td>35-39</td>
<td>40-44</td>
<td>20-24</td>
</tr>
<tr>
<td>40-44</td>
<td>45-49</td>
<td>30-34</td>
</tr>
<tr>
<td>45-49</td>
<td>25-29</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.7 Age Background and Residential Data for Mont Albert and Box Hill
As Table 5.7 shows, the majority of population living in Mont Albert is between 40 and 49, whilst the majority of the population living in Box Hill is between 25 and 30 which is a relatively younger population than Mont Albert. In addition, the percentage of owner occupiers who live in Mont Albert are overall higher than Box Hill. In detail, number of owner occupiers in Mont Albert remained unchanged between 2001 and 2011 at approximately 71%, whilst the owner occupiers in Box Hill has decreased from 51% in 2001 to 46% in 2011. This suggests the majority of the population who live in Mont Albert are established and more mature residents who would weight factors like schools. Mont Albert in this case has its advantage because the transportation can provide direct access to high ranking schools in surrounding suburbs.

Based on the results from Mont Albert and Box Hill, transportation plays a role in price performance between the two locations, but for different reasons. Residents in Mont Albert are seeking a direct route to high ranking primary/secondary schools whilst residents in Box Hill are seeking a direct route to universities. Nevertheless, the house price is positively affected by public transportation if it can provide direct access education facilities.

In summary, the effect of transportation on house price performance had mixed results between case studies. For suburbs that are well serviced by public transport, the effect of transportation on house price performance is not considered important simply because residents can access the same regardless of which suburb they live in. Even though sometimes, the type of public transport services may vary (i.e. bus, tram or train), as long as the coverage provided by available services are similar, then lack of a particular type of transportation is not considered as a disadvantage to house price performance. Interestingly, residents would ‘give up’ transportation and consider social background as a major factor when choosing a location, even though there is a difference in availability of transportation between two locations. But this only applies when access to transportation in nearby suburbs is convenient.

Further, transportation affects the house price performance when such transportation can save commuting time for the local residents, such as having an ‘express service’. Transportation
also affects house price performance when such transportation provides direct access to high ranking education facilities located along a transportation corridor, simply because parents do not need to pick up or drop their children according to school hours and their children can take public transportation themselves.

5.4 Neighbourhoods Characteristics

Based on the literature review (see Morrow-Jones et al. 2004, Simons et al. 1998, Tse and Love 2000, Turnbull and Matthews 2007, Vor and Groot 2009) neighbourhood factors are often classified into i) accessibility to shopping, recreation and community facilities and ii) the quality and appearance of surrounding houses. A detailed discussion of each aspect is presented in the following sections.

Accessibility to Shopping, Recreation and Community Facilities

From accessibility to shopping, recreation and community facilities point of view, all cases have suggested that each location has its own type of facilities and some of them are more advanced than nearby suburbs and/or vice versa. But the differentiation in quality of neighbourhood facilities does not seem a major cause of house price difference between locations given people can easily access the facilities they desire in surrounding suburbs using public transportation or a private vehicle. Therefore, by having a better neighbourhood facility in a suburb does not provide a huge contribution to price performance in that location. This is seen in all four case studies with two interesting examples, Box Hill and Mont Albert; and Glenroy and Broadmeadows. Broadmeadows has Broadmeadows Shopping Centre whilst Glenroy only has shopping strip near Glenroy railway station. Box Hill has Box Hill Shopping Centre, whilst Mont Albert has shopping strip along Union Road with limited shopping centre facilities. However, having a shopping centre in a location does not appear to add a premium to the house price of that location.

Kew vs Hawthorn

Both suburbs are well served by shopping and recreation facilities. In Hawthorn, it has several renowned shopping strip centres that are located along Glenferrie Road and Burwood Road, whilst Kew has Kew Junction and shopping strips located along High Street. The quality of
neighbourhood facilities varies across two locations. Glenferrie Road in Hawthorn is better known as a premium shopping strip than Kew. However Kew has come a long way over the past ten (10) years with new restaurants and cafes around the Kew Junction area.

For recreation facilities, both suburbs have access to Kew Recreation Centre, Hawthorn Library and Kew Library as well as public parks and reserves including Glenferrie Sports Ground, Central Gardens and Alexandra Gardens. Hawthorn recently added a new aquatic centre.

Interviewees concluded that the quality and difference in neighbourhood facilities are not considered as a major factor affecting prices between locations, simply because people can travel to their desired facility by private vehicle or other transportation.

“**But would that (quality of neighbourhood facilities) draw someone to live in the proximity there? It’s possible but I would have thought not for that one particular reason, no there’d be other reasons in the decision factor.”** (Case 1 Real Estate Agent 1)

“I wouldn’t have thought difference in neighbourhood facilities would have be great affect (on house price) there (Kew and Hawthorn), no.” (Case 1 Property Valuer 2)

**Box Hill and Mont Albert**

Both Box Hill and Mont Albert have local shopping and community facilities with some facilities better in one suburb than the other. In Box Hill, it has Box Hill Shopping Centre and shopping strip situated along Whitehorse Road and Station Street. Whilst Mont Albert has Union Road shopping strip centre. The lack of a shopping centre for Mont Albert is not considered as a factor affecting house prices between locations, as residents can travel to either shopping facilities easily.

For recreation facilities, both suburbs have access to Aqualink Box Hill Leisure Centre, Healthways Recreation and Aquatic Centres and Box Hill Library as well as public parks and reserves including Surrey Park, Melbourne Baseball Club and Box Hill Gardens. However, due to availability of public transportation and private cars, residents can easily gain access to the
facilities they desire and interviewees agreed that the house price difference between the two locations is unlikely to be affected by shopping and community facilities in this case.

“I don’t think the neighborhood facilities are the major factors, they (Mont Albert and Box Hill) are very close proximity to everything.” (Case 2 Real Estate Agent 2)

Altona Meadows and Laverton

Again, both Altona Meadows and Laverton have well established shopping and recreation facilities including Williams Landing Shopping Centre for Laverton and Central Square for Altona Meadows. The interviewee suggested residents can travel to either shopping facilities regardless of where they live. For recreation facilities, both suburbs have access to Laverton Slim and Fitness Centre, Altona Meadows Community Centre, Altona Meadow Library and Learning Centre as well as public parks and reserves including Truganina Park, Kooringal Golf Club and Lawrie Emmins Reserve. The difference in neighbourhood facilities is not considered as a major factor affecting the price difference between two locations.

“I think they play a role (in house price performance and where people choose to live), but not a major one.” (Case 3 Town Planner 1)

“Whether you can draw a direct correlation between the two. I think it’s probably a combination of other (factors).” (Case 3 Property Valuer 2)

Glenroy and Broadmeadows

In terms of neighbourhood facilities, Glenroy and Broadmeadows are different. Broadmeadows has Broadmeadows Shopping Centre, whilst Glenroy has no shopping centre, but local shops situated along Pascoe Vale Road near Glenroy railway station. For recreation facilities, both suburbs are similar with both having access to Broadmeadows Aquatic and Leisure Centre, The Age Broadmeadow Library, Glenroy Neighbourhood Learning Centre and Glenroy Library as well as public parks and reserves including the Northern Golf Club, Gervase Avenue Reserve and Rotary Park. Although Broadmeadows has a shopping centre and Glenroy has none, the lack of a Glenroy shopping centre is not considered as a major factor affecting house
prices between the two suburbs because residents can travel to shopping centres in Broadmeadows easily by public transportation and private vehicles.

“Shopping centre is not (considered) the major factor affecting the house price for Glenroy and Broadmeadows.” (Case 4 Real Estate Agent 3)

“Yes, Broadmeadow has a shopping centre, but that shopping is quite old. Would that effect house price? No, I don’t think so.” (Case 4 Property Valuer 1)

Beside access to shopping and recreational facilities, the proximity to undesirable facilities such as industrial sites would have an adverse effect on house price performance and this is seen in Laverton and Altona Meadow case study. Figure 5.3 presents the price correlation between Laverton and Altona Meadows that is extracted from the quantitative chapter.

Figure 5.3 Price Correlation between Laverton and Altona Meadows

![Price Correlation between Laverton and Altona Meadows](image)

Figure 5.3 highlights that the price correlation between Laverton and Altona Meadows decreased to negative 0.2 in 2002. During the analysed period of 1999 and 2002, the median house price for Altona Meadows increased from $167,000 to $205,500 which represents an overall increase of 23%, whilst median house price for Laverton decreased from $162,000 to $157,250 which represents an overall decrease of 3%.

To further illustrate the house price performance in terms of price volatility, compared to Altona Meadows’s steady average annual increase of 7.6% per annum, house prices in Laverton fluctuated from 10% increase in 2000, followed by 15% decrease in 2001 and then 2% increase in 2002. Interviewees suggested the volatility may be the result of the opening of the new Western Ring Road in 2000. The Western Ring Road provides direct access from...
western suburbs to Melbourne Tullamarine Airport which encouraged industrial lands to be developed in Laverton North, a suburb located on the north boundary of Laverton. Figure 5.4 presents the number of industrial properties that have been constructed in Laverton North before and after the opening of the Western Ring Road.

As Figure 5.4 shows, there has been a significant increase in the number of industrial properties constructed in Laverton North after opening of the new Western Ring Road. According to the Department of Environment, Land, Water and Planning (2015), in early and mid-1990s, before the opening of the Western Ring Road, approximately 20-30 additional hectares of industrial land was developed per year. After the opening of Western Ring Road which led to Laverton...
North’s increased accessibility to Melbourne Tullamarine Airport, in the early and mid-2000s, approximately 80 hectares of industrial land was developed per year.

Interviewees suggested that significant increase in industrial land in Laverton North due to the opening of the Western Ring Road have negatively affected prices in Laverton. Because Laverton North is an adjoining suburb to Laverton and given the proximity to undesirable facilities, in this case industrial properties would reduce the value of property in Laverton. This is seen as the cause of 3% decrease in house price for Laverton between 2000 and 2003. The uncertainty of buyers buying in to Laverton also provides high volatility in price performance during that period.

“More industrial properties have been constructed after the construction of (the) Western Ring Road. So instead of going into the city then to the airport, you can go directly to the airport from Laverton North. Would Laverton be affected by this back then? Maybe. Who would want to live near to industrial sites? But I think this is no longer the case. Laverton is currently mainly driven by developer because its development opportunity and two train stations.” (Case 4 Real Estate Agent 2)

“People not sure if continue to buy in Laverton because more industrial properties were constructed after opening of (the) Western Ring Road. Owner occupiers would have resistance in buying a place near industrial sites. But it does not matter to investors. Could be the cause for difference in volatility.” (Case 4 Real Estate Agent 1)

The cause of differentiation in house price performance for Laverton and Altona Meadows in earlier 2000s is also supported by Australian census data. Table 5.8 presents the population growth for Laverton and Altona Meadows.

<table>
<thead>
<tr>
<th>Year</th>
<th>Laverton Population</th>
<th>Altona Meadows Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2001</td>
<td>4,757</td>
<td>18,765</td>
</tr>
<tr>
<td>2006</td>
<td>4,508</td>
<td>18,842</td>
</tr>
<tr>
<td>2011</td>
<td>5,351</td>
<td>18,846</td>
</tr>
</tbody>
</table>

Source: Australian Census Data (2001, 2006 and 2011)
As Table 5.8 shows, the total population for Laverton decreased from 4,757 in 2001 before the Western Ring Road opening to 4,508 in 2006 after the Western Ring Road opening. Whilst the population for Altona Meadows increased steadily. The decrease in Laverton’s population suggested people had a resistance to living in Laverton due to the proximity to industrial sites and these results are consistent with the interview results.

**Neighbourhood appearance**

Based on the street and neighbourhood appearance point of view, if two suburbs are developed in the same era and have a similar dwelling/street features, the neighbourhood appearance does not seem to affect house price performance. This is seen in the Hawthorn and Kew case study.

**Hawthorn and Kew**

Hawthorn and Kew are two old suburbs and established in a similar period with houses that have similar features (e.g. Victorian style, Edwardian style). Interviewees suggested the quality of surrounding houses does not contribute to the house price differences between two locations.

“Not a great deal of different architecture, so we can’t say it’s an architectural preference for Kew or Hawthorn (in relation to price performance).” (Case 1Property Valuer 1)

If a suburb developed in the earlier years and having more period features, then the suburb with more heritage characters will contribute to a higher price premium. This is seen in the Mont Albert and Box Hill case study.

**Mont Albert and Box Hill**

Mont Albert was established in the 1890s and the character of the houses is older style including Victorian and Edwardian. The quality of the houses in Mont Albert are more appealing than Box Hill. People tend to pay a premium for more heritage features. Whilst Box Hill was established in the 1960s and developed to accommodate the population expansion after World War II and the type of houses are basic like California Bungalow which were two bedrooms, one bathroom and a kitchen to accommodate those that are returning from the war. So the
quality of the houses are less appealing than houses in Mont Albert. Therefore, the differentiation in neighbourhood appearance caused Mont Albert and Box Hill to have a different price performance. This explained why Mont Albert had a higher median house price than Box Hill over two decades.

“The quality of the buildings (for Mont Albert) are probably better. So stepping across from Box Hill to Mont Albert, you're in a different quality of properties. So you’ve got art deco buildings that were made, constructed in 1940s. Often they are family sized homes. So that (neighbourhood appearance) would have played a difference.” (Case 2 Property Valuer 2)

“Definitely Mont Albert has a better neighbourhood appearance than Box Hill. Two suburbs were developed in different era and for different reasons. Houses in Box Hill were constructed to accompany population from World War II. Houses in Mont Albert were constructed to be owner occupied in earlier years like 1890s and 1900s. The difference in quality of houses should be reflected in house price.” (Case 2 Real Estate Agent 1)

If none of the suburbs have heritage features, then house price performance is positively affected by suburbs with higher quality of houses or houses built over more recent times. This is seen in both Glenroy and Broadmeadows case study and Laverton and Altona Meadows case study.

Glenroy and Broadmeadows

Glenroy and Broadmeadows were developed in a similar period in circa 1950s, but for different purposes. Most of the houses in Glenroy were built by owners including Art Deco or Californian Bungalow style. However, Broadmeadows was developed and set up as a commission estate in the outskirts of Melbourne. Therefore, houses built at that time have basic finishes. House prices between the two locations is seen to be affected by the difference in neighbourhood appearance.

“You can feel it when you drive through two suburbs. It is different. Would you pay more to live in Glenroy, properly yes.” (Case 4 Real Estate Agent 1)
“You will feel the difference in quality of houses and street appeal between two locations immediately drive into the suburbs. People would pay more to live in Glenroy. The suburb is more appealing.” (Case 4 Property Valuer 1)

Laverton and Altona Meadows

Laverton and Altona Meadows were developed in different eras. Laverton was developed to provide commission housing. Most of the houses in Laverton were built circa 1930s of a basic standard. Whilst Altona Meadows on the other hand was developed in the 1980s and separated from its neighbouring suburb Altona and the houses were relatively newer with better quality. Overall, Altona Meadows has better streetscapes and a nicer living environment. The difference in house price performance between Laverton and Altona Meadows is seen to be affected by the difference in neighbourhood appearance.

“Street appeal in Altona Meadows is more appealing than Laverton. So that’s what I feel is the difference there. That will have an effect on house price.” (Case 3 Real Estate Agent 2)

“Laverton is one of the lowest price suburbs because of its location and its older style dwellings and those dwellings are becoming at the end of their sort of life span.” (Case 3 Property Valuer 1)

“Completely two different appeal, it makes sense you would expect people to pay more for better neighbourhood appeal.” (Case 3 Town Planner 1)

In summary, neighbourhood character often refers to two aspects. On the availability and quality of neighbourhood facilities point of view, house price is not affected by the difference in neighbourhood amenities, simply because, residents can travel to their desired facility by public transport or private vehicle and there is no restriction on accessibility to the amenities if the amenities are not located in the suburb they live in. However, if there is an undesirable characteristic such as industrial sites developed in a nearby location, then the proximity to undesirable facilities would have an adverse effect on house prices and further affect price volatility as market buyers are uncertain about buying into that location. In addition, from
neighbourhood appearance point of view, house price performance is positively affected by suburbs with more heritage appearance or built in a better quality.

5.5 Socio Demographic Characteristics

Differentiation in socio demographic background is considered as one of the most important factors affecting house price differences between two locations and this was supported through all four case studies.

Hawthorn and Kew

From a demographic point of view, Hawthorn and Kew are considered different. The majority of the population in Hawthorn is aged between 20 to 29 and aimed more towards the younger buyers. Whereas Kew is more of higher socio economic demographic and it attracts more mature and older buyers who would weigh more on quality of life when choosing a location.

Interviewees concluded that the differentiation between social backgrounds plays a major role in house price differences between the two locations. Social background is the reason causing Kew to have a higher median house price than Hawthorn. People with higher income tends to prefer Kew due to their desire for similar social attachment and this does drive up house prices in that location. The fundamental is that people like to live in socio ethnic groups that are similar to them.

“It’s a different lifestyle, different quality. Hawthorn, there’s quite a lot of workers cottages, single fronted properties. It’s a different type of neighbourhood. It’s probably aiming more towards the younger buyers whereas Kew is the older, more mature buyers. They want the family home with the swimming pool and the double garage and the bit of land around it.” (Case 1 Real Estate Agent 3)

“How much capital they’ve got? What ethnicity might they be? They like to live in social groups like we all do.” (Case 1 Town Planner 1)
The differentiation in social background between Hawthorn and Kew is also supported by Australian census data. Table 5.9 shows the age background and type of residents in Hawthorn and Kew between 1996 and 2011.

Table 5.9  
Age Background and Type of Residents for Hawthorn and Kew

<table>
<thead>
<tr>
<th></th>
<th>Hawthorn</th>
<th></th>
<th></th>
<th>Kew</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner vs</td>
<td>59% vs</td>
<td>60% vs</td>
<td>56% vs</td>
<td>55% vs</td>
<td>71% vs</td>
<td>67% vs</td>
<td>73% vs</td>
</tr>
<tr>
<td>Renter</td>
<td>41%</td>
<td>40%</td>
<td>44%</td>
<td>45%</td>
<td>29%</td>
<td>33%</td>
<td>27%</td>
</tr>
</tbody>
</table>


Table 5.9 shows the majority of the population in Kew were aged between 20-24 and 40-44 which is relatively older than population in Hawthorn being between 20-29. In addition, the number of owner occupiers in Kew remained similar between 1996 and 2011 at approximately 70%, whilst the number of owner occupiers in Hawthorn was significantly lower which is ranging between 55% and 60%. The census data is consistent with interview results that there is a socio demographic difference between the two suburbs and such differentiation had an effect on house price performance between two locations.

Box Hill and Mont Albert

Box Hill and Mont Albert are considered very different in term of socio demographic background. Table 5.10 shows the socio demographic background for Box Hill and Mont Albert between 2001 and 2011.

Table 5.10  
Socio Demographic Background for Mont Albert and Box Hill

<table>
<thead>
<tr>
<th></th>
<th>Mont Albert</th>
<th></th>
<th></th>
<th>Box Hill</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Birthplace(majority)</td>
<td>n/a</td>
<td>Au77%</td>
<td>Au 73%</td>
<td>Au 69%</td>
<td>n/a</td>
<td>Au86%</td>
<td>Au50%</td>
</tr>
<tr>
<td></td>
<td>Uk4%</td>
<td>Uk 5%</td>
<td>China6%</td>
<td>n/a</td>
<td>China6%</td>
<td>China14%</td>
<td>China20%</td>
</tr>
</tbody>
</table>

Source: Australian Census Data (2001, 2006 and 2011)
Table 5.10 shows the second largest population in Box Hill is Chinese and the number of population who were born in China increased significantly from 6% in 2001 to 20% in 2011. Whilst the majority of the population in Mont Albert were born in Australia or a European country, like UK, albeit the increase in Chinese population in 2011.

The Chinese influence would have been greater in the Box Hill area than it would have been in Mont Albert. Box Hill also has several Chinese grocers and shop owners who sell to the Chinese specifically and that demand and desire to live with a similar background in a location increases. Similarly, for Mont Albert, residents who choose to live in Mont Albert seeking neighbours that they can feel familiar with and comfortable with. In summary, interviewees suggested that the differentiation in social background is considered a key factor affecting house price performance between two locations as people with similar social background tend to live together. I.e. social segmentation.

“I guess they want to live in that community together. The Chinese culture is certainly one, very big one for Box Hill (in relation to house price performance).” (Case 2 Town Planner 1)

“It certainly has been with the Chinese influence. I think certainly the cultural influences in Box Hill would have driven prices higher.” (Case 2 Property Valuer 2)

“The population with higher socioeconomic level intend to buy at Mont Albert, if they can’t, they’ll look at Box Hill.” (Case 2 Real Estate Agent 3)

The change in socio demographic background between Mont Albert and Box Hill was seen as the reason for differentiation in house price performance between the two suburbs in 2005 and 2013. Figure 5.5 shows the 3 year moving correlation in house price performance between Box Hill and Mont Albert that is extracted from the quantitative analysis chapter.
As Figure 5.5 shows, between 2000 and 2015, there were two periods where price correlation between two suburbs dropped to its lowest point at 0.2. During the 3 year correlation analysis between 2002 and 2005, the median house price for Box Hill increased by 10%, whilst the median house price for Mont Albert increased by only 3%. The difference in price growth caused the price correlation to drop to 0.2 in 2005. As Table 5.10 shows, the population born in China more than doubled from 6% in 2001 to 14% in 2006 and this significant change in socio demographic background would suggest the demand for Box Hill from Chinese buyers was higher than for Mont Albert and that additional demand due to social segmentation would place an upward pressure on house price performance in Box Hill.

The same situation occurred in 2013 where the median house price for Mont Albert increased by 18% between 2010 and 2013, whilst the median house price for Box Hill remained unchanged. The difference in house price growth caused the price correlation between two locations to decrease to 0.2 in 2013. Again, as Table 5.10 shows, the second largest population born overseas for Mont Albert changed from UK in 2006 to Chinese in 2011. Although during the same period the Chinese population continued to grow in Box Hill from 14% in 2006 to 20% in 2011, the dramatic change in socio demographics for Mont Albert suggested the Chinese population were moving from Box Hill towards Mont Albert and that extra demand would trigger a positive increase in house prices for Mont Albert. This is consistent with the interview results.

“Recently, we’ve seen more and more Chinese people are buying in Mont Albert because the quality of living, larger land, better environment etc. Asians with higher
socio economic level would buy in Mont Albert, others would buy in Box Hill.” (Case 2 Real Estate Agent 2)

“Once they (Chinese population) start buying in a place, other (Chinese population) would follow and that is what we seen in Mont Albert. Asians are still buying in Box Hill, but they are also buying in nearby suburbs, such as Mont Albert and Surry Hills.” (Case 2 Real Estate Agent 3)

Altona Meadows and Laverton

The same phenomenon occurred in the Altona Meadows and Laverton case study. The social background between two suburbs are completely different. The residents who live in Altona Meadows are owner occupiers who are looking at social factors and schools when choosing a place to live. Whilst Laverton has a lower socio demographic and most of the residents are renters who are trying to get into work and are more interested in low living costs. In general terms, Altona Meadows is considered to have a higher socio economic demographic than Laverton. Laverton is recognized as a ‘commission estate’ with a stigma associated with that. Interviewees suggested the difference in house price performance is influenced mainly by difference in social background.

“There’s a bit of stigma (with Laverton). Altona Meadows is definitely better. If you drive through Laverton, you can definitely see a big difference.” (Case 3 Real Estate Agent 1)

“In Laverton, the social characteristics, it’s definitely a lower demographic area. If you do get some trouble makers in that area that obviously decreases the value of the property and the market.” (Case 3 Property Valuer 1)

“Yeah, social is a factor. Laverton was always viewed as the poorer cousin of Altona Meadows”. (Case 3 Town Planner 1)

This is also supported with Australian census data, Table 5.11 shows the age background, type of residents and household income for Laverton and Altona Meadows between 2001 and 2011.
Table 5.11 Age Background, Type of Residents and Household Income

<table>
<thead>
<tr>
<th></th>
<th>Laverton</th>
<th></th>
<th></th>
<th>Altona Meadows</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (majority)</td>
<td>n/a</td>
<td>33-34</td>
<td>25-29</td>
<td>25-29</td>
<td>n/a</td>
<td>30-34</td>
</tr>
<tr>
<td>Owner vs Renter</td>
<td>n/a</td>
<td>71% vs 29%</td>
<td>56% vs 44%</td>
<td>48% vs 52%</td>
<td>n/a</td>
<td>73% vs 27%</td>
</tr>
<tr>
<td>Income ($1500+/pw)</td>
<td>n/a</td>
<td>1% 3% 6%</td>
<td></td>
<td>n/a</td>
<td>2% 6% 8%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Australian Census Data (2001, 2006 and 2011)

As Table 5.11 shows, the majority of the population living in Altona Meadows is considered older than the population in Laverton. As discussed in the earlier section, the number of owner occupiers in Altona Meadows was much higher than the population in Laverton. In addition, the number of households earning above $1,500 per week in Altona Meadows doubled the number of households in Laverton for 2001 and 2006. All those census data suggest the majority of residents who live in Altona Meadows are more mature owner occupiers with higher socio demographic backgrounds and the difference in socio demographics between the two locations led to a difference in price performance.

**Glenroy and Broadmeadows**

Similar to the Altona Meadows and Laverton case study, Broadmeadows is seen as a State commissioned suburb and there is a stigma associated with it as well. The social background for Broadmeadows is more of investors or renters. Whilst Glenroy is a more established suburb that comprises a majority of owner occupiers. The difference in social background caused buyers to pay a premium to live with the population similar to themselves. Interviewees suggested social is one of the major factors affecting the house price difference between these two suburbs.

“There is a stigma that Broadmeadows is a commission suburb. So straight away, there’s a stigma associated with it. It will affect the house price.” (Case 4 Property Valuer 1)
“Broadmeadows was, at the time set up as a commission estate in the outskirts of Melbourne for that purpose. Would that affect price. Of course it would.” (Case 4 Real Estate Agent 1)

“Because there was gangs, a certain type of demographic lives in Broadmeadows. Like the background of, similar background, or lifestyle. But as families, they look at social first. This may link to your house price difference”. (Case 4 Real Estate Agent 2)

This is also supported by the Australian census data. Table 5.12 shows the type of residents and household income for Glenroy and Broadmeadows.

<table>
<thead>
<tr>
<th></th>
<th>Broadmeadows</th>
<th>Glenroy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner vs Renter</td>
<td>n/a</td>
<td>61%  vs 39%</td>
</tr>
<tr>
<td>Income ($1500+/pw)</td>
<td>n/a</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

Source: Australian Census Data (2001, 2006 and 2011)

As Table 5.12 shows the percentage of population in Glenroy that are owner occupiers remain relatively unchanged between 2001 and 2006 at approximately 70% with a decrease in 2011 to 65%. Whilst the owner occupiers in Broadmeadows decreased from 61% in 2001 to 46% in 2011. This suggested more population who live in Broadmeadows are renters. In addition, the number of households earning above $1,500 per week in Glenroy increased from 4% in 2006 to 6% in 2011 whilst the number of household earning $1,500 per week for Broadmeadows remained unchanged at 2%. The census data suggested the majority of residents who live in Glenroy are owner occupiers with high socio demographic background and the difference in socio demographic between two locations led to a difference in price performance.

In summary, the difference in socio economic demographic is considered as one of the key factors affecting house price difference between locations and this is supported across all four case studies. People tend to live in a location that have similar background as themselves.
Therefore, buyers are willing to pay a premium to separate themselves from others and group themselves with ethnic groups that are similar to them i.e. social segmentation.

5.6 Schools

The school factor effect led to mixed results on house price performance through all four case studies. When there is a high ranking school located in a particular suburb and population that demands for such a school is wealthy enough, then the house price is affected by such school factor regardless of whether it is a private school or public school. This is seen in the Hawthorn and Kew case study.

Hawthorn and Kew

Kew has more Melbourne highly ranked private and public primary/secondary schools than Hawthorn, including Kew Primary School, Sacred Heart Primary School, Methodist Ladies’ College, Preshil, Trinity Grammar School, Xavier College, Kew High School, Ruyton Girl’s School and Genazzano College. Interviewees suggested the quality of schools is one of the major factors affecting house price difference between the two locations. The availability of high ranking schools in Kew attract a lot of parents seeking a better education for their children and this has been seen across different cultural backgrounds including Asians.

“Emotionally most parents will pay extra money to protect and educate their children and certainly the Sackville Ward (in Kew) where most of popular schools are located, attracts more population with that section of the market.” (Case 1 Real Estate Agent 1)

“The good quality private schools would drive people’s wants to acquire, purchase and live in the area. I’d think in the last five years and certainly in the last ten years in Kew, particularly in the Sackville Ward around Carey, that’s been where initially the Hong Kong and Chinese moved in, and now more mainland Chinese have moved in. There’s been a major injection of economic capital into residential property within those markets because of the popularity of those schools.” (Case 1 Property Valuer 1)

Interestingly, private schools are not restricted by the school zone boundary, however, to be able to walk to the preferred private school is a key reason for parents to purchase properties
in Kew. From the Sackville Ward (in Kew), all high ranking schools are located within walking distance. It is the underlying thrust of why the price differentiation and why the growth in Kew prices is based around the popularity of being able to walk to the schools.

“From the Sackville Ward (in Kew), all those five schools are (within) walking distance. Parents who buy in Kew, they don’t have to drop off or pick up their kids. Their kids can go to the school themselves without crossing a major road, is why that Sackville Ward is probably more popular.” (Case 1 Property Valuer 2)

“The number of private schools that are available in Kew is the key to the price growth for Kew. Parents who are rich enough, they would buy in Kew. It provides their kids with walking distance to schools. Parents would pay a premium for that.” (Case 1 Real Estate Agent 3)

More interestingly, a relatively high ranking public school (Kew High School) is not considered as important as private schools for Kew in terms of house price contributions. This is due to private schools ranking higher than the public school, and parents who buy property in Kew would place more weight on private schools regardless of tuition fee due to their earnings.

“Private schools play a much more important part there than the public schools. To live in Kew to go to Kew High School, I don’t think has a great effect. It would be the proximity to the major private schools. That’s six private schools that geographically are in that Sackville Ward (in Kew), meaning that they can walk to school without having to cross a major road. No train, no tram, no bus, we just walk.” (Case 1 Real Estate Agent 2)

“Public school is not the major factor affecting house prices, because people that are fortunate enough to be able to afford to send their children to private schools aren’t necessarily interested in the State school, the public school system. So who’s going to spend more on a house? A parent who can only afford to have their children educated at a public school, or the parents that can afford to spend thirty plus thousand ($30,000) plus a year to have them into their private schools? It’ll be the private school parent every time. So back to where, in Kew, six private schools, they’re what’s going to drive
that price harder because they’ve got deeper pocket, they’ve got more capital, more money.” (Case 1 Real Estate Agent 3)

Schools and Socioeconomic

This research also found there is a close link between schools and social factors. If none of the suburbs have a high ranking school, then the difference in social factors, such as having a low socio economic demographic would have a negative effect on people’s choice of school, hence effect on house price. Simply because parents would like their children to grow up with others of similar social background. This is seen in both Laverton and Altona Meadows and Glenroy and Broadmeadows case studies.

Altona Meadows and Laverton

As discussed in earlier section, Laverton is recognised as having a lower socio economic demographic than Altona Meadows. Interviewees suggested the low socio economic demographic in Laverton has a chain effect on school factors, as residents would expect their children to go to a school with similar social background. Therefore, although none of the suburbs have high ranking schools, the school factor still played a role in their decision making as to where to live.

“I know that there is a stigma associated with Laverton. I think people have always felt that that’s not a place that they’d want to send their kids. This will contribute to the price performance.” (Case 3 Town Planner 1)

“People want to send their kids to a school with similar background and Laverton may not be an ideal place, unless you have no choice.” (Case 3 Real Estate Agent 2)

Broadmeadows and Glenroy

Similar results were shown in the Broadmeadows and Glenroy case study. None of the suburbs have high ranking schools. Broadmeadows is seen as a State commissioned estate and parents in Glenroy are more hesitant to send their children to schools located in Broadmeadows because of the social background and demographic of Broadmeadows.
“I wouldn’t think there is a good school, but if I had to take my pick, Glenroy, Broadmeadows is a completely different area, from social to lifestyle, everything. If I am a parents, I will choose Glenroy.” (Case 4 Real Estate Agent 1)

“There is stigma associated with Broadmeadows. You would not want to walk by yourself at night. Of course parents will consider that. Why would they send their children to a school that is unsafe?” (Case 4 Property Valuer 2)

In summary, schools can have a major positive effect on house prices when there is a high ranking school located in a suburb regardless of it being a private or public school. If none of the suburbs have a high ranking school and there is a significant difference in social background between suburbs, then the school factor will affect the parents’ choice for a location to live in because parents would want their children to grow up with others who have similar socio demographic background.

5.7 Planning Regulations

Restriction of Multi Unit Development

Planning regulations in this research refers to potential for development by different planning schemes introduced by the local authority. The effect of such planning policy on house price performance tends to have mixed results. In a higher social economic suburb, restrictions on multi-unit development would have a positive effect on median house prices. This is seen between Mont Albert and Box Hill case study as well as in the Kew and Hawthorn case study.

Mont Albert and Box Hill

As discussed in earlier sections, Mont Albert is considered as having a high socio economic demographic and restrictions on potential for development in the neighbourhood provide a premium on house prices because residents tend to pay more for lifestyle and low density. Compared to Box Hill, Mont Albert has a number of lower density housing areas, particularly with single heritage dwellings. This means that it is less attractive to developers for unit and
apartment development and more for people moving in to live. Buyers who buy in Mont Albert are buying for residential amenity to be retained and not live near high rise towers. Residents want houses and neighbours they can feel familiar and comfortable with.

“Buyers buying into Mont Albert are buying the low density, the lifestyle. They don’t want to see too many cars on the road, too many people using the facilities. Therefore, they would pay a premium for low density and by having a restrict development policy is a positive thing for Mont Albert.” (Case 2 Property Valuer 2)

“People love that (low density). That’s why they buy in Mont Albert. Be able to enjoy a lifestyle. They would pay a premium for that.” (Case 2 Real Estate Agent 1)

Kew and Hawthorn

Similarly, Kew is considered as having a higher socio economic demographic than Hawthorn and most of the properties in Kew are heritage and local council have restrictions on multi-unit development in that location. People who live in Kew expect it to be a single family home area and there’s a lot more resistance for multi-unit development in that area. Therefore, house prices are reflective of being able to enjoy low density.

“Less development keeps it quite high in price (for Kew). People want the lifestyle.” (Case 1 Property Valuer 1)

“It is not surprise that people intend to pay a premium for a low density area, especially for owner occupiers who want to live in a lifestyle. This is what happened in Kew.” (Case 1 Real Estate Agent 2)

Encourage Multi unit Development and Transportation

For the suburbs which do not have significant high socio economic demographics, with planning policy that encourages multi-unit development would cause the house price to appreciate faster, simply because the property is worth more if a multi-unit building can be built on the land. This research found development opportunity is closely linked to availability of transportation. This is supported by all four cases.
Laverton vs Altona Meadows

Laverton has two train stations and the local authority encourages high density development near transportation. Based on those two facts, Laverton is seen as a ‘golden’ place for developers/investors. However, Altona Meadows on the other hand was established in more recent times and the age and quality of houses is relatively newer and most of the properties in Altona Meadows have covenants that restrict multi-unit development. Therefore, the development opportunity in Altona Meadows is relatively rare. All interviewees concluded that planning policy that encourages multi-unit development in Laverton and the availability of train stations are the key for Laverton to have an overall higher price return than Altona Meadows.

“Land size in Laverton is relatively larger which opens up the development opportunities and attracts builders and developers. State Government has progressively been targeting increased, high density development around activity centres and along railway corridors and public transport corridors, especially for Laverton which has two train stations. Moreover, the quality of dwellings in Laverton is at the end of the life cycle and developers are seeing a very big opportunity for redevelopment into town houses. Because of that development opportunity, house price return in Laverton is higher than Altona Meadows where most of the block was developed recently and you cannot do the same as in Altona Meadows.” (Case 3 Real Estate Agent 2)

“I definitely think historically that could have had an effect between Laverton especially just because of the development market and planning change.” (Case 3 Town Planner 1)

“I think that broader Melbourne 2030 and now Plan Melbourne would definitely play a part in terms of price return in Laverton. The return is generated from development potential.” (Case 3 Property Valuer 1)

“Really the draw card for developers is how much I can buy it for and how much I can sell it for and rent it out for and that’s a perfect location to do that. Being near the train
station, like their train station (in Laverton) is probably one of the biggest reasons driving that factor (price return).” (Case 3 Property Valuer 2)

The development opportunity that enhanced the price return is seen as the cause for house price differentiation between Altona Meadows and Laverton in 2007. Figure 5.6 shows the 3 year moving price correlation between Altona Meadows and Laverton that is extracted from quantitative analysis chapter.

Figure 5.6 Price Correlation between Altona Meadows and Laverton

Figure 5.6 shows in 2007, there was a decrease in price correlation between Altona Meadows and Laverton. During the analysed period of 2005 and 2007, Laverton house price increased by 43% whilst the house price in Altona Meadows increased by 23%. The differentiation in house price growth caused the price correlation to decrease in 2007. The decrease in price correlation can be explained by development opportunities that were available in Laverton as suggested by interviewees. This result is supported by Australian census data. Table 5.13 presents the census data on population, housing density and type of transportation for work.

Table 5.13 Population, Housing Density and Type of Transportation for Work

<table>
<thead>
<tr>
<th></th>
<th>Laverton</th>
<th></th>
<th>Altona Meadows</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>n/a</td>
<td>4,757</td>
<td>4,508</td>
<td>5,351</td>
</tr>
<tr>
<td>Density for</td>
<td>n/a</td>
<td>93%</td>
<td>91%</td>
<td>77%</td>
</tr>
<tr>
<td>houses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Go to work</td>
<td>n/a</td>
<td>9% vs 91%</td>
<td>9% vs 91%</td>
<td>17% vs 83%</td>
</tr>
<tr>
<td>Public vs Car</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Australian Census Data (2001, 2006 and 2011)
As Table 5.13 shows, the density of houses for Laverton has decreased from 91% in 2006 to 77% in 2011, whilst the density of houses for Altona Meadows remain unchanged at 83%. This indicates more townhouse/unit/apartment type properties were constructed during the period in Laverton than in Altona Meadows and this is consistent with population growth. The population in Laverton increased from 4,508 in 2006 to 5,351 in 2011 which represents 19% growth, whilst the population in Altona Meadows was static. The census data also suggested there was an increased number of people in Laverton using public transport. In 2006, 9% of local residents used public transportation for work and in 2011 that number increased to 17% which further suggested the population who moved to Laverton use public transportation. This results are consistent with interview results that more development occurred in Laverton, especially near the train stations. More development occurred in Laverton suggested that developers would pay more to acquire a land with development opportunity and such development potential increases the value of the property significantly which resulted in Laverton having a higher price growth rate than Altona Meadows between 2005 and 2007.

Glenroy and Broadmeadows

Similar to the Box Hill and Mont Albert case study, Glenroy is identified as an ‘activity centre’ and the local authority encourages high density development near transportation hubs. Once the planning policy came into force, the areas that were identified around the Glenroy railway station, have become available for multi-unit/townhouse developments and because of the zoning, the value for dwellings with development potential or have high density zoning has increased significantly in value which creates a platform for higher price return. This goes to explaining why Glenroy had a higher price return than Broadmeadows in 2007.

“There is a lot of development going in Glenroy especially near the train station where all the shops are. You can put up to 5 townhouses on a standard residential land and it is so close to the city only 15 kilometres. Once the property’s got development potential it’s going to be more valuable. That’s had a major impact on house price return.” (Case 4 Real Estate Agent 3)

“Because of the zoning, those dwellings now have an increased value because of development potential. Some of those properties in Glenroy, anywhere where it’s got
that high density zoning. So I suppose people are selling their houses at a greater price than what their other properties are.” (Case 4 Town Planner 1)

The development opportunity that enhanced the price return is seen as the cause for house price differentiation between Glenroy and Broadmeadows in 2007. Figure 5.7 shows the price correlation between Glenroy and Broadmeadows that was extracted from the quantitative analysis chapter.

Figure 5.7 shows there was a significant decrease in price correlation in 2007 between Glenroy and Broadmeadows, during the analysed period of 2005 and 2007, the median house price for Glenroy increased from $275,625 to $380,500 which represents an increase of 38%, whilst the median house price for Broadmeadows increased from $203,750 to $236,500 which represents an increase of 16%. The 22% difference in median house price growth is the reason for the low price correlation between two locations in 2007. The decreased price correlation can be explained by development opportunities that were available in Glenroy as suggested by interviewees. This result is supported by Australian census data. Table 5.14 presents the census data on housing density.

<table>
<thead>
<tr>
<th>Density for houses</th>
<th>Broadmeadows</th>
<th>Glenroy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>n/a</td>
<td>1996</td>
</tr>
<tr>
<td>2001</td>
<td>80%</td>
<td>2001</td>
</tr>
<tr>
<td>2006</td>
<td>80%</td>
<td>2006</td>
</tr>
<tr>
<td>2011</td>
<td>76%</td>
<td>2011</td>
</tr>
</tbody>
</table>

Source: Australian Census Data (2001, 2006 and 2011)
As Table 5.14 shows, the density of houses for Glenroy decreased from 77% in 2006 to 68% in 2011, whilst the density of houses for Broadmeadows only decreased from 80% in 2006 to 76% in 2011. The decrease in density of houses indicates more townhouse/unit/apartment type properties were constructed during the period in Glenroy than in Broadmeadows. This results are consistent with interview results that more development occurred in Glenroy than Broadmeadows. More development occurred in Glenroy suggested that developers would pay more to acquire a land with development opportunities and such development potential would increase the value of the property significantly. This indicates Glenroy has a higher growth rate in house prices than Broadmeadows between 2005 and 2007.

In summary, the effect of planning policy had mixed results on house price performance across the case studies. When a suburb comprises significant high socio economic demographic, then by having a planning policy that restricts multi-unit development would provide a premium on house prices because residents tend to pay more to live in a lifestyle. i.e. low density. For other suburbs, by having a planning policy that encourages high density development, a positive effect on price return is expected because land is worth more if multi-unit dwellings can be built and this research found development potential is closely linked with transportation.

### 5.8 Impact of Independent Variables on Price Measurement

One objective of the research was to identify drivers for local house price differences. In order to enable a comprehensive coverage of the analysis, all microeconomic factors that have been identified in the literature review were examined during interviews and co-analysed with the house price performance profile. Figure 5.8 shows the relationship between each microeconomic factor and the price performance.
Figure 5.8 shows each local factor contributes to house price performance either directly or combined with other factors. Direct impact includes factors like quality of schools or neighbourhood facilities. For example, a high ranking school can positively contribute to price performance and proximity to industrial sites may adversely affect house price performance. Beside direct impact, the contribution of each factor to the house price performance can also be combined with other factors. For example, if a location has transportation that provides direct access to high ranking schools, then house price can be positively affected by combination of transportation and schools. Or if a location with high socio economic demographic and a restricted planning policy is in place, then house prices can be positively affected by a combination of social influence and planning regulations. However, the results vary between locations and each factor had different impact on local house price performance depending on the nature and characteristics of the suburb.

Based on the results from interviews of each case study, this research cross examined drivers for local house price differences between cases and price performance profiles to further demonstrate the effect of each factor on median house price performance, average annual price return and price volatility. Figure 5.9 shows the effect of each factor on median house price performance.
As Figure 5.9 shows, the median house price is affected by either positive factors or negative factors. Some of the positive factors include high ranking schools and better neighbourhood environment which includes high quality of street appeal such as having more heritage or newer constructed dwellings. In addition, if two locations comprise different socio economic demographics, then people with high socio economic demographics would pay a premium to live in a location with a similar social background. Median house prices are also positively affected by a combination of factors, such as combination of restrictive planning regulations restricting supply of higher density residential development and high socio economic demographics. For example, if a location comprises high socio economic demographics, then by having a restricted planning policy (i.e. low density) would provide a price premium for that location, simply because the better quality of living environment that prospective residents with high socio economic demographics would expect. Moreover, high ranking schools and transportation are another two factors which have a combination effect on median house price performance. If none of the suburbs have a high ranking school, then the location that can provide direct transportation access to high ranking schools located in nearby suburbs would attract more parents as their children can go to school directly without transporting them around school times.

A median house price can be negatively affected by factors such as neighbourhood environment including having a low quality of street appeal such as basic or poor quality of dwellings or located in close proximity to an undesirable facilities (industrial sites). In addition, if a location comprises a lower socio economic demographic, then the median house price for
that location would be lower than surrounding suburbs because there is resistance to choosing that location to live, hence lower demand from those with the capital to select a different neighbourhood. With a combination of factors, a median house price is negatively affected by low socio economics that puts pressure on school factors. Parents who are not in a lower socio economic demographic would try to avoid living in a location that having low socio economic demographics as they want their children to go to same schools as other children who have a similar social background. Although school in these case studies do not have direct effect on house price, the hesitation from parents for a location with low socio economic demographic would adversely affect demand for that location.

Unlike the number of factors affecting median house price performance, the number of factors that were identified to have an effect on average annual price return and price volatility in this research are rather limited. Figure 5.10 shows the factor affecting average annual price return and price volatility.

As Figure 5.10 presents, no single factor has been identified to explain the difference in price return, rather a combination of two factors – planning regulation and transportation. For non-high socio demographic suburbs, if local council encourages high density development for a location, then that location would have a development opportunity which would led to a higher price return as the land is worth more if multi-unit dwellings can be built. This research found such development potential is closely linked with transportation.
From a price volatility point of view, if there are undesirable facilities such as industrial sites developed in a near location, then the proximity to the undesirable facilities would have an adverse effect on house price and further affect price volatility as market buyers are uncertain about buying into that location. For example, for owner occupiers, they would not want to live near industrial sites, however, investors are less affected in this case.

5.9 Summary

Based on the descriptive analysis from the quantitative chapter, eight Melbourne local suburbs were selected as case studies for this research. After further examination with comparison of the price performance at different levels, namely country, city and local level, this research found there were certain periods where local house prices did not perform in line with either country, city or other local level. Such differences in price performance are believed to be affected less by macroeconomic factors, but rather by microeconomic factors.

This chapter is aimed to examine the phenomenon resulting from the quantitative analysis and drivers for local house price performance. A series of semi-structured interviews were conducted through real estate professionals including real estate agents, property valuers and town planners to provide opinions from different backgrounds. The effect of factors identified in the literature review including transportation, neighbourhood characteristics, social characteristics, schools and planning regulation were questioned during interviews and analysed across all case studies. The results suggested each microeconomic factor has a different effect between locations and each factor weighted differently towards local house price performance depending on the nature and characteristics of the suburb.

Based on the results from interviews of each case study, this research further analysed the relationship between local factors and the house price performance profile including median house price, average annual price return and price volatility and found the median house price is affected by various positive/negative factors and combination of factors. Average annual price return is positively affected by a combination of planning regulation and transportation factors, whilst price volatility is negatively affected by proximity to undesirable neighbourhood facilities.
Most importantly, the quantitative results concluded from the previous chapter suggested there were certain periods where house prices between two local suburbs performed differently from each other, either being positively correlated or negatively correlated. To provide a comprehensive understanding of local house price differences, this research cross examined the Australian census data with interview results and further triangulated with price correlation results, and found the differences in local house price performance between two locations for a particular period of time could be the result of changes in local factors. For example, a change in neighbourhood facilities including proximity to undesirable industrial sites could decrease the population for that location and further influence the price volatility. Furthermore, a change in socio demographics could increase the demand for that location and hence positively affect price growth. If a suburb experienced an increase in high socio demographic population, then by having a restricted planning policy on high density development could also positively affect price growth. In addition, for suburbs which do not comprise high socio demographics, changes in local planning policy to encourage high density development would enhance house price growth.
CHAPTER SIX

CONCLUSIONS, IMPLEMENTATION AND RECOMMENDATIONS

6.1 Introduction

Housing is important to both the economy and individuals from the perspective of both consumption and investment. Due to this, housing price performance has drawn significant attention from the policy makers, investors, home owners and researchers. House prices are often reported on a country, city and local level. There have been extensive studies at country and city level showing house price movements are closely related to a common set of macroeconomic variables and market specific conditions (Bodman and Crosby 2003, Bourassa and Hendershott 1995, Stepanyan et al. 2010). However, no fixed set of price determinants have been identified and each country has a unique set of price determinants based on economic structures and conditions (Gallin 2003, Mikhed and Zemcik 2007, Munro and Tu 1996). Importantly, several studies suggested in relation to house price changes, there is a degree of price heterogeneity in local housing markets and such deviation cannot be explained by national housing price models (Klyuev 2008, Otto 2007, Tu 2000).

At a local level, there has been an improved understanding (Fack and Grenet 2010, Lauridsen et al. 2013, Meen 2006, Shing and Zhang 2006) of housing markets assisted by identifying and understanding individual factors influencing housing decisions including, but not limited to, transportation, neighbourhood characteristics, social characteristics, schools and planning regulations. At a local level, existing studies focused on examining one or two factors, with nominal attention given to the elaboration of the combination of all factors and how those factors would have a different effect across locations, especially locations that are close to each other.
The aim of this research has been to identify and examine house price determinants at a local level. Based on the research aim, the following research objectives were established:

i. **To examine the relationship of house prices at different levels – local to country/city/local level.** First, to examine the house price performance at different levels and then to compare the price performance between each level to demonstrate if house prices at different levels perform differently. Most importantly, to identify if there exists a price differentiation between locations that are geographically similar.

ii. **To investigate the relationship of local house prices and macroeconomic factors.** Examine and compare the performance of macroeconomic factors to the performance of house prices at a local level to determine if local house prices perform in line with the performance of macroeconomic factors.

iii. **To identify and analyse key local housing market drivers.** Establish the effect of local factors identified in the literature review to the performance of local house prices. This is aimed to identify drivers causing local house price differences and also to demonstrate if the effect varies across locations.

iv. **To understand better key housing price determinants at a local level.** Discuss the research results and model developed for this research with existing studies to provide a better understanding of key price determinants at a local level.

### 6.2 Research Methodology

The mixed methods approach to research which includes both social enquiry and numerical analysis forms the basis of this research. Better understanding of house price performance at different levels and drivers affecting local house price differences are obtained from the use of multiple approaches and methods of investigation. This research adopted explanatory type mixed use research methodology (QUAN -> QUAL), in which quantitative and qualitative data analysis strategies are combined. The benefit of mixed method techniques is the ability to match the purpose of the method to the need in the study. The capacity to triangulate the data and assure its validity and level of variance are also invaluable (Migiro and Magangi 2011). Quantitative analysis is adopted in the first stage of the research to examine and compare house
price performance at different levels and then analyse the relationship between local house price performance and macroeconomic factors to demonstrate if local house prices can be explained by macroeconomic factors. The second stage of the research uses qualitative analysis to explain drivers for local house price differences. The rationale is that the quantitative data and their subsequent analysis provide a general understanding of the research problem. The qualitative data and their analysis refine and explain those statistical results by exploring participants’ views in more depth.

For research methods, this research adopts case studies as a research strategy. A case study explains a social phenomenon through a thorough analysis of an individual case which cooperates with the research aim. This research is aimed at explaining drivers causing local house price differentiation. The case study approach seeks to understand the problem being investigated. It provides the opportunity to ask penetrating questions and to capture the behaviour (Kumar 2005). As more than one case study is selected and no sub-unit is identified for each case study, the holistic multiple case design was adopted for this research.

Based on the intended mixed method explanatory design for this research, the secondary data for quantitative analysis are collected from public and private reputed agencies including ABS, REIV and RBA. Quantitative data analysis comprises mainly the analysis of numerical data using a variety of statistical techniques with specific reference to descriptive and inferential techniques. Standard deviation and correlation coefficient analysis are both used to analyse the performance profile of house prices at different levels. Descriptive statistics allow researchers to summarise large quantities of data with the intention of discovering trends and patterns (Bryman 2006, Burns 1997). Based on the quantitative analysis results, four case studies were selected and each case study includes two Melbourne suburbs located adjacent each other to control the distance variable, but have a different price performance profiles which facilitates the testing of independent variables.

Qualitative analysis is developed subsequent to the quantitative research outcomes to investigate factors influencing local house price differentiation. The primary data collected for the qualitative analysis are obtained from semi-structured interviews of property professionals including real estate agents, valuers and town planners. The analysis process is first to summarise the interview results based on the effect of each factor to house price differences. This is to provide an overview of impact of each factor on house price performance through
the evidence of each case study. The results were then cross examined through all four case studies and further co-referenced with price performance, annual price return and price volatility to provide comprehensive analysis on the price performance profile. The analysis results identified drivers and determinants for local price differences.

To address the research aim and objectives, this research has been structured and undertaken based on the research design established. Table 6.1 shows the research process and objectives achieved at each stage.

Table 6.1 Research Process, Objectives and Outcomes

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<thead>
<tr>
<th>Research Design</th>
<th>Process</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1</td>
<td>To provide research background and statement of problem</td>
<td>Research problem was identified</td>
</tr>
<tr>
<td>Introduction</td>
<td></td>
<td></td>
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### Chapter 5 Qualitative Analysis

<table>
<thead>
<tr>
<th>To explain causes and drivers for local house price differentiation. <strong>(Objective Three)</strong></th>
<th>Each factor had a different effect on local house price performance and the influences can be both direct and combined.</th>
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<tr>
<td>To better understand key housing price determinants at a local level. <strong>(Objective Four)</strong></td>
<td>This research not only examined factors affecting median house price performance, but also factors affecting average annual price return and price volatility.</td>
</tr>
</tbody>
</table>

### Chapter 6 Conclusions, Implementation and Recommendations

| To provide a summary of research findings, research implementation and recommendations for future research. | This research has successfully identified drivers for local house price performance. Research results provide better understanding of house price differences at local level. |

#### 6.3 Research Findings

Based on the results from both quantitative analysis and qualitative analysis, this section provides a summary of the research findings that directly reflect the objectives established at the beginning of the research.

**Objective One: To examine the relationship between house prices at different levels – local to country/city/local level**

In the quantitative phase of the research, statistical analysis was performed on Melbourne residential property market data (1996 – 2016). Three price performance measurements were examined across 202 Melbourne suburbs to assist case study selection. The price performance measurement includes:

i. Performance of median house prices – median house price data was collected from REIV on a quarterly basis between 1996 and 2016 and analysed on an annual basis.
ii. Performance of average annual price returns – price returns were calculated on an annual basis based on median house prices.

iii. House price volatility – price volatility was analysed using the established GARCH model.

Standard deviation was then applied to each house price measurement listed above for all 202 Melbourne suburbs. Standard deviation is the measure of the spread of data from a mean value. The mean and standard deviation are two statistics that help determine differences and similarities in groups that are being researched. Standard deviation is the most widely used measure of dispersion for quantitative research (White and Millar 2014). This research used standard deviation to compare price performance of each suburb and to distinguish suburbs that ‘fall out’ of the standard deviation ‘normal range’. Suburbs with ‘normal standard deviation range’ are defined as suburbs with standard deviation between -1 and +1. Then this research plotted the ‘unusual’ suburbs on the map to provide an overview of the location of ‘unusual’ suburbs and found there is an inconsistency in house price performance at a local level between suburbs. I.e. suburbs located next to each other which showed different price performance, price return and/or price volatility profiles.

Based on the results from the standard deviation analysis, a total of eight suburbs (four pairs) that had different price performance were selected across different locations of Melbourne and compared in pairs. These locations were: Hawthorn vs Kew; Broadmeadows vs Glenroy; Altona Meadows vs Laverton; and Box Hill vs Mont Albert. The case study selection criteria were suburbs located next to each other, but with different price performance profiles.

After the case studies were selected, the research used a 3 year moving correlation coefficient test to examine and compare the relationships of house price performance at different levels, namely local to country level, local to city level and local to local level. The aim of the correlation coefficient test was to identify if there exists differentiation in house price performance across different price levels. The results are summarised below:
Local Parameters of Housing Prices: Melbourne Residential Market

i. Local to Country House Prices

The price correlation between individual suburbs and Australian house prices changed overtime and each suburb appeared to have a different overall correlation trend. Even though two suburbs were located next to each other, the price correlation between two locations could be different. For example, when comparing Laverton median house prices to Australian median house prices, there was a decrease in price correlation from 0.8 in 2000 to -0.1 in 2002, whilst during the same period, the price correlation between Altona Meadows and Australia remained at an historical high of 0.9.

Interestingly, when the housing market was placed under significant stress, such as during and after the Global Financial Crisis, the price performance of individual suburbs appeared to perform in line with Australian house prices and the price correlation between the two levels were highly correlated. For example, the price correlation between Altona Meadows and Australian house prices increased from 0.3 in 2007 to 0.9 in 2008. This was consistent with the price correlation results of Laverton and Australia which increased from 0.3 in 2007 to 0.9 in 2008.

The correlation results for this section suggested local house prices can perform differently to Australian house prices (country level) during certain periods and that there was a degree of price heterogeneity in local housing markets when the correlation between individual suburbs and Australian house prices was low.

ii. Local to City House Prices

In line with the findings from previous section, the price correlation between individual suburbs and the Melbourne median house prices changed overtime and each suburb appeared to have a different overall correlation trend. However, there were certain periods where the price correlation between individual suburbs and Melbourne house prices is different to the price correlation between individual suburbs and Australian house prices. For example, the price correlation for Box Hill increased from 0.2 in 1996 to 0.6 in 1997. However, during the same period, Mont Albert experienced the opposite trend with price correlation decreasing from 0.5 in 1996 to -0.1 in 1997.
Again, when the housing market was placed under significant duress, the price performance of individual suburbs appeared to perform in line with Melbourne house prices. For example, during and after the Global Financial Crisis, the price correlation between Box Hill and Melbourne house prices increased from 0.5 in 2007 to 0.9 in 2008. This was consistent with the price correlation results of Mont Albert and Melbourne which increased from 0.5 in 2007 to 0.8 in 2008.

The correlation results for this section suggested local house prices can perform differently to Melbourne house prices (city level) during certain periods, even if suburbs are located next to each other. This further supported the conclusion from the previous section that there was a degree of price heterogeneity in local housing markets.

iii. Local to Local House Prices

The price correlation between two suburbs within the case study appear to fluctuate and perform differently to each other throughout the years with sometimes positive correlation and sometimes negative correlation. For example, between 1999 and 2002, Altona Meadows experienced 23% price growth whilst Laverton experienced a 0.3% price reduction. The different price growth resulted in a -0.2 correlation in 2002. Interestingly, across all case studies, the price correlation between two adjoining locations often reached to its highest level under duress. For example, immediately after the Global Financial Crisis, the price correlation reached 0.9 between Altona Meadows and Laverton, 0.7 between Mont Albert and Box Hill, 0.9 between Broadmeadows and Glenroy and 0.8 between Hawthorn and Kew. The results further suggested suburbs located next to each other can perform differently from each other during certain periods while performing in line with each other at other times.

Comparing the results from country, city to local level, the research concluded that when market conditions are unstable, such as during GFC, local house price performance follows the national trends. When under normal market conditions, there is a differentiation in house price performance across different levels. Most importantly, this research highlighted, during certain periods, the house price at a local level can perform differently between locations, even though those locations are geographically similar.
Objective Two: To investigate the relationship between local house prices and macroeconomic factors

After examining the relationship of local house prices to the house prices at country, city and other local levels, this research found house prices at each level performed differently from each other. In order to further demonstrate the causes of such price differentiation, correlation coefficient tests were applied between local house prices and eight economic variables on an annual basis between 1996 and 2016 to identify if macroeconomic factors can explain local house price differences. This research found the correlation between each macroeconomic factor and local house prices is different, sometimes being positively correlated and sometimes being negatively correlated. This differentiation appeared to vary across different locations. Nevertheless, the overall price correlation between macroeconomic factors and local house prices ranged between -0.5 to +0.5 which is considered weak. The results highlighted that the relationship between local house prices and macroeconomic factors, such as interest rates, household income, GDP, CPI is not significant.

The results are also in line with inferences from the literature reviews. For example, Tu (2002) highlighted the importance of analysing the regional housing markets given the Australian housing markets, at a sub-national level, are highly segmented. As such a national housing price model would fail to represent housing price dynamics of regional cities. Likewise Otto (2007) examined the house price performance of Australia’s capital cities and found it was not possible to identify successfully a common set of economic factors to explain house price growth rates at a city level. Therefore, there is a degree of price heterogeneity in regional housing markets supporting the contention that individual models are necessary for each city. This is consistent with the results concluded by Klyuev (2008), who tested the US housing market and suggested that at a regional level, house prices can deviate from their equilibrium values for certain periods of time and the deviation can be affected by factors rather than from national level. In conclusion, the housing markets are segmented at a submarket level. Therefore, by estimating house prices using a national price model, it will produce the estimations subject to aggregation bias (Adair et al. 1996, OECD 2005, Mark and Goldberg 1998). However, there has been limited research on examining the relationship of macroeconomic factors at a local level.
The results from this research further fill the research gap and examine macroeconomic factors at a local level. Based on the data analyses, the research concluded macroeconomic factors overall had a limited effect on local house price performance. The results also highlighted house prices are segmented at the local level and local house price differences are unexplainable by macroeconomic factors. This suggested microeconomic factors could be the key the local house price differences.

For objective One and Two, quantitative analysis of secondary data successfully demonstrated price relationships between different price levels. The results suggested that individual suburbs performed at different growth rates compared to country or city levels. Most importantly, this research concluded, during certain periods, house prices at the local level can perform differently between locations, even though those locations are geographically similar and such differentiation is not significantly affected by macroeconomic factors.

**Objective Three: To analyse key local housing market drivers**

The objective of the qualitative research was to investigate the potential reasons behind the phenomena resulting from the quantitative analysis and to provide insights on the market drivers at a local level. A series of semi-structured interviews were conducted with different property professionals including real estate agents, property valuers and town planners (total 24 participants) to provide opinions on local housing market drivers for each case study.

Qualitative analysis was undertaken to explain the following objectives:

i. To understand the effect of local factors identified in the literature review on house price performance for each case study.

ii. To examine how local factors had contributed to price differences at the local level during a specific time period.

Based on the literature review, at a microeconomic level, factors affecting local house price performance are summarised into five major themes: transportation, neighbourhood characteristics, social characteristics, schools, and planning regulations. The five major microeconomic themes were cross examined with three price performance measurements –
median house price, average annual price return and price volatility. The results are summarised in Figure 6.1.

Figure 6.1 shows each local factor contributed to house price performance either directly or combined with other factors. Black lines indicate factors that have direct impact on price measurement, whilst coloured lines indicate factors that have combined impact on price measurement. Direct impact included factors such as ranking of schools or neighbourhood facilities. For example, a high ranking school can positively contribute to price performance and proximity to industrial sites may adversely affect house price performance. The results are consistent with findings from literature reviews. Apart from direct impact, the contribution of each factor to the house price performance can also be combined with other factors. For example, if a location has transportation that provides direct access to high ranking schools, then house prices can be positively affected by a combination of transportation and schools. Or if a location with high socio demographic and a restricted planning policy is in place, then house prices can be positively affected by combination of social influence and planning regulations. However, the results varied between locations and each factor had different impact on local house price performance depending on the nature and characteristics of the suburb. A summary of the effect of each factor on house price performance is listed in the following section:
Theme One: Transportation

The effect of transportation on house price performance was mixed between case studies. For suburbs well serviced by public transport, the effect of transportation on house price performance is not considered important simply because residents can access the same regardless of which suburb they live in. Even though sometimes, the type of transport services may vary (i.e. bus, tram or train), as long as the coverage provided by available services are identical, then transportation does not affect house price differences between close locations significantly. For example, Hawthorn has tram, bus and train services, whilst Kew does not have a train service, but the availability of tram and bus services in Kew provide similar coverage to the train services in Hawthorn. Then house prices are unaffected by differences in the type of transportation available respectively between suburbs, in this case, absence of a train service in Kew.

Interestingly, even though there is a difference between availability of transportation between locations, the significant difference in socio economic background between locations and easy access to transport in nearby suburbs would make residents ‘give up’ transportation and consider social as a more significant factor when choosing a place to live. For example, Laverton has two train stations and Altona Meadows has none, but the availability of two train stations in Laverton did not attract price premium to Laverton’s house price performance. A key reason was the difference in social background between the two suburbs. Laverton is considered to have a lower socio economic demographic than Altona Meadows. Therefore, residents would place a higher weight on social characteristics than public transportation when choosing a location to live, simply due to the desirability for lifestyle.

Transportation appears to affect the house price performance when such transportation can save travelling time for local residents, such as having an ‘express service’. Transportation also affects house price performance when such transportation provides direct access to education facilities located along transport corridors, as parents may not need to pick up or drop off their children during school hours as they can take public transportation. For example, as several tram services in Mont Albert provide direct access to high ranking primary/secondary schools located in surrounding suburbs, it could be assumed that parents would want their children to be able to travel safely and directly to the schools without driving them. Therefore, parents are
looking for suburbs along the public transportation corridors. Such factors contribute to the house price premium for Mont Albert.

**Theme Two: Neighbourhood Characteristics**

Neighbourhood characteristics are classified into two sections. On the availability and quality of neighbourhood amenities point view, house prices are not affected by the difference in neighbourhood amenities. This is because residents can consider the respective utility of the amenity against the concerns of distance to it and there is no restriction on accessibility to the amenities, if the amenities are not located in the suburb they live in. However, if there are undesirable elements such as industrial sites developed nearby then the proximity to theses undesirable elements would have an adverse effect on house prices and further affect price volatility as market buyers are uncertain about buying into that location. For example, after the Western Ring Road opened, more industrial sites were developed in Laverton North. Laverton North is an adjoining suburb to Laverton and the proximity to undesirable facilities, in this case industrial properties, would reduce the value of property in Laverton. This is seen as the cause for a 3% decrease in house prices in Laverton between 2000 and 2003. The uncertainty of market buyers buying into Laverton would also provide elevated volatility in price performance during that period. House prices in Laverton fluctuated from a 10% increase in 2001, followed by 15% decrease in 2002 and then a 2% increase in 2003. In addition, from a neighbourhood aesthetic point of view, suburbs with more heritage appearance or higher quality construction have a positive effect on house prices.

**Theme Three: Social Characteristics**

Differentiation in social background is considered as one of the most important factors leading to house price difference between two locations across all case studies. People tend to live in a location with people having similar social background as themselves, whether it be similarity of income or demographic. People tend to prefer a location they feel familiar with and that social attachment may drive up house prices in that location. The fundamental is that people would pay more to live in socio ethnic groups that are similar to them – social segmentation. For example, Broadmeadows is seen as a State housing commissioned suburb and there is a stigma associated with it. The social background for Broadmeadows is more of investors or renters. Whilst Glenroy is a more established suburb that comprises a majority of owner
occupiers. The difference in social background caused buyers to pay a premium to live in a location with the population similar to themselves, in this case Glenroy.

**Theme Four: Schools**

When there is a high ranking school located in a suburb, house prices are positively affected. Interestingly, while private schools are not restricted by school zones, to be able to walk to the preferred private schools is also a key driver for parents to purchase property in that location. For example, Kew has more highly ranked private and public primary/secondary schools than Hawthorn and school is one of the major factors affecting house price difference between the two suburbs. The availability of high ranking schools in Kew attracted a lot of parents seeking better education for their children, therefore they are willing to pay a premium.

Apart from the direct effect of schools on house price performance, the research also found there is a relationship between the school factor and social factors when choosing a location to live. For example, if none of the suburbs have a high ranking school, the difference in social background would have an effect on people’s choice for schools as parents would want their children to grow up with other children of similar social background and that social difference causes the parents to resist a location. Hence the house price performance of a suburb is adversely affected by low socio economic demographic population that put pressure on schools. For example, Laverton is recognised as having a lower socio economic demographic than Altona Meadows. Parents in Altona Meadows may hesitate to send their children to schools located in Laverton because of the social background and demographic of Laverton. Therefore, parents would pay a premium to separate their children from a suburb with a different socio demographic population.

**Theme Five: Planning Regulations**

The effect of planning regulations produced mixed results on house price performance across the case studies. When a suburb comprises a high socio economic demographic, by having a planning regulation that restricts development opportunity would provide a premium on house price because residents tend to pay more to live in low density neighbourhood. For example, Mont Albert is considered as having a high socio economic demographic and the local council restricts multi-unit development in the neighbourhood which contributes to a premium to house price.
prices. Buyers who buy in Mont Albert are buying for residential amenity to be retained and not live near high rise residential towers. Residents would want houses and neighbours they can feel familiar and comfortable with.

For other suburbs, having a planning policy that encourages high density development would have a positive effect on price return. This research found the development potential can be closely linked with transportation. For example, Laverton has two train stations and the local authority encourages high density development around transportation. Based on those two facts, Laverton is seen as a ‘golden’ place for developers/investors. However, Altona Meadows on the other hand was established in more recent times and the houses are relatively new and most of the properties in Altona Meadows have restrictions on multi-unit development. Therefore, the development opportunity in Altona Meadows is relatively limited. Planning policy that encourages multi-unit development in Laverton and availability of train stations are keys for Laverton to have an overall higher price return than Altona Meadows.

**Objective Four: To better understand key housing price determinants at a local level**

Whilst previous research focused on the effect of a single factor to median house price performance, this research focused on examining a combination of factors not only on median house price performance, but other price measurements like average annual price return and price volatility. Results are summarised in the following section:

*Median House Price*

The median house price is affected by either positive or negative factors. Figure 6.2 provides a summary of factors affecting median house price performance.
As Figure 6.2 summarises, the positive factors affecting median house prices include high ranking schools and better neighbourhood environment. If two locations comprise different socio economic demographics, median house prices are positively affected by higher socio economic demographic as people with high socio economic demographics would pay a premium to live in a location with similar social background to themselves. Median house price is also positively affected by a combination of factors, such as high ranking schools and transportation. For example, if none of the suburbs have a high ranking school, then the location that can provide direct transportation access to high ranking schools located in nearby suburbs would attract more demand.

Median house prices are negatively affected by neighbourhood environment which have a low quality of street appeal or located in close proximity to an undesirable facility (e.g. industrial sites). In addition, if a location comprises a low socio economic demographic, then median house prices are adversely affected by low socio economic demographics. Median house prices are also negatively affected by a combination of factors, such as social and school factors. Low socio economics would put pressure on school factors as parents would try to avoid living in a location that have low socio economic demographics because they would want their children to go to the same schools as other children who have a similar social background as themselves. Although school in this case does not have a direct negative effect on house prices, the hesitation from parents for a location with low socio economic demographic would adversely affect demand for that location.
Average Annual Price Return

Unlike the number of factors affecting median house price performance, the number of factors that identified to have an effect on average annual price return and price volatility in this research are rather limited. Figure 6.3 summarises the factor affecting average annual price return.

Figure 6.3 Factors Affecting Average Annual Price Return

This research concluded no single factor is identified to explain the difference in average annual price return, rather a combination of two factors – planning regulation and transportation. Excluding suburbs with high socio economic demographics, if local council encourages high density development for a location, then that location would have a development opportunity which would lead to a higher price return as the land is worth more if multi-unit dwellings can be built. This research found such development potential tends to be closely linked with transportation.

Price Volatility

Figure 6.4 Factors Affecting Price Volatility
Figure 6.4 summarises the factors affecting price volatility. From a price volatility point of view, if there are undesirable facilities such as industrial sites developed in a nearby location, then the proximity to those undesirable facilities would have an adverse effect on house prices and further affect price volatility as market buyers are uncertain about buying into that location. For example, for owner occupiers, they would not want to live near industrial sites, however, investors are less affected in this case.

Most importantly, the quantitative results concluded from this research suggested there were certain periods during which house prices between two local suburbs performed differently to each other, either being positively or negatively correlated. To provide a comprehensive understanding of local house price differences, this research cross examined the Australian census data with interview results and further triangulated with price correlation results, and found significant differences in local house price performance between two locations for a particular period of time could be the result of changes in local factors. For example, change in neighbourhood facilities including proximity to undesirable industrial sites would decrease the demand for that location and further influence the price volatility. Furthermore, change in socio demographic would increase the demand for that location and hence positively affect price growth. If a suburb experienced growth in high socio demographic population, then by having restrictive planning policy on high density development would also positively affect price growth. In addition, for non-high socio demographic suburbs, changes in local planning policy that encourage high density development would place up pressure on price growth.

6.4 Conclusions

The performance of housing prices has drawn significant attention from the policy makers, investors, home owners and researchers. House prices are often reported at either macroeconomic level or microeconomic level. At microeconomic level, there has been nominal attention on examining the effect of local factors on house price performance at a local level, especially locations that are located close to each other.

Although this research does not quantify the impact of local factors on housing price movement, the findings still form an important insight into local house price determinants. The proposed multidisciplinary approach to the study reflected the complexity of the way submarkets segmented based on a variety of microeconomic factors. This research therefore contributed to
an understanding of house prices at the local level in two main areas: i) contribution to body of knowledge and ii) contribution to property industry.

iii. Contribution to body of knowledge

As noted in the literature review (chapter 2), there are limited studies on house price determinants at a local level, especially in Australia. International studies appear to focus on examining one or two local factors on house price performance with nominal attention on examining the combination of local factors. In review of all identified local factors to the effect of house price performance, the results of this research expanded the body of knowledge and provided a better understanding of local market operation and determinants. In addition, by further examining the relationship between local house price performance and macroeconomic factors, this research provided insights into local housing market dynamics, in particular, it lends strong support to the hypothesis that microeconomic factors cause local house price differentiation.

The research is unique in its access to the extensive REIV data base. The sales information collected include number of transactions and median house prices on a quarterly basis for 547 Melbourne suburbs from 1996-2016. This level of local sales data created a point of difference from previous research pages which focused on national/city markets.

The quantitative investigation included extensive data analysis which covered detailed visual, descriptive analysis and correction modelling. This extensive and time consuming approach highlighted interesting performance differences across local markets which appeared not to be covered in previous academic research.

To further support the research, risk measurements were undertaken to divide the local Melbourne residential markets into different performance profiles based on the standard deviation statistics. The variations in local residential market performance have not previously been examined in the housing literature.
iv. Contribution to buyers/investors

Housing is often considered as a major investment and a significant financial asset. It is important to understand determinants of local house prices in respect to individual buyers and investors as the latter becomes a relatively high proportion of the population owning residential property. In Australia, almost 70% of the total of Australian household assets is in the housing form. Australia also has relatively high homeownership rates in the world at 68% (ABS 2015, RBA 2015). This research provides a platform for understanding the influences on buyers and investors’ decisions based on historical data and ultimately improved recording of key price determinants at a local level.

In highlighting different risk profiles of local residential markets, special focus was made on variation between markets in close vicinity to each other. The research explored four residential market pairs with diverse risk profiles. The in-depth understanding of house price determinants in these case studies was achieved through interviews with local government planners, valuers and real estate agents with expert knowledge on the selected paired housing market.

It is no doubt that a better understanding of the relationship between local factors and house price performance will help buyers or investors to identify and address issues that were attributable as factors to residential property house performance and hence making better investment decisions.

6.5 Implementation

Existing studies have only examined one or two factors affecting local house price performance. This research analysed all identified factors and revealed that there is no single factor contributing to the difference in price performance, but a combination of factors and those factors tended to have a co-effect on each other and the degree of the effect varies across different locations. These results suggest that when making investment decisions, consideration of all factors and their effect should be taken into account and weighted differently depending on the outcome the investor wants to achieve. If high return is the aim, then suburbs with transportation and planning regulation that encourages high density development will be the
key more than socio demographic backgrounds. Owner occupiers may choose suburbs with better socio demographic and schools which may be more important than planning policy that encourages multi-unit development. If there is a recent change in local facilities that enhance undesirable development (industrial sites), then higher price volatility for that location may be expected.

This research further illustrated that the price performance of two suburbs could be very different even though those two suburbs are located close to each other. For example, if two suburbs are located next to each other, location with low socio demographic would expect a lower median house price and location with high ranking schools or better street appeal would expect a higher median house price. In addition, a location with transportation and planning policy that encourages multi-unit development would expect a higher return. These results further suggest that locations that are geographically similar do not necessarily represent similar price performance. Therefore local characters should be taken into consideration when making investment decisions.

Moreover, existing studies only revealed the effect of local factors on one price measurement such as median house price performance or price return. This research has analysed the effect of local factors on different price measurement – median house price performance, price return and price volatility. For example, a suburb with better living environment and high median house price does not necessary mean it will achieve higher return as return does not necessary relate to social and neighbourhood quality. On the other hand, a suburb with higher price growth than nearby suburbs does not necessary mean it is a better place to live as price return could be the results of properties sold with development opportunity. The results suggest different factors had a different influence on price measurement and this research recommends when making investment strategies, median house price performance might not be the sole index for buyers or investors, it is also critical to look at other indicators, such as average price return and price volatility to justify investment decisions.

### 6.6 Further Research and Recommendations

Although the results of this research are extensive, there are limitations which can lead to further research opportunities. The timeframe and the number of variables included in the research are necessarily limited. The research examined the house price performance from
1996 which included the most prolonged price boom (1996-2008). However, the significant house price booms started in the early 1970s (Abelson and Chung 2005). To test the accuracy of the hypothesis and to compare them with historical trends, a longer timeframe is suggested for future analysis.

This research aim was achieved from historical data or past decisions made based on economic situations and individual preferences at that time, therefore, the research results can only be seen as reference and guidance for future decisions, not actual prediction of house prices as the economic growth outlook remains uncertain. This can be expanded further by scenario analysis looking at trend of changes of local factors in order to predicate the potential future growth.

This research covered the geographical area of Metropolitan Melbourne, Australia. The scope was therefore limited to specific locations and how well those findings transfer to other locations’ context should be reviewed. However, data sourced from public and property organizations presented sufficient explanation on selected determinants. It is recommended that a study of enlarged magnitude needs to be conducted. Nominal research has been done on local housing market determinants in Australia and this research should be treated as an initial step and be expanded to different cities which have a range of social and economic structures.

The method used for this research provided findings with an explanation of parameters affecting local house prices across various locations. However, to test the accuracy of the results, it is necessary to develop the model using different statistical techniques, data composition and research models.

This research is aimed at examining the interrelationship between local determinants and housing price performance, not quantifying the impact of each determinants to housing price movement. The quantification impact can be examined and investigated in future research.
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APPENDIX

Semi-structure interview questions
Local Parameters of Housing Prices: A Case Study of Melbourne Residential Property Markets

Semi-Structured Interview Guide Questions – Kew vs Hawthorn

Information on Interviewee
1) What is your knowledge of location? Hawthorn and Kew
2) What is your role/experience in the real estate industry?

Location of Kew and Hawthorn (Local boundary)

Background
Kew and Hawthorn Housing performance

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<th>Kew</th>
<th>Hawthorn</th>
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<tr>
<td>Housing Price</td>
<td>One of the highest median price suburbs +2SD</td>
<td>Within the normal price range +/- 1 SD</td>
</tr>
<tr>
<td>Housing Price Performance</td>
<td>One of the highest annual price growth suburbs +2SD</td>
<td>One of the highest annual price growth suburbs +1SD</td>
</tr>
<tr>
<td>Housing Price Volatility</td>
<td>One of the highest price volatility suburbs +2SD</td>
<td>Within the normal market volatility range</td>
</tr>
</tbody>
</table>

3) Can you think of any reasons why there was a price performance differentiation between two suburbs?
4) When comparing volatility of the two suburbs, Kew is more volatile than Hawthorn. Can you think of any reasons, which may affect the price volatility?

![Volatility Graph](image_url)

5) In above three years, the house price performed differently to each other? Why? Can you think of any factors/policy that may be effect the price difference?

**Background of Kew and Hawthorn**

<table>
<thead>
<tr>
<th></th>
<th>Kew</th>
<th>Hawthorn</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public Transportation</strong></td>
<td>Tram and Bus</td>
<td>Train, Tram and Bus</td>
</tr>
<tr>
<td><strong>Neighborhood</strong></td>
<td>Kew Junction</td>
<td>Neighborhood strip shopping centre</td>
</tr>
<tr>
<td></td>
<td>Neighborhood strip shopping centre</td>
<td></td>
</tr>
<tr>
<td><strong>Social</strong></td>
<td>67% born in Australia</td>
<td>60% born in Australia</td>
</tr>
<tr>
<td></td>
<td>60% employed full time</td>
<td>62% employed full time</td>
</tr>
<tr>
<td></td>
<td>40% working as professionals</td>
<td>40% working as professionals</td>
</tr>
<tr>
<td><strong>School</strong></td>
<td>Kew High School</td>
<td>Hawthorn High School</td>
</tr>
<tr>
<td></td>
<td>(Top 50 public high school)</td>
<td>(not within the ranking)</td>
</tr>
</tbody>
</table>

*Source: ABS (2014)*

6) Do you think the house price difference between suburbs is affected by public transportation? Kew has no train station, but Hawthorn has?

7) Do you think house price differences between suburbs are affected by Neighbourhood characteristics (i.e. shopping mall, recreation, health, culture facilities). If yes, what are the neighbourhood characteristics in Kew that are different from Hawthorn?

8) Do you think the house price difference between suburbs is affected by social characteristics (i.e. residence average age, cultural background, affordability?). If yes, which social characteristics in Kew are different from Hawthorn?
9) In your option what are the key differences between the two suburbs? Can these points be ranked? (Transport, neighbourhood, social and schools)

Physical Boundary of Kew and Hawthorn

10) Do you think the house price difference between the two suburbs is affected by School factors (Kew High School, one of the top high schools in Melbourne)? If yes, when do you think the school factors start to take effect? Recently or historically overtime?

11) Will people give more consideration to the School over other factors when choosing to live in Kew?

12) What are the other factors affecting people buying in one suburb over the other? (other than we mentioned above 4 factors)

13) Can you think of any government policies including planning policies that may affect the price difference between Kew and Hawthorn?

14) Has the council constructed any new facilities in the suburbs that caused price differences? If yes, what year.

Town Planning Professionals

1) What are the planning policy/public facilities that in Kew is different from Hawthorn?

2) Can you think of any government policies including planning policies that may affect the price difference between Kew and Hawthorn?
3) The house price performance between two suburbs intend to be different in 1995, 2005 and 2010. Can you think of any policy/facility that may affect the price difference?

4) Is there any planning policy introduced in the past have effect on house price difference between Kew and Hawthorn? If yes, that are the policies? to what level of effect?

5) Has the council constructed any new facilities in the suburbs that caused price difference?

6) Is there any planning policy that may have effect on one suburb rather than the other?

7) In general terms, hawthorn and Kew is under same planning policy? No different? Then how about public / community facilities?
Local Parameters of Housing Prices: A Case Study of Melbourne Residential Property Markets

Semi-Structured Interview Guide Questions - Mt Albert vs Box Hill

Information on Interviewee

3) What is your knowledge of location? Box Hill vs Mont Albert? (eg Town Planner)
4) What is your role/experience in the real estate industry? (eg, more than 10 years)

Below is the locations of Mont Albert and Box Hill. Those two suburbs are located next to each other.

![Map of Mont Albert and Box Hill](source: google map (2014))

Below shows the housing performance of Mont Albert and Box Hill. As we can see, although those two suburbs are located next to each other. However, the price performance is very different.

<table>
<thead>
<tr>
<th></th>
<th>Mont Albert</th>
<th>Box Hill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing Price</td>
<td>One of the highest median price suburbs +2SD</td>
<td>Within the normal price range +/-1 SD</td>
</tr>
</tbody>
</table>
3) Can you think of any reasons why there was a price performance differentiation between two suburbs?

4) When comparing volatility of the two suburbs, Mt Albert is more volatile than Box Hill, can you think of any reasons, which may affect the price volatility?

Below shows the correlation of house price between two suburbs. As we can see in 1996, 2005 and 2012/14. The house price performance between two suburbs are different.

6) Can you think of any factors/planning policy that may be effect the price difference in those 3 years?

Below shows the background of Mont Albert and Box Hill.

<table>
<thead>
<tr>
<th></th>
<th>Mont Albert</th>
<th>Box Hill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Transportation</td>
<td>Train, Tram and Bus</td>
<td>Train, Tram and Bus</td>
</tr>
<tr>
<td>Neighborhood</td>
<td>Mont Albert Village Shopping Centre</td>
<td>Box Hill Shopping Centre</td>
</tr>
<tr>
<td>Social</td>
<td>69% born in Australia</td>
<td>42% born in Australia</td>
</tr>
<tr>
<td></td>
<td>5% born in China</td>
<td>20% born in China</td>
</tr>
<tr>
<td></td>
<td>58% employed full time</td>
<td>54% employed full time</td>
</tr>
<tr>
<td></td>
<td>42% working as professionals</td>
<td>29% working as professionals</td>
</tr>
<tr>
<td>School</td>
<td>Koonung Secondary College</td>
<td>Box Hill High School</td>
</tr>
<tr>
<td></td>
<td>(Top 50 public high school)</td>
<td>(Top 50 public high school)</td>
</tr>
</tbody>
</table>

*Source: ABS (2014)*
Do you think the house price difference between suburbs is affected by public transportation?
Do you think house price differences between suburbs are affected by Neighbourhood characteristics (i.e. shopping mall, recreation, health, culture facilities). If yes, what are the neighbourhood characteristics in Mt Albert that are different from Box Hill?
Do you think the house price difference between suburbs is affected by social characteristics (i.e. residence average age, cultural background, affordability?). If yes, which social characteristics in Mt Albert is different from Box Hill.
Do you think the house price difference between the two suburbs is affected by School factor? If so, why?
Will people give more consideration to the Social over other factors when choosing to live in Box Hill (population background).
In your option what are the key differences between the two suburbs? Can these points be ranked? (Transport, neighbourhood, social and schools)

Has those factors been changed over recent times?
What are the other factors affecting people buying in one suburb over the other? (other than we mentioned above 4 factors)
What are the planning policy/public facilities that in Mt Albert is different from Box Hill?
Can you think of any government policies including planning policies that may affect the price difference between Mt Albert and Box Hill?
Is there any planning policy introduced in the past have effect on house price difference between Mt Albert and Box Hill? If yes, are the policies? to what level of effect?
Has the council constructed any new facilities/going to construct any new facilities in the suburb/s that caused price difference?
In general terms, if Mt Albert and Box Hill is under same planning policy? No different? Then what do you think the major difference is between two suburbs?
Local Parameters of Housing Prices: A Case Study of Melbourne Residential Property Markets

Semi-Structured Interview Guide Questions – Laverton vs Altona Meadows

Information on Interviewee
What is your knowledge of location? Laverton vs Altona Meadows (Eg. Town Planner)
What is your role/experience in the real estate industry? (eg, more than 10 years)

Location of Laverton and Altona Meadows. Those two suburbs are located next to each other.

![Google Map of Laverton and Altona Meadows](image)

*Source: google map (2014)*

Below shows the housing performance of Laverton and Altona meadows. As we can see, although those two suburbs are located next to each other. However, the price performance is very different.

<table>
<thead>
<tr>
<th></th>
<th>Laverton</th>
<th>Altona Meadows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing Price</td>
<td>One of the lowest price</td>
<td>Within the normal price</td>
</tr>
<tr>
<td></td>
<td>suburbs -2 SD</td>
<td>range +/-1 SD</td>
</tr>
</tbody>
</table>
Housing Price Performance

<table>
<thead>
<tr>
<th>One of the highest annual price growth suburbs +2SD</th>
<th>One of the lowest annual price growth suburbs -2SD</th>
</tr>
</thead>
</table>

Housing Price Volatility

<table>
<thead>
<tr>
<th>One of the highest price volatility suburbs +2SD</th>
<th>Within the normal market volatility range</th>
</tr>
</thead>
</table>

3) Can you think of any reasons why there was a price performance differentiation between two suburbs?

4) When comparing volatility of the two suburbs, Laverton is more volatile than Altona Meadows, can you think of any reasons, which may affect the price volatility?


5) In above three years, the house price performed differently to each other? Why? Can you think of any factors/policy that may be effect the price difference?

Background of the Suburbs

<table>
<thead>
<tr>
<th>Public Transportation</th>
<th>Laverton</th>
<th>Altona Meadows</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Two Train Stations and bus (Aircraft &amp; Laverton)</td>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Neighborhood</th>
<th>Williams Landing Shopping Centre</th>
<th>Central Square Shopping Centre</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Social</th>
<th>47% born in Australia</th>
<th>60% born in Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>52% employed full time</td>
<td>60% employed full time</td>
</tr>
<tr>
<td></td>
<td>21% working as labourers</td>
<td>16% working as administrative workers</td>
</tr>
<tr>
<td></td>
<td>15% working as Technicians and Trades</td>
<td>15% Technicians and Trades</td>
</tr>
</tbody>
</table>

| School | Laverton College (not within the top 50 ranking) | Mount St. Joseph Girls College (not within the top 50 ranking) |
6) Do you think the house price difference between suburbs is affected by public transportation? 
Laverton has two train stations, but Altona Meadows has none?

7) Do you think house price differences between suburbs are affected by Neighbourhood characteristics 
(i.e. shopping mall, recreation, health, culture facilities). If yes, what are the neighbourhood 
characteristics in Laverton that are different from Altona Meadows?

8) Do you think the house price difference between suburbs is affected by social characteristics (i.e. 
residence average age, cultural background, affordability?). If yes, which social characteristics in 
Laverton is different from Altona Meadows.

10) Do you think the house price difference between the two suburbs is affected by School factor?

11) Will people give more consideration to the Transport over other factors when choosing to live in 
Laverton (two train stations).

9) In your option what are the key differences between the two suburbs? Can these points be ranked? 
(Transport, neighbourhood, social and schools)

12) What are the other factors affecting people buying in one suburb over the other? (other than we 
mentioned above 4 factors)

13) Can you think of any government policies including planning policies that may affect the price 
difference between Laverton and Alton Meadows?

Is there any planning policy introduced in the past have effect on house price difference between 
Laverton and Altona Meadows? If yes, that are the policies? to what level of effect?

15) Has the council constructed any new facilities in the suburbs that caused price differences? If yes, 
what year.

16) In general terms, if Laverton and Altona Meadow is under same planning policy? No different? 
Then what do you think the major difference is between two suburbs?
Local Parameters of Housing Prices: A Case Study of Melbourne Residential Property Markets

Semi-Structured Interview Guide Questions – Laverton vs Altona Meadows

Information on Interviewee
What is your knowledge of location? Laverton vs Altona Meadows (Eg. Town Planner)
What is your role/experience in the real estate industry? (eg, more than 10 years)

Location of Laverton and Altona Meadows. Those two suburbs are located next to each other.

Below shows the housing performance of Laverton and Altona meadows. As we can see, although those two suburbs are located next to each other. However, the price performance is very different.

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<td></td>
<td>-2 SD</td>
<td>=/-1 SD</td>
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Source: google map (2014)
Local Parameters of Housing Prices: Melbourne Residential Market

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4) When comparing volatility of the two suburbs, Laverton is more volatile than Altona Meadows, can you think of any reasons, which may affect the price volatility?


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<td>Neighborhood</td>
<td>Williams Landing Shopping Centre</td>
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<td>15% Technicians and Trades</td>
</tr>
<tr>
<td>School</td>
<td>Laverton College (not within the top 50 ranking)</td>
<td>Mount St. Joseph Girls College (not within the top 50 ranking)</td>
</tr>
</tbody>
</table>

Source: ABS (2014)
6) Do you think the house price difference between suburbs is affected by public transportation? Laverton has two train stations, but Altona Meadows has none?

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8) Do you think the house price difference between suburbs is affected by social characteristics (i.e. residence average age, cultural background, affordability?). If yes, which social characteristics in Laverton is different from Altona Meadows.

10) Do you think the house price difference between the two suburbs is affected by School factor?

11) Will people give more consideration to the Transport over other factors when choosing to live in Laverton (two train stations).

9) In your option what are the key differences between the two suburbs? Can these points be ranked? (Transport, neighbourhood, social and schools)

12) What are the other factors affecting people buying in one suburb over the other? (other than we mentioned above 4 factors)

13) Can you think of any government policies including planning policies that may affect the price difference between Laverton and Altona Meadows?

Is there any planning policy introduced in the past have effect on house price difference between Laverton and Altona Meadows? If yes, that are the policies? to what level of effect?

17) Has the council constructed any new facilities in the suburbs that caused price differences? If yes, what year.

18) In general terms, if Laverton and Altona Meadow is under same planning policy? No different? Then what do you think the major difference is between two suburbs?