Assessing the immediate and short term impact of flooding on residential property participant behaviour

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Key words

Natural disasters, floods, flood impact, residential property, property returns, buyer and seller behaviour, property sales.

Abstract

The past decade has seen an increase in the number of significant natural disasters that have caused considerable loss of life as well as damage to all property markets in the affected areas. In many cases these natural disasters have not only caused significant property damage, but in numerous cases, have resulted in the total destruction of the property in the location.

With these disasters attracting considerable media attention, the public are more aware of where these affected property markets are, as well as the overall damage to properties that have been damaged or destroyed.

This heightened level of awareness has to have an impact on the participants in the property market, whether, a developer, vendor seller or investor.

To assess this issue a residential property market that has been affected by a significant natural disaster over the past two years has been analysed to determine the overall impact of the disaster on buyer, renter and vendor behaviour, as well as prices in these residential markets.

This paper is based on data from the Brisbane flood in January 2011. This natural disaster resulted in loss of life and partial and total devastation of considerable residential property sectors. Data for the research has been based on the residential sales and rental listings for each week of the study period to determine the level of activity in the specific property sectors and these are also compared to the median house prices for the various suburbs for the same period based on suburbs being either flood affected or flood free. As there are 48 suburbs included in the study, it has been possible to group these suburbs on a socio-economic basis to determine possible differences dur to location and value. Data was accessed from realestate.com.au, a free real estate site that provides details of current rental and sales listings on a suburb basis, R.P. Data a commercial property sales database and the Australian Bureau of Statistics.

The paper found that sales listings fell immediately after the flood in the affected areas but there was no corresponding fall or increase in sale listings in the flood free suburbs. There was a significant decrease in the number of rental listings follow the flood as affected parties sought alternate accommodation. The greatest fall in rental listings were in areas close to the flood affected suburbs indicating the desire to be close to the flooded property during the repair period.

Introduction

As world populations increase a greater percentage of a country's land area is taken up with increased urban development and an increase in infrastructure requirements (Brand, 2011). Increasing population also results in an increase in the number of residential properties and commercial properties, often in areas that in the past have been considered unsuitable for urban development. This increased number of properties, development in marginal areas as well as changes in water collection and flows has led to the situation where; worldwide, commercial and residential property markets are becoming more exposed to the consequences of a flood natural disaster

A severe climatic or geological event that would have resulted in some inconvenience 50 years ago can now be a natural disaster in many cities and countries. Following such natural disasters there is often a tally of the cost of the disaster in respect to the number of lives lost, injuries and infrastructure replacement costs and the cost of damaged and destroyed property. However, the actual impact of such disasters on the minimally affected or nearby non affected property markets and consumer behaviour in those property markets is rarely quantified.

There have been a number of studies detailing the long term impact of floods on property markets on property prices and values (Proverbs 2006, Eves, 2002, 2004b, 1999), which have found that property values decrease immediately after a flood but within 3 to 4 years, the difference in price between flood affected and non-flood affected residential property values is minimal. These studies have also shown that in the 12 months following the flood event the differences in value between flood affected and non-flood affected properties in the same location can be up to 35%.

This paper will define natural disasters, provide examples of the extent and cost of the most severe natural disasters, with particular emphasis on flooding and finally analyse the impact of the 2011 Brisbane floods on 48 residential suburbs that were either flood affected or flood free during the 2011 flood event. Previous flood studies have tended to look at the long term impact of floods from a cost to repair, flood mitigation or long term impact on property prices. For the first time this paper has approached the issue of flood impact on residential property markets by analysing the short term behaviour of residential property participants immediately after a flood event. This is achieved by assessing the change in the number of residential properties listed for sale or rent immediately prior to a major flood event and for the 12 months following that event. These listings are compared on a suburb basis and include 24 suburbs suffering significant flood damage and 24 suburbs which were flood free but close to the flood affected suburbs, and in many cases adjoining the flood affected areas.

Defining Natural Disasters

A natural disaster has been defined as climatic or geological events that causes great financial and emotional hardship for individuals or communities and can lead to loss of life (Australian Government, 2007). A more precise definition is provided by Guha-Sapir et al (2004) being:

"*A situation or event of overwhelming local capacity, necessitating a request to the national or international level for external assistance, or is recognised as such by a multinational agency or by at least two sources."*

These natural disasters can also be defined by the extent of damage, loss of life or affectation. According to EM Dat (2012) to classify as a natural disaster the event must:

- Result in loss of life greater than 10
- A minimum of 100 people have to be affected
- A declaration of a state of emergency has to be declared

or

- A call for international assistance needs to be made.

Natural disasters can be weather or climate based or geological events. The climate and weather based natural disasters include floods, wind storms and drought related events, with the geological events being: earthquakes, volcanic eruptions and tidal waves. A detailed breakdown of natural disasters is shown in Table 1.

Statistics collected by Guha-Sapir et al (2004) show that during the period 1900 to 2003, there were a total of 9,000 events that could be classified as natural disasters and of these more than 80% actually occurred in the period 1973 to 2003

Since 2003, this increasing trend in natural disasters has been continuing, with some of the most severe climatic natural disaster occurring in the past 10 years, including the 2011 Japan earthquake and tsunami, Hurricane Katrina in 2005, the 2004 Indonesian earthquake and tsunami and the 2010 Haiti earthquake.

With increasing populations and the subsequent continued urban development, a severe climatic or geological natural disaster has the potential for increasing loss of life, injury and loss of infrastructure and property.

Table 1 Natural Disaster Types and Occurrence in percentages.

Flood Events	**Windstorms**	**Geological**	**Drought Related**
Floods (84%)	Storms (31%)	Earthquakes (83%)	Drought (58%)
Landslides (8%)	Typhoons (20%)	Volcanic eruptions (16%)	Bushfire (21%)
Mudflows (5%)	Cyclones (16%)	Tidal waves (1%)	Extreme temp.(21%)
Avalanches (3%)	Hurricanes (13%)	Tsunamis	
	Winter storms (9%)		
	Tornadoes (7%)		
	Tropical storms (4%)		

(Source: EM DAT 2012)

Cost of natural disasters

Figure 1 provides a list of the worst natural disasters based on insured and economic loss. This list varies significantly with Table 2, as natural disasters in countries with higher populations and less developed property sectors and infrastructure do not have the same level of economic loss compared to loss of life. The Venezuela floods ranks as one of the worst flood disasters in the past 20 years based on loss of life(refer to Table 2); but does not rank in the list of worst economic natural disasters, a similar situation applied to the 2004 tsunami in Indonesia which ranked as the 7th most severe natural disaster based on loss of life but also does not rank on the basis of economic loss, as the economic loss of this disaster was only US $14 billion compared to the $200bn in the Kobe earthquake in Japan in 1995.

Figure 1; Economic Cost of Natural Disasters.

Figures stated by EM DAT (2012) also confirm that over the past 30 years there has been considerable loss of life from major droughts in developing countries, but the actual economic loss in these drought disasters has not been as significant as the economic losses suffered in the more recent climate and geological natural disasters.

Figure 1 also confirms that the economic loss from earthquakes (including subsequent tsunamis) have been the most significant since 1965, representing a total of 10 of the most severe natural disasters from 1965 to 2011. During the same period floods resulted in five of the worst economic natural disasters and severe storms (hurricanes/cyclones) three of the most severe natural disasters over this time period.

According to Reibeek (2005), the average annual economic cost of a natural disaster as recently as the 1950s was only US$3.9 billion, but these costs have been increasing since the 1950s. Since 1970, there have been 14 years where the average annual economic costs of natural disasters has exceeded US$50 billion (Reibeek, 2005). This also reflects the growing and high levels of consumption and affluence in some of the regions affected.

It is also important to note that the worldwide economic cost of natural disaster during 2011 was estimated to be US$380 billion, with US$210 billion attributed to the Japan earthquake alone. Munich Re (one of the largest reinsurance companies in the world) states that the number of natural disaster due to geological events has been relatively stable since 1960, but the number of natural disasters due to climate factors has been increasing (New Scientist, 2012).

Table 2 Recent Worst Flood Disasters: Loss of Life

Total Population affected	Death toll (est)	Event	Location	Date
483,635	30,000	Flash flood	Caracas, Venezuela	December 1999
166,831	6345	Flood	Afghanistan	June 1988
67,000	6200	Flood	Hubai, Anhui , China	June 1980
32,000,000	3800	Flood	Nth East India	July 1978
238,973,000	3656	Floods and storms	China	August 1998

Source: Jonkman (2005)

A study by Chen (2004) found that cyclones have accounted for approximately 30% of all damage to residential property in the 20th century, followed by flood 20%, bushfires approximately 19% and hailstorms 11%.

Natural disaster in Australia

Severe natural disasters in Australia over the past 35 years have included fatal bushfires in Sydney, Canberra and Victoria, floods in Queensland, Brisbane and northern NSW, and cyclones in Northern Queensland. Each of these events has resulted in significant loss of life, extreme damage and costs associated with the damage to infrastructure, buildings and personal property.

Over the past ten years various residential property markets throughout Australia in general, and NSW in particular, have been subject to substantial natural disasters. These occurrences have included floods, bushfires and hailstorms. In extreme cases the actual rectification costs can be measured in the $billions for property losses alone and there is now additional losses in relation to global economies and stock markets in affected countries (Worthington, 2008).

Natural disasters such as severe storms and hailstorms have tended to be very indiscriminate in relation to frequency and the actual location of damage, whereas the nature of bushfire and flooding tends to be more defined, with risk prone areas more easily identifiable (Eves, 2002, 2004a, 2004b).

Although these extreme natural disasters tend to be infrequent, occurrences of floods and bushfires in residential property areas are becoming more common, particularly as urban sprawl encroaches closer to waterways, floodplains, National Parks, State Recreation Parks and State Forests.

Table 3 ranks these most severe natural disasters based on total damage costs, normalised to 2010 values. This table shows that during this period the most costly natural disaster based on 2011 prices have been the 2011 eastern Australian floods followed by the Newcastle earthquake. Damage from five of the most severe hailstorms have totalled $8.86 billion during the same period, followed by bushfires $4,466 million. Of these significant natural disasters, floods account for a total economic loss of $8.1 billion.

In all the discussion above the actual economic loss has been calculated on the physical loss of property (real estate and personal), cost to repair infrastructure and property and business losses. One aspect of a natural disaster that is not addressed in these stated losses is the short term response to the various participants in the residential property sector to these disasters.

Table 3: Natural Disasters in Australia: 1974-2011.

Year	Natural Disaster Event	Location	Normalised Loss (2011) (AUD$ millions)
2011	Flooding	Eastern Australia	5,600
1989	Earthquake	Newcastle	4,810
1974	Cyclone	Darwin	4,083
1999	Hailstorm	Sydney	3,691
2009	Bushfire	Victoria	2,643
1974	Flood	Brisbane	2,338
2010/2011	Earthquake	Christchurch	2,300
1985	Hailstorm	Brisbane	1,913
1983	Bushfire	Victoria/South Australia	1,823
1990	Hailstorm	Sydney	1,644
1973	Cyclone	QLD/NT/WA	1,286
1976	Hailstorm	Sydney	817
1986	Hailstorm	Sydney	794
1984	Flood	Sydney	738

Source: Sharechat, 2012, Australian Government, 2007; Victorian Government, 2010; Crompton and McAneney, 2008; NSW Fire Brigades, 2003; Department of Community Services, 2002.

Floods and property markets

Considerable work has been carried out on flood effects on property markets by Bell (1999), Donnelly (1988), Skrantz and Strickland (1987) in the US, and Chou and Shih (2001) in Taiwan. Fibbens (1994), Lambley and Cordery (1991) and Eves (2004; 2002) have carried out studies in relation to the effect of flooding on residential property values in the Sydney region, including the tracking of flood prone property values over time. The majority of these studies have indicated that a flood event will result in a ;loss in value for affected residential properties.

Studies by Tobin and Montz (1988, 1990, 1994 and 1997) provided a comprehensive review of the impact of floods on house sales and selling prices in a number of US locations. Results from the 1988 study confirmed that house prices decreased by up to 17% after the 1986 Yuba River flood and at the time of the analysis in 1988 the residential property market in the flooded locations had not returned to pre flood levels. The 1997 study was particularly enlightening, with the analysis covering a residential market that was subject to recurring flood events over a short period of time and the same area as the 1988 study. These results showed that floods have an immediate impact on residential house prices in the affected areas, with houses with slight flood damage recovering value quicker and with severe and prolonged flooding the market for affected houses can take up to 10 years to recover to similar levels to non flooded houses.

In Europe several flood studies carried out by Apel, Thieken, Merz and Bloschl (2004) and Merz, Kreibich, Thieken and Schmidtke (2004) addressed the issues of modelling flood building damage estimates and flood risk uncertainty assessment in Germany. These studies were predominately based on the prediction of possible flood inundation and damage due to levee breaches.

Kreibich, Thieken, Petrow, Muller and Merz (2005) analysed the residential property areas affected by the 2002 flood of the Elbe River. They surveyed building owners/occupiers to determine how flood prevention measures reduced the overall impact and damage on flood affected properties. This study found that flood prevention measures reduced building damage and that there was a 42% increase in building installing flood prevention measures after the 2002 Elbe river flood.

The more recent studies carried out by Lamond and Proverbs (2006), Lamond et al (2007) Eves and Brown (2002) and Eves (2004b, 2002) in the UK have shown that a flood will have its greatest impact on a residential property market in the first 12 months after the flood event but differences in prices between flooded and non-flooded properties would reduce over time and after 3 to 4 years of no further flooding house prices tend to be similar.

Lamond et al (2005) have also carried out comparative research of floods and housing markets in the US. This study has shown that the impact of flooding on house prices has varied significantly depending on the event and the location of the market, with price reductions of up to 30% and in a number of instances there was no impact on the residential property markets in the flood location.
These previous flood studies have focused on areas of price differences, values, risk management and models to predict market reactions to flood events in residential property markets. This study focuses on how the participants in the residential market react to flood events in respect to their sale and rental of properties in the 12 month period immediately after a major flood event.

Research Methodology

The study focuses on the Brisbane (Queensland) floods that occurred in January 2011. As previously stated the economic impact of this flood exceeded $AUD 5 billion (refer to Table 3).

This figure represents substantial portions of the residential markets in these affected Brisbane suburbs and therefore provides a sound basis to examine the impact of flood disasters on residential property markets and buyer/vendor/renter behaviour.

Data has been collected for the Brisbane flood event for the month prior to the event and the following 12 months after the event in respect to average weekly sales and rental listings and volume of sales. Sales data has been collected for the 12 months prior to the event and the 12 months after the flood.

Data for 48 suburbs was obtained for the study, with 24 suburbs being subject to extensive flooding and 24 suburbs being of similar residential property characteristics but not flood affected.. As there are currently 190 suburbs in the Brisbane Local Government Area the study area represents 25% of the Brisbane housing market. However, when considering only the flood affected suburbs the study covers over 95% of the suburbs that had significant flood damage.

Realestate.com.au was the data base used to determine the average number of sales listings and rental listings for each of the suburbs in the study. This data was collected on a weekly basis and used to determine an average weekly figure per month for analysis purposes. The volume of sales and average sales price for each suburb was obtained by analysing the RP Data sales database. This commercial data base records every residential property sale that occurs and allows these sales to be sorted based on property type, location, zoning and sales date. The data was analysed on a comparison basis between the non-flood and the flood affected residential suburbs. Australian Bureau of Statistics demographic census data was used to determine the socio-economic status of each of the suburbs. For this study suburbs of similar socio-economic status were compared to determine if the results varied depending on the type and value of the residential property in the various suburbs.

The data has been analysed to determine:

- The change in the number of average weekly residential property sales listings over the study period.
- The change in the number of average residential property rental listings over the study period
- Volume of residential property sales over the period and comparison with the previous 12 months
- Comparison of median price trends between flood affected and non-flood affected suburbs in Brisbane.

Results and Discussion

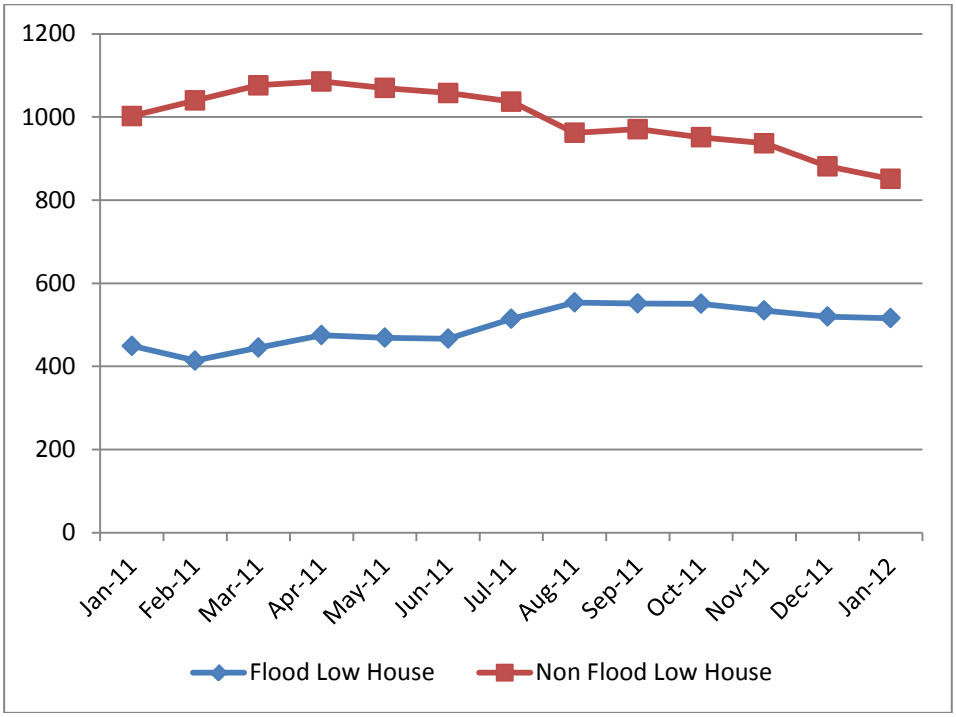
The research results will be discussed on a location basis with the conclusions providing a comparison between the various natural disasters and their respective property market performance. For this paper, the focus will be on free standing residential property, with some general comment on the residential unit market in the subject areas if applicable to the results. A full analysis of the residential unit/townhouse market in the subject areas will form part of another research paper.

Brisbane Floods

The Brisbane flood in January 2011 was the first major flood in Brisbane since 1974. The nature of the flood, although lower than the 1974 level, actually resulted in greater property losses compared to previous floods and this increase has been compounded by the significant increase in urban development from 1974 to 2011 in areas known to be affected by flooding.

For this study the results have been presented on the basis of the overall classification of suburbs on a value basis. In all, the study compares a total of 48 Brisbane suburbs, 24 suburbs that had flooding issues and 24 suburbs that were not flood affected in anyway. Not all houses in the flood affected suburbs were inundated. However, extensive media coverage of the flood made people aware that these suburbs were subject to flooding.

Figure 2:Socio-Economic comparisons: House Sale Listing Numbers (Volume) Low Value Suburbs

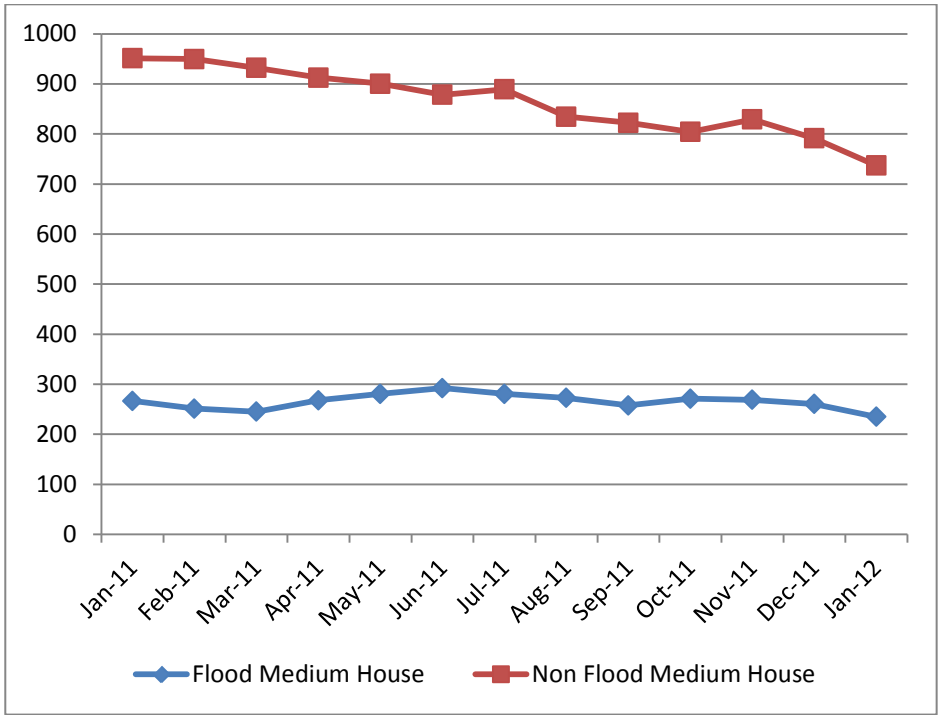


Sales listings Houses

Figures 2 to 4 show the average weekly residential house sales listings for the month prior to the floods and the following 12 months after the floods. Each figure compares listing for flood affected suburbs and non-flood affected suburbs. Although the suburbs were reasonably similar in relation to housing demographics, there was considerable less sales listings for the flood affected suburbs in the low to middle socio-economic areas but a higher number in the high socio-economic areas compared to residential sale listings in the flood free suburbs.

From Figure 2, it can be seen that in the month following the flood, there was a 7.8% drop in the number of sales listings in the low value flooded suburbs but a corresponding 3.8% increase in sales listings in the flood free suburbs. However, after one month the number of sale listings in the flood affected low value suburbs started to increase, with this increasing trend continuing until September 2011. During the first six months after the flood the percentage increase in weekly sales listings for the flood affected low value suburbs was 4% compared to 5.8% for the flood free suburbs From July 2011 the trend in sales listings declined for both sectors, with the flood affected sale listings falling 6.9% but a 19% decrease in sales listings for the non-flood affected suburbs. This decreasing trend in the non-flood suburbs also reflected the general softening of the Brisbane housing market over that period but also suggests that after the initial flood period a greater number of property owners were presenting their homes for sale in the flood affected low value suburbs due to limited financial resources to repair their properties or taking the opportunity to move to a less impacted suburb.

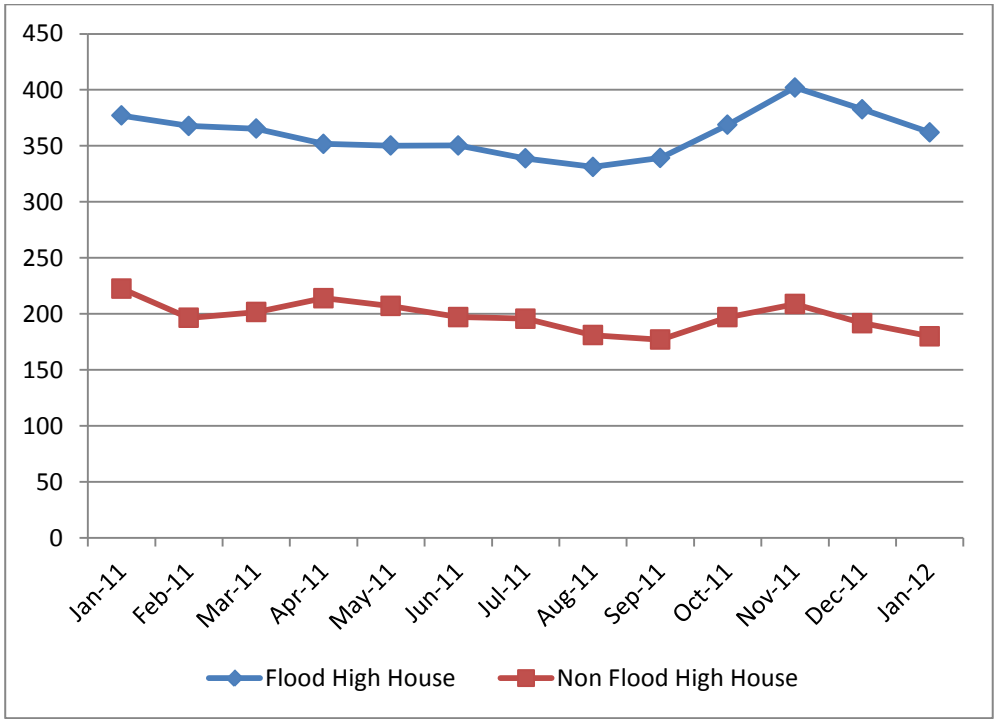
Figure 3: Socio-Economic comparisons: House Sale Listings Numbers (Volume): Middle Value Suburbs



In the middle value suburbs there was a decrease in sales listings for both flood affected and non-flood suburbs in the two months following the floods, a respective decline of 8.2% and 2.0%. Again, while the number of sales listing continued to decline for the non-flood suburbs throughout 2011, there was an increasing trend for property listings in the flood affected middle value suburbs. This again suggests that despite a softening of the residential property market, people in the flood affected suburbs were more anxious to sell.

Figure 4 shows the trend in house sale listings for the high value suburbs. Interestingly, the impact of the floods on sale listings was not as pronounced in these higher value suburbs compared to the lower and middle value suburbs. Both flood and non-flood suburbs showed a declining trend in sales listings from January 2011 to September 2011, at which point both saw an increasing trend in sales listings. Figure 4 also shows that the trend in sales listing were very similar (although volumes were different), indicating that the decision to sell was more a market decision rather than the impact of the flood. Over the 12 month period, the decrease in sales listings for the high value residential flood affected suburbs was 3.9%, with the flood free high value suburbs recording a decrease in sales listings of 19.3%

Figure 4: Socio-Economic comparisons: House Sale Listings Numbers (Volume): High Value Suburbs



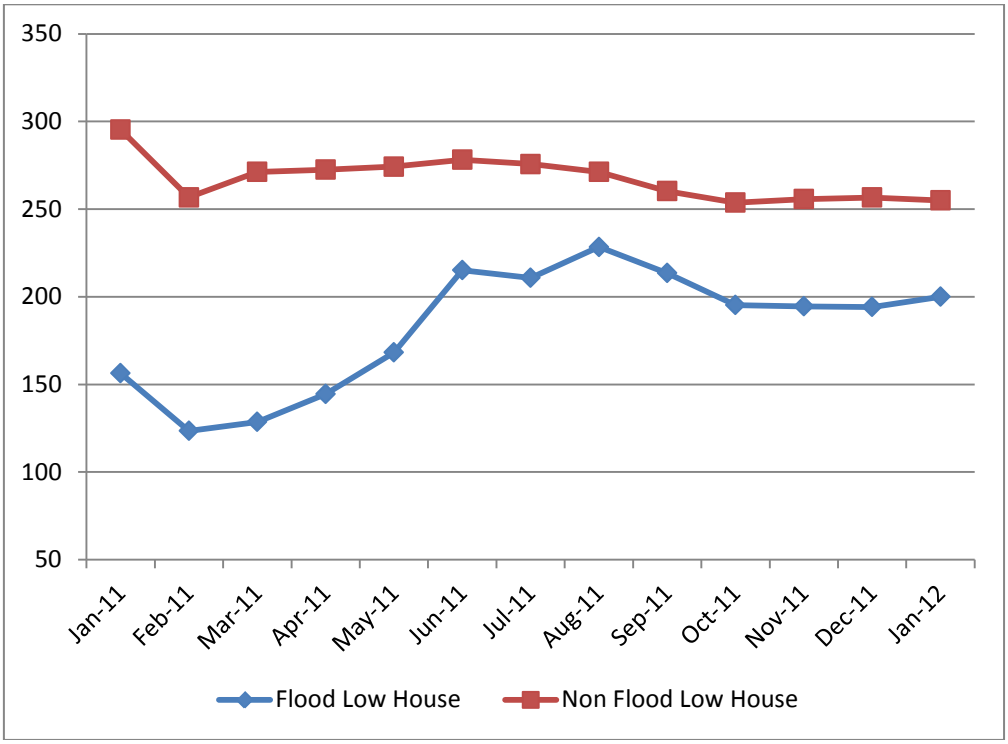
Rental Listings Houses

Any significant flood event causes housing stress for the affected parties, with a requirement to seek alternate accommodation pending repair to or sale of the affected house. Based on this assumption, it is expected that immediately after a severe flood there will be a decrease in the number of residential properties being offered for rent, as this short term housing demand issue is resolved.

Figures 5, 6, and 7 show the change in average weekly residential house rental listings, from January 2011 to January 2012, across suburbs in the study area. Regardless of the value status of the flood and non-flood affected suburbs, there was a decrease in the number of residential houses available for rent immediately after the flood (within one week). However, after the first week following the flood, the market reaction differed according to the socio-economic status of the suburb.

Figure 5 shows that in the first month following the flood there was a drop of approximately 50 house rentals in both non-flood and flood affected lower value suburbs, this was a 12.9% fall for the non-flood suburbs but 20.5% decrease for the flood affected suburbs. The significant percentage decrease in the flood affected suburbs can also be attributed to a number of the house listed for rent prior to the flood were actually damaged by the flood. However, after 2 months a considerably higher number of rental houses were listed for rent in the flood affected low value suburbs compared to a trend of declining house availability for rent in the non-flood lower value suburbs. This indicates people renting in these lower value flood affected areas took the opportunity to move to other areas after the flood rather than staying in flood affected suburbs. From October 2011, the trend in rental listings were very similar, indicating that the rental market had stabilised between the two sectors.

Figure 5: Socio-Economic comparisons: House Rental Listings Numbers (Volume): Low Value Suburbs



The impact of the floods on the middle value suburbs of Brisbane does not appear to be as significant as the low and high value suburbs. Figure 6 shows that while the volume of rental properties available in the suburbs was different, the monthly trend in rental listings was reasonably similar throughout 2011.

Figure 6: Socio-Economic comparisons: House Rental Listings Numbers (Volume): Medium Value Suburbs

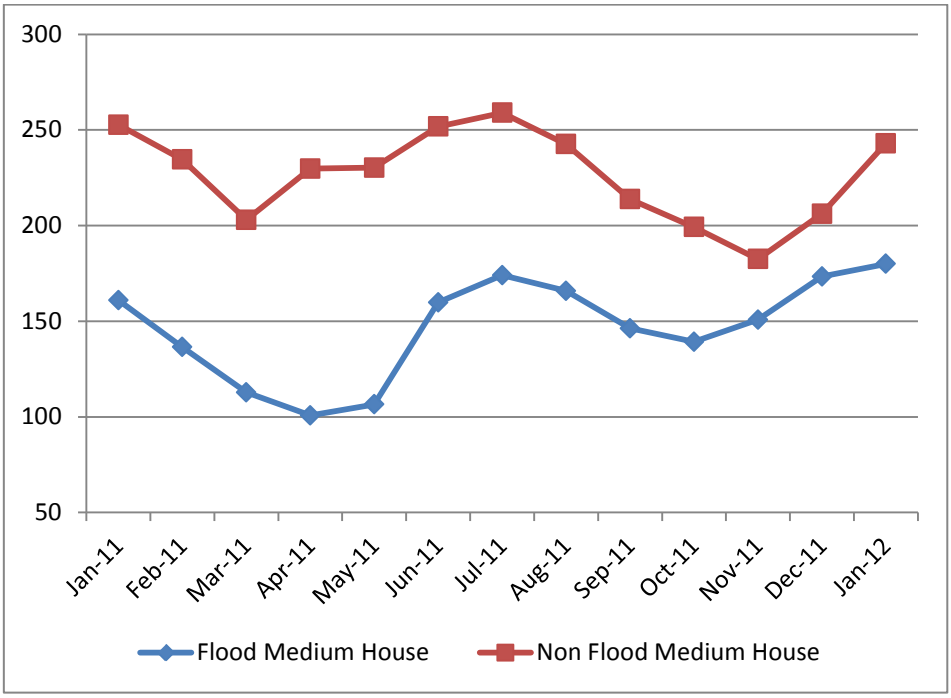


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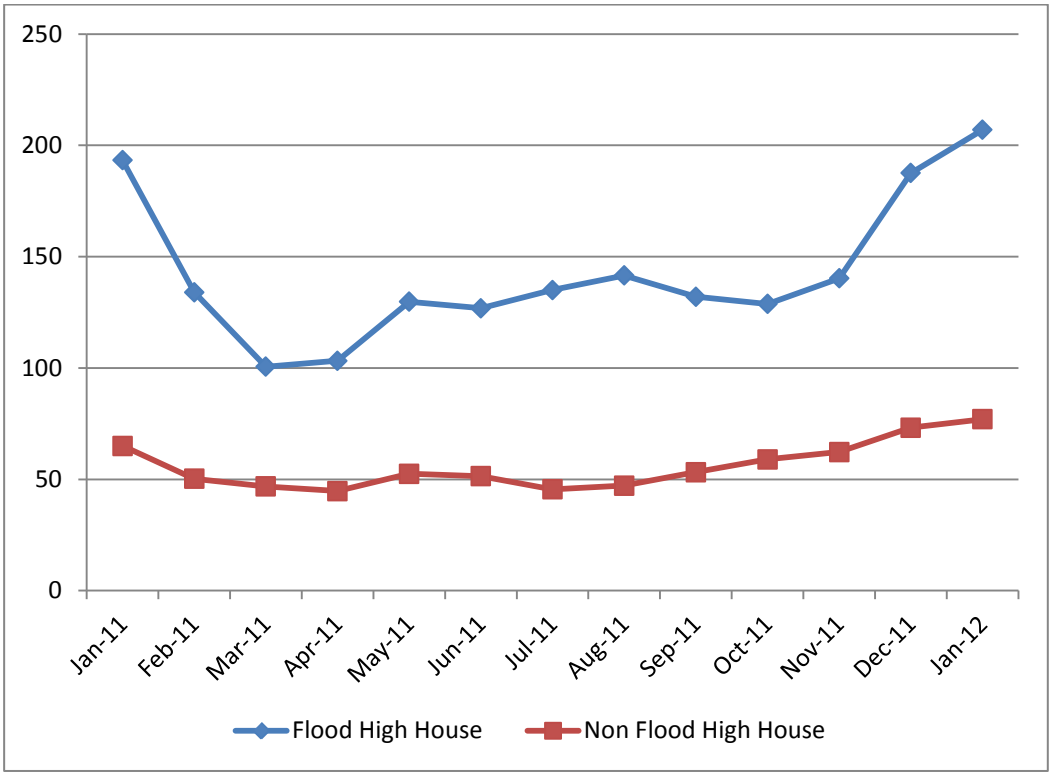
Figure 7: Socio-Economic comparisons: House Rental Listings Numbers (Volume): High Value Suburbs



The high value rental property market in the flood free suburbs has shown a relatively stable number of houses available for rent over the 12 months following the flood (refer to Figure 7), with rental listings showing .an 18.5% increase from January 2011 to January 2012. The rental listings in the flood affected high value suburbs increased by only 7.3%, but the monthly rental listings were more volatile.

However, in the two months following the flood, the number of houses available for rent in the high value flood affected suburbs decreased from a weekly average of 198 homes to 100 homes. This suggests that many of the home owners whose properties were flooded immediately sought nearby rental accommodation until their properties could be repaired.

It is also interesting to note that the number of rental properties being listed in all suburbs increased after 6 months from the flood, which would suggest that owners of the flood affected properties only took short term leases to cover the repair period for their own homes.

Median Price

Although the study compares suburbs that were subject to flooding and suburbs that were flood free, it is important to note that not all houses in the flood affected suburbs were actually affected in any way. However, based on previous studies by Proverbs (2006) and Eves (2004, 2006) the stigma of flooding can also have an effect on property in the immediate vicinity of the severe flood damage. In areas where the

flooding was widespread the impact on median house prices is consistent across the housing stock; however. If there was only a small section of the suburb affected the impact on the overall median price for that suburb would be limited. To avoid this issue only suburbs that suffered significant and extensive flood affectation were included in the study. This data has been presented on a quarterly basis to reflect the typical reporting cycles for this property asset class in Brisbane and to smooth the variations due to unequal sales volumes on a monthly basis.

Table 5: Brisbane Median House Price Comparison 2011.

2011	Low Flood	Low Non-Flood	Med Flood	Med Non-Flood	High Flood	High Non-Flood
Q1	423000	409333	597667	545667	882333	792333
Q2	327333	385667	620333	514000	816000	723333
Q3	345333	376000	584667	516000	750000	739333
Q4	388667	378000	608333	517000	741667	736000
2011 Return (%)	-8.12	-7.65	1.78	-5.25	-15.94	-7.11

Table 5 compares the change in the quarterly median price for houses in the study area for the 12 months following the flood. This table shows that the low value flood affected suburbs had a 22.7% fall in median house prices in the three months immediately following the flood. In this period the only sector that did not show a decrease in the median house price were the flood affected medium value suburbs. This can be explained to some extent in that there was more overland flooding with limited in house flooding in the middle value suburbs, whereas the flooding in the high value and lower value suburbs was generally into the houses causing minor to major structural damage. Flooding over the land only was predominately more nuisance than costly and the physical evidence of the flood was more quickly removed.
This table also shows that over the 12 month period following the floods there has been a general decline in the median house price for all sectors other than the flood affected medium value suburbs. This can be explained to some extent by the type of flood affectation across the flood prone suburbs. The higher value suburbs were all on or near the Brisbane River and the lower value suburbs affected by the floods were all in very low lying parts of Brisbane and these low lying areas covered a significant portion of the affected suburbs. Only parts of the medium value suburbs were close to the Brisbane River or low lying.

In the 12 months after the flood, the most significant difference in the median price between flood affected and flood free house prices has been in the high value suburbs of Brisbane, which recorded a fall in median price of 15.94%, compared to a decline of 7.11% for non-flood high value suburbs for the same period.

Actual sales in the various suburbs have also had an impact on the median price for houses in those areas. Table 6 compares the sales transaction volume between the flood affected and non-flood suburbs. In the case of the higher value suburbs, over the past 12 months, there have been 110 houses in the flood affected suburbs to 93 sales in the flood free suburbs. This contrasts significantly to the lower and middle value suburbs, where the sales in the flood free areas have been greater than sales in the flood affected suburbs (164/318 and 169/374 respectively).

Table 6 Sales Transactions Brisbane 2011

	2011/1	2011/2	2011/3	2011/4
Flood Total Houses	84	133	104	121
Non Flood Total Houses	177	237	194	177
Flood Low House	25	52	40	47
Non Flood Low House	72	102	84	60
Flood Medium House	29	49	39	52
Non Flood Medium House	81	113	87	93
Flood High House	30	32	25	23
Non Flood High House	23	23	23	24

Sales to listings

Figures 8 to 10 compare the number of residential house sales each month to the average weekly sale listings for that month across the suburbs in the study. These figures show that the trend in sales to listings has been significantly different across the various socio-economic areas of Brisbane.

Figure 8 shows that both the trend in monthly sales transactions has been virtually the same for flood free and flood low value suburbs over the past 12 months, despite the higher number of sales in the flood free suburbs. The actual percentage turnover in the low value suburbs has been as low as 4.2% to a maximum of 11.9% for the flood affected suburbs, with the flood free suburbs showing a minimum turnover of 3.95% and a maximum turnover of 12%.

Although the general trend in sales to listings has been similar in the middle value suburbs, the actual turnover to listings has been consistently higher in the flood affected suburbs compared to the non-flood suburbs.

Figure 8: Monthly Sales to Average Weekly Listings (%): Low Value Suburbs

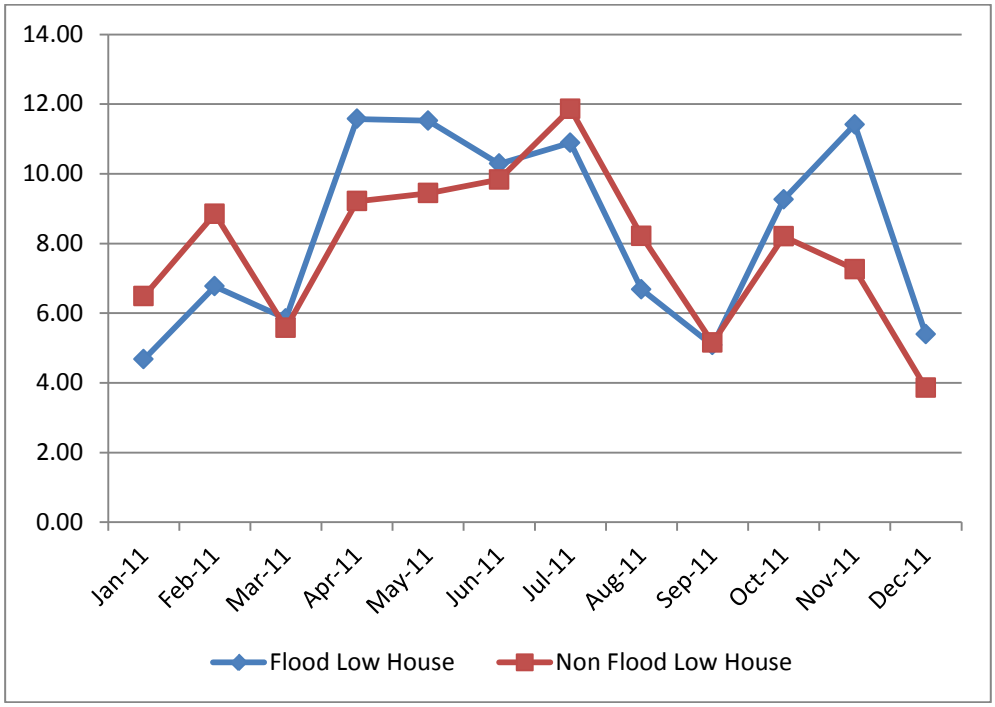


Figure 9: Monthly Sales to Average Weekly Listings (%): Medium Value Suburbs

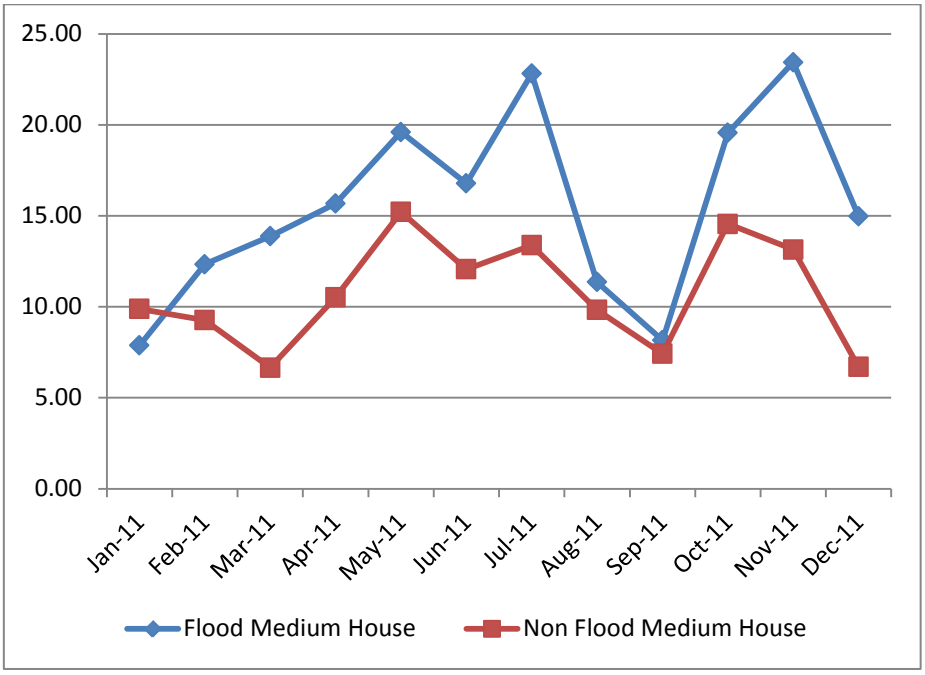
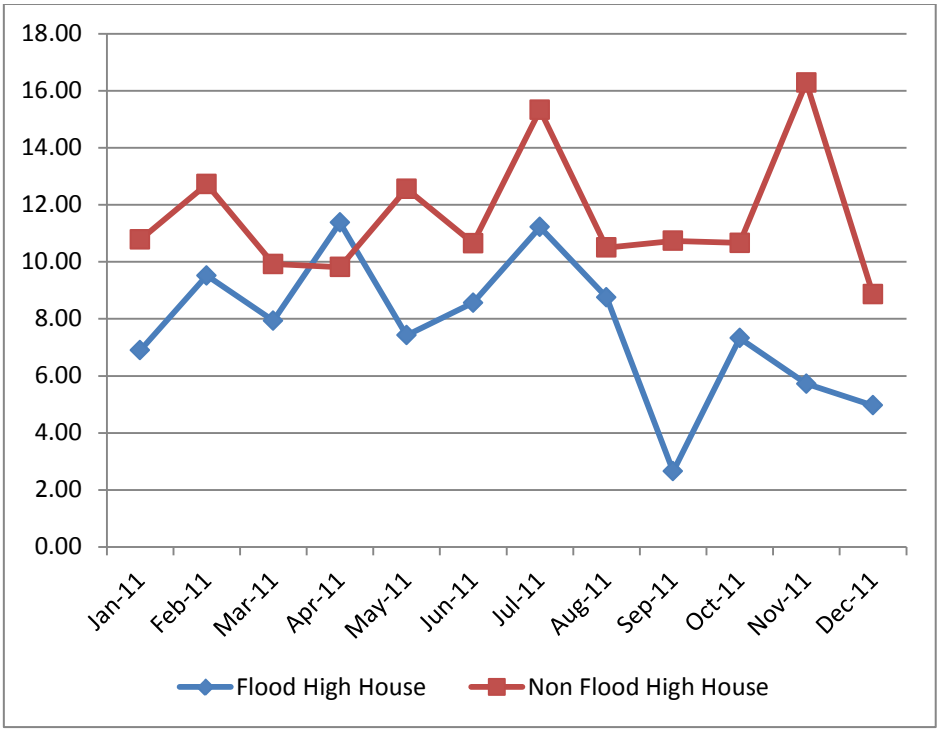


Figure 9 shows that over the past 12 months the sales to listing turnover for the flood affected suburbs in the middle value suburbs has been as low as 6.8% in January 2011, but this rate increased in each successive month to 20% in May 2011 and a year high of 23%. These sales to listings rates were nearly double the rates for flood affected properties in the low and high value suburbs.

Figure 10: Monthly Sales to Average Weekly Listings (%): High Value Suburbs



During the same period, the percentage rate of sales to listings in the non-flood middle value suburbs was consistently lower than the flood affected suburbs, with lowest conversion percentage of 5.7% in December 2011 and a highest rate of 15% May 2011. However, these rates were still higher than the low and high value suburbs for either flood free or flood liable residential property.

Figure 10 shows that the rate of sales to sale listings in the higher value suburbs has not been similar to the other property sectors. In the case of the higher value suburbs the predominant sales activity has been in the flood affected suburbs but the conversion rate of sales to listings has been much lower in the flood affected suburbs compared to the non-flood suburbs. In September 2011 sales in the flood suburbs were only 2.6% of average weekly listings for that month and the highest conversion percentage was 11.7%. In the flood free suburbs the highest conversion percentage was 16%, with a low rate of 8.5%

Conclusions

The main focus of this study has been to determine how residential property buyers, sellers and tenants have reacted in the 12 months following a significant flood event,. and to determine if their property market behaviours have been affected by the flood event and subsequent reporting of the event.
The results show that there is a significant impact on the number of properties being offered for sale immediately after the flood, with the volume of stock decreasing in the flood affected suburbs due to damaged properties being taken off the market. However, after 2 to 3 months the number of homes being listed for sale in the flood affected suburbs increases in a similar trend to the non-flooded suburbs, although volumes remain lower.

In cases where the damage from the flood is widespread, the impact on sale listings is consistent and results in an overall decline in listings until such time as major repairs are undertaken. This is particularly the case in the high value suburbs in Brisbane that were flood affected. These suburbs had the greatest degree of impact and the flood affects were more widespread and took longer to rectify than other suburbs. In these suburbs the percentage of sales to listings was significantly greater for the flood free properties compared to houses in the flood affected high value suburbs. The actual sales to listing percentages in the lower value suburbs for flood free and flood affected suburbs was similar, indicating that although there were lower numbers of property offered for sale in the flood affected suburbs, this did not result in a lower number of transactions, suggesting that buyers saw the reduction in median house prices as an offset to potential future flood damage.

Following the Brisbane 2011 flood, there was an immediate impact on the rental property market in all of the study suburbs. Rental property listings decreased immediately after the flood event as people sought alternate accommodation. The drop is more prominent in the higher value suburbs as these people generally have greater access to funds to rent, whereas the alternatives are not as great for house owners/renters in the lower value areas. The take up of rental units is greater than houses as the rental period is only for a short period not long term. After 6 months there was an increase in available rental property across all suburbs as those who rented while their own properties were repaired, moved back in.

The market response to the Brisbane flood has been very much determined by the location of the residential property. For flood affected homes in the higher value suburbs, owners tended to rent alternate accommodation while their homes were

repaired and did not put their damaged properties on the market. However, in the lower value suburbs, a greater number of flood damaged homes were listed for sale rather than repaired, this could also be due to a lower level of insurance cover in lower socio-economic areas or flood affected owners taking the opportunity to sell and move to flood free locations.

This study has been limited by the fact that not all suburb data was available for the 12 months leading up to the flood to assess the actual trends prior to the January 2011 flood. However, the study does provide a range of findings that would be applicable to residential housing markets in major cities and towns that are impacted by a significant flood event.

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