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THE IMPACT OF STAMP DUTY REDUCTIONS IN FIRST-HOME BUYER MARKETS – A WESTERN AUSTRALIAN CASE STUDY

Gregory J Costello

Curtin University of Technology

Perth, Western Australia.

Contact author for all inquiries

GPO Box U1987 Perth, Western Australia, 6845

Phone: +61 8 9266 7778

Fax: +61 8 9266 3026

Email: G.Costello@curtin.edu.au

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Abstract: *This paper examines the impact of changes in stamp duty in first-home buyer markets by focusing upon 2004 policy initiatives of the Western Australian (W.A.) State Government. The paper examines the impact of policy on demand in first-home buyer markets. Stamp duty is a taxation instrument that can be used by governments to intervene in housing markets by directly influencing the level of transaction costs to home buyers. The W.A. policy initiative acts to reduce stamp duty levels for first-home buyers. Did this improve housing affordability for first-home buyers in these markets? Other research questions analysed include whether the announcement of proposed stamp duty changes in the relevant price segments impacted upon demand for those segments prior to the effective date of reduced stamp duty rates and the impact on demand in these price segments after the policy introduction. How did the announcement impact upon prices in these markets before and after the introduction of the policy? How did the announcement impact upon specific regional housing markets and spatial sub-markets with more cheap housing opportunities? The paper uses data from the WA Valuation Land and Property Database for the period 1988-2005 to test these propositions in an empirical study.*

1.0 Introduction

On 7 May 2004 the Western Australian (WA) state government announced a set of specific policy incentives for first-home buyers to be introduced on 1 July 2004. The main thrust of the policy changes were either total conveyance-duty (stamp-duty) exemptions or significant reductions for specified price bands of housing and vacant land. The introduction of these policy incentives presents the opportunity for empirical research relating to the impact of the policy on both demand and prices in housing markets and the impact of new information on demand and prices within housing markets. This paper examines first how the May 2004 *announcement* of the impending policy change impacted on demand for housing prior to July 1 2004 and second how the *enactment* of the policy impacted on demand within the Perth housing market after July 1 2004.

The 2004 policy incentives targeted at WA first-home buyer markets can be summarised:

- First-home purchases of less than $220,000 became free of conveyance duty and a reduced rate of conveyance duty became available for first-home purchases up to $300,000.
- Purchases of vacant land by first-home buyers of less than $100,000 became free of conveyance duty and a reduced rate became available for purchases up to $150,000.[1]

2.0 Motivation and Related Literature

The introduction of these policy changes presents the opportunity to examine empirically the influence of an important housing policy initiative and the impact of important information or 'news' within a large urban housing market. With Australia having one of the world's highest levels of home ownership, a major proportion of Australian individual wealth is kept in the form of housing stock and a large proportion of personal consumption expenditure is devoted to housing. In this environment housing affordability is an important economic and political concern. During the period 2002-2006 information and commentary concerning housing markets in Australian capital cities has appeared frequently in the popular press and it is widely acknowledged that Australia has experienced a significant housing boom during this period. The housing boom has identified several areas of concern for housing policy and the general macro-economy. The issues of housing affordability and a potential 'generational wealth divide' caused by increasing house prices are topical subjects attracting frequent media commentary and political debate.

[1] In addition to stamp duty exemptions eligible first-home owners could also receive a first-home owner grant (FHOG). The FHOG had been in existence for some time and did not constitute new information.

Over the years a number of housing policies at State and Federal levels in Australia have been targeted at the expansion of home ownership. Under the Australian taxation system, stamp (conveyance) duty is a taxation instrument that can be used by state governments to intervene in housing markets by directly influencing the level of transaction costs to home buyers.

There is a considerable international literature examining the influence of taxation policies in housing markets. An established neo-classical view is that rapidly expanding housing markets are influenced heavily by demand for newer properties and effective housing policy should promote equilibrium in housing markets by stimulating supply of new housing since the short-run supply of housing is inelastic (Poterba (1984)).

It is important to acknowledge the wide variation in international practice in the use of taxation measures in housing policy. Wood (1990) discussed a number of taxation policy initiatives in European housing markets that were designed to encourage private sector investment and argued that these policies had the ability to benefit both rental and owner-occupied tenures. More recently, Berry, McGreal, Stevenson and Young (2001) examine the impact of taxation reforms in the Dublin housing market and acknowledge that significant increases on the demand side for housing are created by macro economic influences such as increasing population, employment levels, wages and low interest rates. In Ireland during the 1990's these demand forces exceeded the supply side response capacity with a resultant rapid increase in prices. It is in this environment that governments can either revert to fiscal policy or taxation measures to influence both demand and supply in housing markets.

In the UK much of the literature has focused upon the influence of the now defunct mortgage tax relief measures for owner-occupiers. Berry et al (2001) point out that this policy was largely ineffective, resulting in higher house prices and little change in the supply of housing. They argue that taxation measures such as increases in stamp duty offer an alternative mechanism to the use of interest rates in 'dampening' down speculative housing markets as occurred in Ireland during the 1990's.

This international variation in approaches to taxation policy in housing markets makes the 2004 WA policy initiatives an individual and somewhat unique case study. In contrast to other countries, Australia has never had a mortgage tax relief scheme for owner-occupiers and if such a scheme was to be introduced it would need to be promoted at a Federal level.

Stamp duty is a state based tax and in the 2000-2004 period the increases in stamp duty levels had been the focus of considerable media commentary and political debate in WA. The initiative to either exempt or significantly reduce levels of stamp duty for first-home owners within specific price bands represents an individual policy initiative with the potential to provide useful information on its effects in a number of urban and regional housing markets throughout WA.

These policy initiatives also provide an opportunity to examine how the introduction of important new information can influence both demand and prices in housing markets. The value and influence of information in asset markets has been a key theme in the finance literature since Fama's (1970) seminal contribution. This paper contributes to the considerable housing market efficiency literature (for a comprehensive review see Gatzlaff and Tirtiroglu (1995)). Efficiency in the real estate market is desirable for the same reasons that efficiency is desirable in other product or securities markets. If prices provide accurate signals for purchase or disposition of real estate assets then they facilitate the correct allocation of scarce financial resources.

The processes by which households exchange housing units over time and thereby move between different price and location segments is important in analysing housing market efficiency in the widest sense. This process encompasses important issues of informational, allocative and operational efficiency. The theory of efficient housing markets suggests that in an aggregate housing market, the information diffusion processes will exist whereby housing units can be exchanged with an absence of market failure in all price-location segments. The time lag (almost two months) between the announcement and the enactment of the 2004 WA policy provides an opportunity to conduct an instructive 'event' study as to how this information influenced changes in demand and prices both within first-home sub-markets and the aggregate Perth housing market.

3.0 The Empirical Study

These policy initiatives and the quality of data available for analysis provide the opportunity to complete an instructive empirical analysis of the impact of the policy initiatives on the demand for housing in the Perth metropolitan region.

3.1 Data and Methodology

The empirical study uses house sales for the period June 1988 to June 2005 for the entire Perth metropolitan region. This data was obtained from the WA Valuation Land and Property Database. This data service provides a rich source of micro-data, comprising a complete record of the demand side of the Perth housing market for the sample period. The empirical study focuses upon two key research questions:

1. Did the announcement of proposed stamp duty changes in the relevant price segments impact upon demand for those segments and in the aggregate Perth housing market prior to July 1, 2004?
2. What was the impact on demand in these price segments and in the aggregate Perth housing market post July 1?

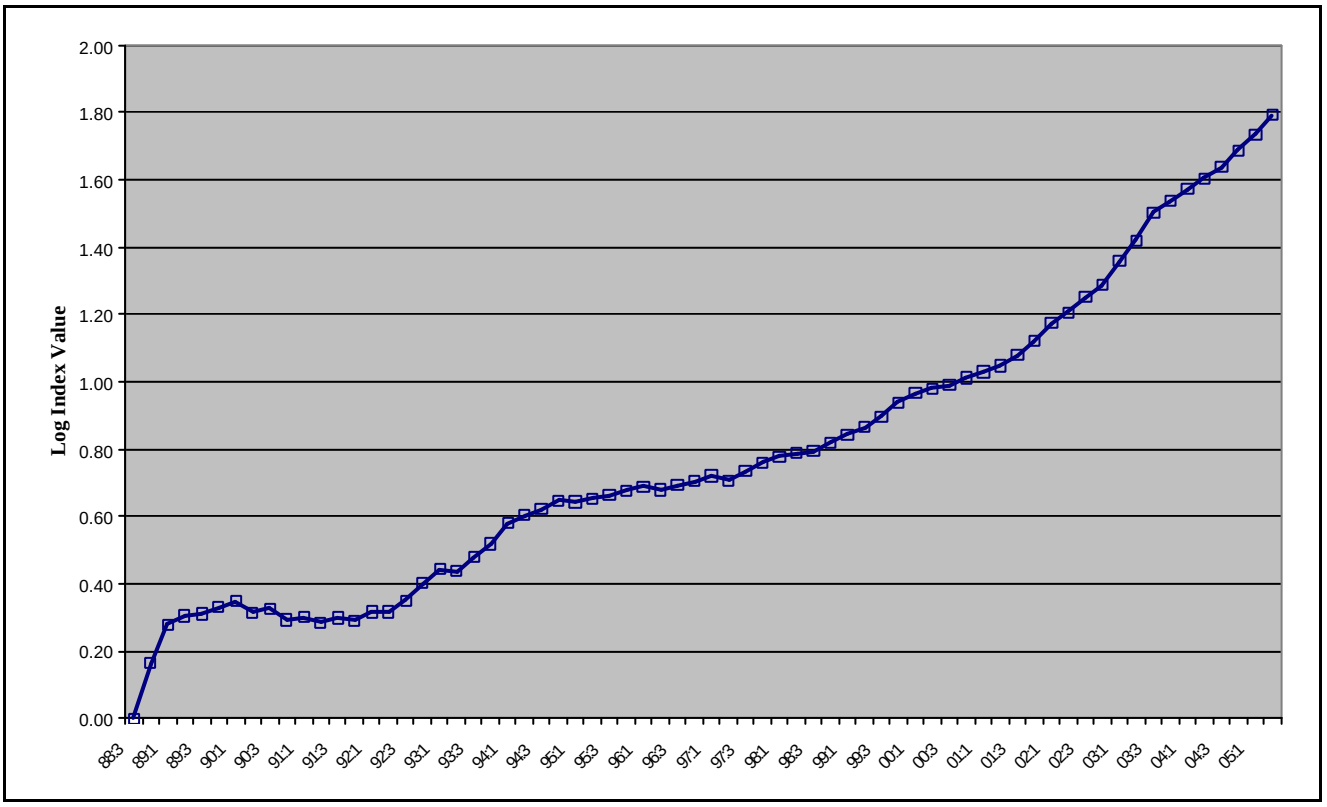
Assuming that participants in the Perth housing market acted rationally in response to the value of information then intuition suggests that it is likely that the announcement of the policy *prior* to enactment on 1 July would influence both the demand and supply of housing. In addition, it is likely that in some sub-markets a two-tier market might exist whereby different motivations existed for the different classes of market participants (first and non-first-home buyers and sellers). The *a priori* expectation is that after the policy announcement on 7 May, first-home buyers would be discouraged from purchasing prior to 1 July. This is due to the significant cash benefit in the form of reduced transaction costs available after 1 July.

Given these market conditions it is likely that demand for housing within the relevant price segments would decline in the period prior to 1 July. In a similar manner, sellers of these properties would be encouraged to defer sale until after 1 July when the impact of the policy might encourage buyers to pay higher prices since they were saving on transaction costs. Given this scenario and rational expectations it is likely that after 1 July there would be an increase in demand in first-home buyer markets.

An associated but less clear implication of the policy initiatives is the extent to which changes in demand in first-home buyer markets would impact on the aggregate market and other house price segments. The contingent nature of housing markets means that many individual sales are components of 'chains' of transactions. In this environment, first-home sales are an important part of these chains since many of these sellers are 'trading up' in the market. Changes in demand and supply in first-home price segments are likely to also impact on other price segments. For this reason the tests that follow include results for the aggregate market, first-home price bands and 'other' sales.

Research questions 1 and 2 above focus upon tests of change in demand in specific time periods either before or after 1 July 2004. To test these questions the research design uses a specific method of housing market disaggregation determined by price levels through the sample period. This involves deflating the relevant 1 July 2004 house price limit of $220,000 to identify comparable price segments through time that are the target of the policy initiatives. The deflation procedure uses a weighted repeat-sales (WRS) index constructed using the Case and Shiller (1989) method. This index model has been extensively applied to analysis of the Perth housing market in previous studies.[2] Chart 1 illustrates the trend of house price changes in Perth for the period 1988-2005 from the relevant house price index used in the deflation procedure.

Chart 1: House Prices Perth 1988 - 2005



[2] Costello (2000) provides a comprehensive overview of this index model with relevant index diagnostics.

The consistent increase in house prices in the period 2000-2005 is clearly evident in Chart 1. The relevant index numbers used in the deflation procedure are available in Table 1 and confirm that the increase in house price for the full sample period 1988-2005 is about 180% and in the five year period 2000-2005 about 83%.

The objective of this deflation procedure is to specify house price sub-markets through time that might be comparable to the 2004 target sub-markets for the policy initiatives. To identify a relevant price sub-market through the sample period the logarithmic WRS index is used as follows:

$$Pt = \frac{220{,}000}{\exp\left(WRS:Q3:04 - WRS:Qt\right)} \qquad (1)$$

Where:

Pt	is the deflated price level at quarter *t*.
WRS:Q3:04	is the constant logarithmic index level of 1.638 measured at quarter 3, 2004.
WRS:Qt	is the variable logarithmic level for the relevant quarter *t* where *Pt* is to be estimated.

Table 1 provides summary data for estimated index levels and first-home owner price bands through the sample period. As an example, from equation (1) the estimated first-home owner price band for Q3:03 to Q2:04 is estimated as follows: 192,000 ~ 220,000 / exp(1.638 – 1.502). Note that some small rounding adjustments are needed to round prices off to the nearest thousand dollars to reflect the reality of negotiated prices in housing markets.

Table 1: Perth house sales 1988-2005 summary data

Summary Data						Total sales moving average example			F Ratios	
Period	WRS Logarithmic Index Level	First-home Price band *1.*	Total Sales	First-home price band sales	Other sales	Moving average *2.*	Centred moving average *3.*	Φ Ratio Total sales *4.*	Φ Ratio First-home price band	Φ Ratio Other sales
88:Q3	0.000	43,000	7,450	714	6,736	6,728				
88:Q4	0.163		8,341	631	7,710	6,037	6,382	1.31	1.60	1.29
89:Q1	0.278		6,902	270	6,632	5,054	5,546	1.24	0.85	1.27
89:Q2	0.304		4,217	141	4,076	5,082	5,068	0.83	0.43	0.86
89:Q3	0.310	58,000	4,689	365	4,324	5,517	5,300	0.88	0.79	0.89
89:Q4	0.331		4,409	349	4,060	6,148	5,833	0.76	0.57	0.78
90:Q1	0.348		7,012	660	6,352	6,798	6,473	1.08	0.87	1.11
90:Q2	0.315		5,959	785	5,174	6,923	6,861	0.87	0.90	0.86
90:Q3	0.325	59,000	7,213	915	6,298	7,496	7,210	1.00	0.95	1.01
90:Q4	0.293		7,007	984	6,023	7,519	7,507	0.93	0.98	0.93
91:Q1	0.299		7,514	985	6,529	7,146	7,332	1.02	1.01	1.03
91:Q2	0.283		8,251	1,117	7,134	7,373	7,260	1.14	1.18	1.13
91:Q3	0.298	58,000	7,302	934	6,368	7,543	7,458	0.98	1.01	0.98
91:Q4	0.291		5,517	728	4,789	7,813	7,678	0.72	0.79	0.71
92:Q1	0.316		8,422	1,000	7,422	8,459	8,136	1.04	1.07	1.03
92:Q2	0.316		8,930	993	7,937	8,575	8,517	1.05	1.10	1.04
92:Q3	0.350	61,000	8,384	1,005	7,379	8,684	8,630	0.97	1.21	0.95
92:Q4	0.401		8,101	776	7,325	9,114	8,899	0.91	0.95	0.91
93:Q1	0.442		8,884	694	8,190	9,563	9,339	0.95	0.79	0.97
93:Q2	0.436		9,368	687	8,681	10,545	10,054	0.93	0.70	0.96
93:Q3	0.479	69,000	10,102	1,207	8,895	10,712	10,629	0.95	1.10	0.93
93:Q4	0.518		9,899	1,066	8,833	10,634	10,673	0.93	0.89	0.93
94:Q1	0.579		12,811	1,241	11,570	10,187	10,410	1.23	0.97	1.27
94:Q2	0.604		10,036	1,061	8,975	8,958	9,572	1.05	0.81	1.09
94:Q3	0.621	80,000	9,790	1,638	8,152	8,383	8,670	1.13	1.23	1.11
94:Q4	0.646		8,110	1,321	6,789	7,932	8,157	0.99	0.99	1.00
95:Q1	0.643		7,895	1,217	6,678	7,780	7,856	1.01	0.92	1.02
95:Q2	0.652		7,735	1,241	6,494	8,039	7,909	0.98	0.90	0.99
95:Q3	0.663	83,000	7,986	1,501	6,485	8,018	8,029	0.99	1.05	0.98
95:Q4	0.678		7,502	1,358	6,144	7,821	7,920	0.95	0.95	0.95
96:Q1	0.688		8,932	1,582	7,350	7,884	7,853	1.14	1.10	1.15
96:Q2	0.679		7,653	1,321	6,332	7,267	7,576	1.01	0.94	1.03
96:Q3	0.691	85,000	7,197	1,449	5,748	7,553	7,410	0.97	1.04	0.96
96:Q4	0.704		7,754	1,489	6,265	8,019	7,786	1.00	1.01	0.99
97:Q1	0.720		6,465	1,191	5,274	8,422	8,220	0.79	0.76	0.79
97:Q2	0.707		8,796	1,574	7,222	9,354	8,888	0.99	0.94	1.00
97:Q3	0.734	89,000	9,059	1,865	7,194	9,635	9,494	0.95	1.04	0.93
97:Q4	0.761		9,369	1,751	7,618	9,581	9,608	0.98	0.95	0.98
98:Q1	0.777		10,192	1,832	8,360	9,620	9,601	1.06	0.97	1.09
98:Q2	0.787		9,918	1,845	8,073	10,174	9,897	1.00	0.92	1.02
98:Q3	0.792	94,000	8,845	2,012	6,833	10,409	10,292	0.86	0.94	0.84
98:Q4	0.820		9,525	2,037	7,488	10,953	10,681	0.89	0.89	0.89
99:Q1	0.843		12,407	2,477	9,930	11,238	11,096	1.12	1.00	1.15
99:Q2	0.864		10,860	2,179	8,681	11,097	11,168	0.97	0.85	1.01
99:Q3	0.898	105,000	11,021	2,931	8,090	10,598	10,847	1.02	1.14	0.98
99:Q4	0.937		10,663	2,566	8,097	10,326	10,462	1.02	1.01	1.02
00:Q1	0.966		11,845	2,688	9,157	9,889	10,108	1.17	1.07	1.21
00:Q2	0.979		8,861	2,027	6,834	9,852	9,870	0.90	0.80	0.93
00:Q3	0.989	115,000	9,934	2,899	7,035	10,607	10,229	0.97	1.08	0.93
00:Q4	1.011		8,917	2,393	6,524	11,056	10,832	0.82	0.83	0.82
01:Q1	1.029		11,694	3,043	8,651	11,941	11,498	1.02	1.00	1.02
01:Q2	1.046		11,883	2,875	9,008	12,458	12,199	0.97	0.91	1.00
01:Q3	1.080	126,000	11,731	3,479	8,252	12,644	12,551	0.93	1.11	0.88
01:Q4	1.120		12,454	3,198	9,256	12,591	12,617	0.99	1.02	0.98
02:Q1	1.173		13,762	3,019	10,743	12,400	12,496	1.10	0.95	1.15
02:Q2	1.207		12,628	2,732	9,896	12,510	12,455	1.01	0.84	1.07
02:Q3	1.252	149,000	11,519	3,651	7,868	13,035	12,772	0.90	1.10	0.83
02:Q4	1.287		11,692	3,355	8,337	13,202	13,118	0.89	0.98	0.86
03:Q1	1.357		14,202	3,405	10,797	12,840	13,021	1.09	0.96	1.14
03:Q2	1.420		14,725	2,933	11,792	12,148	12,494	1.18	0.82	1.32
03:Q3	1.502	192,000	12,187	4,450	7,737	10,918	11,533	1.06	1.26	0.97
03:Q4	1.535		10,245	3,424	6,821	11,018	10,968	0.93	0.95	0.93
04:Q1	1.572		11,436	3,457	7,979	11,277	11,148	1.03	0.94	1.07
04:Q2	1.603		9,804	2,757	7,047	11,585	11,431	0.86	0.74	0.92
04:Q3	1.638	220,000	12,587	5,026	7,561	12,217	11,901	1.06	1.32	0.93
04:Q4	1.686		11,282	3,651	7,631					
05:Q1	1.734		12,667	3,562	9,105					
05:Q2	1.792		12,333	3,125	9,208					

Notes:

This table presents an example of the procedure used to construct variables used in statistical tests of seasonality and policy influences on demand. The data presented above is for the aggregate Perth housing market. In the statistical tests that follow in Table 2 the same procedure is followed for 19 local government authority areas and the data is 'stacked' to increase the explanatory power of the tests.

1. The first-home price band is derived by deflating the figure of $220,000 in 04:Q3 by the relevant change in the logarithmic index for the relevant quarterly period. A numerical example is included in the text.
2. The four period moving average (MA) for the first four quarterly periods; ((7,450+8,341+6,902+4,217)/4) = 6,728.
3. The centred moving average (CMA). For the first period; ((6,728+6,037)/2) = 6,382.
4. The ratio of transactions for a quarterly period to the CMA, is denoted as the variable Φ. For the first period, 8,341/6,382 = 1.31. This ratio Φ is used in parametric tests to test for statistically significant differences in sales volumes for quarterly periods. The periods 04:Q2 and 04:Q3 are shaded as these are the periods specifically tested to assess the impact of the policy initiatives.

Table 1 demonstrates how quarterly demand series are constructed according to the volume of transactions in the aggregate Perth housing market but if aggregate data is used there is a problem of a limited number of observations in the time series. This issue is overcome by further disaggregating the data into 19 spatial regions determined by Local Government Authority (LGA) and using a 'stacked' data procedure to improve the explanatory power of statistical tests by increasing the number of observations on the relevant quarterly periods of interest.

Before testing for changes in demand, seasonal and trend influences must be addressed. To recognise trend and seasonal influences in demand, a centred moving average (CMA) procedure is used to construct a variable Φ that is the ratio of the volume of transactions in a quarterly period to the CMA for the annual period. From Table 1, the new variable Φ can be used in parametric statistical testing methods to test whether demand in a quarterly period is significantly different than for other quarterly periods. Costello (2001) used similar tests to identify clear seasonal trends within the aggregate Perth housing market.[3]

After recognizing seasonal influences, research questions 1 and 2 focus upon measuring the impact on demand of changes in levels of stamp duty at 1 July 2004. The quarterly periods of interest for these tests are Q2:2004 and Q3:2004 (highlighted in Table 1). If the impact of events is as expected, demand in Q2 should be lower than for previous years and in Q3 demand should be higher. The variation in demand in these periods is also tested with the parametric one-sample *t* test. In these tests the ratio variable Φ from Table 1 is used to test the null hypothesis that the mean Φ for the relevant quarter (Q2 or Q3:2004) is the same as the mean Φ for the relevant quarters for the full time series 1988-2005 and also for a shorter time series 1999-2005. The results for these tests on seasonality and policy influences on demand are shown in Table 2.

[3] Costello (2001) identifies the first quarter (Jan-Mar) having the highest demand and the second and third quarters having the lowest demand. The fourth quarter is characterised by a distinct 'christmas effect' with a marked decline in demand during December.

Table 2: Seasonal and policy influences on demand

Part A: Tests for Seasonal Influences on Demand 1988-2005

Sample	Mean F all periods N	Seasonality One Sample *t* tests Mean Φ for Quarter *t* Q1 Mean F (t) df	Q2 Mean F (t) df	Q3 Mean F (t) Df	Q4 Mean F (t) df	One Way ANOVA F *Prob.* df
Full sample	0.991 1,216	1.066 (10.2)* 303	0.983 (-1.3) 303	0.976 (-2.6)* 303	0.939 (-6.4)* 303	58.5 0.00 1,212
First-home price band	0.964 1,216	0.940 (-1.9)* 303	0.864 (-7.2)* 303	1.094 (9.5)* 303	0.957 (-0.4) 303	48.4 0.00 1,212
Other sales	0.996 1,216	1.093 (12.2)* 303	1.018 (2.8)* 303	.938 (-9.8)* 303	0.936 (-7.2)* 303	99.4 0.00 1,212

Notes:
1. The variable Φ is the ratio of the volume of transactions in a quarterly period to the centred four period moving average. This procedure is explained more fully in Table 1.
2. The one-sample *t* test, tests the null hypothesis that the mean Φ for a quarterly sample is the same as the mean Φ for the full sample (mean Φ all periods).

* denotes statistical significance at a level of .05 or higher.

Part B: Tests for Policy Influences on Demand 1988-2005

Sample	Policy Influences One Sample *t* tests Mean Φ for Quarter 2: 2004 and Quarter 3: 2004 Mean F all Q2 periods N	Q2:04 Mean F (t) df	Mean F all Q3 periods N	Q3:04 Mean F (t) df
Full sample	0.983 304	0.855 (-13.9)* 18	0.976 304	1.044 (4.0)* 18
First-home price band	0.864 304	0.700 (-8.6)* 18	1.094 304	1.332 (5.5)* 18
Other sales	1.018 304	0.919 (-9.0)* 18	0.938 304	0.911 (-1.1) 18

Part C Tests for Policy Influences on Demand 1999-2005

Sample	Policy Influences One Sample *t* tests Mean Φ for Quarter 2: 2004 and Quarter 3: 2004 Mean F all Q2 periods N	Q2:04 Mean F (t) df	Mean F all Q3 periods N	Q3:04 Mean F (t) df
Full sample	0.981 114	0.855 (-13.7)* 18	0.987 114	1.044 (3.3)* 18
First-home price band	0.987 114	0.700 (-5.6)* 18	1.186 114	1.332 (3.4)* 18
Other sales	1.044 114	0.919 (-11.5)* 18	0.916 114	0.911 (-0.2) 18

Notes:
In Parts B and C the one-sample *t* test, tests the null hypothesis that the mean Φ for Q2 or Q3:2004 is the same as the mean Φ for the relevant quarters for the full time series 1988-2005 (Part B) and also for a shorter time series 1999-2005 (Part C).
* denotes statistical significance at a level of .05 or higher.

3.2 Results

Table 2 is arranged in three parts. The results in Part A are tests for seasonality, Part B for policy influences for the full sample period 1988-2005 and Part C reports results for similar policy tests on a shorter time series 1999-2005. The tests in Part C are used as a control group as it is possible that patterns of demand and/or relevant first-home price bands in the more recent boom period might vary from earlier market periods that are included in the full sample and this could distort results. The results are reported first for the aggregate market (full sample), then first-home price bands and finally non-first-home sales or 'other' sales.

The results in Part A confirm the previously established seasonal trends in the Perth housing market (Costello (2001)) but use a longer time series. Part A also extends previous results in that seasonal influences are identified for cheaper housing in the first-home price band and 'other' sales. Interestingly the seasonal pattern for cheaper properties is markedly different from that observed in the aggregate Perth housing market and for 'other' sales.

In contrast to the aggregate market, the highest demand period for cheaper homes is quarter 3 even though this is a significantly quieter period for the aggregate market and 'other' sales. Quarters 1 and 2 are characterised by low demand for cheaper properties and the results for quarter 4 are not significantly different than for all periods. Similar tests for seasonal influences were also completed for the shorter time series 1999-2005 used in Part C (results not reported) and very similar seasonal patterns were observed for all price segments.

These varying patterns of demand for cheaper properties are likely to be driven by investment activity for cheaper residential property rather than owner-occupier sales. Whereas aggregate market demand tends to be largely influenced by owner-occupier sales, investment activity and demand variations tend to coincide more with taxation considerations and the financial year. Owner-occupier housing search behaviour tends to correspond closely with summer holiday periods, hence quarter 1 tends to be a high demand period. Investors in cheaper residential property are likely to be influenced by taxation considerations and will base purchasing decisions around tax year periods. These distinct seasonal patterns for different price segments further confirm the need for robust methodologies to be used in the analysis of patterns of demand in housing markets.

The results in Parts B and C confirm that the periods associated with the policy changes are characterised by significant changes in demand. In Q2:2004 it was expected that the announcement of the policy would impact negatively on the demand for cheaper properties. The results confirm that the introduction of the new information on 7 May 2004 had a significant negative impact on the demand for housing in the first-home price band. The results in Table 2 confirm that with the full time series 1988-2005 (Part B), this change is in the order of a decline of 19% in demand from that observed for other Q2 periods in the time series. When analysing the shorter more recent time series 1999-2005 (Part C), this decline is more significant, around 29%. These results are supported with high levels of statistical significance.

Furthermore, it is evident that the policy announcement also impacted negatively on demand both within the aggregate Perth housing market and for 'other' sales. While the 13% decline in demand for the aggregate market can in some part be explained by the first-home price band influence the 10%-12% decline in demand for the 'other' sales price segment is more instructive. These demand variations in price segments not directly targeted by the policy are likely to be caused by the operational characteristics of housing markets and the contingent nature of many real estate transactions. It is apparent that the announcement of the policy initiatives may have 'stalled' transaction activity by impacting on the necessary 'chains' of transactions that allows cheaper home owners to 'trade up' to more expensive housing.

In Q3:2004 it was expected that the enactment of the policy would impact positively on the demand for cheaper properties. The results confirm that the introduction of the policy on 1 July 2004 also had a significant positive impact on the demand for housing in the first-home price band. The results in Table 2 confirm that with the full time series 1988-2005 (Part B), this change is in the order of an increase of 22% in demand from that observed for other Q3 periods in the time series. When analysing the shorter more recent time series 1999-2005 (Part C), this increase is less significant, around 12%. Once again these results are supported with high levels of statistical significance.

It is evident that the policy enactment also impacted positively on demand within the aggregate Perth housing market but there was no significant change for 'other' sales. The 6%-7% increase in demand for the aggregate market is most likely explained by the first-home price band influence. While there is no significant influence for other price segments in Q3:2004 it is possible that there might be an increase in demand in later periods due to the lagged influence of the policy whereby increased sales in the cheaper price bands during Q3:2004 would feed into the 'chains' of transactions enabling the sellers of these properties to 'trade up' during the later periods of 2004 and early 2005.

4.0 Conclusions

The results of this study confirm that direct intervention by state governments in housing markets through amending conveyance (stamp) duty levels for first-home buyer price segments can have an immediate and significant impact on demand in both the price segments that are the target of policy initiatives and also within the aggregate housing market. The results of this study confirm that the introduction of reduced stamp duty rates for specified cheaper house price segments on July 1 2004 resulted in an increase in demand of about 22% to that observed for comparable price segments in the sample period 1988-2005. There was also a lower level increase in demand for the aggregate market.

This study also confirms some important information diffusion effects that have important implications for further policy development. The results indicate that the release of the information on 7 May 2004, almost two months prior to the enactment of the policy lead to a pronounced *decline* in demand for cheaper housing, and also in other price segments. The implication for policy makers is clear in that information of this type impacts significantly on demand in two ways; first a significant *decrease* in demand through the 'news' content of government sponsored incentives at a later date and second the significant *increase* in demand as the value of the government sponsored incentives become available to the market.

If it is assumed that the general objective of the policy initiatives was to increase affordability levels for first-home buyers then policy makers need to be aware of the influence of information of this type in the market prior to the introduction of a policy. The significant variations in demand in two quarterly periods will eventually impact on prices and further research is required to examine whether the stamp duty reductions are eventually capitalised into higher prices for cheaper housing thus negating the initial objectives of the policy.

In addition policy makers need to be aware of the wider reaching implications on housing demand through policy initiatives of this type. Many housing transactions are contingent in nature with the cheapest price segments being an important first link in many of the 'chains' of housing transactions that allow participants to 'trade up' in the housing market. The results in this study indicate clearly that the information content of the May 7 announcement impacted significantly in 'stalling' demand not only for cheaper housing but also for the aggregate market and non-first-home price segments.

This study is the first stage in analysing the influence of these policy initiatives. The results reported here are for demand influences on housing in the Perth metropolitan region. Further research is required as to the influence of these policy initiatives within regional Western Australia and also within vacant land markets. The cheaper house price levels in regional areas suggest that the influence of the policy might be more pronounced in these areas. Finally, the important issue of how these policy initiatives impacted on price changes both within cheaper price segments and the aggregate housing market must be examined to understand the full influence and effectiveness of these measures in promoting affordability in first-home markets.

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