TIME-ON-MARKET AND HOUSE PRICES IN AUCKLAND, NEW ZEALAND

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ABSTRACT

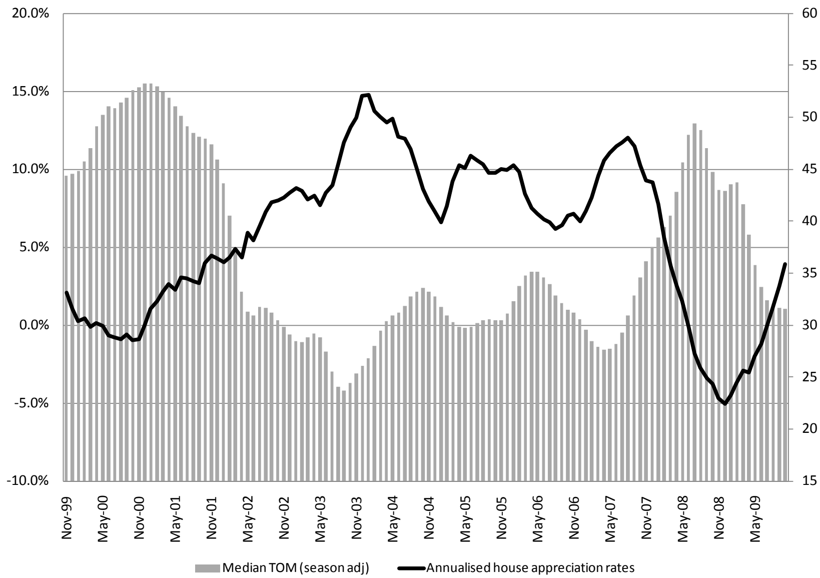
This paper offers the first empirical investigation of the impact of marketing time on house sale price in Auckland, New Zealand. Using residential sales data and life table analysis, the impact of market cycle on the hazard of sale was tested. It was found that properties in a booming market sold more quickly than properties sold in a declining market. In addition, the relationship between time-on-market and price is tested using a two stage least square estimation. The results show that prolonged time-on-market reduces sale price. However, this impact is not uniform with variations observed due to changes in market conditions.

INTRODUCTION

Time-on-market, or days-to-sell (the New Zealand equivalent expression), is commonly used as one of the leading indicators of housing market performance. Real Estate Institute New Zealand's (REINZ) monthly residential market reports are accompanied by three statistics: median sale price, sales volume and median days-to-sell. Despite data being available, there has been no empirical investigation of the price and marketing time relationship in New Zealand. Internationally, studies on the subject of time-on-market (TOM) have been limited to the US context, with emerging evidence from the UK and other European markets.

Time-on-market could be roughly defined as the time transpired between the date a home-seller first lists their property to when the buyer and seller sign a sale and purchase agreement. Anecdotal evidence presented in the mass media suggests that the increase in 'days-to-sell' is a precursor to house price declines (Gibson 2009). Specifically, a property with a long TOM decreases the desirability of the property due to "increasing visibility" and the arrival of new listings, "followed by a gradual stigma attached to unsold homes" (Jud *et al.* 1996). However, in a buoyant market, higher asking prices lead to longer TOM, which in turn results in higher sale prices being achieved (Bjorklund *et al.* 2006). Miller (1978), Kang and Gardner (1989) and Sirmans *et al.* (1991) found that marketing time is dependent on market conditions, and this is likely to influence the relationship between TOM and sale price. Therefore, it is worth examining whether housing market conditions impact TOM. Our analysis indicates that over the last decade, TOM has been one of the leading indicators of position within the Auckland housing market cycle. It can be seen from Figure 1 that the shortest marketing periods are followed by peaks and a gradual decrease in appreciation rates. Correlation analysis shows a strong relationship between the TOM and appreciation rates with a Pearson correlation coefficient of -0.78. Therefore, TOM provides an insight into current market conditions and provides an early indication of upcoming changes in house prices.

Figure 1. House appreciation rates and median time-on-market



BACKGROUND TO THE NEW ZEALAND SELLING SYSTEM

While there is no requirement in New Zealand to list with a real estate agent, most people will engage a real estate agent to assist them. Approximately 80% of all freehold, arm's length sales are conducted by real estate agents (McDonald & Smith 2009). In general, there are three main methods used to sell property: private treaty sale, auction and tender. As shown in Table 1, in Auckland City, the preferred method of sale over the 2006-2008 period was private treaty. In contrast, a survey of properties advertised for sale reveals that the majority of listings in a popular newspaper supplement are being sold under auction (see Table 2). This disproportionate representation of auction properties is perhaps due to higher average sale price of those properties which enables sellers to afford a higher marketing budget and more intensive marketing campaign.

Table 1: Number of sales and sale type in Auckland City: 2006-2008

Sale Type	Private treaty	Auction	Tender
Number of Sales	21,624	4,480	508
Mean sale price	494,913	720,588	764,726
Mean TOM (days)	43	36	33

Source: REINZ

Table 2: The number of advertised properties for sale and sale type from October sample of The New Zealand Herald Homes

Month/Year	Auction	Tender	Private treaty		Total
			POA	Fixed price	
October 2006	111 51%	37 17%	34 16%	36 17%	218 100%
October 2007	103 48%	28 13%	39 18%	46 21%	216 100%
October 2008	139 60%	21 9%	34 15%	37 16%	231 100%
Total	353	86	107	119	665

In New Zealand, all three sales methods are accompanied by a reservation price, regardless of whether they have a list price (REAA 2009a). This reservation price is usually set by the home seller together with the real estate agent. The agent will typically assist in setting the reservation price by providing some market evidence of recent sales and listings in the geographic locality of the property, while the home seller provides the real estate agent with property specific information that is only known by the seller.

The private treaty method includes both the fixed price and 'price on application' (POA) methods and involves a process of negotiation. The list price is usually set above the home seller's reservation price, which leaves for some room to negotiate from the list price once a homebuyer shows interest to purchase the property. The determinants of the list price include the market evidence provided by the real estate agent, registered valuation and/or rating valuation (provided by the local authority using mass appraisal techniques). Market feedback, like offers that are significantly lower than the list price or long duration of TOM, may induce the seller to revise the list price downwards.

Auctions are open processes at which buyers bid against each other to purchase a property, and once the reserve price is reached, the highest bidder becomes the successful buyer (REAA 2009b). Auctions have a fixed period for marketing, are always unconditional and tend to have a shorter marketing period compared with private treaty sales (see Table 1). Tenders are somewhat similar to auctions and require all buyers to submit their sealed offers to the seller by a set date, through the seller's agent (REAA 2009c). Tenders could be conditional but offers must remain sealed until the tender closing date. The main difference of a tender to an auction is that buyers will not know the bids of other buyers, and therefore must put forward their best offer. Both auctions and tender will usually not have a listing price, but only a price-guide and this may or may not be the reservation price of the seller.

REVIEW OF LITERATURE

The relationship between selling price and property marketing time has been widely investigated in the literature, with Cubin (1974) conducting the first empirical study on the subject. Despite the numerous TOM studies spanning the past four decades, uncertainties about the direction of this relationship still exist. According to a meta-analysis of dozens of empirical studies employing hedonic price models, Sirmans *et al.* (2005) found that a time-on-market variable was included in 18 of the studies analysed. The TOM variable was statistically insignificant in half the models, while in eight models days-to-sell had a significant negative impact on house price and within one, hedonic model TOM had a positive effect on price. This mixture of relationships between TOM and house price is corroborated in two independent reviews of studies (Johnson *et al.* 2007 and Clauretie & Thistle 2007) published between 1990 and 2007. Both sets of authors found no consensus of opinion in the body of literature. Some empirical studies found a significant positive relationship, others found a significant negative relationship, while several studies conclude that TOM does not influence house price.

Initially, researchers were mainly at the stage of empirical model building, and concentrated on estimating the relationship between selling price and marketing time. The topic was pioneered by Cubin (1974). Using a limited sample of 83 sales from Coventry, England, it was established that higher priced houses sold faster suggesting that 'people use price as a proxy for quality when buying a house'. Belkin *et al.* (1976) tested the TOM by grouping properties into geographic and price-differentiated submarkets. Their results contradicted Cubin's findings and concluded that greater price concessions led to longer TOM and this relationship is greater for higher priced properties. Miller (1978) confirmed the existence of price-differentiated submarkets indicating a more significant increase in TOM for higher-priced properties. It can be seen that there emerged two problems for future researchers; the disagreement of the positive vs. negative relationship of TOM and sale price, and existence of price-differentiated submarkets.

Over the next decade, academics began to refine the price-TOM relationship by examining the effects of property characteristics (e.g. vacant homes, atypicality), housing market volatility, financing premiums and brokerage impact. Miller & Sklarz (1987) confirmed that a greater degree of overpricing (listing price relative to value) results in longer marketing time and lower selling price. Kang & Gardner (1989) and Ferreira & Sirmans (1989) focused on the effect of overpricing during different states of the housing market. Kang and Gardener found overpricing to be a significant factor in lengthening TOM across all periods (low, medium, and high interest rates), whereas Ferreira and Sirmans' results showed no impact of overpricing on TOM during periods of high interest rates. In addition, Larsen & Park (1989) found that owners who priced their properties lower for a quick sale could recover the cost of concession by a lower brokerage commission. Marketing time was also found to be longer for houses with atypical features (Haurin 1988). Zuehlke (1987) was the first to test duration dependence of vacant and occupied houses. Employing the 'Weibull Hazard Model', he found that vacant houses exhibit positive duration dependence meaning that the hazard rate of sale increases with increased TOM. Contrasting effects of financing premiums of assumable mortgages were found by Ferreira & Sirmans (1989) and Zuehlke (1987), with the former researchers showing that sellers trade the premium to achieve shorter marketing time during 'depressed markets' while Zuehlke concluded that homes with assumable mortgages are simply less likely to sell.

The subject of TOM over the last two decades attracted a greater number of researchers and is characterised by considerably larger sample sizes and increased statistical significance. The more recent published research can be broadly characterised into three categories: listing price strategy, residential brokerage and housing characteristics. The empirical results provide evidence that houses with unusual characteristics take longer to sell (see Forgey *et al.* 1996; Jud *et al.* 1996; Glower *et al.* 1998; Harding *et al.* 2003). Studies conducted by Knight (2002), Anglin *et al.* (2003), Yavas and Yang (1995), Asabere *et al.* (1993), Jud *et al.* (1996), Ong and Koh (2000) and Bjorklund *et al.* (2006) all find that homes that are overpriced lead to prolonged marketing time. Furthermore, overpricing strategy can potentially lead to a higher transaction price (Bjorklund *et al.* 2006). In contrast, Knight (2002) found that the opposite is true. Whilst properties listed on the Internet experience extended marketing periods, this is offset by a slight premium in the selling price (Ford *et al.* 2005). Adopting alternative list price design methods can impact TOM differently. For example, homes listed with a price range rather than a single price tend to have longer TOM (Allen *et al.* 2005), yet 'off-dollar' pricing significantly shortens marketing time (Salter *et al.* 2007). Allen & Dare (2004) tested the effect of ‘charm’ pricing, where the price is set just below some round number. Their findings indicate this pricing strategy has a positive price effect. Allen & Dare (2006) extended their research to hypothesise whether charm pricing suggests precision which in turn would lead to smaller discounts from listing prices. This hypothesis is confirmed through their empirical results. However, the findings of Salter *et al.* (2007) indicate that ‘off dollar’ pricing, an alternative framework for measuring list price design, does not affect selling price.

A number of studies have investigated the impact that individual agents and firm size have on marketing time. Sirmans *et al.* (1991) demonstrate that larger firms sell homes faster than smaller firms. Later studies could not confirm this relationship and found no evidence of firm effects on TOM (Yang & Yavas 1995; Jud *et al.* 1996; Turnbull & Dombrow 2007). Agent motivation is found to be both positively and negatively related to TOM. Furthermore, the literature finds that extending listing contract length (Brastow *et.al* 2009) and offering a bonus to the selling broker (Johnson *et al.* 2004) prolongs the marketing period. However, principal agents (brokerage firm owners) who receive full-commission are able to reduce TOM (Munneke & Yavas 2001). In addition, agents selling their own properties receive 3 to 7% price premiums in comparison to properties owned by clients for both single-family houses (Rutherford *et al.* 2005) and condominiums (Rutherford *et al.* 2007), but generally properties have to stay on the market longer to achieve the premium.

It can be seen from the existing literature that the empirical evidence on the relationship between time on market and selling price is often contradictory from one study to another. Furthermore, there seems to be disagreement over the choice of statistical model with a number of studies using single equation models, while other researchers employ two-stage least squares (2SLS) estimations. The standard search theory (Yavas 1992) postulates a positive relationship, whereby sellers that are willing to wait longer have a higher probability of receiving a higher bid. However, several recent studies employing two-stage least squares estimations found a negative relationship (Huang and Palmquist 2001; Knight 2002; Turnbull and Dombrow 2006; Turnbull and Dombrow 2007). According to Jud et al. (1996) and Taylor (1999), this negative relationship arises because homes that stay on the market for extended periods of time become ‘stigmatised’ (i.e. buyers believe there is something wrong with the house), resulting in a lower selling price.

When considering property market cycles, it emerges that often negative TOM-price relationships are found in periods of decline (see Belkin *et al.* 1976; Turnbull & Sirmans 1993; Asabere *et al.* 1993; McGreal *et al.* 2009), whereas positive relationships exist in rising markets (see Cubin 1974; Miller 1978; Bjorklund et al. 2006). In addition, research has been primarily originating in the U.S. with evidence from other geographic markets only beginning to emerge (Pryce & Gibb 2006; McGreal *et al.* 2009; Rossini *et al.* 2010).

DATA

The study is based on property information collected from the Auckland City Territorial Authority between January 2006 and December 2008. The data are based upon information collected on the sale of residential properties from two databases, Terralink International's Property Guru and the Real Estate Institute New Zealand (REINZ). Property Guru is a service offered online by Terralink International and is a database accessible by real estate professionals who subscribe to this service. It contains property information on all sold properties in New Zealand. The REINZ dataset contains data provided by real estate agents who are members of the institute, and the dataset is only accessible by registered Real Estate Agents who are currently contracted by a real estate agency. Residential sales transactions between January 2006 and December 2008 were selected from the two data sources and merged into a final database. The Property Guru database provided detailed property specific characteristics, such as property type, floor area, period of construction, wall material etc., while the REINZ database provided sales information such as the list price, list date, agreement date and unconditional date.

The sales data in the REINZ dataset were entered by the selling agent. Therefore, withdrawn or re-listed property information was not available. In other words, only the most recent listing price and TOM were considered. Knight (2002) explored the effect of incomplete information (price revision/relisting) on the TOM variable. Knight analysed a sample of transactions for which list price changes have occurred. Knight's Model 1 used the original listing information and Model 2 used the revised listing information. The coefficient for TOM in both models was negative and significant, however TOM impact diminishes with more recent data (Model 2). The present authors acknowledge the limitations of the dataset, but choose to continue in order to gain a better understanding of this significant indicator of market conditions.

The address of the property, the sale price and date of sale were present in both datasets and were used to match sales records. This merger of the Property Guru and the REINZ databases resulted in a total dataset of 5,783 sales. Table 3 summarises the variables adopted in the analysis, and their brief definitions. The sale price and TOM are known for each property. Both existing and newly built detached single-family homes are included in this study. This study interprets TOM as from the date of property listing as recorded by the real estate brokerage firm to the date of sales agreement, which is the typical interpretation adopted in the mass literature originating in the US.

Table 3: Variables and definitions

Variable	Definition
Sale_price	Natural log of net sale price of the house, in the regression models.
TOM_days	Natural log of the calculated number of days from date of listing to agreement, in the regression models.
Floor_area	Total floor area of the property in square metres.
Floor_area_sq	Total floor area of the property, squared.
Land_area	Property's land area in square metres.
Int_qual_poor	Dummy variable indicating poor internal quality, with default condition being average quality.
Int_qual_superior	Dummy variable indicating superior internal quality, with default condition being average quality.
Wall_brick	Dummy variable indicating brick wall material, with the default condition being all other cladding materials.
Garage_MR	Dummy variable indicating the presence of a garage under the main roof.
Contour_steep	Dummy variable indicating steep land contour, with the default condition being level or moderate sloping contour.
PeriodConst_Pre1914 ... 2000_009	Dummy variable indicating decade house was constructed. The periods are: pre 1914s, 1914s to 1929, 1930s, 1940s, 1950s, 1960s, 1970s, 1980s, 1990s, and 2000 to 200, with default condition being PeriodConst_2000
SQ01Y06...SQ04Y08	Dummy variable indicating sale quarter and year of the house.
au51400, au514101, etc	Dummy variable indicating the area unit in which a property is located with the area unit containing the most observations used as the default category.

Sales volume varied in the period of analysis as shown in Table 4. The highest number of sales was Quarter 4 of 2006 (n = 2,932), while Quarter 3 of 2008 (n =1,281) marked the lowest number of sales. As well as experiencing a booming housing market and shortening time to sell, the periods of Q2 2006 to Q2 2007 recorded the highest number of sales with a considerable dip in sales afterwards, especially in the second half of 2008.

Table 4: Number of sales by quarter

Sales by quarter	Q1'06	Q2'06	Q3'06	Q4'06	Q1'07	Q2'07	Q3'07	Q4'07	Q1'08	Q2'08	Q3'08	Q4'08
n	2,390	2,670	2,634	2,932	2,864	2,778	1,965	2,104	1,447	1,432	1,281	1,390

The distribution of sales is provided in Table 5. It was found that those properties selling after 30 days, the mean discount over list price increases gradually from 5.23% to a peak of 9.5% between 180 and 365 days on the market, then slight decrease to 8.68% in discount after 365 days. This suggests that TOM may be significant for the majority of properties taking in excess of one month to sell.

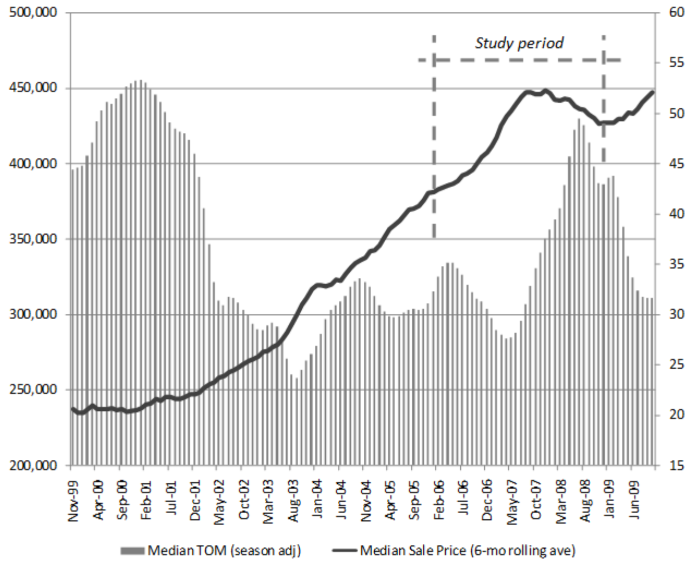
Table 5: Number of sales and percentage of discount over list price by Time-On-Market

TOM	0-7	8-14	15-30	31-60	61-90	91-120	121-180	181-365	>365	Totals
Number of sales	1,969	1,294	2,701	2,961	1,499	763	794	572	276	12,829
Mean discount over list price (%)	2.97	3.55	3.81	5.23	6.48	7.24	8.06	9.5	8.68	5.13

METHODOLOGY

A limited number of papers exist where the data is available through all phases of a housing market cycle (for example, see Turnbull and Dombrow 2006). The study time frame captures phases of property price rises (2006) and price declines (2008), with a flat market in 2007. These variations in the market condition allow for an examination of the effects of market cycle on the TOM-price relationship. Figure 2 shows changes in the monthly median sales prices and the corresponding median TOM. The graph visually depicts an inverse relationship between sales price and TOM. In other words, as the median number of days-on-market declines, prices tend to increase. During the study period, this relationship is especially strong in the rising price environment, with a Pearson correlation coefficient of -0.94.

Figure 2: Seasonally adjusted TOM and median sale price



The goal of this study is to test two hypotheses:

Hypothesis 1: Different phases of residential property cycle will have different impacts on TOM. That is, in a declining market, the average days houses stay on the market will be longer than in the rising market. The hazard model is used to determine whether the probability of a property selling increases or decreases based on the number of days it has been on the market. Hazard rates based on the life table with grouped lifetime (TOM) data are estimated for the pooled sample and for each year in the dataset respectively. More specifically, let T be a continuous random variable representing the time to sale of property (lifetime) with cumulative distribution function F(t) = Pr(T≤ t) and probability density function f(t), where t is a realisation of T. The probability of a property surviving to time t is given by the survival function S(t) = Pr(T>t) = 1 – F(t). The hazard function is defined as:

$$h(t) = \lim_{\Delta t \to 0} \frac{\Pr(t \le T < t + \Delta t | T \ge t)}{\Delta t} = \frac{f(t)}{S(t)} \quad (1)$$

The hazard function provides an instantaneous probability of sale at time interval *t*, given that the property is on the market up to *t*.

Hypothesis 2: If the time-on-market for a property is long, then the resulting sale price of that property will be low. In other words, when a property has been on the market for a long time, it becomes increasingly difficult to sell causing the property to develop a 'gradual stigma' (Jud et al. 1996; Taylor 1999). House prices are estimated using 2SLS modelling, which is the methodology most commonly employed in the literature. According to Knight (2008), TOM is endogenous, which means that the error term in a single selling price equation is correlated with the TOM variable. For this reason, TOM is separately specified and estimated in the first stage. The predicted values of TOM are then substituted as an explanatory variable in the second stage. The TOM is instrumented in the first-stage estimation and is written as:

$$LnTOM_i = \beta_0 + \beta_1 X_i + \beta_2 T_i + \beta_3 L_i + \varepsilon_i. \quad (2)$$

where TOM is the number of days the i^{th} property was on the market before it was sold, X_i is a vector of physical and environmental property characteristics, T_i represents temporal variations and L_i represents the area unit location of the i^{th} property. The operational model for the second-stage estimation of sale price is written as:

$$LnSP_i = \beta_0 + \beta_1 X_i + \beta_2 T_i + \beta_3 L_i + \beta_4 \, TOMHAT_i + \varepsilon_i. \quad (3)$$

where SP is the selling price of the i^{th} property and TOMHAT is estimated in the first-stage.

The 2SLS modelling is used to test for the impact of market conditions on the TOM-price relationship with annual estimations.

EMPIRICAL RESULTS

Hypothesis one

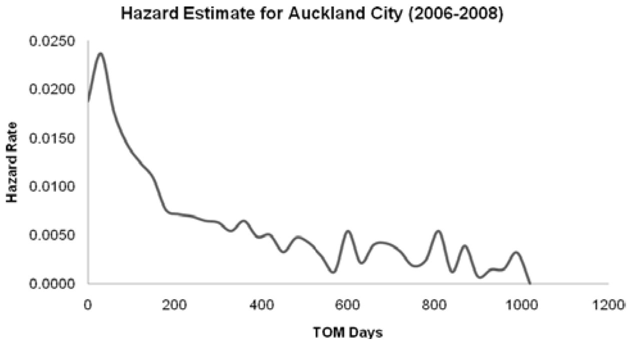
Table 6 is the Life Table for TOM for a pooled sample that includes sales from 2006 through 2008. From the cumulative failure rate, it can be observed that around 21% of all properties sell within the first 15 days, and around 44% sell within a month. After three months, only 15% are still on the market, and this figure falls to less than 5% after 180 days, and around 1% after 1 year. This clearly shows that roughly half of properties sell within the first month, which is in agreement with the range of average TOM of 22 to 42 days within the study timeframe.

Table 6: Life table for time-on-market for pooled sample (2006-2008)

TOM (days)		Cumulative failure	Hazard rate	95% confidence interval	
0	15	21.25%	0.0159	0.0154	0.0163
15	30	43.92%	0.0224	0.0218	0.0230
30	60	73.28%	0.0236	0.0231	0.0242
60	90	84.49%	0.0177	0.0170	0.0183
90	120	90.00%	0.0144	0.0136	0.0152
120	150	93.16%	0.0125	0.0116	0.0134
150	180	95.08%	0.0109	0.0099	0.0119
180	210	96.08%	0.0075	0.0066	0.0085
210	240	96.83%	0.0071	0.0061	0.0081
240	270	97.42%	0.0069	0.0057	0.0080
270	300	97.88%	0.0064	0.0052	0.0076
300	330	98.24%	0.0063	0.0049	0.0076
330	360	98.50%	0.0054	0.0040	0.0067
360	720	99.64%	0.0034	0.0031	0.0037
720	1080	99.84%	0.0022	0.0016	0.0027
1080	1440	100.00%	0.0000	0.0000	0.0000

As seen in Figure 2, the hazard of sale rises steeply and reaches its peak in the first two months, then falls gradually with small peaks after one year. This demonstrates a duration dependent (non-constant) hazard function that is both positive (i.e. the hazard of sale increases with the longer duration of TOM) and negative (i.e. decreasing hazard rate over prolonged marketing periods). In summary, the analysis of 2006-2008 sales shows that most of the listings are cleared after one year and the highest probability of sale is between two weeks and three months from the start of the marketing campaign. This indicates that the awareness about a new listing is built up in the first two weeks, however after three months, the listing becomes ‘stale’ and it becomes more difficult to sell. Therefore, a revitalised marketing strategy should be adopted after the initial three month period.

Figure 2: Hazard rate estimate for pooled sample



Further analysis divides the dataset into annual intervals (see Table 7). The results indicate that in 2008, only around 15% of properties sold after 15 days of TOM, as compared to 23% and 24% in 2006 and 2007, respectively. The comparison of cumulative failure rate across years reveals further evidence of market cycle differences with properties selling faster at the peak in 2007, followed by sales in 2006 (rising market) and 2008 (declining market). Similarly to the pooled hazard function, annual hazard functions are duration dependent. The highest peak occurred during the 2007 market plateau when the market experienced a much steeper rise in hazard rate followed by a swift decline. This suggests that at the peak of the market, properties need to be marketed more aggressively as the probability of sale greatly diminishes. In other words, decreasing probability of sale is a precursor to declining prices and lengthening TOM. However, the hazard rate gap between 2008 compared with 2006 and 2007 slowly closes after three months of TOM. Therefore, properties which are on the market longer than 3 months did not experience shorter TOM, even if they were sold in rising markets. Regarding Hypothesis 1, it can be concluded that there is evidence of cyclical dependence where properties in a booming market sold more quickly that properties in a declining market.

Hypothesis 2

Table 8 provides the 2SLS results of annual estimations, with TOM as the dependent variable. The models explain little of the variation in the days on the market with R^2 ranging from 0.103 to 0.144. This is not unexpected and similar explanatory power was achieved in Yavas and Yang (1995), Knight (2002), Harding *et al.* (2003), McGreal et al (2009), where property characteristics fail to substantially predict TOM. The models indicate that houses built prior to 2000 are expected to sell faster, with the properties built in the first half of the 1900's experiencing the shortest marketing time.

Table 7: Annual life tables for time-on-market

TOM (Days)		2006				2007				2008			
		Cumulative failure	Hazard rate	95% CI		Cumulative failure	Hazard rate	95% CI		Cumulative failure	Hazard rate	95% CI	
0	15	22.56%	0.0169	0.0162	0.0177	23.61%	0.0178	0.0171	0.0186	14.60%	0.0105	0.0097	0.0113
15	30	45.35%	0.0230	0.0220	0.0240	48.63%	0.0261	0.0250	0.0272	33.53%	0.0166	0.0156	0.0177
30	60	73.48%	0.0231	0.0223	0.0239	78.10%	0.0268	0.0259	0.0278	66.04%	0.0216	0.0206	0.0226
60	90	83.96%	0.0164	0.0154	0.0174	88.39%	0.0205	0.0192	0.0217	79.94%	0.0172	0.0159	0.0184
90	120	89.55%	0.0141	0.0129	0.0152	92.51%	0.0144	0.0130	0.0159	87.59%	0.0157	0.0142	0.0172
120	150	92.60%	0.0114	0.0101	0.0127	95.10%	0.0139	0.0121	0.0157	91.81%	0.0137	0.0119	0.0155
150	180	94.65%	0.0107	0.0092	0.0122	96.36%	0.0098	0.0080	0.0116	94.50%	0.0131	0.0109	0.0153
180	210	95.69%	0.0072	0.0057	0.0086	97.06%	0.0071	0.0053	0.0089	95.80%	0.0089	0.0068	0.0110
210	240	96.44%	0.0063	0.0049	0.0078	97.65%	0.0075	0.0055	0.0096	96.85%	0.0096	0.0070	0.0121
240	270	97.10%	0.0068	0.0051	0.0085	98.03%	0.0059	0.0039	0.0079	97.61%	0.0091	0.0062	0.0120
270	300	97.66%	0.0071	0.0052	0.0090	98.30%	0.0048	0.0028	0.0068	98.15%	0.0085	0.0053	0.0116
300	330	98.04%	0.0060	0.0040	0.0079	98.64%	0.0075	0.0048	0.0102	98.51%	0.0071	0.0039	0.0104
330	360	98.42%	0.0070	0.0047	0.0094	98.79%	0.0039	0.0018	0.0060	98.71%	0.0048	0.0018	0.0077
360	720	99.61%	0.0034	0.0029	0.0039	99.71%	0.0034	0.0028	0.0040	99.58%	0.0028	0.0021	0.0036
720	1080	99.83%	0.0021	0.0013	0.0030	99.92%	0.0031	0.0019	0.0043	99.72%	0.0011	0.0003	0.0019
1080	1440	100.00%	0.0000	0.0000	0.0000	100.00%	0.0000	0.0000	0.0000	100.00%	0.0000	0.0000	0.0000

Rehm *et al.* (2006) found that in Auckland City, early vintage houses attract significant premiums. Desirability of these houses could translate in shorter selling time. As anticipated, auction properties had shorter TOM attributable to the set marketing time of this method, except for the 2007 model where the coefficient is positive but statistically insignificant. The models display significant seasonal effects. For instance in 2006, properties sold faster in the last quarter, with generally records the highest market activity, with houses taking longer to sell over the winter months. Similarly, houses sold in the summer/autumn (Q1 and Q4) of 2008 had the shortest marketing times. However, seasonal effects are not found in the 2007 regression results. Given that the market turned at the end of 2007, houses sold in the last quarter experienced the longest TOM.

The results of the second stage regression, which includes *TOMHAT* as an independent variable, are reported in Table 8. The model exhibits a considerable improvement of the R^2 above 0.86 in all models. Most of the variables in the second stage equation are significant and in the expected direction. However, the age variables suggest that earlier vintage houses sell at a slight discount to new houses, which is contrary to the vintage effect observed in Rehm *et al.* (2006). Houses situated on steep contours sell at a discount, while houses with a garage under main roof attract a 2.3% to 5% premium. The coefficients of sale type in 2006 and 2007 indicate that when houses are marketed through auction, the seller is able to achieve a slight premium over houses sold under private treaty. Earlier research by Dotzour et al. (1998) obtained a similar premium amount for auctioned properties in Christchurch, New Zealand. However, the 2008 model indicates that a private treaty method is preferred in a declining market. The negative coefficient for auctions could partially be explained by the fact that the number of mortgagee sales have more than doubled in 2008 (Terralink 2009). These sales are often advertised as auctions suggesting that distressed properties are sold at a discount. The coefficient of interest, TOMHAT, reveals that TOM is negatively related to the sales price across the varying phases of the market cycle and is statistically significant in the 2006 and 2008 models. There was little price movement that occurred in 2007, hence the insignificant TOM coefficient. However, when the market is more dynamic and the price movements are either positive or negative, TOM has a significant impact on sale price. In summary, the TOM coefficients confirm our second hypothesis that ‘stigma effects’ are gradually attached to unsold houses, with more severe discounts found in a market when prices are falling and TOM lengthens.

Table 8: 2SLS time-on-market estimations

Variable	2006	2007	2008
(Constant)	2.945	3.339	3.455
	(12.206)***	(15.937)***	(12.707)***
Floor_Area	.002	.001	2.83E-04
	(1.092)	(.556)	(.127)
Floor_Area_Sq	-6.57E-07	--5.89E-07	2.31E-06
	(-.125)	(-.118)	(.387)
Land_area	3.45E-04	5.01E-05	1.99E-05
	(3.490)***	(.593)	(.157)
Garage	.013	.030	-.004
	(.251)***	(.683)	(-.069)
Int_Qual_Poor	-.075	.215	-.773
	(-.252)	(.403)	(-2.068)**
Int_Qual_Superior	-.155	-.063	.251
	(-1.408)	(-.664)	(2.068)**
Contour_Steep	.059	.097	.061
	(.697)	(1.272)	(.612)
WallMaterial_Brick	.007	-.010	.030
	(.108)	(-.159)	(.387)
PeriodConst_Pre1914	-.333	-.164	.034
	(-2.876)***	(-1.642)*	(.275)
PeriodConst_1914_29	-.345	-.196	-.026
	(-3.579)***	(-2.322)**	(-.249)
PeriodConst_1930s	-.424	-.155	-.110
	(-3.775)***	(-1.578)	(-.866)
PeriodConst_1940s	-.268	-.212	-.102
	(-2.480)***	(-2.263)**	(-.882)
PeriodConst_1950s	-.329	-.058	-.006
	(-3.302)***	(-.671)	(-.050)
PeriodConst_1960s	-.493	-.079	.013
	(-4.804)***	(-.887)	(.115)
PeriodConst_1970s	-.395	-.064	.002
	(-3.277)***	(-.602)	(.011)
PeriodConst_1980s	-.145	.179	.293
	(-1.080)	(1.421)	(1.745)*
PeriodConst_1990s	-.096	.140	-.032
	(-.878)	(1.457)	(-.273)
Auction	-.001	.015	-.250
	(-.023)	(.331)	(-4.384)***
SQ01_06	.190		
	(3.091)***		
SQ02_06	.299		
	(5.121)***		
SQ03_06	.132		
	(2.223)**		
SQ01_07		-.187	
		(-3.516)***	
SQ02_07		-.191	
		(-3.570)***	
SQ03_07		-.155	
		(-2.726)***	
SQ01_08			-.035
			(-.501)
SQ02_08			.074
			(1.099)
SQ03_08			.200
			(2.915)***
N	*2083*	*2271*	*1429*
R2	*.124*	*.103*	*.144*

LnTOM is the dependent variable. All regressions include dummy variables for area units to control for locations. Their coefficients are not reported for brevity.
t-statistics are shown in brackets; *** significant at the .01 level, **.05 level, *.1 level

Table 9: 2SLS pricing estimations

Variable	2006	2007	2008
(Constant)	13.095 (45.464)***	14.065 (10.595)***	14.175 (12.494)***
Floor_Area	.005 (12.450)***	.005 (8.189)***	.004 (10.128)***
Floor_Area_Sq	-4.39E-06 (-4.465)***	-2.74E-06 (-2.557)***	-1.41E-06 (-1.000)
Land_area	4.55E-04 (12.191)***	3.90E-04 (15.116)***	4.034E-04 (15.982)
Garage	.038 (3.803)***	.049 (3.186)***	.023 (2.157)**
Int_Qual_Poor	-.061 (-1.095)	.069 (.490)	-.488 (-1.868)*
Int_Qual_Superior	.200 (7.760)***	.207 (6.405)***	.361 (4.190)***
Contour_Steep	-.097 (-5.749)***	-.041 (-.975)	-.028 (-1.026)
WallMaterial_Brick	.008 (.619)	-.004 (-.292)	.003 (.158)
PeriodConst_Pre1914	-.067 (-1.712)*	-.055 (-.801)	.002 (.087)
PeriodConst_1914_29	-.140 (-3.687)***	-.122 (-1.527)	-.059 (-2.688)***
PeriodConst_1930s	-.210 (-4.544)***	-.140 (-2.170)**	-.123 (-2.767)***
PeriodConst_1940s	-.196 (-5.900)***	-.187 (-2.157)**	-.175 (-4.264)***
PeriodConst_1950s	-.235 (-6.345)***	-.119 (-4.118)***	-.131 (-5.962)***
PeriodConst_1960s	-.296 (-5.750)***	-.155 (-4.270)***	-.152 (-6.877)***
PeriodConst_1970s	-.268 (-5.990)***	-.179 (-5.388)***	-.172 (-6.409)***
PeriodConst_1980s	-.183 (-6.332)***	-.041 (-.534)***	.040 (.397)
PeriodConst_1990s	-.113 (-5.014)***	-.013 (-.216)	-.066 (-2.579)***
Auction	.033 (3.348)***	.032 (2.753)***	-.123 (-1.504)*
SQ01_06	-.005 (-.242)		
SQ02_06	.043 (1.370)		
SQ03_06	.016 (.940)		
SQ01_07		-.123 (-1.636)	
SQ02_07		-.090 (-1.167)	
SQ03_07		-.089 (-1.411)	
SQ01_08			.070 (3.921)***
SQ02_08			.104 (3.894)***
SQ03_08			.148 (2.218)**
TOMHAT	-.273 (-2.832)***	-.492 (-1.237)	-.554 (-1.694)*
N	*2083*	*2271*	*1429*
R2	*.876*	*.868*	*.877*

LnSP is the dependent variable. All regressions include dummy variables for area units to control for locations. Their coefficients are not reported for brevity.

CONCLUSION

This paper provides the first examination of the impact of time-on-market on sale price of residential properties in New Zealand. The findings corroborate the previous work of Pryce and Gibb (2006) that the property market cycle has an impact on the probability of sale. Properties sold during the recent market boom exhibited significantly shorter TOM and sold relatively faster compared to those properties sold in a declining market. As expected, the maximum hazard rate as well as the steepest curve was observed at the market's 2007 peak. Although market conditions varied during the study period, most of the properties were sold within one year with the greatest probability of sale within the first three months. It appears that after this period, the listing becomes 'stale', therefore property professionals should revitalise their marketing campaign if their listing remains on the market for more than three months. The relationship between TOM and sale price is found to be negative over different phases of the market cycle, thereby confirming that a gradual stigma is attached to houses that remain on the market. The TOM coefficient is found to be significant in dynamic markets; however TOM has no statistically significant impact when there is little price movement. Therefore, TOM plays an important role in determining house prices and should be included as a regressor in house price equations. Omitting TOM from the regression would lead to biased estimates of other relevant variables with which TOM is correlated (e.g. market conditions). In addition, house price equations indicate that in the Auckland housing market during 2006 and 2007, auctions lead to higher selling prices. However, in 2008 when house prices started to decline and the global financial crisis forced the country into recession, auction properties began to sell at a discount. This could be due to the doubling of mortgagee sales which often use auction as the sale mechanism.

Limitations of this paper include the weak ability to generalise, as the markets in New Zealand are quite different to that of the UK and U.S. markets. In addition, more property characteristics could be included in the model, as well as environmental externalities and location variables. These limitations can be addressed and applied to future research.

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