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Market Conditions, Marketing Time, and House Prices

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Abstract

We examine whether the relationship between marketing time and selling price changes with conditions in the Auckland housing market. Our sample covers periods when house prices rise (2006:Q1–2007:Q3), then decline (2007:Q4–Q4 2008:Q4), and lastly resume appreciating (2009:Q1–2010:Q3). We estimate hedonic pricing models for each identified subperiod. Our results indicate that the coefficient of time-on-market (TOM) is clearly influenced by the changing market conditions. In buoyant market conditions, houses that remain unsold are subject to a stigma discount. TOM, however, does not significantly impact price in a falling market.

Buyers and sellers in the housing market will be familiar with three well-publicized indicators of market performance: average sale price, number of house sales, and median days-to-sell. Monthly, *The New Zealand Herald* (the country's most widely read newspaper) reports on these statistics from two key sources: the Real Estate Institute and Quotable Value. These reports provide a general direction for the nation's housing markets. For example, local bank economists suggest that a presently flat housing market is evidenced by the long number of days-to-sell (Gibson, 2011). It is widely accepted that longer marketing time and lower sales volumes would generally point to a downturn in the market and vice versa. Anecdotally, for properties that no longer attract potential buyers, some real estate agents in the United States creatively reset their marketing time. These ''stale'' houses appear as ''new listings'' after agents change property ID and modify the address so that it cannot be tracked as a relisted property (Mabrey and Patrea, 2008).

Scholars have recognized and empirically established the marketing time and price relationship. The results, however, have not been consistent, and both positive and negative signs have been observed. Kang and Gardner (1989) suggested that it is market conditions that influence the relationship. There is consensus within the literature that housing market conditions change over time. This is reflected in the persistent use of time dummy variables in hedonic analyses. Nevertheless, researchers tend to estimate a single equation spanning multiple market cycle stages. We have taken an alternative approach and found clear evidence of a time-varying coefficient on time-on-market (TOM). Building on Kang and Gardner (1989), we isolate the influence of market conditions on the price-TOM relationship by segmenting the study's timeframe into two market phases: rising and falling.

Literature Review

In the home selling process, various factors influence the marketing time and ultimate selling price: atypical houses with unusual features (Haurin, 1988; Forgey, Rutherford, and Springer, 1996; Turnbull and Dombrow, 2006), older properties (Zuehlke, 1987), off-dollar pricing (Salter, Johnson, and Spurlin, 2007), influence of architectural review boards (Johnson, Benefield, and Wiley, 2009), vacant houses (Sirmans, Turnbull, and Dombrow, 1995), as well as seasonal influences and seller motivation and strategy.

A number of researchers have attempted to explain the marketing time-selling price relationship, with the first study conducted by Cubbin (1974). The relationship can be in either direction, indicating a lack of consensus. According to a comprehensive review of nearly 125 hedonic pricing models (Sirmans, MacPherson, and Zietz, 2005), TOM was one of the most common characteristics present, appearing in 18 studies. Of these, half found no statistically significant relationship. When a significant relationship was established, negative relationship prevails over positive eight to one. Similarly, Johnson, Benefield, and Wiley (2007) reviewing the TOM literature found mixed results. Out of 45 separate hedonic pricing models, 27 established a significant negative relationship, while only seven established a positive one. It appears that more recent research tends to claim significant negative relationship more often (Sirmans, MacDonald, and MacPherson, 2010). A positive relationship is greatly outnumbered and is found in only 15% of studies, with some authors observing that such a relationship is associated with higher-priced submarkets (Forgey, Rutherford, and Springer, 1996; Benefield and Sirmans, 2009).

Commonly, researchers estimate a single equation over the entire study period. In Sirmans, MacDonald, and MacPherson's (2010) meta-analysis of TOM studies, the authors report the average timeframe of studies is four years but ranges from one to nine years. The literature suggests that property market cycles typically last between four and twelve years with an average of eight years (Barras, 1994; Wheaton, Torto, and Evans, 1997; Royal Institution of Chartered Surveyors, 1999; Mueller, 2002). Given the presence of cycles, ignoring market influences in a single equation model would potentially lead to biased estimates of the TOM coefficients. For example, TOM lengthens with increasing supply of listings (Anglin, Rutherford, and Springer, 2003; Turnbull and Dombrow, 2006), which in turn lowers selling price (Knight, 2002; Merlo and Ortalo-Magné, 2004). On the other hand, Bjorklund, Dadzie, and Wilhelmsson (2006) analyze sales in a booming market and find a positive effect of prolonged TOM on selling price. Forgey, Rutherford, and Springer (1996), however, suggest that a positive relationship can only be observed for more expensive houses.

Researchers have justified the direction of the TOM-price relationship using two theories. Those who observe a positive relationship often use ''search theory'' to explain the tradeoff between the selling price and TOM. In the search theory, sellers are willing to wait longer for the probability of a better offer, in other words a longer TOM will produce a higher price (Miller, 1978; Forgey, Rutherford, and Springer, 1996). To explain the negative relationship, Taylor (1999) applied the concept of ''negative herding.'' According to this theory, potential buyers regard properties with longer TOM as overpriced or defective, and a gradual stigma is attached to homes that remain unsold (Jud, Seaks, and Winkler, 1996).

A small number of researchers differentiated their analysis by market conditions. Kang and Gardner (1989) were among early researchers to establish that relationship between the selling price and TOM changes with conditions in the housing market. They demonstrated that TOM had a positive impact on selling price during the period of high mortgage rates and a negative impact during the periods of lower interest rates. Sirmans, Turnbull, and Dombrow (1995) validated this changing relationship: TOM was insignificant during the time when house prices were declining, whereas a significant negative effect was associated with the rising housing market. Turnbull and Dombrow (2006) corroborated a significant negative relationship during a rising market, while a negative relationship was maintained in both declining and rising market in Zahirovic-Herbert and Chatterjee (2011). Conversely, Benefield and Sirmans (2009) estimated a positive relationship in ''pre- and post-peak'' markets. While these researchers make an important contribution regarding a TOM and house price relationship, we aim to determine if prolonged marketing periods affect house prices differently over various stages of the housing market cycle. We hypothesize that the relationship between marketing time and selling price changes with conditions in the housing market. In rising markets, houses sell faster than when the market is falling. Applying the negative herding theory, we expect a steeper discount in the TOM variable when house prices are rising.

Data and Methodology

Our analysis focuses on the Auckland City Territorial Authority and is based on sales transaction data for detached single-family houses sold between January 2006 and September 2010. The primary data source is Quotable Value's official database of residential transactions. This dataset includes variables related to the physical characteristics of the house (e.g., lot and building size, quality of interior, building age). These data are gathered for the purpose of assessing property taxes. Assessments are conducted every three years, with an undisclosed portion of sold properties being subject to inspection to establish current building size, quality, etc.

We supplemented these physical attributes with location and road classification variables generated through use of a geographic information system. This was then further supplemented by transaction data from the Real Estate Institute (REINZ) of New Zealand to ascertain sales method, TOM, and number of bedrooms.

The raw, combined dataset was then reduced. For instance, only arms-length transactions involving standard residential detached and semi-detached dwellings situated on their own plot of land with freehold interests were selected for analysis. In addition, Forgey, Rutherford, and Springer (1996) and Benefield and Sirmans (2009) observed a significant positive relationship between selling price and TOM for higher priced properties, whereas the relationship was mainly negative for more traditional houses. By excluding homes with a selling price in excess of $1,500,000, we aim to reduce the influence of such luxury homes and estimate coefficients that are more representative of the general housing stock.

In New Zealand, there are three predominant methods used to sell property: private treaty, auction, and tender. Private treaty is the most preferred method among sellers and accounts for approximately 80% of all sales. Only properties marketed as private treaty sales are included in the analysis. There are two reasons for excluding auction and tender sales. Firstly, both methods have a fixed period of marketing (approximately four to six weeks) and typically the marketing time of those properties is shorter than with private treaty. Secondly, in New Zealand auctions and tenders are more widespread among higher priced properties.

The variables with information on the address of the property, its price, and date of sale are available in the Quotable Value and REINZ datasets, and are used to match sales transactions. Although there is no requirement in New Zealand to list with a real estate agent, approximately 80% of all sales are conducted by agents (McDonald and Smith, 2009). Because our main dataset covers all residential transactions (agent and private listings sales), the merge process did not result in a 100% success rate. This was also caused by occasional discrepancies in address and sale prices. The merger of two datasets resulted in a total dataset of 5,685 sales transactions.

Both hedonic and two-stage least squares (2SLS) models have dominated the TOM literature. In most studies, property characteristics failed to substantially predict TOM in 2SLS estimations. Therefore, we elected to estimate a conventional hedonic pricing model. A log-linear functional form is used where the dependent variable (sale price) is transformed to its natural log form. In our model, we specify the sale price of a house to be a function of its structural attributes, local neighborhood characteristics, time trend variables, and TOM. The model's reduced form in Equation 1 is:

$$\ln(SP) = \beta_0 + \sum_{i=1}^{n} \beta_i S_i + \sum_{j=1}^{n} \beta_j L_j + \beta_k TOM_k + \beta_l Q + \varepsilon. \tag{1}$$

Where *SP* is the natural log of sale price, net of chattels (personal property), for which the house was sold; *S* is a vector of structural characteristics of the house (i.e., floor and land area, age, home's interior condition); *L* is a vector of location variables (i.e., road category and suburb); *TOM* is the marketing period; and *Q* is the quarter of the year in which the property was sold controlling for market changes within the model. Earlier work by Rehm, Filippova, and Stone (2006) found a nonlinear relationship between vintage and house prices using data from New Zealand. Therefore, age is specified as a binomial. To capture the expected negative effect of being located on busy roads, a dummy variable *Road_arterial* was included with minor, collector roads being the default category. Lastly, a series of dummy variables representing each Area Unit (New Zealand Census enumeration units containing between 3,000 and 5,000 residents) serve as proxies for school quality and other neighborhood amenities not otherwise measured.

We differentiate market stages—rising and falling—by estimating the basic model with all sales transactions. This allows us to determine shifts in house price movements over the study period. With 2006:Q1 established as the default category, house prices rise through 2007:Q3, then decline from 2007:Q4 through 2008:Q4, and resume appreciating

Exhibit 1. Hedonic Model Summaries and Standardized Beta Coefficients by TOM Specification

	2006:Q1–2010:Q3	2006:Q1–2007:Q3	2007:Q4–2008:Q4	2009:Q1–2010:Q3
	Entire Period	Rising	Falling	Rising
Linear TOM				
Adj. R^2	0.871	0.874	0.865	0.869
Std. error of estimate	0.141	0.138	0.139	0.144
Std. beta coefficient	−0.011*	−0.011	0.010	−0.012
Natural Log TOM				
Adj. R^2	0.872	0.875	0.865	0.870
Std. error of estimate	0.140	0.138	0.139	0.143
Std. beta coefficient	−0.029**	−0.028**	−0.014	−0.028**

Notes:
*Significant at the 0.05 level.
**Significant at the 0.01 level, using a two-tailed test.

from 2009:Q1 onwards. We then proceed with our main analysis by estimating separate models with the three subperiods.

In terms of the specification of TOM, researchers have yet to explore whether it is beneficial to transform TOM or include it as a continuous, linear independent variable. Roughly half of the research to-date has included TOM as a linear variable, while an equal number of studies have transformed TOM into log form. No one has provided an explanation as to why a particular TOM specification was chosen. Therefore, we modeled both specifications in an effort to determine which technique best fits our data.

Exhibit 1 presents the model summaries, standardized beta coefficients, and significance levels of both TOM specifications within each modeled time period. The transformed variable, *Log_TOM*, is found to be superior as it enhances model explanatory power and reduces the standard error of the estimate. Furthermore, the natural log specification's standardized beta coefficients are considerably larger than its linear counterpart. This demonstrates that *Log_TOM* maintains greater influence on the dependent variable. Lastly, the linear TOM variable was only statistically significant to the 0.05 level in the model analyzing the entire study time period. In contrast, the log specification was significant to the 0.01 level in all but the period marked by falling house prices. In this study, taking the natural log of TOM is clearly the appropriate technique.

Exhibit 2 provides brief definitions of the variables, while Exhibit 3 offers summary statistics on the model's continuous variables.

Results

Detailed results of the overall model are reported in Exhibit 4, while summary findings from the three subperiod models—rising, falling, and rising again—are presented in Exhibit 5. All models provide very high explanatory power, with an adjusted R^2 between

Exhibit 2. Description of Variables

Variable	Description
Ln(SP)	Natural log of sales price (net of chattels).
Log_TOM	Natural log of TOM measured from the date the property is listed to the date the sales agreement was executed.
Floor_area, Floor_area2	Floor area (square meters), floor area squared.
Site_area, Site_area2	Site area (square meters), site area squared.
Age, Age2	Pair of variables (age and age-squared) to control for residential vintage effect present in the Auckland housing market.
Int_Poor, Int_Good	Variable for whether the property's interior fixtures and finishes were coded by the valuer as being in poor, average or good condition. The default is average.
Beds_2_less, Beds_4_more	Series of dummies variables indicating the property's number of bedrooms. The default is *Beds_3*.
Contour_steep	Dummy variable for whether the property's land plot is steeply sloped or not. The default category is not steep, which includes properties coded in the dataset as featuring either a level contour or having an easy to moderate fall or rise.
Road_arterial	Dummy variable for whether the property is located on an arterial road [Road Class 1 as defined by Land Information New Zealand (LINZ)] or minor arterial road (Road Class 2) with the default category being an aggregation of Road Class 3 collector and Road Class 4 local road.
au506901, au506903, etc.	A series of dummy variables indicating the area unit (suburb) in which a property is located. The area unit containing the most observations serves as the default category.
Sold_2006_Q1, Sold_2006_Q2, etc.	A series of dummy variables for each quarter of when the property was sold. The default condition is the first quarter of each market phase.

Exhibit 3. Summary Statistics All Analyzed Sales Transactions (2006:Q1–2010:Q3)

Variable	Mean	Median	Std. Dev
Net sales price	639,185	573,500	267,595
TOM	52.31	35	73.39
Floor area (sqm)	141.9	128	51.69
Bedrooms	3.4	3	0.82
Site area	616.6	607	243.50
Age	56.9	58	31.04

Exhibit 4. Hedonic Equation Results
All Analyzed Sales Transactions (2006:Q1–2010:Q3)

Variable	B	Std. Error	*t*-Stat.	Variable	B	Std. Error	*t*-Stat.
Constant	12.335	0.025	496.782**	*Sold_2006_Q2*	0.020	0.010	1.912
Floor_area	4.21E-03	2.09E-04	20.143**	*Sold_2006_Q3*	0.048	0.011	4.470**
Floor_area2	−4.83E-06	5.54E-07	−8.705**	*Sold_2006_Q4*	0.060	0.011	5.752**
Site_area	4.63E-04	3.13E-05	14.818**	*Sold_2007_Q1*	0.110	0.010	10.650**
Site_area2	−7.65E-08	1.77E-08	−4.324**	*Sold_2007_Q2*	0.135	0.011	12.576**
Int_Good	0.176	0.014	12.981**	*Sold_2007_Q3*	0.139	0.011	12.263**
Int_Poor	−0.143	0.031	−4.667**	*Sold_2007_Q4*	0.147	0.010	14.073**
Beds_2_less	−0.061	0.007	−8.253**	*Sold_2008_Q1*	0.115	0.012	9.532**
Beds_4_more	0.019	0.005	3.894**	*Sold_2008_Q2*	0.066	0.011	5.779**
Contour_steep	−0.061	0.008	−7.911**	*Sold_2008_Q3*	0.051	0.012	4.316**
Arterial_road	−0.060	0.006	−9.451**	*Sold_2008_Q4*	0.020	0.012	1.705
Age	−6.12E-03	3.17E-04	−19.293**	*Sold_2009_Q1*	0.029	0.011	2.650**
Age2	5.77E-05	2.84E-06	20.333**	*Sold_2009_Q2*	0.067	0.011	6.084**
Log_TOM	−0.009	0.002	−5.849**	*Sold_2009_Q3*	0.077	0.011	7.138**
				Sold_2009_Q4	0.117	0.011	10.358**
				Sold_2010_Q1	0.105	0.011	9.225**
				Sold_2010_Q2	0.095	0.011	8.439**
				Sold_2010_Q3	0.126	0.020	6.344**

Notes: Area Unit dummy variables are omitted from table; dependent variable = natural log of net sales price. Adj. R^2 = 0.872; standard error of the estimate = .140; *N* = 5,685.
**Significant at the 0.01 level, using a two-tailed test.

0.865 and 0.875. Each control variable included in the models is a significant predictor of sale price. Their magnitude and signs are in line with theoretical expectations. In general, selling prices increase with site and dwelling size, good interior condition, and additional bedrooms. Conversely, older properties, houses located on a sloped site, busy arterial road, or of poor interior quality decrease sale price.

The variable of interest is clearly influenced by changing market conditions. In both subperiods when house prices are rising, *Log_TOM* demonstrates a significant, negative relationship with house prices. Noteworthy is the stability of the *Log_TOM* coefficients across the two rising models. On the other hand, TOM is found to have an insignificant impact on house price during the declining market from 2007:Q4 through the end of 2008. This suggests that in buoyant market conditions with shorter marketing periods being the norm, houses that remain unsold are subject to a stigma discount. However, this is not the case in a falling market. Although the model indicates a negative relationship, marketing time does not significantly impact selling price.

Exhibit 6 provides the annualized appreciation rates and median TOM across the three timeframes. Price appreciation was greatest during the first period, while median TOM was 31, its lowest point. During the second period marked by falling prices, TOM

Exhibit 5. Unstandardized Beta Coefficients across Market Phases

Variable	2006:Q1–2007:Q3 Rising	2007:Q4–2008:Q4 Falling	2009:Q1–2010:Q3 Rising
Constant	12.339**	12.479**	12.337**
Log_TOM	−0.009**	−0.005	−0.008**
Age	−6.46E-03**	−6.44E-03**	−5.09E-03**
Age_Sq	6.08E-05**	5.56E-05**	5.11E-05**
Floor_area	4.42E-03**	3.69E-03**	4.05E-03**
Floor_area2	−5.03E-06**	−2.56E-06*	−4.69E-06**
Site_area	4.60E-04**	5.40E-04****	4.36E-04**
Site_area2	−7.39E-08**	−9.68E-08**	−7.90E-08*
Int_Good	0.160**	0.159**	0.203**
Int_Poor	−0.074	−0.121*	−0.406**
Beds_2_less	−0.055**	−0.074**	−0.058**
Beds_4_more	0.018*	0.003	0.020*
Contour_steep	−0.077**	−0.039*	−0.065**
Arterial_road	−0.045****	−0.057**	−0.072**
Adj. R^2	0.875	0.865	0.870

Notes: Location and sale quarter dummy variables are omitted; dependent variable = natural log of net sales price. In 2006:Q1–2007:Q3, *N* = 2,480; in 2007:Q4–2008:Q4, *N* = 1,360; and in 2009:Q1–2010:Q3, *N* = 1,852.
*Significant at the 0.05 level.
**Significant at the 0.01 level, using a two-tailed test.

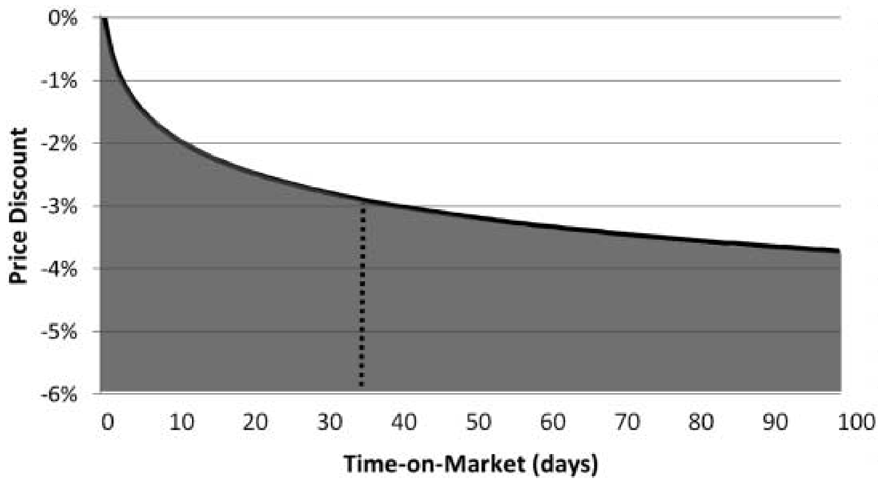
Exhibit 6. Appreciation Rate and TOM across Market Phases

	2006:Q1–2007:Q3 Rising	2007:Q4–2008:Q4 Falling	2009:Q1–2010:Q3 Rising
Annual appreciation rate	8.15%	−10.10%	4.95%
Median TOM	31	43	34

increased considerably to 43 days. When prices rose again in the third time period median, TOM fell back to 34 days. Perhaps a key reason for TOM's lack of influence on house price in a falling market is that a larger proportion of properties marketed for sale in such depressed conditions tend to linger on the market. Therefore, buyers do not react to stale listings in the same manner that they would in a buoyant market.

As shown in Exhibit 7, the final model indicates that the TOM price discount gradually levels off at approximately 4% after one year on the market. During that second rising market period, the median TOM was 34 days, which translates to the discount of just under 3% relative to houses that sell immediately upon listing. Overall, our results present convincing evidence that the relationship between TOM and selling prices changes with housing market conditions.

Exhibit 7. House Price Discount for Increased TOM



Conclusion

With few exceptions, researchers have not considered whether market conditions play a role in the relationship between TOM and house prices. Our research fills the gap in this area by focusing on this important issue. As with recent research, our data reflects a negative relationship between TOM and house prices. However, we further find that marketing period influences house prices only when the market is rising. Within such buoyant environments, properties that become stale are perceived by the market as being deficient in some way. This stigma, whether justified or not, negatively impacts house price. During depressed market conditions, however, buyers do not react to stale listings in the same manner and a stigma discount is not evident.

In addition, we compare the two predominant TOM specifications and find that a natural log transformation is superior to a simple, linear specification. This research can be directly applied by real estate agents who are ultimately responsible for the successful marketing of their clients' homes. Clearly, during rising markets, efforts should be made to refresh listings to avoid stigma losses. Residential property valuers can also apply this study's findings by taking into consideration the influence of such stigma on market evidence used in the sales comparison approach.

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