Homebuilders' Localized Market Power and House Prices

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Abstract

In the literature on real estate seller's bargaining power and house prices, little attention has paid to the developers. The existence of developer's market power in 'bargaining' higher housing price is challenged by the perfect competitive market structure homebuilding industry that is widely accepted in the traditional housing research. This paper provides deeper understanding to this assumption to examine the existence of developer's market power in the housing market and to test whether the observed dominance of homebuilders in the localized market in Singapore's housing market will confer any pricing power on the dominant homebuilders. The market power of homebuilders is proposed to estimate using the proportion of the homebuilders' existing supply in the district. The empirical testing is proposed to use Singapore housing transaction data from January 1996 to December 2012 totally 52,085 observations.

1.   Introduction

In the housing market where products are heterogeneous, it is recognized that the market will be thin and price will be influenced by both the characteristics of the product and the bargaining skills and power of the buyers and sellers (Sirmans, Rosenthal and Harding, 2003). To explore the true house price that cannot be fully estimated by the hedonic pricing model, a plethora of studies have researched on the impact of seller and buyer's bargaining power on house prices. Apparently, the relevant literature has documented time-on-market, marketing time, vacancy and the buyer and seller's characteristics and pricing strategy as important factors affecting sellers' bargaining power (Turnbull, Sirmans and Benjamin, 1991; Turnbull and Herbert, 2011; Turnbull and Dombrow, 2006).

Nevertheless, this branch of literature studies real estate seller's bargaining power from an individual seller level. The bargaining power of real estate seller as an organization, which is the developer over selling price has received relatively little attention. This is despite of the established mechanism in the industrial organization literature that the market power, which signifies the firm's bargaining power, will enable a firm to raise price above the competitive level without losing so many sales so rapidly (Landes and Posner, 1981). The degree of a firm's market power in the market thus signifies its bargaining power in setting the desired price level to maximize its profit.

The lack of the research in the area of developer's market power reveals one assumption common in the existing literature. The traditional housing research assumes the homebuilding industry as perfectly competitive and each developer will have a very small market share given large number of competitors and small share of the national market. Under this assumption, there is no or little existence of developer's market power and the corresponding pricing power.

While this assumption is held in some existing studies, it is also being refuted and modified in other housing research. Mills (1980) argues that development projects have become increasingly broad in scope, more complex and involving much greater capital investment. This change in nature of the project leads to higher barrier of entry that limits the number of players in the market. Also, developer's ownership of land resources and its financial capability determines its cost of construction and will give rise to different market power and different land rent. Somerville (1999) further the argument by providing empirical evidence to show there is a wide and systematic variation across metropolitan-area housing markets in both the average size of builders and the market share for the largest builders in an MSA. The empirical evidence has two implications. First, the variation of developer's market share across region reveals that the market power for a developer could vary in different region. Second, it is suggestive that the measurement of developer's market power would be more accurate if it is specified at a regional level.

The lack of research on the bargaining power of developer in house price, and the arguments on the market structure of homebuilding industry lead to two research question that are intriguing to explore: Is there is existence of developer's market power in the housing market? Will the existence of market power alter developer's bargaining power in price setting? In the existing literature, the most relevant branch of literature views the residential development process as driven by developer inter-

temporal land pricing to exploit market power (Markusen and Scheffman, 1978a, 178b; Mills, 1980; Turnbull, 1988a). In their theoretical models, developer's market power is defined by its proportion of land ownership in the market. Firms with substantial market power can withhold land in order to increase the land price in each period. Meanwhile, it is also highlighted in their model sequential release of land to the market caused by landlord's substantial market power would increase the total land supply and reduces real land rents and prices over time. It would eventually dampen the effects of exogenous growth in land demand.

This paper is proposed to study the relationship between developer's localized market power and its ability to set house prices. The proposed topic does not only provide deeper understanding of the research gap abovementioned, but also attempt to deepen the understanding of the potential problem caused by developer's market power. It is evident in existing literature that monopolistic power or substantial market power possessed by firms could create price distortion that is detrimental to land allocation and urban development. Turnbull (1988) examined the effects of market power and location rents on the land use allocation process. The main results reveal that increases in land market power may either hasten or slow land use adjustment, depending on the initial state, although it will lower the amount of land allocated to urban use in the long run. Also, increased market power in the development sector will slow the pace of development, but will not alter the ultimate land allocation. Better understanding of developer's market power in the housing market and its implications on house prices will allow researchers and policy makers to provide a market structure and housing policy that maximize the welfare of the society.

The present study is proposed to focus in the context of Singapore housing market. As the literature defines the market power of the developer as its market share of the existing supply, the proxy used to measure market power would be defined as the developer's market share of existing supply of housing stock in the planning region. To answer the research question of whether homebuilder's localized market power will effect on their pricing ability, the following hypothesis will be examined in the paper:

Homebuilders with larger market power will have greater pricing power in the housing market in the local planning region.

2. Literature Review

In this chapter, a broad summary of the relevant literature will be discussed in an attempt to convey the major knowledge and ideas that have been established by previous studies. The discussion will start with the fundamental theories linking market power and price leadership. Next, a review of the concept of product differentiation will be discussed in relation with market power to justify the existence of causality between market power and pricing ability. The third section is a discussion on the key viewpoints that substantiate the causal link between market power and pricing ability for homebuilders. Finally, the literature review ends with a summary of the major branches of literature and the highlight of the literature gap that this present paper is proposed to fill.

2.1. Price Leadership and Market Power

The existing literature classifies price leadership according either market structure or conduct (Stigler, 1947b, Markham, 1951, Ono, 1982). Scherer (1970) classifies price leadership into three types: dominant, collusive and barometric. According to him, the dominant type is considered to describe industries in which a dominant firm, which has the largest market share, solidly establishes the price leadership position with the other minor firms being followers. The collusive type (the monopolistic type of Stigler's barometric price leadership) is where some principal firms set prices which are followed by other minor firms being followers. Finally, in the barometric type (the competitive type of Stigler's barometric price leadership), the price is set around the competitive level. The definition of price leadership demonstrates the close link between the firm's market share, which could possibly translate to its market power and its corresponding ability to lead in price setting. Besides, the market structure that concerns degree of competition present in the market would also be paramount in determining a firm's pricing ability.

2.2. Market Power and Product Differentiation

The concept on market power and pricing ability are first proven empirically in the U.S. airline industry. The prior empirical studies confirm that airline's increasing market power, which is measured by the proportion of number of passengers given a set of itineraries, will enhance the airline's ability to set prices. It is also implicit in these studies that airline industry is oligopolistic and their products are undifferentiated, thus market shares of the airlines could well reflect their degree of market dominance. Berry (1990), however, refutes these notions by attributing the dominating airline's market power to their 'differentiated' output provided. Customers are willing to pay a premium to the dominating airlines for factors like better services and higher flight frequencies. Such analysis does not only probe deeper into the concept of market power in the airline industry, but also shed light on the firm's market power acquired through product differentiation and branding of their goods. It is suggestive that in the industry where products are heterogeneous, branding through product differentiation will enhance firm's market dominance and its pricing power.

With close relevance to the exploration of product differentiation and market power in the real estate market is the study done by Leishman (2001), which tests the hypothesis that house builders are able to differentiate or 'brand' their output. Based on a dataset comprising 1,155 new housing transactions with physical attributes and transaction prices for Glasgow between 1989 and 1992, he proves that competition decreases with increased market concentration, which greatly enhances firm's ability to differentiate output and obtain higher prices compared to other suppliers. The 'branding' effect by different homebuilders has shown significance in the hedonic results. In contrary to the implicit assumption in many housing literature that house building industry is competitive, this study also prove empirically that the industry's share of output is dominated by the large house builders. Though the relationship

between market power and pricing ability is not explored in this study, it provides basis for the existence of branding effect caused by product differentiation and its influence over homebuilder's market power in the real estate market.

2.3.　　Housing Literature on Market Power

In the early literature on housing market, the idea of market power is elaborated in the residential development process in the early literature on housing market. This branch of the literature views the residential development process as driven by developer intertemporal land pricing to exploit market power (Markusen and Scheffman, 1978a, 1978b; Mills, 1980; Turnbull, 1988a). Broadly, these studies define the concept of 'market power' based on market structure. In the theoretical model presented by Markusen and Scheffman (1978a), a 'concentrated' market is defined as a few large land owners own a significant proportion of developable land. Turnbull (1988a) examines market power in the monopolistic and competitive land markets. The definition of market power in prior literature is consistent with that in the airline studies that define market power of airlines in terms of their outputs in the market.

In these real estate market power models, the casual link between market power and price setting is established in the way the firm withholds land in order to increase the land price in each period. Specifically, land prices are driven by the time paths of consumer bid rents, either stationary or exogenously growing over time (Sirmans et al., 1997). The theoretical finding is suggestive of the existence of market power acquired by the homebuilders in the real estate industry, and such market power could be estimated by the market concentration of their outputs. .

Market competition provides another perspective to explain the relationship between increasing market power and homebuilder's ability to set higher. In contrary to market dominance by a few homebuilders, increasing the number of sellers in a competitive market increases the competition for buyers, and if the number of buyers is exogeneous then this competitive effect reduces selling prices. Having greater market power, which also means having fewer competitive new listings nearby, will in turn enable the homebuilders to command higher selling prices.

Bearing in mind the downward pressure market competition could affect on unit selling prices, it is worthy to note that the notion of shopping externality might create upward pressure to the unit selling prices and blur the actual effect of market competition. It is postulated in Turnbull et al. (2006) that buyers will be attracted to locations with a greater concentration of sellers in order to reduce the search costs associated with contacting a wider variety of sellers. Increasing the concentration of sellers in a particular locale also creates a shopping externality, increasing the probability of a successful match between seller and buyer, which tends to increase selling prices.

Based on 4922 transactions during July 1985 to June 1997, the same study finds that the dataset exhibits both competitive spatial externality effects on selling prices. It is also highlighted in the study that the relative strength varies with how fresh the house is in the market, the freshness of surrounding houses, and the phase of

market cycle. While new listings have the strongest shopping externality effect on neighboring houses that have been on the market for some time, vacant houses have their strongest competition effects in the declining market and externality effects in the rising market. Fresh houses on the market reap little benefits from shopping externalities in all phases of market cycle.

2.4.   Summary of Literature Review

Overall, both theoretical and empirical evidences have proven that a firm's market power would have substantial influence over its pricing ability, which could even enable it to be the price leader in the market. A widely accepted fact from most studies on this field is that the concentration of firm's output in the localized market is an established estimator of the firm's market power in the given market. Moreover, the findings on homebuilders' ability to differentiate and brand their outputs, the importance of market timing and house freshness in determining the effect of market power on selling prices as highlighted in Turnbull et al. (2006) has crucial implications to the research designs of the present paper. The variables to be controlled in the model will be well-considered in order to ensure the robustness of the final findings.

The discussion above has revealed at least two gaps in the existing literature that this paper is proposed to fill. First, there are a scant number of studies that focus on the impact of market power of pricing ability on firms in industry with heterogeneous output. Markham (1951) believes that the condition of each producer viewing the output of all other firms as close substitutes must be met, in order to ensure the market is characterized by a single price policy. It is however, arguable that housing goods are deemed homogeneous, since each residential unit would have distinctive location, orientation, floor level, area and many other attributes that would determine housing prices. The lack of empirical studies in the field of heterogeneous goods further motivates the present study to establish theoretical justifications between market power and pricing capability for homebuilders, and to examine the effects empirically using the most appropriate proxies for market power in various localized markets.

Secondly, there are no empirical studies that a scant number of studies are done on the Asian housing pre-sale market, which might exhibit different characteristics compared to the U.S. market due to home buyers' perception of product branding and homebuilder's pricing capability. In view of this knowledge gap, the proposed research that examines such relationship in housing market will be paramount to the understanding of this field. Further, the proposed research leverages on the dataset on Singapore housing market to fully explore the casual link between market power and its influence over pricing ability in the localized market.

3.   Empirical Specifications

This section will start with introducing the detailed context and source of data, followed by the introduction of model selection and design. Last but not least, a comprehensive explanation of the variables selection will be documented to explain the rationale of the research design.

3.1.   Singapore Housing Market and Data Selection

The data for this study will be taken from the fourth quarter 2013 version of the Real Estate Information System (REALIS) transaction data published by the Urban Redevelopment Authority (URA) of Singapore. The proposed sample will cover the entire residential transactions available in the REALIS data dated from January 1996 to December 2012. This dataset covers all the residential property transactions in Singapore that have been lodged caveats. As most home buyers in Singapore will take up mortgages to supplement their purchases, this REALIS dataset is able to capture approximately 90% of all the private residential sales in Singapore. The randomness and substantial coverage of the data used ensures the results would be reflective of Singapore context. Along with the unit transaction price information, the data also include variables such as postal code, unit area, contract date, tenure, postal district, completion date and planning area, totally 52,085 household's transaction information.

Besides the information available in the dataset, there are also other variables that are required in the study such as the information of the homebuilders of the developments, the development's distance to nearest subway station (referred to 'Mass Rapid Transit' (MRT)) as well as to the Central Business District (CBD). To find the missing variables in the dataset, Geography Information System (GIS) is used to ensure the dataset is comprehensive for the study.

The present study focuses on the private housing market in Singapore. In comparison with the public housing sector, the private housing market is relatively small (18 per cent of total housing stock). Tu (2004), nevertheless, contends that its impact on the Singapore economy is significant because any fluctuation of private housing prices has important implications for the national wealth holding.

The use of Singapore transaction data enables the study to analyze the housing market dynamics from several unique perspectives that conventional data from the U.S. and other countries with large territories cannot offer.

First, the market structure in the housing development market exhibits monopolistic competitiveness. The state plays a strong interventionist role in order to achieve optimal land allocation given the constraint of land resources (Ho, 2010). Meanwhile, the price is set not by the government but through the Government Land Sale (GLS) Programme, which allows market forces to come in by letting the private developer to tender the land parcels. Apparently, tender price and design are the two main criteria for land allocation. While such GLS system allows the market to be more

competitive, it is also argued that some big developers are still dominating the market, such as City Developments Limitd (CDL), Far East Organization (FEO), KeppeLand, United Overseas Limited (UOL) and many renowned developers. The potential existence of developer's market power provide good context for the study.

Second, consistent with the common practice in many of the Asian markets, such as China, Hong Kong, Taiwan, South Korea and Malaysia, most new condominiums in Singapore are sold before project completion. Prior to offering residential units for sale in Singapore, the developer has to obtain a Housing Developer Sale License, which is only granted to those with good track record (Munneke et al., 2011). Usually, it takes another 12 quarters for the developer to complete the new development and hand over the completed units to the buyers. As the home buyers are not able to view the actual housing product during the purchase, the developer's reputation does play a part in their decision making. In another words, the homebuilder's ability to bid for good land location to develop private housing, its ability to provide good unit design and manage the condominium will determine how good their 'brand' will be perceived by the buyers in the market. This will in term be translated into the price premium paid by the home buyers.

3.2.   Model Selection

To address the question on whether market structure at the local district level is an indicator of pricing power, a regression with measures of transaction price on a vector of development and homebuilder characteristics including measure of market share or concentration will be used in the present study. This price equation can be considered a reduced form specification, where demand and supply characteristics of the relevant market are included as explanatory variables. To ascertain whether market dominance at the district level conveys any competitive advantage, the data will be segmented into different district, and a measure of average fare of every development in a particular district will also be generated. By aggregating the data in this manner, multiple observations will be generated for each district.

Many factors explain inter-district differences in price. As it is nearly impossible to specify completely all these factors and many factors are difficult to measure, a fixed-effects procedure will be employed to estimate directly the effect of district market shares on prices.

The research design closely follows the econometric model specified in Evans and Kesside (1993) with modifications based on literature on hedonic pricing and many other housing studies. Fixed-effect regression models will be used in the analysis. The equation estimated is proposed to be:

$Ln\ (P_{ij}) = \ LMP_{ijt} + X'_{ij}\beta + f_j\ + v_j + \mathcal{E}_{ij}\ for\ i= 1,2,…,f_j,\ and\ j = 1,2,…,\ n$

where P_{ij} is the unit transaction price of unit i in district j, *LMP_{ijt} is the market power of the project i in the district j at time t,* X_{ij} is a k x 1 vector of characteristics that vary with the unit's identity within the district, the v's are fixed-district effects, f_j is the number of units in district j, and there are n districts.

To ensure the accuracy of the findings, robustness check is proposed to control for inter- private condominium market heterogeneity, the market will be sub-divided into different categories for more precise estimations. The criteria for categorization could be either pricing[1] of the unit or size of the developments[2]. The examination of market dominance and its effect on pricing power will be based on price premiums at individual unit level.

3.3.   Variable Selection

This section provides detailed explanation of the basis and methodology of choosing the variables. A summary of the variable definition and calculation will be provided in Table 1.

<u>Localized Market Power (LMP)</u>

Empirically, the dependent variable is price; the main variable of concern is 'Localized Market Power' (LMP) that measures the concentration of homebuilder i's proportion of existing supply of launched yet unsold housing stock in the planning region it locates. This definition of MP follows Mills (1980), which defines developer's market power as its proportion of existing supply of land in the region. This variable serves as a proxy to measure the market share of the individual homebuilders in the localized area. As the number of unsold supply could also indicate homebuilders' weakening bargaining power that could possibly lead to lower selling price, the variable indicating the 'freshness' on market is included to control for this effect.

Other various ways of measuring LMP will be tested to increase the robustness of the study. They include 1) Lag and lead proportion of existing supply to capture anticipation effect & influence of LMP; 2) Proportion of existing supply by developer in the region/nation; 3) Calculate the proportion of existing supply of the project to that of the projects in the same tiers in the region. The tiers could be defined by the price ranges of the developments. This methodology might not yield different results as projects launched in the same region are normally of comparable price ranges.

Resale transactions should be handled with care in the estimation. They could be taken out of the database or considered to have LMP=0 since individual sellers normally have one unit to sell at a time.

<u>Dependent Variable (LnPrice)</u>

The dependent variable will be the natural logarithm of unit sale price. The key variable of utmost concern, the local market power of firm *i* will be defined as the

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[1] The sample could be divided into mass market, medium range, high- end and luxury markets according to the price per square foot

[2] The size of the development is quantified based on the number of units in the development. Proposed categorization could be less than 50 units, 50-100, 100-200 and more than 200 units.

market share of the firm in a particular district *j*. The market share will be calculated by dividing firm *i*'s number of units sold over the number of total units sold in the district. Binary variable indicating whether the firm *i* selling unit g adapts dominant price leadership will be used, which indicates '1' if the firm has more than 40% of market share in the local district and '0' if it does not.

Besides, a restrictive instrument variable that is the rank of the firm's market share is proposed to alleviate the endogeneity problem caused by the reverse causality between market share and price premium, as well as the correlation between market share and error term. Development, firm specific attributes, cost index [3] and Herfindahl index[4] will be controlled in the model.

The testing of hypothesis will be based on the coefficient of the market share variable.

<u>Other Control Variables</u>

Moreover, the time-on-market of the unit is measured by the variable, 'DOM' (day on market) that measures the number of days the particular unit is launched in the market. In addition, the variable 'newly listed' is defined as any house that has been listed for 14 days or less as mentioned in Turnbull et al. (2006). The bargaining power of the seller will decrease with the increase of the units' time on market and it could lead to lower selling prices. To control for the vacancy effect, a continuous variable indicating the unit's time on market is included in the empirical specification.

Table 1 Summary of Definition and Calculation of Variables

Variable	Definition	Unit / Calculation	Expected Sign
Dependent Variable			
Ln (P)	Natural logarithm of unit sale price	Singapore Dollar	-
Key Independent Variable			
LMP*i*	Market power of the developer for unit *i*	Proportion of the total number of remaining supply of developer i in the district it locates	+
Independent Variables on Physical Attributes of Houses			
MRT*i*	Walking distance from property *i* to the closest MRT station	Dummy: "1" if the walking distance to the closest MRT < 800m, "0" if otherwise	+

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[3] As estimated in the annual construction reports published by Rider Levett Bucknall

[4] Herfindahl index (HHI) is a measure of the size of firms in relation to the industry and an indicator of the amount of competition among them. It is defined as the sum of the squares of the market shares of the 50 largest firms in the market.

PRM-SCH	Primary school within 1km radius of property i	Dummy: "1" if there is a primary school within 1km radius; "0" if otherwise	+
CBDi	Distance from property i to CBD central	Kilometer	-
PPIi	Market index at time of sale	Total number of directors on board of REIT i for year t	+
FLi	Floor level of the property	-	+
CENTRAL_Ri	Planning region where the property is located	Dummy: "1" if the property is in the Central region; "0" if otherwise	+
Independent Variables on Market Timing and Time-on-Market			
DOMi	The time the unit is launch on market	Transaction date minus project launched date	-
HOTi	Whether the unit is launch in hot market period	Dummy: "1" if the unit is launched in hot property season, "0" if otherwise	+
Independent Variables on Homebuilders			
Good	Indication of whether the homebuilder is reputable in Singapore	Dummy: "1" if the homebuilder is one of the top 10 developers in Singapore, "0" if otherwise	+
Other Independent Variables			
HHI	Herfindahl index	Sum of the squares of the market shares of the 50 largest firms in the market.	-

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