

Market Structure in the Residential Real Estate Brokerage Market

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Abstract. This study provides empirical evidence regarding brokerage firm concentration in a local market multiple listing service setting over the years 1992–1995. To evaluate the level of brokerage firm concentration in this market, Gini Coefficients, Herfindahl-Hirschman Indices and Concentration Ratios for each year of the study period are calculated. Our results indicate that for firms responsible for listing properties, firm concentration has not varied substantially over the four-year study period. However, for those firms that were responsible for actually selling properties, firm concentration has decreased over the study period. This finding tends to indicate that the MLS now provides greater exposure to a wide variety of sales firms, therefore leading to a higher level of competition with a lower level of concentration for selling firms in this local market.

Introduction

The market for the services of residential real estate brokerage firms has seen considerable change in recent years. One dramatic change is a result of new computer technology that has increased the formation of regional multiple listing services (MLS) versus the traditional MLS for one city. Some concern exists that the residential brokerage business is moving toward domination by large national and regional firms. Michael Selz (1990) in a *Wall Street Journal* article reports that more than a half dozen of the largest national brokerage firms and the twenty-five largest regional firms handle more than 40% of houses sold. In the same article, Selz indicates that Richard Loughlin, chief executive officer of Century 21 Real Estate Corporation, predicted that the largest companies' share of the business would grow to 60% by 1995. These estimates are for homes that are sold through local multiple listing services and exclude new houses that are typically sold by developers.

The residential real estate brokerage industry is considered to have few barriers to entry with numerous companies offering what is perceived to be essentially the same service. In an industry with such low barriers to entry we would expect to find insignificant concentration levels. However, it is possible that at the firm level, brokerage firms are able to establish dominant positions in a market and thus command a large percentage of market share. Selz's (1990) comments support the view that considerable residential brokerage firm concentration exists and that it may be increasing.

In this study we examine brokerage firm concentration in a multiple listing service setting. We estimate the market structure of brokerage firms in an MLS over the 1992–95

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period. Market structure in terms of brokerage firm sales from both the listing firm's and the selling firm's perspective is estimated. Even though the national figures provided by Selz (1990) suggest increased concentration in the brokerage industry, this picture may be misleading due to the fact that on the supply side the market has traditionally been localized. Therefore, although in our study we focus on brokerage firm concentration in one Texas city, it is believed that this study is of importance nationally, as it indicates the likely situation throughout the country.

This study is organized as follows. The next section presents a brief review of several studies that are concerned with market structure of the real estate industry. The third section presents our sample and summary statistics. The fourth section discusses the methodology. Section five reports our empirical findings and the last section contains our conclusions.

Related Studies

Several studies related to market structure in the real estate industry provided insights for the analysis presented in this work. Following the development of the MLS, market structure of the real estate industry received increased attention. For example, Miller and Shedd (1979) reviewed court decisions regarding whether market information gained from the MLS can be reserved only for the members of the local realty board who joined the MLS. In addition, they dealt with the question of whether the existence of uniform commission rates necessarily indicates illegal price fixing. They drew the conclusion that "as brokerage firms continue to grow larger and franchise affiliations increase, collusion among a fewer number of firms becomes easier and subject to increasing scrutiny."

Colwell and Marshall (1986) empirically analyzed market share in the real estate brokerage industry. Their analysis was especially valuable in developing some of the methodology used in our study. In particular, one part of their study uses the Gini Coefficient as a measure of dispersion of listings or sales among brokerage firms. In an application to Champaign County, Illinois for the years 1980 and 1981, Colwell and Marshall (1986) state that their results indicate "a high level of concentration but not so high as to indicate the presence of monopoly power or even a dominant firm."

Zumpano, Elder and Crellin (1993) empirically estimated an average cost curve that reflects the effects of firm size on the production costs of residential real estate brokerage firms. Their results show that after an initial sharp decline in average costs with an increase in firm size, average costs remain essentially constant over a wide range of outputs. Data for their analysis come from a national, cross-section sample of real estate brokerage firms that derived at least 75% of their revenues from residential real estate transactions.

Although Yang and Yavaş (1995) were not concerned directly with brokerage firm concentration, their analysis does emphasize the impact of size of the brokerage firm upon Time On the Market (TOM) for a sample of single-family home sales in State Park, Pennsylvania in 1991. Their findings indicate that size of the listing firm does not have a significant impact on TOM.

An empirical investigation of the market structure of the real estate agents industry in the 1980s in the U.K. was conducted by Dietrich and Holmes (1990). Their study analyzes changes that occurred in seller concentration and geographical diversification using a data set of all real estate agents in the Lyneside area. The four-firm Concentration

Ratio used as a measure of concentration in their study is also used in our study. Their analysis shows that following 1983 there was a sharp rise in concentration due to the entry of large financial institutions.

Data

The data used in this study consists of residential transactions sold over the period January 1992 through December 1995. The Multiple Listing Service's Property Sold records for a city of approximately 250,000 in Texas supplied the information identifying the listing firm, selling firm and the sale price. These three variables were obtained for 11,937 of 12,307 properties sold over this period. The sample includes all sales, but only the listings that resulted in sales. The 11,937 sales represent 96.99% of the total transactions. Total number of transactions was obtained from the Texas A&M University Real Estate Center *TRENDS* publication. We were unable to obtain any information on the remaining 3.01% of the transactions. Of the 11,937 sample sales, 2,838 occurred in 1992, 3,082 in 1993, 2,954 in 1994, and 3,063 sales were reported for 1995. The average sales price over the entire sample is \$96,013, with an average of \$90,277 for 1992, \$97,222 for 1993, \$95,917 for 1994, and \$100,204 for 1995.

Methodology

This study will first use the Gini Coefficient to measure the dispersion of residential sales among brokerage firms. Then two direct measures of market concentration, the Herfindahl-Hirschman Index and the Concentration Ratio, are calculated. The availability of sales price allows us to calculate market concentration based upon dollar volume instead of in terms of numbers of listings and sales.¹ The measures of dispersion and market concentration are calculated for the year for each firm in terms of dollar volume and only those listings that resulted in a sale are included in the data.

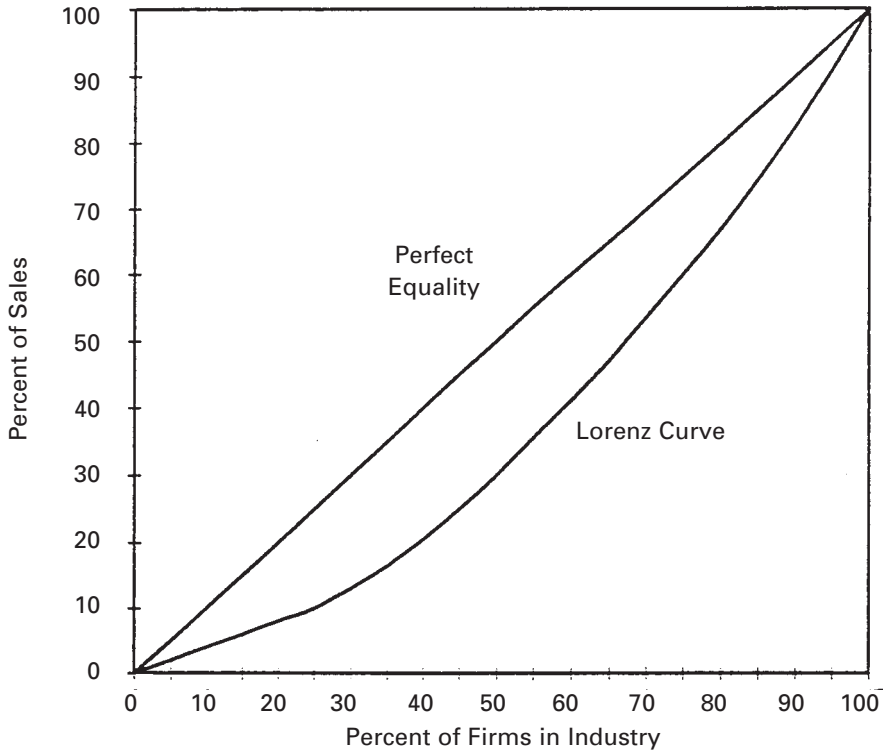
Derivation of a Gini Coefficient can be illustrated by comparing areas on a graph which depict a Lorenz curve. In Exhibit 1 the cumulative percentage of residential sales is measured on the vertical axis and the cumulative percentage of brokerage firms, ranked from smallest to largest based upon dollar volume sales, is measured on the horizontal axis. If sales are equally dispersed among all firms then, for example, the smallest 25% of the firms will account for 25% of the industry's sales. Thus, perfect equality in the dispersion of sales among the industry's firms is represented by a diagonal line with a 45-degree slope. The actual dispersion of sales is represented by a Lorenz curve that reflects that, for example, the smallest 25% of the firms may account for only 10% of total sales.

Thus, the closer the Lorenz curve lies to the line of equality, the more equally sales are distributed among firms. Conversely, the further the Lorenz curve is bowed away from the 45-degree line, the greater the degree of inequality in the distribution of sales. The Gini Coefficient permits a convenient measure of the degree of inequality. The Gini Coefficient is calculated as:

$$Gini\ Coefficient = 2 \int_0^{100} \left\{ \frac{[x - f(x)]}{P} \right\} dX ,$$

where X equals number of sales and P is the number of brokerage firms. The resulting coefficient is the ratio of the area between the Lorenz curve and the line of equality to the

Exhibit 1
Lorenz Curve



entire area below the line of equality.² Therefore, the larger the Gini Coefficient, the more unequal the distribution of sales. Thus, complete inequality (pure monopoly) will yield a ratio of 1, and perfect equality, a ratio of 0.

A small Gini Coefficient means that there is little inequality among firms in sales. An inference could be made that in this case there are no large firms accounting for a high percent of sales. That is, there is a small degree of market concentration. However, this may or may not be the case. For example, a Gini Coefficient of 0 (perfect equality) is derived whether there are two firms in the industry with equal sales or forty firms with equal sales. The degree of market concentration, however, differs significantly.

Thus, while a measure of dispersion provides useful information about market structure, it must be used with caution for inferences regarding market concentration. Thus, we supplement the information provided by the Gini Coefficient with Concentration Ratios and the Herfindahl-Hirschman Index. The Concentration Ratio measures the proportion of total industry sales accounted for by the largest selected firms. It is defined as:

$$CR_N = \sum_{i=1}^N \frac{X_i}{T}$$

where N is the number of firms ranked from the largest to the smallest and χ_i is the number of sales for the i^{th} firm, and T is the total number of sales in the market. If one chooses to consider the four largest firms the Concentration Ratio is designated CR_4 , as opposed, for example, to CR_8 if one chooses to consider the eight largest firms. The Concentration Ratio also has a principal limitation, since it measures concentration at only one point on the size distribution of firms. For example, suppose that in a given year $CR_4=50$ and $CR_8=75$ and that five years later in the same industry $CR_4=45$ and $CR_8=80$. This leaves open the question of whether the industry has become more or less concentrated.

The last measure of market concentration we calculated is the Herfindahl-Hirschman Index which is defined as:

$$HHI = \sum_{i=1}^N S_i^2,$$

where S_i is the percentage of total industry sales (market share) by the i^{th} firm and N is the number of firms in the industry. Thus, the index is the sum of the squares of the market share percentages of all firms in the industry. A value of 1, or 100%, for the index would indicate only one selling firm (a pure monopoly market structure). The HHI is often presented as an integer where 100% is equivalent to 10,000. The index value declines as the number of firms increase and increases as inequality among a given number of firms increases. The HHI weights the market shares for large firms more heavily than for small firms as indicated by the squaring of market shares.

As in the case of the Gini Coefficient, the value of the Herfindahl-Hirschman Index can be misleading as a measure of market concentration. For example, the index will be equal to approximately .17 (1700) in each of the following cases: (1) an industry composed of two large firms with market shares of 25% each and five small firms selling 10% each, or (2) an industry composed of six firms with each selling 16.67% of the market total. Clearly, market concentration is considered higher in the first instance.

Given that each of the three measures of dispersion/concentration has some limitations, we estimate all three. Consideration of all three measures provides a more informative picture of market structure for a given market. However, our interpretation of the results are influenced most heavily by the Department of Justice's shift from Concentration Ratios to the Herfindahl-Hirschman Index in 1982 when new merger guidelines were announced.³

Results

The data was divided into the following two groups: (1) Listing Office/Firm and (2) Selling Office/Firm. The Listing Office/Firm results are presented in Exhibit 2 and the Selling Office/Firm results are presented in Exhibit 3. The Listing Office/Firm group is comprised of those brokerage firms that listed any properties that were subsequently sold, either by the same firm or another firm. Firms responsible for listing properties that did not sell were unavailable for the analysis. The Selling Office/Firm group is comprised of the brokerage firms that sold any properties during the study period, whether they were listed by the same firm or another firm.

A word of explanation is required for the large increase during the 1992–95 time period in the number of listing firms (from 53 to 134) and the number of selling firms (from 64

Exhibit 2
Listing Brokerage Firm Concentration over the 1992–1995 Period

	Year of Sale	1992	1993	1994	1995
	Number of Sales	2838	3082	2954	3063
Listing Office/Firm					
1. Number of Listing firms with sales		53	80	109	134
2. Gini Coefficient		0.7948	0.8468	0.8827	0.8760
3. CR_4 for listing firms		0.5561	0.5670	0.5829	0.5625
4. CR_8 for listing firms		0.8143	0.8223	0.8266	0.7823
5. Herfindahl-Hirschman Index (HHI)		0.1027	0.1012	0.1069	0.0951
5a. Herfindahl-Hirschman Index (10000s)		1027	1012	1069	951

Exhibit 3
Selling Brokerage Firm Concentration over the 1992–1995 Period

	Year of Sale	1992	1993	1994	1995
	Number of Sales	2838	3082	2954	3063
Selling Office/Firm					
1. Number of Selling firms with sales		64	112	204	198
2. Gini Coefficient		0.7851	0.8364	0.8530	0.8463
3. CR_4 for selling firms		0.4717	0.4609	0.4419	0.4518
4. CR_8 for selling firms		0.7520	0.7177	0.6622	0.6629
5. Herfindahl-Hirschman Index (HHI)		0.0821	0.0755	0.0652	0.0672
5a. Herfindahl-Hirschman Index (10000s)		821	755	652	672

to 198). After discussing this issue with the MLS, the conclusion was reached that this increase in both listing and selling brokerage firms is primarily attributed to two items. First, there was a net increase in new firms entering the market in 1993 primarily due to the increase in market activity and the drop in interest rates. Second, the MLS expanded from a local/city MLS to a regional/county MLS. When this transition occurred in February 1994, the monthly fees dropped from \$72.50 to approximately \$25 per month. Thus, brokerage firms already active in the market were more willing to join the MLS. The combination of both factors resulted in a considerable increase in the number of firms during 1994 with stabilization in 1995. These factors are undoubtedly significant in explaining some of the reduction in the concentration measures that follow.

Interpretation of Gini Coefficients

As previously mentioned, the Gini Coefficients are indicative of the dispersion of residential sales among all participating brokerage firms. The relatively large values of the Gini Coefficients indicate the market for both listing and selling firms is characterized by a high degree of inequality in the distributions of sales. The Gini Coefficient increased for the listing firms from .7948 in 1992 to a peak of .8872 in 1994 and fell slightly to .8760 in 1995. For selling firms the Gini Coefficient had the same trend, increasing from .7851 in 1992 to .8463 in 1995. Thus, inequality in the distribution of sales among both listing and

selling brokerage firms increased during this time period, although in both cases the coefficient was slightly smaller in 1995 than in 1994.

Interpretation of Concentration Ratios

The Concentration Ratios provide a measure of the proportion of total market sales accounted for by the largest firms. Two Concentration Ratios, CR_4 defined as the percentage of the market held by the four largest firms, and CR_8 defined as the percentage of the market held by the eight largest firms, were calculated for this study. Looking at the firm identification code, the same set of firms hold the top positions each year.

Specifically, the CR_4 indicates that over the sample period that four of the listing firms maintained on average 56.71% of the market for listings that eventually sold. The CR_8 on average is 81.14% for listing firms. There is a slight increase in concentration for listing firms over the period 1992–94, with a slight drop in the 1995 estimate for both the CR_4 and CR_8 value. Overall, based upon the Concentration Ratios, the market concentration of the listing firms is reasonably stable over the period of our study. We find no evidence that the largest listing firms are increasing their share of the market in this local market.

The Concentration Ratios for the selling firms are less consistent. The CR_4 indicates a reasonably stable concentration level, with four firms on average accounting for 45.66% of the dollar volume of sales over the sample period with a standard deviation of 1.27%. However, we find a standard deviation of 4.4% with a mean of 69.87% for the CR_8 . From 1992 to 1995, the largest four selling firms saw their market share decline by 4.22%, while the largest eight selling firms experienced a decline of 11.85% of their market share.

Based upon Concentration Ratios, our results provide no evidence that firms in the brokerage industry are increasing their market share. On the contrary, the results suggest that due to technological advances and the resulting increased competition, the level of concentration in residential brokerage may be declining.

Interpretation of Herfindahl-Hirschman Indices

The Herfindahl-Hirschman Indices (HHI) provide a measure of the degree of market concentration among all participating brokerage firms in a specified market. The Justice Department's merger guidelines indicate that for markets with HHI values below 1000, a merger challenge is deemed unlikely.⁴ Listing firms have an average HHI value of 1015. This value lies in the range (between 1000 and 1800) where the Justice Department is unlikely to challenge a merger unless the HHI value would be increased by 100 points by the merger. Based upon these guidelines, we conclude that the level of concentration for the listing firms should not be a significant concern. We do find a decrease in the HHI value to 951 in 1995, indicating a lower level of concentration than the prior three years. Over the period 1992 (HHI=1072) to 1995 (HHI=951), there is a 7.4% decrease in the level of market concentration for listing firms based on the changes in the HHI.

Selling firms have an average HHI value of 725 over the sample period. The largest value was 821 in 1992 and the lowest value was 652 in 1994. Over the four-year period there is a 18.15% decrease in the HHI value. For all years the value of the HHI indicates that the level of concentration for selling firms, given the Department of Justice's guidelines, is not a major concern. Additionally, the results tend to support the conclusion that the level of market concentration has decreased over the 1992–95 period for the selling firms.

Summary and Conclusions

The purpose of this research was to empirically evaluate the degree of concentration for residential real estate brokerage firms in a local MLS setting over the period 1992–95. Gini Coefficients, Concentration Ratios and Herfindahl-Hirschman Indices were used to determine the level of concentration in the market for both listing and selling brokerage firms.

Although the Gini Coefficients indicate less equality among firms in the distribution of sales, the CR_4 , CR_8 and HHI measures indicate that a slight reduction in concentration among selling brokerage firms has occurred during the study period, 1992–95, while the concentration of listing firms has remained relatively unchanged. These results are consistent with Richard Loughlin's estimate that the largest companies share of the residential brokerage business would be above 60% in 1995. The results indicate that the largest eight firms had market share above 65% for selling firms and above 75% for listing firms for all years. However, there is no evidence that the level of market concentration is increasing. Additionally, our results suggest that the level of concentration found in this analysis of a local residential brokerage market is unlikely to be a cause for concern based upon Justice Department guidelines and the Herfindahl-Hirschman Index values.

One possible explanation of the results of this study is that increased competition brought about by greater exposure through an expanded regional MLS has led to a marginal decrease in market concentration by selling firms. Listing firms on the other hand seem to be relatively unaffected by this change. These findings tend to indicate that the MLS now provides greater exposure to a wide variety of sales firms, therefore leading to a higher level of competition with a lower level of concentration for selling firms in this local market.

Notes

¹The results are essentially identical whether we use number of listings and sales or dollar volume of listings and dollar volume of sales. Given the availability of sales prices, we provide the results of our calculations of market concentration based upon dollar volume.

²In this study the Gini Coefficient is calculated by a procedure developed by Lerman and Yitzhaki. (See Lerman and Yitzhaki, 1984, pp. 363–68 for a more complete discussion.)

³The Department of Justice shifted its focus to the Herfindahl-Hirschman Index in 1982 when new merger guidelines were announced. The merger guidelines indicate that for markets with HHI values above 1800, mergers that would increase the HHI value by 100 points or more would "likely" be challenged. For markets with HHI values below 1000, a merger challenge is deemed unlikely. (See Scherer and Ross, 1990, pp. 184–88 for a more complete discussion.)

⁴For the real estate industry, we know of no specified or calculated critical value for the HHI. Thus we assume that the general guidelines of the Department of Justice is a reasonable proxy to determine if the HHI indicates a "high level" of concentration.

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