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A Study on the Mechanism of Urban Catering Price Differentiation from the Perspective of Imperfectly Competitive Markets

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Abstract: It is hard to fully explain the price differentials in urban catering markets based on the quality differential of their products. Rather, more complicated structural mechanisms exist behind price differentials. According to the theoretical model of monopolistic competition, this paper sets up a three-dimensional price stratification analysis model including brand recognizability, platform attention and location cost. With the help of the publicly available data of an online restaurant p latform in New Delhi, where there are 1,684 valid sample observations at the store level, this paper systematically studies the price stratification mechanism of three different types of firms: independent store, chain brands and viral stores. Both descriptive statistics and analysis of variance confirm the existence of price stratification among the three types of firms. The results of Spearman correlation analysis demonstrate that votes and location cost proxy are two key explanatory variables behind price differentials and their Spearman coefficients are 0.40 and 0.38, which are both far greater than that of user rating. Meanwhile, semi-log regressions further reveal that while controlling for popularity and location conditions, chain brands still have a stabl e price premium around 8.09%, yet the independent significance of viral-store price premium cannot be held any more. The price premium of viral stores is mainly determined by their combination effect of platform popularity and location conditions.

Keywords: Monopolistic competition; Price stratification; Brand premium; Platform attention; Location cost.

1. Introduction

Urban catering is one of the most fiercely competed and crowded service sectors in daily consumer markets. While industrial goods are homogeneous products and thus less substitutable, catering products are substitutable while differentiated with brand image, spatial location, service experience, platform popularity, and social diffusion. In the same city and the same product category, consumers can find many substitute alternatives, but there still exist remarkable price differences among catering stores. It suggests that the catering industry is not in accordance with the theoretical assumption of homogeneous product converging into the same price in the theory of complete competition. Instead, it seems more like the monopolistic competition in terms of the industrial organization. According to the monopolistic competition theory, when many firms coexist and entry is relatively easy, the product differentiation gives the firm certain pricing power [1-2]. Thus, the price differentiation in urban catering cannot just be explained by the consumer preference. It is an industrial-organization issue with respect to the firm's cost structure, market positioning, brand recognition, and competitive pattern.

Existing industrial-organization theory provides the basis for explaining this phenomenon. In addition to the traditional market-structure theory which mainly concentrates on the impact of entry barrier, economies of scale, and market concentration on firm behavior [3-4], the sunk-cost theory also argues that marketing cost such as advertisement, brand establishment, store decoration, and site selection will influence the firm's entry, growth, and pricing strategy [5]. In catering industry, location rent, renovation cost, personnel cost, and platform operation are major cost source. Moreover, in the theories of brand differentiation and competitive strategy, firms are able to establish relatively stable price premiums due to brand recognition, service standardization, and market positioning [6]. From these perspectives, price difference in catering can no longer be simply ascribed to the difference in product quality. They need to be explained from the aspects of the cost structure and the mechanism of differentiated competition under imperfectly competitive market.

Empirically speaking, the price formation in differentiated product markets requires the analysis from both the observed demand evaluation, the supply side cost constraint, and the firm's pricing strategy simultaneously. In differentiated product model, the price is a function not only of the product characteristic and the market demand but also of the unobserved quality, brand recognition, and market power [7-8]. For the catering industry, we cannot observe the rent, the raw-material cost, or the labor cost directly through the public platform data. But proxy indicators can be established with the help of variables such as the consumption level of commercial district, user rating, platform voting, the density of stores, and the number of stores with the same name, which enables us to carry out reproducible empirical analysis on the price differentiation mechanism. With the popularization of food delivery and platform, platform traffic allocation and social exposure have become the structural factor in catering pricing, which makes the explanation paths focusing merely on traditional quality signal or location variable increasingly insufficient [9-10]. In comparison with those analyses that focus only on consumer preference or service experience, the analysis with firm type, cost proxy, and market concentration reflects more economic properties of catering as a monopolistic competitive market.

Current studies about the price of catering tend to stress the consumer preference, service evaluation, and the word-of-mouth of platform, while pay insufficient attention to the cost structure on production side, the difference of firm type, and

the market power. Why different stores can maintain different price levels in the same city and the same category, whether the brand premium mechanisms of chain brands, independent stores, and viral stores are structurally equivalent, and how the dispersed competition at overall level coexists with the concentration at local level in segmented category all need further empirical examination. Given the above research gap, the current paper confines its scope of research object to the fast casual food, beverages and desserts, and bakery stores within the same city. And firms are classified into chain brands, independent stores, and viral stores to explore the price differences, cost structure, brand premiums, and market concentration.

In this paper, the central question is: why can different firm types form persistent price differences in the environment of high substitutability of similar catering products in the same city where firms are abundant? Based on the public catering platform data, it firstly employs descriptive statistics to illustrate the feature of price stratification, then employs the analysis of variance, nonparametric test, and Spearman correlation analysis to study the relationship between price and factors such as firm type, rating, popularity, location cost, and store density. Then it calculates the indicator of CR4, CR8, and HHI to measure the market concentration in segmented category, and employs the semilog price model to test the brand premium effect of chain brands and viral stores after controlling for the category, rating, popularity, location, and competitive density. There are three contributions of this study: firstly, it places urban catering in the frame of monopolistic competition and avoids reducing the price differences to consumer preference; secondly, it establishes the framework of price differentiation in four dimensions including brand recognition, platform popularity, location cost, and market concentration, which makes the industrial-economy perspective emphasized in catering research; thirdly, it establishes a reproducible empirical path based on public platform data, which provides the methodology and variable for further alternative validation with data from Meituan, Dianping, and other similar platforms. The rest of this paper is organized as follows: section 2 establishes the theoretical framework, section 3 introduces the data and empirical design, section 4 shows the empirical results and mechanism analysis, and section 5 draws the conclusion.

2. Theoretical Framework and Analytical Perspective

2.1. Product Differentiation in Monopolistically Competitive Markets

The theory of monopolistic competition has been systematically established in Chamberlin's masterpiece. The core idea is that when there are many firms and products are differentiated with high substitutability, every firm will confront a declining demand curve and therefore possesses some degree of pricing power in the local market [1-2]. Unlike the price formation process in perfectly competitive markets, the price under monopolistic competition is not purely determined by market clearing, but simultaneously influenced by the extent of product differentiation, entry barriers and consumer search costs. Dixit and Stiglitz extended consumers' preference for differentiated products to a general equilibrium framework, establishing the basis of the analysis of market structure with increasing returns to scale [2].

Structurally speaking, the urban catering market conforms to all these theoretical assumptions. Firstly, entry barriers are relatively low, the number of stores in a city is large, and no firm can establish monopoly power in a market-wide manner. Secondly, catering products are highly substitutable from a functional perspective, but notable differences exist among brands, experiences, presentations, and social properties, resulting in non-negligible consumer search costs. Thirdly, the widespread of delivery and review platforms has increased the informational aspect of product differentiation. Consumers not only make decisions based on the observable characteristics of products themselves, but also rely on the reputation information generated by platform ratings, votes and dissemination [9-10]. There exists substantial evidence that online rating system has a considerable impact on the decision-making of catering consumption, and even small changes in ratings may generate observable revenue impact [11]. Therefore, product differentiation becomes the core premise of price stratification in urban catering. It is against such market structure that different types of firms are able to keep different price levels by differentiating their strategies, instead of converging to a common equilibrium price.

2.2. Cost Structure and Pricing Power of Firms

On the basis of the theory of monopolistic competition, pricing power of firms is not only dependent on the extent of product differentiation, but also to a considerable extent, their cost structures. Market-structure theory distinguishes entry barriers and economies of scale as key structural factors influencing the competitive behavior of firms [3-4]. In addition, sunk-cost theory argues that the existence of unrecoverable fixed expenditures like brand-building, renovation and site selection reshapes firms' entry and pricing strategies [5]. The cost composition in the catering industry is characterized by fixed costs: rent, renovation expenses, employment, and platform operations are important sources of fixed and quasi-fixed costs, while raw material purchase, staff scheduling and delivery are the major components of variable costs. The heterogeneity of fixed costs particularly exists across different types of firms. The chain brand needs to spend a lot of money at the beginning on brand-building, supply chain integration, and cross-store standardization, but when scale effect is gained, the marginal cost of store expansion is much lower than that of independent stores.

Location cost is the most visible component of fixed costs in the catering industry. The cost pressures caused by high-rent commercial districts are partially transformed into price premiums, which has been empirically verified in previous literatures [14-15]. Meanwhile, location itself is also a positioning strategy. Consumers located in the commercial districts with high consumption frequency usually have relatively higher disposable income and are less sensitive to price, which means that location has an influence on price formation not only through cost, but also indirectly by affecting the composition of demand. Since location cost and operational cost can't be observed directly from public platform data, this paper uses the consumption level of the commercial district as the proxy variable for location cost.

2.3. Brand Recognizability, Platform Attention, and Location Premium

Building upon the above-discussed structural conditions, this paper goes further to identify three fundamental mechanisms behind price stratification in urban catering

services and integrate them into a framework, as illustrated in Table 1.

Table 1. Three-Dimensional Analytical Framework

Mechanism Dimension	Theoretical Logic	Main Carrier	Empirical Proxy Variable
Brand recognizability	Reputation assets reduce search costs and support structural premiums	Chain-brand stores	Number of same-name stores in the city >= 5
Platform attention	Visibility increases demand elasticity and supports short-term high prices	Viral stores	Platform votes and rating thresholds
Location cost	Rent pressure and consumer composition jointly shape pricing space	Stores in high-consumption commercial districts	Proxy variable for average commercial-district consumption level

Brand recognizability serves as the first mechanism. Through standardized cross-store operation, the chain brands create relatively stable customer expectations towards product quality and dining experience, thus reducing information search costs. Researches on brand differentiation and competition strategy reveal that firms can develop price premiums by means of brand recognizability, service standardization, and market positioning [6]. Brand recognizability, per se, becomes a part of firm reputation assets, which makes customers pay extra money to decrease uncertainty, rather than for observable product characteristics. In terms of empirical evidence, there exist relatively abundant studies which verify price premiums of chain brands, yet rare are the ones that compare them with viral stores' premiums directly and measure their stability difference under competitive conditions [12-13].

Platform attention is the second mechanism that represents the distinctive feature of the urban catering market in the context of the digital platform. Delivery and review platforms have structurally changed the attention allocation system. Platform algorithms, voting mechanism, and social dissemination jointly decide how much visibility a store gains in the eyes of consumers. More visibility directly leads to higher demand elasticity and consumer willingness to visitthe store and thus creates room for pricing [9-10]. Viral stores represent the typical embodiment of this mechanism. Due to their high rating and huge number of votes, such stores can gain platform popularity and support a substantially higher price level than their competitors within a short period. Yet, the premium generated by platform attention is different in nature from that generated by brand assets. The former depends much more on continuous exposure on platform and external traffic flow; when the popularity fades, the price support would be weakened. For the latter, the generation of premium depends on long-term brand recognizability accumulation. Thus, the former has weaker structural stability than the latter. Besides, differentiated product models show that prices are determined not only by product attributes and market demand, but also by some unobserved quality, brand cognition, and market power [7-8]. This helps to understand the difference between the two types of premiums.

Location premium is the third mechanism. As stated before, location conditions in high-consumption commercial districts influence price via both cost side and demand side [14-15]. It needs to be highlighted that the three mechanisms are not mutually independent of each other. Chain stores with relatively high brand recognizability tend to locate in highly visible commercial districts. While high-consumption district agglomeration effect offers traffic conditions for accumulating platform attention. The three mechanisms thus commonly co-exist in the empirical research context. Their respective contributions need to be disentangled via the designing of control variables, which forms the main goal of the empirical part of this paper.

3. Empirical Framework

3.1. Empirical Setting

Public restaurant data collected on the Zomato platform serve as the empirical sample for this paper. The original dataset includes 9,551 observations, including information about the city, commercial district, cuisine, average cost for two, price range, user rating, platform votes, availability of reservations, and delivery through online services. In order to prevent any distortion caused by differences in currency unit, level of consumption, and institutional structure in different cities, the New Delhi city sample - having the biggest sample size - is used as a unique empirical setting.

In the sample cleaning process, observations with missing values of the cuisine field, average cost for two not bigger than zero, and without ratings are excluded one after another. The analysis will be confined to the three categories which fit into the theoretical framework of this paper the most: fast casual food, bakery, and beverages and desserts. After that procedure, the final valid sample consists of 1,684 restaurants. Dependent variable is the average cost for two, measured in Indian rupees. The estimate of the per-capita cost is calculated by dividing the average cost for two by two. The key explanatory variables are the dummy variables for firm type. Control variables are the user rating, platform votes, proxy of the commercial district consumption level, store density in the same commercial district and same category, and number of stores in the same city having the same name. Due to the unobservable nature of real rents, labor costs, and costs of raw materials in public data, this paper employs the average level of consumption in the commercial district as the proxy of location cost and platform votes as the operationalization of platform attention.

3.2. Firm Classification and Research Design

The classification of firm types forms the core of the empirical design. Using observable platform information, this paper classifies stores into three types. Chain-brand stores are defined as the stores whose restaurant name occurs at least five times in New Delhi, where the number of restaurants with the same name is treated as an indicator of brand replication capacity. Viral stores are defined as those among non-chain stores that have a user rating of at least 4.0 and are ranked in the top 20% by their votes in the non-chain sample, capturing the effect of platform popularity through the combination of thresholds of platform reputation and social visibility. All the remaining stores that fail the above criteria are considered independent and serve as a base category. The distribution of the three types of firms is reported in Table 2.

Table 2. Basic Sample Characteristics: Descriptive Statistics of Three Firm Types

Firm Type	Sample Size	Mean Price (INR)	Median Price (INR)	Average Rating	Average Votes	Average Location Tier
Independent stores	1,101	477.86	400	3.30	88.91	2.40
Chain brands	500	495.80	450	3.20	96.51	2.61
Viral stores	83	734.94	600	4.22	909.05	3.16

It is important to note that the above categorization approach uses only observable platform information and therefore is unlikely to be equivalent to the ownership structure of firms in the legal or business registration terms. The number of restaurants with the same name is far from being a strict way to identify the ownership of chains. This design enables the reproducible measurement of brand recognizability and social visibility within a public platform database, yet its external validity will need to be tested against more comprehensive firm level information.

The research design proceeds from descriptive evidence to the correlation structure and finally to regression tests. First, descriptive statistics and analysis of variance are performed to prove the existence of statistically significant price stratification. Then, Spearman correlation analysis is conducted to discover the nature of associations between price and each explanatory variable. Market concentration measures are used to describe the structure of competition in segmented categories. Eventually, a semilog regression model is built to test the net price effect of firm type controlling for various factors. The regression model takes the form:

$$\ln(\text{Price}_i) = \alpha + \beta_1 \text{Chain}_i + \beta_2 \text{Viral}_i + \gamma X_i + \varepsilon_i \quad (1)$$

Here, the dependent variable is the natural logarithm of average cost per two. Chain and Viral are binary variables which take value 1 for chain brands and viral stores, respectively, with independent stores as a base category. The set of control variables includes such characteristics as category, rating, logarithm of votes, location-tier indicator, and store density within the same commercial district and category. Robust standard errors HC3 are used to cope with the problem of heteroskedasticity.

4. Empirical Results and Mechanism Analysis

4.1. Descriptive Evidence on Firm Type and Price Stratification

The descriptive statistics reveal that there is a definite price gradient across the three firm types. For the two independent stores, chain brands and viral stores, the mean average cost is 477.86, 495.80, and 734.94 Indian rupees, respectively. In terms of estimated per capita cost, these figures translate into 238.93, 247.90, and 367.47 Indian rupees. The mean price of viral stores is around 1.54 times the mean price of independent stores, and the former's price dispersion is much larger, with an interquartile range of nearly 500 rupees. This means that the price distribution of viral stores is much wider than the other two types. The mean-price gap between chain brands and independent stores is fairly small, but the median price difference (450 rupees versus 400 rupees) reveals that there is a systematic shift upward of the middle of the price distribution of chain brands. The boxplot of price distribution across the three firm types is depicted in Figure 1. Clearly, the centers and upper boundaries of price distribution of viral stores are both much higher than the other two types, as illustrated in Figure 1.

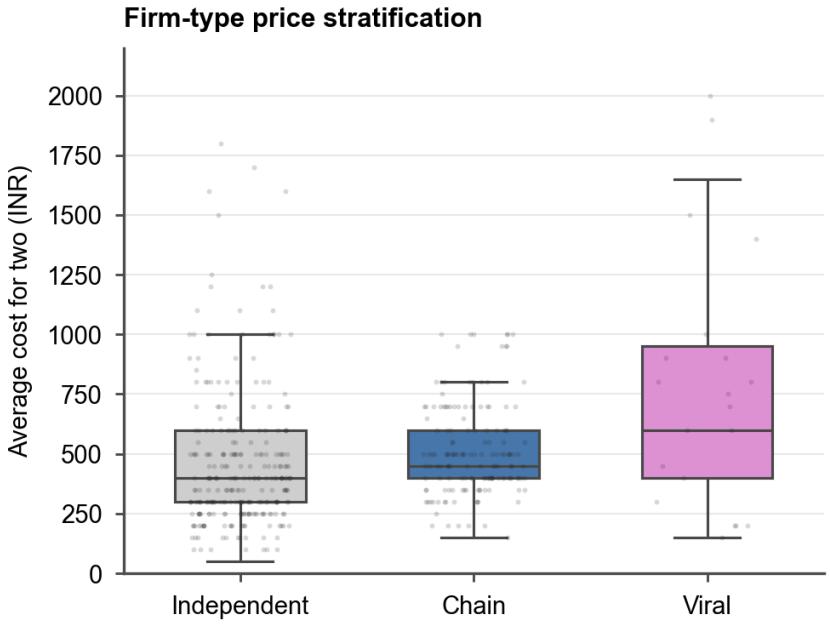


Figure 1. Price Stratification by Firm Type

Both ANOVA analysis and non-parametric analysis confirm that the above price difference is statistically significant. The one-way ANOVA statistic is 24.972, and the Kruskal-Wallis robust nonparametric statistic is 70.408. The p-value of each of the two tests is near to zero (as shown in Table 3). The consistency of nonparametric test results makes it impossible that the right skewness of price distribution causes the ANOVA test result, which means that the price

stratification across the three firm types is statistically significant.

Table 3. Statistical Tests of Price Differences among Three Firm Types

Test Method	Statistic	p-value
One-way analysis of variance (ANOVA)	24.972	<0.001
Kruskal-Wallis nonparametric test	70.408	<0.001

Regarding the mechanism, the high mean price of viral stores is not just a price-labeling effect. This is associated with a large number of platform votes (mean 909.05, much higher than the 88.91 of independent stores), high user rating (mean 4.22, versus mean 3.30 of independent stores), and high location tier (mean 3.16, versus mean 2.40 of independent stores). Such evidence suggests that the price advantage of viral stores may be the result of several favorable conditions. This speculation will be validated by the following regression analysis.

4.2. Structure of Correlation in Price Formation

From the results of Spearman correlation analysis, it can be seen that there exists a clear hierarchy in terms of the degree of correlation between price and each of the explanatory variables. The Spearman coefficients of the correlation between each variable and price are illustrated in Figure 2 below. The highest Spearman correlation coefficient is for platform votes and it amounts to 0.40; followed by the proxy variable of location cost with a coefficient of 0.38. Both are statistically significant at the 1% level and the difference in their coefficients is quite evident when compared to those of other variables.

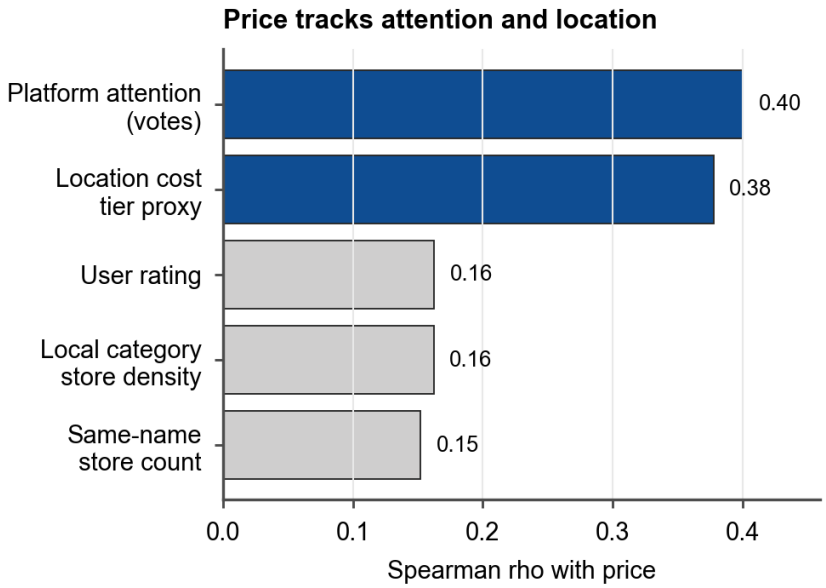


Figure 2. Spearman Correlation Coefficients between Variables and Price

For user rating, same district density in the same commercial category, and number of same-name stores in the same city, the Spearman coefficients of correlation with price are 0.16, 0.16, and 0.15, respectively. Even though all three are statistically significant, their coefficients are quite smaller compared to those of other explanatory variables (Table 4).

Table 4. Spearman Correlation Coefficients between Variables and Restaurant Price

Variable	Spearman Coefficient	p-value
Platform votes	0.40	<0.001
Location-cost proxy variable	0.38	<0.001
User rating	0.16	<0.001
Store density in the same commercial district and category	0.16	<0.001
Number of same-name stores in the same city	0.15	<0.001

The results above carry significant implications in terms of mechanism. User rating, the most direct observable signal of quality, is less correlated with price than the indicators of platform popularity and location. This indicates that, in the presence of monopolistic competition, consumers do not purchase the product quality alone; rather they pay extra for the attention scarcity created by platform popularity and the location premium due to high consumption commercial districts. This observation is in agreement with the theoretical framework's predictions: platform attention and location costs are the two major transmission channels of urban catering price formation while the effect of quality signals on pricing is relatively insignificant.

4.3. Market Concentration and Local Competitive Pattern

Estimating market concentration indicators using platform vote shares suggests that all three categories demonstrate the pattern of dispersed competition, although there are systematic differences between categories. Distribution of HHI and CR4 between the three categories is presented in Figure 3. Beverages and Desserts have the greatest market concentration among the three categories, with HHI of 461.04 and CR4 of 35.49%. Bakery occupies the second position with HHI of 301.04 and CR4 of 26.65%. Fast Casual shows the most dispersed competition with HHI of 155.70 and CR4 of 17.16%.

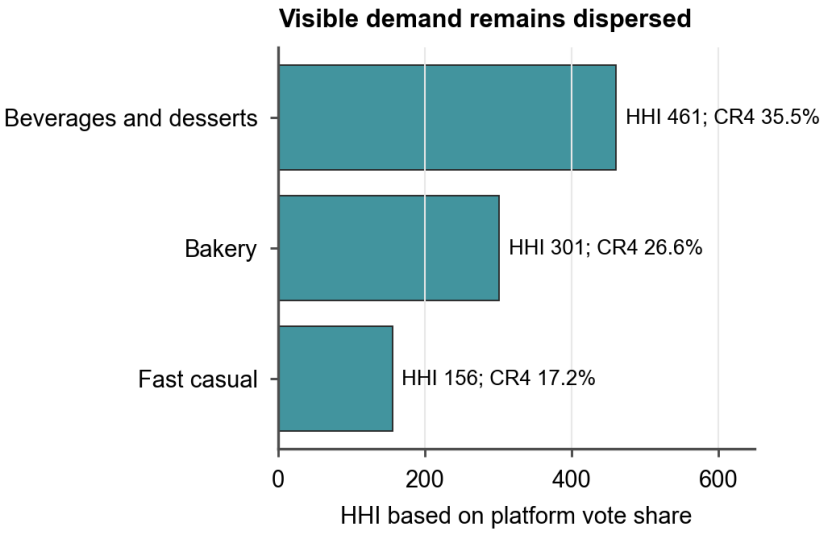


Figure 3. Market Concentration by Segmented Category: Visible Demand Remains Dispersed

HHI values of all three categories do not exceed the common threshold of 1,000 that is used to measure moderate concentration, which means that the market structure leans more towards dispersed competition than to oligopoly (see Table 5).

Table 5. Market Concentration by Segmented Category

Category	Sample Size	Number of Brands or Names	CR4 (%)	CR8 (%)	HHI
Fast casual	1,082	665	17.16	26.75	155.70
Bakery	323	271	26.65	38.99	301.04
Beverages and desserts	279	159	35.49	50.03	461.04

Technically, the concentration in the category of beverages and desserts is much higher compared to the other two categories, which corresponds to the specific features of this market in terms of high penetration of chain brands and higher concentration of platforms' exposure to leading stores in the segment. The extremely dispersed competition of the fast casual category is explained by low barriers to entry, high substitutability and relative inefficiency of brand recognition effects. Differences at category level support the theoretical conclusion of this study that the degree of accumulated brand recognizability has a positive relation to market concentration and categories with high concentration can be viewed as competitive segments where the effects of chain brand premiums are noticeable. However, it should be mentioned that the above market concentration indicators are calculated using platform vote shares, meaning that they are measures of the distribution of platform visible demand, but not actual sales volume.

4.4. Regression Results and Discussion on Premium Mechanisms

The results obtained through the semi-log regression model are quite different from the descriptive analysis, showing essential distinctions between the structural stability of the two kinds of premiums (see Table 6). Despite controlling for category, rating, the log of votes, location tier proxy variable, and store density in the same commercial district and category, the chain brand stores are still priced with an additional premium of around 8.09% compared to the independent stores. The estimated coefficient is 0.078, which is highly significant at 1%. For viral stores, the estimated coefficient is 0.022, and the premium is about 2.19%, but the p-value of it is 0.746, which means that it is statistically insignificant.

Table 6. Semi-Log Price Regression Results

Variable	Coefficient	Robust Standard Error	p-value	Approximate Effect (%)
Viral stores	0.022	0.067	0.746	2.19
Chain brands	0.078	0.024	0.001	8.09
Bakery category	-0.273	0.036	<0.001	-23.86
Beverages and desserts category	-0.481	0.035	<0.001	-38.21
User rating	-0.015	0.034	0.670	-1.44
log(1 + votes)	0.110	0.012	<0.001	11.66
Location-cost proxy variable	0.153	0.011	<0.001	16.54
Store density in the same commercial district and category	-0.004	0.002	0.010	-0.38

The regression results are of great analytical importance on the mechanism level. The significance of chain brand premiums despite the control of popularity and location conditions means that there is the structural pricing power of the reputation assets formed by the brand recognizability independent from the traffic and commercial district conditions. It is fully consistent with the theoretical prediction about the stability of the chain brand premiums. On the

contrary, viral store premiums turn out to be insignificant after the control for the log of votes and location tier. This proves that the high average prices of viral stores observed in the descriptive statistics are essentially the result of the joint influence of the platform popularity and consumption-dense commercial district, rather than an independent and stable firm type effect. Or, in other words, viral stores do not systemically charge a higher price than independent stores, when platform attention and location advantages are taken into account.

The coefficient of the log of votes is 0.110, which means that when platform attention increases by one logarithmic unit, the price increases by 11.66%. Moreover, this effect is even more substantial than that of the chain brand premiums, which once again proves the crucial role of platform popularity in the formation of prices. The coefficient of the location cost proxy variable is 0.153, which corresponds to the effect of 16.54%. It is the largest effect among all control variables. It reflects the important pass-through of the location cost pressure to the consumer. The coefficient of user rating is negative and insignificant. Thus, the findings obtained before are confirmed once again, which proves that rating has little relation to price. It means that the observable quality signal does not make any independent contribution to price after controlling for other conditions.

All in all, the findings of the four subsections show that the price stratification of the urban catering industry occurs due to the functioning of multiple mechanisms layered on each other. Location cost creates the pricing base of the stores; platform attention creates the price elasticity due to traffic; and the brand recognizability creates the structural premium capacity, which goes beyond popularity. The degree and stability of the contribution of the three mechanisms is quite different, which is directly analytically important for understanding the competitive structure of urban catering markets in the digital platform environment.

5. Conclusion

Price variations in urban catering markets have always been considered as a natural reflection of product quality differentiations. However, it becomes more and more challenging to find an explanation of the phenomena in the context of platformized competition. The first research question that this paper seeks to address is precisely how to explain such variation when brand recognizability, platform attention and location choice interact in the price formation process. Specifically, how significant is the direct effect of premium of quality signals on price? Are the premium sources of different firms structurally stable? Existing literature does not provide systematic empirical evidence on those questions yet.

Based on the theory of monopolistic competition, the three-dimensional framework of brand recognizability, platform attention, and location cost is built in this paper, and the price stratification mechanisms of three types of firms are tested using public data of a New Delhi catering platform. The research finds out that price stratification in urban catering markets is a combination of multiple mechanisms. Location cost acts as the basic constraint on price, which approximately has the effect of 16.54% on price. It is the largest single factor among all explanatory factors. Platform attention brings traffic-induced price elasticity, when the logarithm of votes increases by one unit, the price will rise by 11.66%. The structural premium capacity brought by brand recognizability is not subject to the fluctuations of popularity, even after considering the influence of popularity and location, chain brands are still able to get approximately 8.09% premium. Meanwhile, the descriptive high prices of viral stores become insignificant after controlling for platform popularity and location factors. This implies that the high mean prices of viral stores are only caused by multiple favorable conditions instead of independent and stable firm-type effect. The observable quality signal, user rating, shows negative and insignificant coefficients in the regression, indicating that the consumers on the platform pay more attention to the premium of visibility and location, but not the direct information represented by ratings. Those results highlight the difference in the source of two types of premiums on the mechanism level and provide reference for understanding the structural characteristics of competition in urban catering markets under the condition of digital platforms.

There are several limitations to this paper in data and methodology aspects. First, the empirical sample comes from the data of Zomato in New Delhi. The institutional environment and consumption pattern are quite different from the situation in Chinese cities, so the generalization of the conclusion needs further verification through localized data. Second, the actual rent, labor cost and raw-material cost cannot be directly captured by public data, so the measuring accuracy of the location-cost proxy is limited, and the causal identification will be constrained by omitted variable bias. Therefore, the conclusions should be regarded as correlational and descriptive rather than causal identification. Third, the classification of firm types is made based on observable platform information. The number of same-name stores is not necessarily equivalent to the chain ownership in law or registration aspects, and the classification of viral stores also relies on the threshold value of ratings and votes. The future research direction includes three parts: introduce the data of Chinese urban platforms to test the robustness between different markets; introduce the information of business registration, delivery sales or social media exposure to improve the precision of variable measurement; and explore the dynamic change of price-premium structures under the platform algorithm intervention and commercial district rent shock.

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