Do Rivals Impact U.S. Fast Food Firm Entry in China?

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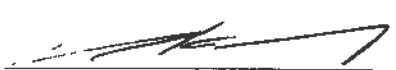

Dr. David Guilkey

Abstract

This research examines whether rival firms' market presence influences initial market entry decisions for U.S. fast food firms McDonald's, KFC and Pizza Hut in Eastern China between 2004 and 2011. It also examines factors influencing the recent increase in local Chinese fast food firms' initial market entry. The analysis utilizes a firm-and-consumer-learning theoretical model from Toivanen and Waterson (2005) and a single-spell discrete time hazard empirical model, which are applied to data from the Carolina Population Center's China Health and Nutrition Survey. This research reveals that the presence of KFC in a given market did not influence McDonald's initial market entry decisions during 2004 and 2011 (and vice versa). A positive relationship was demonstrated between KFC initial market entry and higher-population, higher-income markets, and the same was demonstrated for McDonald's initial market entry and urban markets. Also, local Chinese fast food firms entered markets where KFC already existed.

Acknowledgment

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That research inspired my topic for this work, which would not have been possible without the affirming and growth-inducing guidance of Klara Peter and David Guilkey. Dr. Peter and Dr. Guilkey recognized the value of this research from its inception, ensured that I made it through what has turned out to be the most enriching academic experience of my undergraduate career, and are responsible for all worthwhile results of this research. Any mistakes are my own.

I. Introduction

According to McDonald's Corporation founder Ray Kroc in his autobiography *Grinding It Out: The Making of McDonald's*, Kroc's most important job as CEO was to choose promising new locations for McDonald's franchises. Doing so required Kroc to analyze a myriad of factors such as community size, fast food competition, and proximity to extant McDonald's stores. Kroc even mentions rummaging through competitors' trash to gauge their sales volume! Although McDonald's Corporation's method for choosing new franchise locations has certainly grown more sophisticated since Kroc's reign in the 1950s to 1970s, fast food firms' choice of market entry in relation to profit potential and rivals' presence remains vital (Kroc 1978).

While McDonald's and fast food competitors like KFC have by now saturated the United States market, Asian markets (China in particular) remain a promising growth story. Since KFC's debut with a Tiananmen Square store in 1987 Beijing, today there are over 4,600 KFCs in China, making KFC the leading foreign fast food brand (Yum! Brands 2014). KFC's parent company, Yum! Brands, also operates 1,200 Pizza Huts in China. Besides KFC, China's only other prominent Western fast food player is McDonald's, which entered in 1992 (ICMR 2014). The competitive dynamic that saw McDonald's as the United States' fast food market "leader" and KFC as "follower" during late twentieth century America is reversed in China, seeing KFC as the market leader and more popular amongst Chinese consumers than McDonald's.

As Yum! Brands and McDonald's battle amongst each other for market share, of critical importance will be each firm's process for choosing which Chinese markets to enter. Whichever firm can enter the most profitable markets the fastest has a competitive advantage. Thus both firms' initial market entry decisions as a function of those markets' estimated profitability (gleaned from present market structure) is of great interest. Also of interest is whether KFC and

Pizza Hut, both of which are owned by Yum! Brands, share amongst themselves common initial market entry processes or profitability forecasts to advance Yum! Brands' growth.

In the past several years, a new phenomenon has emerged to complicate U.S. fast food firms' expansion plans in China: local Chinese fast food firms are emerging *en masse*. *The Wall Street Journal* noted in December 2014 that these local firms are popping up in more rural markets and catering to localized tastes that U.S. fast food firms presently miss. Thus the factors determining initial market entry for this new wave of less-experienced, lower-budget local Chinese fast food firms are also of interest in this research (Abkowitz and Burkitt 2014).

While previous research has applied market-learning industrial organization theory to empirical analysis of fast food firm entry decisions in relation to market structure, and one study has even examined such decisions for KFC and McDonald's in China, no research to date has examined *initial* Chinese market entry strategies amongst KFC, McDonald's, Pizza Hut *and* local Chinese fast food firms (Shen and Xiao 2013). I analyze what market structure factors—such as the presence of rival fast food firms and demographic characteristics like population density, mean wages, and urbanization—impact fast food firms' initial entry decisions for Chinese markets from 2004-2011. My study builds upon existing literature by analyzing an expanded selection of fast food firms over the most recent time period of any similar research, and serves as the first research of its kind on China Health and Nutrition Survey (CHNS) data.

The paper will proceed as follows: first an examination of the motivation and importance of this research; then a literature review of relevant previous theoretical and empirical research, with attention to industrial organization and firm entry decisions; then the guiding firm-and-consumer-learning theoretical model will be explained; then an explanation of the single-spell discrete time hazard empirical model used for this research; an overview of the CHNS data this

research utilizes; and finally, an analysis of the empirical results attained with a conclusion examining the implications of this research and suggesting areas for further related research.

II. Motivation

This research is motivated by the desire to contribute to understanding of industrial organization and firm market entry behavior within China. Such motivation arises due to the importance of initial market entry—both for firms wishing to expand and profit in a fast-growing Chinese economy with increasingly sophisticated consumers and heightened competition, as well as for the interesting implications that this study's differentiating aspects may contribute to existing literature. This research analyzes McDonald's and KFC's Chinese market entry over a more recent time period (2004-2011) than any comparable study. This research also examines the initial market entry strategies that fledgling local Chinese fast food firms are utilizing while attempting to grow and compete with their corporate American rivals in a profitable manner.

III. Literature Review

Theory Literature

The relevant theory for this research encompasses industrial organization market-entry theory. Specifically, relevant previous research examines the ways in which market structure (which denotes the presence of own and rival firms operating in a given market, as well as consumer demographic characteristics of a given market) impacts firm entry decisions.

Economic theory on how market structure affects firm entry traces back to Bain (1951), who theorized a "one-way" causation chain between market concentration and competition. Shaked and Sutton (1990) laid further groundwork for traditional industrial organization theory. By acknowledging the difficulty of generating reliable entry models given multiple potential equilibria, then proposing a reparameterization of the status quo models to focus on empirically

observable market traits—namely the expansion effect and the competition effect with regards to firm expansion—Shaked and Sutton formulated testable estimates about the relationship between market concentration and competition.

While certainly a breakthrough, Shaked and Sutton's theoretical model left much to be desired in its ability to explain certain observed market structures, such as a market where there is observed a positive effect of rival firms' presence on another firm's entry. Since it's assumed that a firm will only enter a market if expected profits equal or exceed zero, one cannot explain firm over-saturation in certain markets and total absence of firm presence in other similar markets. In an economy where firms have perfect information and consumer demand is exogenous, there's no reason why one firm would enter a saturated rather than under-served market.

Thus advances were made in industrial learning theory to better explain firm entry as a *result of* market structure. Caplin and Leahy (1998) observed that in reality, firms lack perfect information and face significant uncertainty about the profitability of a potential market. These firms can inform and improve their estimations of a market's profitability by observing the present performance of rival firms (just as Ray Croc did by rummaging through competitors' trash in the 1950s). This "firm-learning" model predicts that rival presence can positively affect own-firm entry. Baum, Li, and Usher (2000) took the firm-learning model a step further by differentiating between experiential and vicarious learning. Vicarious learning was described previously as learning through rival firms' performance; whereas experiential learning involves a firm learning through its own stores' performance and imitating successful stores' entry models.

Yet these learning theories still do not explain why there has been observed in reality a positive relationship between the market presence of a firm's own stores and that firm's

subsequent additional market entry. Assuming exogenous consumer demand, would not opening further stores in a given market cannibalize the expanding firm's profits? Toivanen and Waterson (2005) discuss a "consumer-learning" theory where the market presence of a firm such as McDonald's causes consumer habit formation that over time increases demand for the firm's goods. This consumer learning explains a positive effect between own-firm presence and entry.

One further theory proposed by Bresnahan and Reiss (1991) may explain why certain viably profitable markets remain devoid of any firms while other markets are cluttered with competing firms. Their theory of entry thresholds implies that a certain market size is needed to support *n* firms at average entry costs. Entry thresholds prove to be relatively small and once the entry threshold is reached, additional entrants don't significantly impact competition. In other words, firms' competitive conduct changes noticeably as the second or third firm enters a given market, but once five firms are reached, the next entrant has little effect on competitive conduct. Thus firms may prefer entering concentrated markets than building demand in untapped markets (because rival firms in a saturated market may have grown demand through consumer learning).

In addition to explaining market entry as a function of market structure, theory also wrestles with explaining the firm entry game itself. Dixit (1979) began the theoretical grappling match by using game theory to analyze market entry prevention and accommodation. Berry's (1992) breakthrough treated the entry of existing firms as different to that of new firms, and expounded a theoretical model where leader and follower firms make sequential entry decisions. The follower takes the leader's decision as given and observes the actual number of rival outlets in a given period, while the leader accounts for the rival's optimal response when making its entry decisions. Thus the market entry game is based on firms accounting for the total number of

entrants, which Berry's theory demonstrates is a uniquely determined outcome. Chevalier (1995) and Morton (1999) also treat entry of existing firms as different from new firms' entry.

Empirical Literature

The empirical modeling of strategic firm entry decisions as a result of market structure has proven difficult—partly because the equilibrium response of rival firms matters, which implies a simultaneous-move entry decision that cannot be modeled econometrically; and partly because there exist multiple potential equilibrium outcomes for a multi-firm market-entry game.

Shaked and Sutton (1990) summarized such difficulty: "outcomes depend on models that are hard to identify or proxy empirically, so models may seem empirically empty in regard to predictions about industrial structure." Shaked and Sutton thus concentrated on observable variables that could serve as proxies for unobserved variables. This involved assuming a multi-good case with a sequential model of firm entry decisions. Berry (1992) refined Shaked and Sutton's approach with an empirical methodology that used firm entry decisions as indicators of the underlying profitability functions guiding market structure. Examining firm-specific profit sources in the vast heterogeneous airline industry, Berry concluded that airport location chiefly determines airline profitability and competition.

Toivanen and Waterson (2005) built upon Berry's approach with a static model implying a two-stage entry game conditional on the actual order of play. In this model, leader and follower firms make sequential entry moves, which are observed annually. By utilizing the observed timing of entry, Toivanen and Waterson resolved the need to address firms' decision interdependencies and solved for the decision problem of the second entrant. Toivanen and Waterson's results empirically supported the theoretical model of "leader" and "follower" firm entry decisions.

Then there is the empirical question of accounting for firm heterogeneity and product differentiation. During empirical analysis, the effects of firm learning are not to be mistaken for demand heterogeneity, in which market-specific unobservables lead to greater or lesser demand than predicted. However, demand heterogeneity can be controlled for econometrically, as Toivanen and Waterson (2005) do in their research. Firm and product heterogeneity are taken into account by the empirical models of Bresnahan and Reiss (1991) as well as Berry (1992). This is achieved by modeling firms' expected profits based on revealed market entry decisions. These authors provide models that allow firms operating in an oligopoly to vary in entry costs, profit functions, and product offerings, which paves the way for interesting empirical analyses.

IV. Theoretical Model

The theoretical model for this research is based on Toivanen and Waterson's (2005) model. The economic agents are firms whose objective function is to maximize profits. With the decision whether to enter a given market (i.e. open a store) as the dependent variable, the key explanatory factor is the existing market structure where entry is being considered.

There are several assumptions underlying firms' entry decisions. One is that firms will enter a given market so long as expected profits equal or exceed zero, as shown below.

$$E(\prod_{ij}) - F_{ij} \geq 0$$

Where E is expected profits for firm i *'s entry* $\prod$ *into market* j *given fixed costs* F.

Also assumed is that firms have perfect information about their own fixed and variable cost structures, but have imperfect information about a given market's profitability when considering entry. Thus firms form and update their assumptions about a market's profitability by observing the performance of existing own-stores and rival firms, as well as market

demographics like mean wages and urbanization. The equation below models a given firm's initial market entry decision as a function of profit expectations formed by market structure.

$$\prod_{ijt} = \pi_{ijt}(Rival_{jt}, Market_{jt}) - F_{ijt} - \varepsilon_{ijt} > 0$$

Where the left-hand initial entry decision Π *is modeled as a function of expected profits, based on rival firm presence* (Rival) *and market demographics* (Market)*, for firm* i *in market* j *during time period* t*, accounting for firm* i*'s fixed costs* F *and error term* ε*.*

The above theoretical foundation is implied by market-learning theory, which guides Toivanen and Waterson's (2005) research as well as my own. Market learning implies a positive relationship between a firm's market entry decision and the presence of rival firms in that market (through the positive spillover effect of vicarious firm learning), as well as a positive relationship between the market presence of a firm's own stores and subsequent additional same-market store entry by that firm (through the induced market expansion resulting from consumer learning).

Toivanen and Waterson's theory specifically applies to firms in a market duopoly. Thus a leader-follower model is assumed where the follower firm accounts for the leader's observed entry in its entry decisions, and the leader accounts for the follower's equilibrium response in its own entry decisions. Entry decisions are also assumed to be made on the basis of existing market conditions and do not account for expected future market profits. Of course, the assumption could be made that firms' profit functions as revealed through prior market entry decisions also account for future-discounted expected market profits.

The main implications of the firm-and-consumer-learning theoretical model utilized by this research are to expect a positive relationship between own-firm and rival-firm presence on a given firm's decision to enter a market. This would imply that firms are more likely to enter markets in which that firm or rival firms already operate than a market in which neither firm

currently operates. Also, the incorporation of market structure demographics into firms' initial market entry decision functions suggests a positive relationship between profitability-indicating market demographics (e.g. mean wages, population density) and a firm's initial market entry.

In the next section, we translate this theory into a testable empirical model.

V. Empirical Model

The persistent difficulties in applying theoretical market entry models to empirical analysis include a dearth of revealed data to econometricians (e.g. a firm's cost structure) and simplifying assumptions about firms' homogeneity and access to perfect information (Berry and Reiss 2014).

Thus Toivanen and Waterson decided to treat firms' entry decisions as revealed preferences indicating underlying determinants of firm profitability (e.g. fixed and variable costs). In this case, the number of firms within a given market is treated as an endogenous variable. Another potential issue with analyzing market entry is multiplicity, since multiple firms' entry functions must be considered using the same data. Toivanen and Waterson utilize the actual timing of firm entry to resolve the need to deal with interdependencies between the firms' decisions, thus simplifying the model to deal with individual choices (Levin 2009).

The empirical model for this research assumes that a firm enters a given market when its expected profits equal or exceed zero, where that firm's expected profits are a function of market structure (demographics and the presence of own and rival firms) and the firm's cost structure. Since the firm must plan its initial market entries in advance, the empirical model assumes that a firm's initial market entry is a function of market structure in the previous observed time period. Thus the variables comprising market structure will be included as lags in the analysis.

This research utilizes a single-spell discrete time hazard model to analyze probability of firm entry. The time hazard model measures the conditional probability that a firm will enter a given market in a given year for the first time (a single-spell occurrence) given that it has not yet done so. The discrete time hazard will be modeled with a log-odds (or *logit*)-based logit-hazard model so that there will not be bounds above 1 and below 0. The discrete time hazard model works well because a firm's initial market entry is a one-time event, and since firm entry is only observed at discrete surveyed time points. Another advantage of the time hazard model is the inclusion of the time-invariant community error term, which controls against biased estimations (since there is assumed zero mean error, the inclusion of this error term prevents biased results).

The data contains both left-censored and right-censored firm entry observations. This means that for certain firms' entry within certain city markets, a number of firms had already entered some markets prior to the research start date of 2004 (AKA left-censored), while other firms never entered a given market during 2004 to 2011 (AKA right-censored). Left-censored observations are treated as missing and are not analyzed within the model to avoid biased results.

Below is the discrete time hazard model for a fast food firm's initial market entry (three distinct versions of this analysis are done, one each for McDonald's, KFC, and Chinese firms):

$$ln\left|\frac{P(Y_{ijt}=1\,|Y_{t-1,ij}=0}{P(Y_{ijt}=0\,|Y_{t-1,ij}=0}\right| = X_{ijt-1}\beta + \alpha_1 R_{ijt-1} + \alpha_2 M_{ijt-1} + \mu_j$$

Where Y *is a firm* i*'s initial entry into market* j *during time* t, R *is a vector of rival fast food firm presence in market during time* t-1, M *is a vector of demographic variables for market* j *during time* t-1, *and* μ *is a time-invariant community error term with assumed mean 0 and variance* σ_μ^2.

This research includes single-spell discrete time hazard analyses for KFC, McDonald's, and other Chinese fast food firms' initial market entry. The market-entry decisions for each firm

will be represented as a function of the presence of rival firms in a given market (R); and of market-specific demographics (M) which includes mean wages, population density, urbanization, total number of fast food restaurants, and whether population is over 1 million. Together, the vectors R and M constitute a given market's structure (demographics and rival presence).

The inclusion of these variables stems from the theoretical and empirical models implemented by Toivanen and Waterson (2005) as adapted to this research, where market structure denotes the presence of own and rival firms as well as market demographics. The results attained from the discrete time hazard empirical model are discussed in Section VII.

VI. Data Source

This research utilizes a dataset from the Carolina Population Center's China Health & Nutrition Survey. The panel data set surveys several thousand randomly selected individuals within 216 sampling units across 9 eastern China provinces every 2-4 years between 1989 and 2011. A map of the participating Chinese provinces can be observed below in Figure 1.

Figure 1: CHNS Participating Provinces

Map of provinces participating in the CHNS study, 1989-2011 (CPC)

The CHNS provides individual, household, and community-level information about demographics (e.g. income, population) and infrastructure (e.g. fast food chains' market presence) relating to health and nutrition. The CHNS variables relevant to this research are aggregated at the community level for 2004, 2006, 2009, and 2011. Listed below in Table 1A and Table 1B are baseline summary statistics for the relevant variables sorted by year. A more detailed overall summary of these variables can be observed in Table 2 (Section IX).

Table 1A

Description of Market-Structure Variables by Year

	2004		2006		2009		2011	
Variable Name	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Mean Wages (log)	8.687	(0.628)	9.007	(0.587)	9.608	(0.475)	9.898	(0.528)
N of Fast Food Restaurants	0.453	(1.875)	0.519	(2.632)	0.258	(1.543)	0.756	(5.576)
Province	37.333	(9.695)	37.284	(9.721)	37.359	(9.680)	36.045	(12.508)
Urban (binary)	0.333	(0.472)	0.335	(0.473)	0.332	(0.472)	0.397	(0.490)
City Population Over 1 Million (binary)	0.418	(0.494)	0.445	(0.498)	0.470	(0.500)	0.465	(0.500)
City Population Density	1849.235	(8486.994)	972.922	(4639.924)	1835.255	(5121.620)	4779.672	(12769.490)
City Exist McDonald's (binary)	0.097	(0.297)	0.128	(0.335)	0.175	(0.381)	0.233	(0.424)
City Exist KFC (binary)	0.120	(0.326)	0.183	(0.388)	0.230	(0.422)	0.328	(0.470)
City Exist Pizza Hut (binary)	0.042	(0.200)	0.064	(0.246)	0.074	(0.262)	0.164	(0.371)
City Exist Other Chinese (binary)	0.056	(0.230)	0.041	(0.199)	0.143	(0.351)	0.178	(0.383)

Table 1B

Description of Market-Entry Variables by Year

	2004		2006		2009		2011	
Variable Name	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
City Entry Any (binary)	0.000	(0.000)	0.166	(0.373)	0.213	(0.411)	0.156	(0.364)
City Entry KFC (binary)	0.000	(0.000)	0.073	(0.261)	0.067	(0.251)	0.049	(0.217)
City Entry McDonald's (binary)	0.000	(0.000)	0.040	(0.197)	0.058	(0.234)	0.022	(0.148)
City Entry Other Chinese (binary)	0.000	(0.000)	0.061	(0.239)	0.126	(0.333)	0.067	(0.250)
City Entry Pizza Hut (binary)	0.000	(0.000)	0.024	(0.153)	0.015	(0.121)	0.024	(0.155)
City Entry YUM (binary)	0.000	(0.000)	0.127	(0.334)	0.121	(0.327)	0.094	(0.292)
Number of Observations	1166		1216		1152		1319	

Note: There are no initial firm entry observations for 2004 because it cannot be assumed that restaurants which existed in 2004 entered in that year. The discrete time hazard model requires such left-censored observations to be eliminated from analysis.

The strengths of the CHNS data include its reliability and consistent methodology. There are many pertinent market-structure variables that exist in the dataset, making the CHNS so comprehensive that no other data sources were needed for the key variables of interest. The CHNS data provides the most recent time frame for analysis of any previous similar research. Moreover, the data includes unprecedented data on Pizza Hut and Chinese fast food firms.

Setting aside these prevailing strengths, the drawbacks of the CHNS are its limited geographic scope (only select communities in Eastern China) and non-comprehensive tallying of firm entry. Rather than quantifying aggregate firm entry and store count within sampled markets, the survey only indicates whether a given fast food company operates within a given market. Also, there were not sufficient Pizza Hut market entries to allow for its rigorous analysis.

Accounting for the particular strengths and weaknesses of the CHNS data, the key independent variable is *initial* market entry for McDonald's, KFC, and other Chinese firms (which differs from the ideal theoretical independent variable: initial *and* subsequent market entries by firm). These independent variables were constructed from the dataset by creating a firm entry variable based on whether a firm existed in a given community from one surveyed year to another. Although it would have been ideal to use annual entry data instead of biennial, Shen and Xiao's similar research found no difference in annual or biennial results (2013).

When utilizing the independent entry variables for these three firm-specific time hazard analyses, the estimation samples for each firm's empirical entry model were selected based on observations that were not left-censored and that contained all relevant dependent variables. The resulting three estimation samples' summary statistics can be seen in Figure X (Section IX).

The independent variable of initial market entry for each firm (McDonald's, KFC, Pizza Hut, and local Chinese fast food firms) can be observed below by time period in Table 2. These

firms' initial market entry across various market types (high-population and urban), in addition to firm entry across time period, can be observed graphically in Figures 2-5 (Section IX).

VII. Results and Findings

Using a single-spell discrete time hazard analysis to determine factors influencing initial market entry decisions for McDonald's, KFC, Pizza Hut, and other Chinese fast food firms in Eastern China during 2004-2011, several interesting conclusions can be drawn, both aligning with and departing from previous empirical and theoretical research on firm market entry. All three time-hazard analyses described in this section can be observed in Table 5 (Section IX).

Before interpreting the significant results of each analysis, it is worth noting that the variance of the time-invariant community error is only significantly different from zero for the Chinese local fast food firms. Thus neither KFC nor McDonald's are influenced by fixed unobservables (to the econometrician) of communities, but Chinese firms are influenced by these unobservables. This observation may result from Chinese firms' greater attunement to (observable and unobservable) local conditions than the globalized corporate fast food firms.

While it is hypothesized that McDonald's would be more likely to enter markets where KFC already existed (since McDonald's is the latecomer to China where KFC dominates), this could not be proven at a p-value of 0.10, despite previous research's success doing so (Shen and Xiao 2013). There is at least one compelling reason why this may be so: this research's recent dataset (2006-2011) could examine a time period when McDonald's had matured from competitive infancy in China and thus entered markets with more autonomy (and less need to imitate KFC) than its earlier years. Another reason is that the analysis cannot control for the endogeneity of McDonald's decision, which may be correlated with unobservable community characteristics. The results did indicate with significance that McDonald's is strongly positively

influenced to initially enter a Chinese market if it is urban, and to a much lesser degree is also positively influenced by the quantity of fast food restaurants that are already operating in the market.

When analyzing the factors that influence KFC to initially enter a given Chinese market, the theoretical model would imply KFC to be more driven by demographic data and experience than the other firms (since as a "leader" firm, KFC would seek out and enter markets before "follower" firms). This hypothesis proved true, and the factors that most positively influence KFC's market entry are mean market wages and whether the market supports a population over 1 million. These results can be explained by the fact that unlike McDonald's, KFC has already exhausted growth in urban markets and thus is driven to find up-and-coming high-population (but not yet necessarily urbanized or highly developed) markets to enter before its rivals.

When performing an identical time-hazard analysis for Chinese fast food firms' initial market entry, these resource-starved firms were expected by theory to "follow" or imitate their larger Western rivals' market locations. This hypothesis proved correct, as local Chinese fast food firms' initial market entry decisions were highly positively influenced by the existing market presence of a KFC. More so than the KFC factor, these firms were also inclined to enter markets with high mean wages. These results can be explained by local Chinese firms' lack of experience in profitable market entry combined with their low budgets, thus incentivizing them to "piggyback" off KFC's market entry success. As for the tendency of Chinese firms to enter higher-income markets, perhaps this is because their prices are higher than those of their Western rivals. Another explanation: demand for local food could be an emerging upper-class trend.

While there were insufficient observations of Pizza Hut market entries and existence between 2004 and 2011 to perform a discrete time-hazard analysis, it can be observed that 100%

of Pizza Hut entries occurred in markets where KFCs existed, as well as in exclusively urban markets (Table 3). Theory supports this finding, given that KFC and Pizza Hut are owned by the same parent company Yum! Brands, and Pizza Hut entered China later than KFC. It's quite plausible that KFC shares its market profitability research with Pizza Hut to act on its findings. Moreover, Pizza Hut may mitigate expansion risk as a "follower" firm by entering only markets where customers have developed a taste for Western fast food (AKA urban markets with KFCs).

VIII. Conclusion

This research examines factors influencing initial market entry in Eastern China for Western and local Chinese fast food firms between 2004 and 2011. The results bolster the case for firm-learning theory by demonstrating that local Chinese fast food firms are imitating KFC's market existence when entering new markets. The research results also indicate that McDonald's and KFC are driven by distinct factors (urbanization and high-population, respectively) when determining markets to enter. This leads to the interesting conclusion that McDonald's may have matured in its China operations to the point where it no longer emulates KFC's entry decisions.

Future research that builds upon these findings could employ a comprehensive dataset (spanning KFC's initial 1987 China entry to the present) and thus observe whether McDonald's, Yum! Brands', and local Chinese firms' entry strategies changed over time as market dynamics shifted. A more comprehensive dataset would also allow a proper time-hazard analysis of whether and to what degree Pizza Hut emulates KFC's market entry decisions, which would be compelling, as both firms operate under Yum! Brands and thus may share information, but still must compete against or assist one another to grow profits within the same Chinese markets.

Finally, a natural extension of this research would be to examine the same firms' market entry in China across the broader time period mentioned, but also examine repeat market entries

as Toivanen and Waterson (2005) did. Doing so would reveal to what degree these firms are likely to re-enter markets where they already operate versus entering untapped markets, where potentially higher profit potential exists—but so does risk of costly profitability miscalculations.

IX. Tables and Figures

Table 2A

Description of Market-Structure Variables

Variable Name	*Mean*	*Std Dev*	*Min*	*Max*	*Obs*
Community ID	370879.300	(106419.700)	111101	552304	946
Survey Year	2007.766	(2.753)	2004	2011	946
Year ID	2.613	(1.145)	1	4	938
Mean Wages (log)	9.348	(0.737)	6.534	11.293	942
N of Fast Food Restaurants	0.517	(3.544)	0	90	930
Province	36.934	(10.637)	11	55	938
Urban (binary)	0.353	(0.478)	0	1	938
City Population 1 Million+ (binary)	0.451	(0.498)	0	1	923
City Population Density	2548.763	(8928.925)	8.547	158446.1	911
City Exist McDonald's (binary)	0.164	(0.371)	0	1	938
City Exist KFC (binary)	0.224	(0.417)	0	1	938
City Exist Pizza Hut (binary)	0.092	(0.289)	0	1	938
City Exist Other Chinese (binary)	0.110	(0.313)	0	1	938

Table 2B

Description of Market-Entry Variables

Variable Name	*Mean*	*Std Dev*	*Min*	*Max*	*Obs*
City Entry Any (binary)	0.135	(0.342)	0	1	754
City Entry KFC (binary)	0.047	(0.212)	0	1	764
City Entry McDonald's (binary)	0.030	(0.170)	0	1	808
City Entry Other Chinese (binary)	0.064	(0.244)	0	1	864
City Entry Pizza Hut (binary)	0.016	(0.126)	0	1	866
City Entry YUM (binary)	0.087	(0.281)	0	1	797

Table 3

Summary Statistics for Firm Entry by Key Variables

	McDonald's Entry		*KFC Entry*		*Pizza Hut Entry*		*Other Chinese Firm Entry*	
Key Variables	***Mean***	***Std Dev***	***Mean***	***Std Dev***	***Mean***	***Std Dev***	***Mean***	***Std Dev***
Time Period								
2004	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
2006	0.040	(0.197)	0.073	(0.261)	0.024	(0.153)	0.061	(0.239)
2009	0.058	(0.234)	0.067	(0.251)	0.015	(0.121)	0.126	(0.333)
2011	0.022	(0.148)	0.049	(0.217)	0.024	(0.155)	0.067	(0.250)
Urban vs. Rural								
Urban	0.062	(0.241)	0.079	(0.271)	0.052	(0.223)	0.068	(0.251)
Rural	0.017	(0.130)	0.036	(0.185)	0.000	(0.000)	0.062	(0.241)
High vs. Low-Population								
> 1 Million	0.042	(0.201)	0.081	(0.273)	0.036	(0.186)	0.066	(0.249)
≤ 1 Million	0.022	(0.146)	0.026	(0.160)	0.002	(0.045)	0.061	(0.240)

Table 4

Estimation Sample Statistics

Variables	*S = 0 (N = 8,956)*	*McDonald's Entry (N = 3,745)*	*KFC Entry (N = 3,549)*	*Other Chinese Firm Entry (N = 4,544)*
Mean Wages (log)	9.348	9.045	9.015	9.057
	(0.737)	(0.678)	(0.672)	(0.667)
N of Fast Food Restaurants	0.517	0.366	0.377	0.400
	(3.544)	(2.121)	(2.176)	(2.168)
Urban (binary)	0.353	0.265	0.252	0.320
	(0.478)	(0.442)	(0.435)	(0.467)
City Population 1 Million+ (binary)	0.451	0.404	0.371	0.428
	(0.498)	(0.491)	(0.483)	(0.495)
City Population Density	2548.763	1339.276	1319.951	1423.475
	(8928.925)	(5955.118)	(6090.265)	(5876.312)
City Exist McDonald's (binary)	0.164	…	0.020	0.102
	(0.371)	…	(0.139)	(0.303)
City Exist KFC (binary)	0.224	0.071	…	0.141
	(0.417)	(0.257)	…	(0.348)
City Entry McDonald's (binary)	0.030	0.041	…	…
	(0.170)	(0.199)	…	…
City Entry KFC (binary)	0.047	…	0.067	…
	(0.212)	…	(0.250)	…
City Entry Other Chinese (binary)	0.064	…	…	0.093
	(0.244)	…	…	(0.291)

Notes: Descriptive statistics for the baseline estimation samples for McDonald's, KFC, and other Chinese firms' respective discrete time hazard entry analyses. Standard deviations are in parentheses.

Table 5

Discrete Time Hazard Analysis of Fast Food Firm Initial City Market Entry

Variables	***McDonald's Entry***	***KFC Entry***	***Other Chinese Firm Entry***
City Population Density (lag)	0.000	0.000	-0.000*
	(0.000)	(0.000)	(0.000)
Urban (binary) (lag)	1.779*	0.263	-1.074
	(0.924)	(0.643)	(1.022)
City Population 1 Million+ (binary) (lag)	-0.972	1.799**	-0.018
	(0.755)	(0.757)	(0.843)
Mean Wages (log) (lag)	1.235	1.933***	3.208***
	(0.754)	-0.746	(0.928)
N of Fast Food Restaurants (lag)	0.185**	0.135*	0.158
	(0.086)	(0.078)	(0.119)
City Exist KFC (binary) (lag)	1.246	…	2.776**
	(0.951)	…	(1.259)
City Exist McDonald's (binary) (lag)	…	1.474	-0.187
	…	(1.463)	(1.360)
Constant	-16.402**	-22.740***	-35.512***
	(8.209)	(7.933)	(9.048)
σ_μ^2	1.219 (1.476)	1.307 (1.113)	3.113 (0.341)
Observations	535	507	568
Number of Communities	199	193	216

Notes: *** Significant at 1%. ** Significant at 5%. * Significant at 10%. Table shows results for single-spell discrete time hazard analysis of initial market entry for McDonald's, KFC, and Chinese firms as a function of market structure. Robust standard errors are in parentheses. The standard error μ_i is assumed to have a mean zero and variance σ_μ^2.

Figure 2

Number of Initial Market Entries by Firm (Time Period)

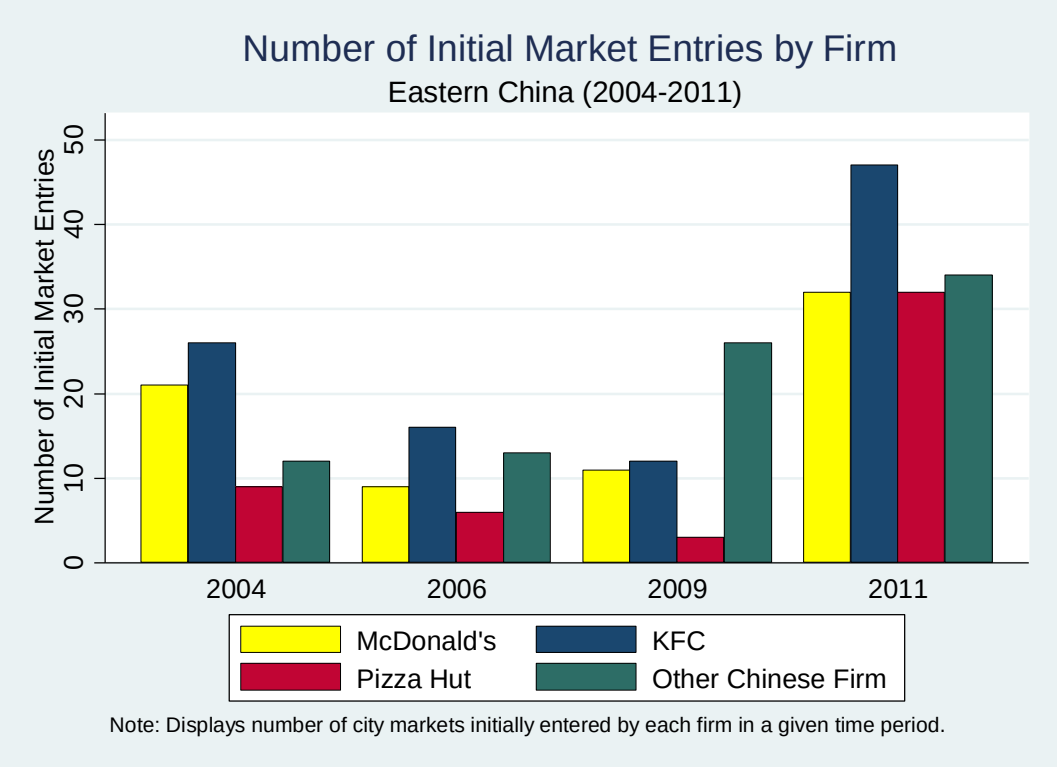


Figure 3

Number of Initial Market Entries by Firm (Urban vs. Rural)

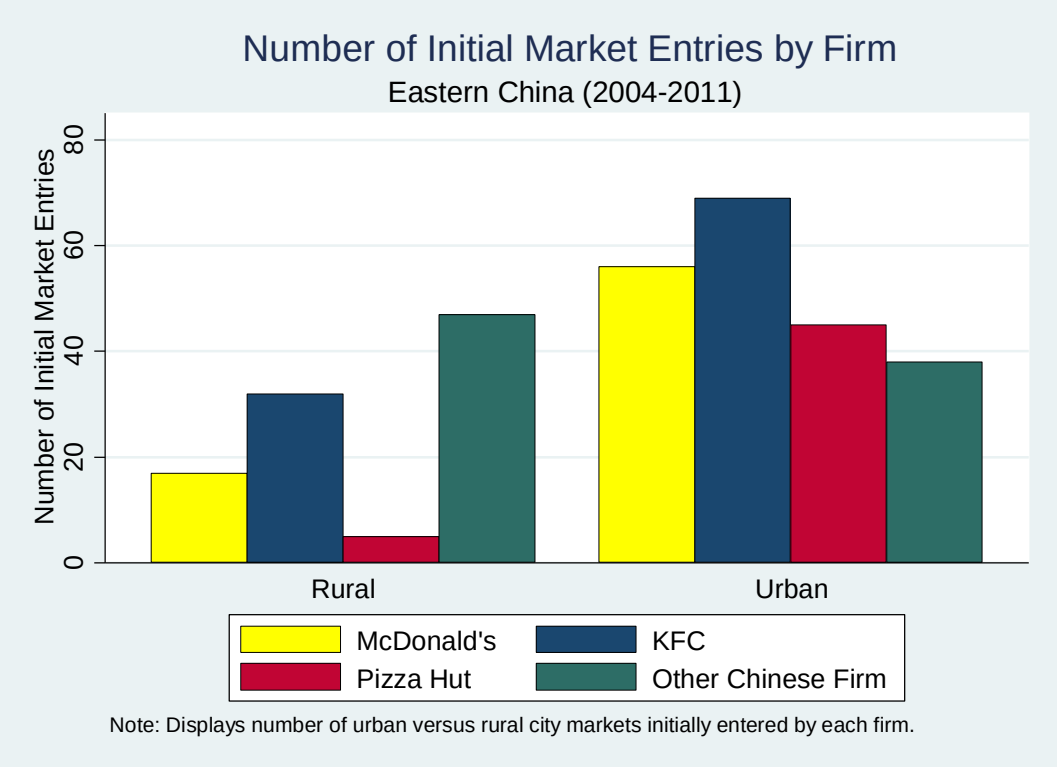
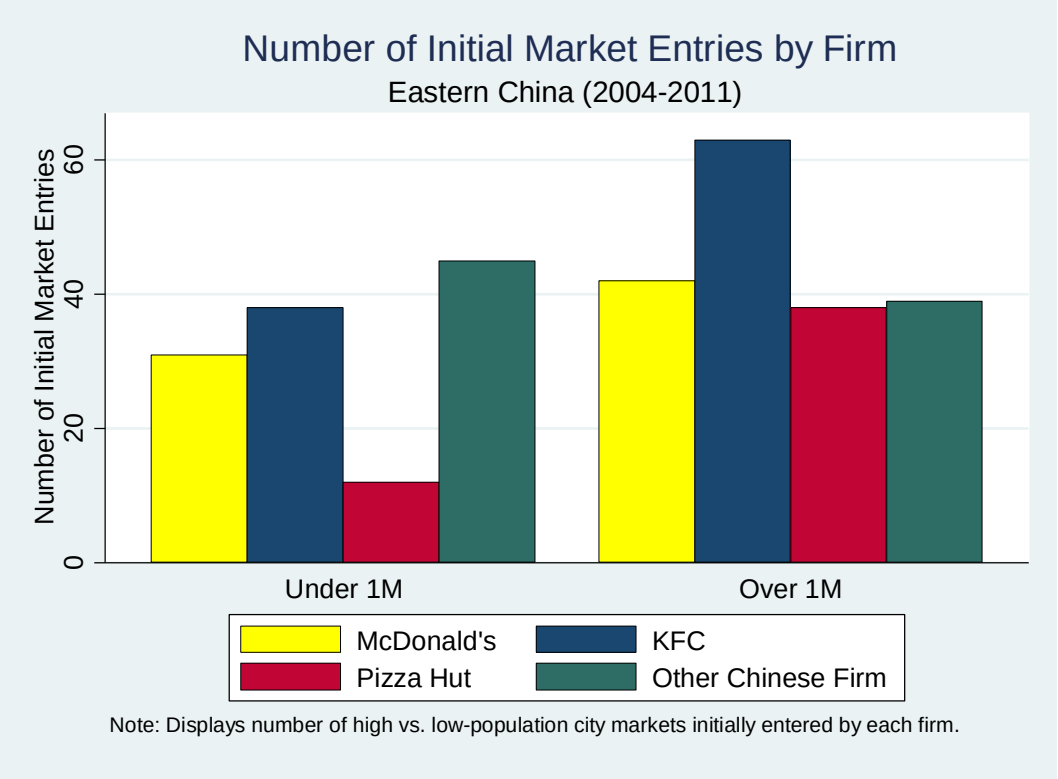


Figure 4

Number of Initial Market Entries by Firm (High vs. Low-Population)



Appendix

Table A1

Description of Variables

Independent Variables		
Short name	***Variable name***	***Long definition***
Community ID	Community identifier	Identifies the 190 unique communities surveyed
Survey Year	Survey year	Identifies year of survey (2004, 2006, 2009, 2011)
Year ID	Survey year identifier	Assigns number ID (1-4) to each of the survey years
Province	Province identifier	Identifies city province
Mean Wages (log)	Log of mean wages	Quantifies log of mean wages for a given community (wages measured in RMB)
Urban (binary)	=1 if city is urban	Identifies whether a city is classified as urban or rural by the Chinese government
City Population 1 Million+ (binary)	=1 if city population is over 1 million	Identifies whether a city has a population over 1 million
City Population Density	City population density	Quantifies a city's population density by dividing the city's population by area (sq km)
N of Fast Food Restaurants	Number of fast food restaurants	Quantifies total number of fast food restaurants operating in a given city
City Exist McDonald's (binary)	=1 if McDonald's exists in city	Identifies whether at least one McDonald's restaurant exists in a given city
City Exist KFC (binary)	=1 if KFC exists in city	Identifies whether at least one KFC restaurant exists in a given city
City Exist Pizza Hut (binary)	=1 if Pizza Hut exists in city	Identifies whether at least one Pizza Hut restaurant exists in a given city
City Exist Other Chinese (binary)	=1 if Other Chinese Firm exists in city	Identifies whether at least one other Chinese fast food firm exists in a given city

Table A1

Description of Variables (continued)

	Dependent Variables	
Short name	***Variable name***	***Long definition***
City Entry Any (binary)	=1 if any fast food firm initially enters into city	Identifies whether any fast food firm enters a city market for the first time
City Entry KFC (binary)	=1 if KFC initially enters into city	Identifies whether KFC enters a city market for the first time
City Entry McDonald's (binary)	=1 if McDonald's initially enters into city	Identifies whether McDonald's enters a city market for the first time
City Entry Other Chinese (binary)	=1 if Other Chinese Firm initially enters into city	Identifies whether other Chinese fast food firms enter a city market for the first time
City Entry Pizza Hut (binary)	=1 if Pizza Hut initially enters into city	Identifies whether Pizza Hut enters a city market for the first time
City Entry YUM (binary)	=1 if YUM! Brands initially enters into city	Identifies whether YUM! Brands enters a city market for the first time

Notes: All city entry variables are constructed for proper use in a single-spell discrete time hazard analysis. This means that once a firm enters a given market (for a value of 1), the values for that firm's city entry variable in each subsequent year are labeled missing. All data from the China Health and Nutrition Survey (2004-2011).

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