Threat of Entry and Organizational-Form Choice: The Case of Franchising in Retailing

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Web Appendices (Not for Publication)

A: Similarities across Chains in Pricing, Operating Hours, Number of SKUs, and Floor Space

Below are the details of the similarities among the six major convenience-store chains in Japan in price, operating hours, the number of stockkeeping unit (SKU) item in an outlet, and store space. The price level for a variety of consumer packaged goods is similar across these six major chains.[1]

For operating hours, most outlets of these six major chains open 24 hours a day. According to the Japan Franchise Association, the national average for major convenience-store chains in 2007 was 94.7%.[2] The fraction does not change much over time and across chains. For instance, about 95% of Family Mart outlets operated 24 hours a day in 2017.[3]

For the number of items, the number of SKU items in a typical outlet is similar across chains. For instance, typical 7-Eleven, LAWSON, and Family Mart outlets carries about 2,800 SKU items, 2,900-3,000 SKU items, and 2,800 SKU items, respectively.[4]

For the average store size by chain, all four major chains' floor space is close to the national average in 2004 (110.4 square meters). The table is available in the online appendix of Nishida (2017).

[1] For instance, see a survey at Nikkei Trendy (business magazine) on August 26, 2013. Retrieved March 19, 2020, from http://trendy.nikkeibp.co.jp/article/pickup/20130826/1051696/?SS=expand-life&FD=1486428519.

[2] Retrieved October 19, 2019, from https://www.env.go.jp/council/06earth/y060-69/mat03.pdf.

[3] Mainichi Shinbun (a newspaper) on October 31, 2017, retrieved March 19, 2020, from http://mainichi.jp/articles/20171031/k00/00m/020/165000c.

[4] The data for 7-Eleven come from the company's news release in 2011, retrieved March 19, 2020, from http://www.sej.co.jp/dbps_data/_material_/localhost/pdf/2011/2014103102.pdf. The data source for LAWSON and Family Mart come from an article from Nihon Keizai Shinbun (newspaper company) on August 21, 2013, retrieved March 19, 2020, from https://messe.nikkei.co.jp/rt/news/124060.html.

In the empirical analysis in the third section, we capture the time-invariant heterogeneity across chains by including chain-brand fixed effects.

B. Spatial Distribution of Convenience Stores in Tachikawa City, Tokyo Prefecture, in 2018

Figure W5 presents a map of convenience stores in Tachikawa City in the Tokyo prefecture in 2018.[5] Note both sunkus and Circle K outlets were rebranded as Family Mart outlets due to a merger between Family Mart Co., Ltd. and UNY Group Holdings Co., Ltd. in 2016.

C: Technical Details about Numerical Simulations

With the calibrated model and state transitions, we compute equilibrium strategies using Pakes and McGuire's (1994) iterative approach, which stops once the conditional choice probabilities and value functions have converged. We begin with an initial guess $x^0 = (V^0, P^0)$, and then apply the following iteration b for all states S: $x^{b+1} = G(x^b)$, where $G(x^b)$ is a collection of best responses by chains 1 and 2 against strategies P^{b-1} and simulated value functions V^{b-1} based on those strategies. We use a tight convergence criterion of 10^{-8}. We interpret a convergence of this algorithm as evidence suggestive of equilibrium existence under the parametric assumptions about the model. Our iterative algorithm converges in fewer than four iterations. The fact that our algorithm converges suggests we are able to locate one ex-ante maximizer (i.e., strategies in probability space) of the Bellman equation for a given set of value functions generated based on our calibrated model.

We note five limitations of the simulation analysis. First, our setup has an incumbent-entrant two-player setup. Our intention is to ensure this simulation setting better maps onto Goolsbee and Syverson (2008) in the sense that the incumbents in their empirical framework face only one potential entrant (i.e., Southwest). In theory, one could extend our framework for more than one incumbent, though doing so would lead to computational difficulties (i.e., large state space) in solving for the equilibrium with, say, six players. Meanwhile, unlike typical models of entry/expansion, our simulation analysis allows the firms to make not just one decision (i.e., number of outlets), but two decisions, because they must decide how many company-owned and franchised outlets to expand with. Our hope is that this simplification then allows us to focus our analysis on the interactions between an incumbent firm and a potential entrant.

[5]The map is generated by locationsmart.org. Retrieved March 19, 2020, from https://www.locationsmart.org/en/map.html?id=shopping/conveni&lat=39.292765300000006&lon=-76.6123771&z=3&vector=true.

Second, we ignore the inter-temporal nature of competition across markets due to tractability. Nonetheless, our model captures the inter-temporal nature of competition within a market by solving the dynamic optimization problem over a time horizon. That is, for both incumbent and entrant, company-owned- and franchised-outlet-expansion decisions are optimal (i.e., MPE) given the current state space and, by construction, their expected continuation values given the current state.

Third, the model abstracts away from the location choice within a market. Due to a small trade area for a typical outlet, spatial competition is indeed a factor in the industry's local competition. Although restrictive, the modeling approach allows us to avoid several issues that will make the model intractable to solve for the equilibrium in the simulations, including a large number of states, due to endogenous location choice and ownership-type choice.

Fourth, the model does not incorporate own and rival firms' strategic actions in multiple markets, because doing so in a fully dynamic setting remains an intractable methodological challenge when solving for an equilibrium. Nonetheless, our framework partially covers the strategic situation in Goolsbee and Syverson (2008). Our simulation model starts from zero outlets for both firms (i.e., no incumbent), and when the first entrant enters the focal market, the model describes the strategic actions of incumbents toward the second entrant until the second entrant enters the focal market. Meanwhile, after both firms enter the focal market, the simulation model describes within-market strategic interactions among incumbents, because no third entrant is allowed in the model.

Finally, due to a data limitation and tractability, the simulations do not directly incorporate store-closure decisions. Because the simulation exercises aim to capture the chains' competition in store expansion, however, this restriction may not be totally unreasonable. In addition, consistent with the specification in Tables 5 and 6, the choice variable a_{it}^k, the number of net store openings, implicitly incorporate gross store closings, because the net openings equal gross store openings minus gross store closings.

When setting the model parameters for simulation, we try to estimate them using the data we used for the descriptive analyses in a manner similar to a dynamic game estimation. For the parameters governing the demand side and transition matrices, the model parameters in simulation come from the same data set that we utilize for the descriptive analyses. For the calibration of those parameters, we follow an estimation approach that is similar to a structural approach, as we detail below. Given these estimates, we present calibrated parameters of the model in Table W6 for simulations.

To simulate the value functions, we need transition probabilities for market characteristics and model parameters. For the state transition of population and income per capita, we approximate their transition matrices using our data, following the same procedure when we estimate a dynamic model of oligopoly. Tables W7 and W8 display the estimated matrices.

To recover the model parameters regarding revenues, we run a revenue regression with the average sales per outlet as a regressand. We use this measure for three reasons. First, the regressions have the same functional form as the revenue function in the payoff function for the firms in the simulation model. Second, the literature on retailing regards sales per outlet as one of the key performance measures of a firm when only the aggregate-level data are available (see, e.g., Caves and Murphy, 1976; Martin, 1988). Finally, practitioners find sales per outlet are a useful yard stick for comparing sales performance across firms and markets (e.g., Kosova, Lafontaine, and Zhao, 2012). This measure is useful particularly when the market size differs significantly across markets as in our data.[6]

Table W9 shows the baseline sales per outlet for a franchised outlet, α_1^F, are 110 million yen per year, and the magnitude is in line with the unconditional average sales per outlet in Table 2. As expected, revenue per outlet is positively associated with population density and income per capita.

For the operating costs per outlet, we calibrate these parameters based on industry figures. Kawano (2016) reports the major components of operating costs for a convenience store are 18.5 million yen per year combined. For simulation, we follow the same rescaling we conduct for the revenue parameters, and our range captures the operating costs of around 0.18 (= 18.5/100). Note we use this cost estimate for both ownership types (i.e., franchised and company-owned), because the evidence on how the operating costs per outlet are (or are not) different across two ownership types is scant, unlike revenues. For instance, convenience-store chains do not disclose these figures by ownership type. Because the magnitude of the calibrated operating costs, 0.18, is considerably smaller than the differences in the revenue per outlet across types, which is 0.7 (= 1.1 - 0.4), we argue the role that differences in operating costs across ownership types plays in the simulation outcomes might be limited, if such a role exists at all.

For the expansion costs per outlet, Nikkei (October 8, 2011) reports the costs of constructing a building for a convenience store are around 13 million yen, and Oya (2015) reports the costs for the interior of a convenience store are around 15 million yen. Combined, these costs per outlet will be around 28 million yen per year. Our range of expansion costs is centered on a case in which costs are about 0.28 (after applying same scaling of 100). Furthermore, we allow company-owned and franchised expansion costs to be different, because implicit costs might be associated with franchised outlets that may not be directly stated in financial statements (e.g., franchisee recruiting costs and incentives). This possibility provides further motivation for why we consider not just a specific calibrated value but also a range when we

[6] Given that the spatial competition in the industry is localized due to a small trade area, a potential drawback of working with the average sales per outlet at the market level and ignoring local competition at the outlet level might be that precisely capturing the competition effects among chains could be empirically challenging, and thus we may underestimate the effects ("Rival-brand competition effects for a franchised outlet") if competitor chains' store density is not uniform within the market. For instance, consider a case in which competing chains' outlets tend to locate in areas distant from the focal chain's outlets. Because not all outlets face competition among chains, the competition effect per outlet among different chains' outlets is smaller when we take the average across all outlets of the focal chain.

perform the sensitivity analysis: we try a range of values, from 0.1 to 0.5 in increments of 0.1.

For the sunk costs of entry, we do not have reliable information about entry costs, which motivates us to consider a wide range of potential values that the entry costs could take in our sensitivity analysis. To better understand the implication of these assumptions, we conduct some sensitivity analysis on a range of values, from 0.1 to 0.5 in increments of 0.1. We choose a range similar to the range of entry costs (translated into yen) inferred in Hollenbeck (2017), though we consider a larger upper bound in case the entry costs in our setting need to also incorporate the costs associated with setting up headquarters.

The estimation results highlight two differences between company-owned and franchised outlets. First, the difference in the intercept term $(\alpha_1^C - \alpha_1^F)$, which measures how the baseline annual revenues per outlet are higher for company-owned outlets than for franchised outlets, is negative. The negativity matches the unconditional average sales per outlet for franchised and company-owned outlets in Table 2. The sign implies that, all else equal, a franchised outlet generates more revenues than a company-owned outlet.[7]

Second, the density of competitor chains' outlets, measured by the number of outlets divided by the population of the focal market, has a negative and statistically significant impact on revenues in franchised outlets (i.e., $\alpha_4^F < 0$), whereas the average revenues per outlet increase in the density of outlets of the focal chain in the market (i.e., $\alpha_3^F > 0$). The former sign suggests the presence of rival chains' outlet density within a market dampens the focal chain's average revenue per outlet. Meanwhile, the latter sign suggests either the presence of positive effects through repeated purchases (e.g., Nishida, 2017), brand awareness through quality investments and advertising efforts by the company and franchisees (e.g., Bai and Tao, 2000; Blair and Lafontaine, 2005; Lafontaine and Slade, 2001), or potential size spillovers in demand (e.g., Blevins, Khwaja, and Yang, 2018). For company-owned outlets, both effects are mitigated in magnitude. This pattern may reflect the fact that this parameter measures the average business-stealing effect within a market when the density of rival outlets is uniform, yet in reality, advertising expenditures may differ from one outlet to another (even if they are all located in the same prefecture).

[7]These revenue-efficiency benefits of a franchised outlet could potentially be explained by agency problems; unit managers in company-owned outlets may have an incentive to shirk in their efforts to maintain an acceptable level of quality and performance (e.g., Carney and Gedajlovic, 1991; Combs and Ketchen, 2003; Fan, Kuhn, and Lafontaine, 2016; Gal-Or, 1995; Lafontaine and Slade, 1996; Shane, 1996). Furthermore, franchise-based operations could have informational advantages, because franchisees may know more about the local market conditions (e.g., Minkler, 1990). Relatedly, franchisees may be more responsive and adaptive to changes in market conditions than managers who work under corporate bureaucracy (e.g., Srinivasan, 2006; Yin and Zajac, 2004). Nonetheless, several limitations exist in these interpretations. For example, their larger intercept terms (i.e., $\alpha_1^C < \alpha_1^F$) may be driven by a combination of the franchisee's aligned incentives with the chain to maximize sales and the notion that chains may present franchisees locations with inherently high-revenue potential as a way to incentivize them to run the location. We also acknowledge that the revenue estimation in Table W9 does not address the issues related to unobserved heterogeneity in the state space or a sample selection (i.e., we observe revenues only when the focal chain has entered).

We note that we assume the incumbent and potential entrant share the same primitives (i.e., revenue parameters, sunk cost parameters), because the simulation treats these two firms as ex-ante symmetric when they have not entered the market (i.e., potential entrants). The potential entrant (i.e., non-focal firm) is different from the incumbent only when the entrant experiences a sudden reduction in its entry cost (for markets it has not entered yet). Through this entry threat, we find the asymmetry between the incumbent and potential entrant. We made this assumption to avoid introducing other sources of asymmetry that may confound with the elevated entry threat.

D. Advantages of Proportion Measure and Robustness Checks to Choice of Dependent Variable

The proportion of company-owned outlets as the dependent variable in Table 5 has the following advantage over the actual counts of company-owned outlets. As in the case of market share, the proportion of company-owned outlets is by construction bounded between 0 and 1, making this measure comparable across all chains and all markets in all years. This feature allows the proportion of company-owned outlets a cleaner dependent variable in the regressions of the franchising decisions on the regressors relative to the use of actual counts of company-owned outlets. By contrast, the actual number of company-owned outlets can depend on various factors, such as the market size, that are unrelated to the focal chain's intention of utilizing the company-owned outlets. Accordingly, the actual count measure becomes noisy and problematic as a proxy of franchising decisions when the geographical markets are heterogeneous in population and income, which is the case for our data (see summary statistics in Table 4). For instance, the population of the Tokyo prefecture, the most populous prefecture in Japan, is 15 times the population of the Tottori prefecture. All else equal, the actual number of company-owned outlets can be as much as more than 10 times in Tokyo than the actual number in Tottori, but the difference may largely reflect the market size, not the tendency for a chain to operate via company-owed outlets versus franchised outlets. Reflecting this advantage, the proportion of company-owned outlets is widely accepted as a measure of dual distribution decisions (i.e., operation via either company-owned outlets or franchised outlets) in the franchising literature (Blair and Lafontaine, 2005).

Nonetheless, we run a robustness-check regression where the dependent variable is the actual count of company-owned outlets. Column 2 in Table W4 shows the entry threat in adjacent markets is positively related to the use of company-owned outlets measured in the actual counts. These parameters are not precisely estimated at the 10% level. The imprecise estimates, however, might not be too surprising given that actual counts are a noisier measure of franchising decisions as discussed above.

E: Choosing Measure of Market Size

Whereas Ellison and Ellison (2011) utilize sales as a proxy for market size, we let the data select the candidate measure. We leverage random forests to predict the probability of entry using all of the predictors we are able to obtain (e.g., all available market characteristics). When fitting the entry-probability model, the random-forest algorithm allows for rich interactions between all of the relevant market characteristics. With the fitted model, we then obtain importance ranks for each of the predictors, whereby the top-ranked predictor serves as the main measure of market size that we use for the non-monotonicity test. After performing this analysis, we confirm in Table W5 that aggregate sales of the incumbent firms in the year before in the focal market are the best predictor of expansion, followed by population in the year before in the focal market.

F: Implementation of Non-monotonicity Test by Ellison and Ellison (2000)

We denote entry and market size by a and $Z \in \mathbb{Z}$, respectively. To set up the test, suppose the data $\mathbb{D} = \{(Z_d, a_d, 1 \leq d \leq n\}$ are generated by the model $a_d = g(Z_d) + \varepsilon_d$. As in Ellison and Ellison's (2000) framework, we assume ε_d have zero mean and variance σ^2. We implement isotone regressions to determine the monotone function $\hat{g}(Z_d)$ that best fits the data. We then form the residuals $\hat{\varepsilon}_d = a_d - \hat{g}(Z_d)$ to test whether the residuals appear to come from a misspecified model:

$$T = \frac{\hat{\varepsilon}\bar{W}\hat{\varepsilon}}{2^{1/2}\hat{\sigma}^2 \sum_{ij} \bar{w}_{ij}}. \tag{1}$$

Here, W is a kernel weight matrix with elements w_{ij} reflecting differences in the Z's, $\bar{W} = (W + W')/2$, and $\hat{\sigma}^2 = \hat{\varepsilon}'\hat{\varepsilon}/n$. If the true $a^*(Z)$ is nonmonotone, regions exist for which $a^*(Z) > \hat{g}(Z)$, and other regions exist where $a^*(Z) < \hat{g}(Z)$. A large statistic will lead to a rejection of the null hypothesis that a is monotone in Z. To obtain the appropriate p-values, we implement a bootstrap procedure. We first obtain an estimator $\hat{\sigma}^2$ and then simulate values of ε_d. We then use Monte Carlo approximations to simulate the distribution of T and compute an approximated point τ such that $P(T > \tau) = \alpha$, where α is the level of significance. The null hypothesis is rejected if T computed from the data exceeds the critical value τ.

G. Robustness Checks: Expanded Definition of a Neighboring Market

The focal chain's response in the franchising decision shown in Table 5 may not be coming from the heightened presence of rival chains in the geographic markets that are directly adjacent to the focal market, but from the heightened presence of rival chains in more distant markets from the focal market, such as those that share a border with the markets that are adjacent to the focal market.

To check the robustness of the empirical results in Table 5 to the definition of a neighboring market, we provide an empirical result based on an expanded definition of a neighboring market. In particular, we employ an empirical specification in which we take into account heightened entry threat in the geographical markets that are adjacent to the focal market's neighborhood markets but are not directly adjacent to the focal market ("second-degree adjacent markets"). Those second-degree adjacent markets represent an "outer" circle of the neighborhood markets that we employ in the baseline specification in Table 5 ("first-degree adjacent markets"). The idea behind this extended definition of neighborhood markets is that a chain may be responding to the heightened entry threat not only in the markets geographically adjacent to the focal market ("first-degree adjacent markets"), but also in the markets that geographically surround the first-degree adjacent markets.

Column 1 in Table W4 confirms the baseline results in Table 5 are robust to the expanded definition of a neighboring market. Column 1 shows the coefficients on the increase in the entry threat in the second-degree adjacent markets are not precisely estimated at the 5% level. We find no statistically significant evidence that the entry of rival chains in the second-degree adjacent markets is related to the franchising decision of the focal chain in the focal market. The focal chain appears to respond to the increase in the entry threat only when its rival chains increase their presence in the geographical markets that share the border with the focal market, not in those second-degree adjacent markets. This result shows first-degree adjacent markets are a more relevant definition of a neighboring market for the focal market from the perspective of convenience-store chains' decision-making regarding responding to entry threat. In other words, a chain may not regard entry of rival chains in the second-degree adjacent markets as a "threat" of entry into the focal market.

H: Definition of Equilibrium for Model in Numerical Simulation

We define the chains' Markov strategies as follows. The payoff-relevant states are $S = (X_t, N_{t-1})$. The strategies are $\sigma_i = (\sigma_i^C, \sigma_i^F)$, which consist of the entry strategies for company-owned outlets $\sigma_i^C : S \to \mathcal{A}$, and entry strategies for franchised outlets $\sigma_i^F : S \to \mathcal{A}$.

Let $\sigma = \{\sigma_i\}_i$ be a Markov-strategy profile. Assuming the chains follow a stationary Markov Perfect Equilibrium (MPE),[8] they choose a strategy profile σ^* such that for all i,

$$V_i(S;\sigma|\sigma_i^*, \sigma_{-i}^*) \geq V_i(S;\sigma|\sigma_i, \sigma_{-i}^*) \tag{2}$$

for all σ_i, where $V_i(\cdot)$ is the Bellman equation defined as

$$V_i(S;\sigma) = E[\Pi_i(S;\sigma^C(S), \sigma^F(S)) + \rho E(V_i(S';\sigma)|S, a^C = \sigma^C, a^F = \sigma^F)|S]. \tag{3}$$

For simplicity, we restrict ourselves to symmetric equilibria for a given ownership type.

I. Summary of Results from Sensitivity Analysis

When performing the sensitivity analysis, we search over a parameter space in which the company-owned and franchised expansion costs may be different. We consider a range of scenarios that are generated by the different model primitives. For the model primitives, we consider a range of expansion costs for company-owned outlets between 0.1 to 0.5 in increments of 0.1 (i.e., five scenarios), expansion costs for franchised outlets between 0.1 to 0.5 in increments of 0.1, and entry costs into a new market between 0.1 to 0.5 in increments of 0.1. These ranges are centered around industry-based numbers and/or past estimates from research about retail entry. In total, the simulation model allows us to explore a comprehensive number of scenarios (5 x 5 x 5 = 125 scenarios in total) in our sensitivity analysis. In addition, for the number of scenarios, we simulate a very large number of industry dynamics for each scenario. We use over 250,000 simulated trajectories spanning 20 years each, in which the threat of entry is elevated in year 11. The sensitivity analysis serves two purposes. First, it helps us confirm the main findings about the responses to elevated entry threats is consistent across a handful of scenarios. Second, this analysis offers potential managerial implication (i.e., Is the threat of entry harmful for the incumbent?). Our analysis confirms the incumbent's expansion based on the increased proportion of company-owned outlets is the observed response to the elevated threat of entry in all of the scenarios we simulate (i.e., 125 out of 125). Finally, we explore the impact of elevated entry threats on the incumbent's profits per store. Our results demonstrate that company-owned outlet expansion in response to the threat of entry does not improve profits per store in any of the cases.

[8] Refer to Ericson and Pakes (1995) for the general framework.

J. Example of Publications Announcing Entry into Prefecture

Figure W2 presents an example of convenience-store chains publicizing their market entry. On July 10, 2019, 7-Eleven issued a newsletter titled "On Thursday, July 11, 2019, Seven-Eleven Will Enter Okinawa Prefecture and Simultaneously Open 14 Stores."[9] The newsletter contains a list of 14 outlets with their store names and physical addresses.

[9] Retrieved March 19, 2020, from https://www.sej.co.jp/company/news_release/news/2019/2019071001.html.

Table W1: Incumbent Responses to Entry Threat: Without Proxy Variable

	(1)	(2)
Increase in entry threat in adjacent markets:		
In the current year	0.0119***	0.0351**
	(0.00427)	(0.0171)
A year ago	0.000372	0.0000586
	(0.00358)	(0.0145)
Two years ago	0.00709*	0.0168
	(0.00419)	(0.0163)
Three years ago	-0.00161	-0.0150
	(0.00296)	(0.0130)
Four years ago	-0.00205	-0.0107
	(0.00363)	(0.0145)
Observations	1799	1799

Note. The dependent variable is the proportion of company-owned outlets.
All specifications include a constant term, chain-, year-, and market-level fixed effects.
The set of the regressors in columns 1 and 2 not shown in the table
is the same with the one in columns 3 and 4 in Table 5, respectively.
Column 2 normalizes the entry threat variables by the number of
markets that are geographically adjacent to the focal market.
Demographic controls refer to eight market-level variables: Growth rate of population,
income per capita, wage, and land price in the focal market and in adjacent markets.
We cluster the standard errors on the panel identifier (i.e., a market-chain combination).
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table W2: Entry Order and Proportion of Company-Owned Outlets

	(1)	(2)	(3)	(4)
First entrant	0.0762***	0.0778***	0.0725***	0.0729***
	(0.00933)	(0.00978)	(0.00888)	(0.00890)
Second entrant	0.0479***	0.0472***	0.0470***	0.0471***
	(0.00935)	(0.00974)	(0.00887)	(0.00888)
Third entrant	0.0447***	0.0411***	0.0400***	0.0399***
	(0.00925)	(0.00968)	(0.00875)	(0.00877)
Fourth entrant	0.00883	0.00960	0.0107	0.0106
	(0.00867)	(0.00896)	(0.00803)	(0.00805)
Fifth entrant	-0.00274	-0.00782	-0.0134	-0.0130
	(0.00922)	(0.00959)	(0.00860)	(0.00862)
Chain fixed effects		Yes	Yes	Yes
Market fixed effects			Yes	Yes
Chain-Year fixed effects				Yes
Observations	2199	2199	2199	2199

Note. The dependent variable is the proportion of company-owned outlets.
The set of the regressors not shown in the table is the same with the one in column 3 in Table 5.
We cluster the standard errors on the panel identifier (i.e., a market-chain combination).
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table W3: Franchising Decisions and Brand Preference

	(1)	(2)	(3)	(4)
Scores in 2005 survey	-0.000414	-0.00171**		
	(0.000443)	(0.000717)		
Scores in 2010 survey			-0.00314*	-0.00321
			(0.00152)	(0.00333)
Constant	0.0730***	0.170***	0.111***	0.113
	(0.0138)	(0.0385)	(0.0266)	(0.0762)
Chain fixed effects		Yes		Yes
Observations	34	34	17	17

A unit of observation is a chain-region combination. Japan has 10 regions.
The dependent variable is the proportion of company-owned outlets.
The independent variable is the percentage of people who voted for a chain in a given region either in 2005 or 2010. The survey in 2005 asks, "What is your favorite convenience-store chain? (Pick one)" The 2005 survey did not include Circle K in the choice set of convenience-store chains. The survey in 2010 asks, "Which convenience-store chain do you like the most?"
Standard errors in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table W4: Incumbent Responses to Entry Threat: Robustness Checks

	(1)	(2)
Increase in entry threat in adjacent markets:		
In the current year	0.0110**	0.548
	(0.00450)	(0.692)
A year ago	0.00000345	0.377
	(0.00384)	(0.671)
Two years ago	0.00777*	1.137**
	(0.00438)	(0.550)
Three years ago	-0.000877	0.857**
	(0.00324)	(0.426)
Four years ago	-0.00181	-0.460
	(0.00380)	(0.512)
Increase in entry threat in second-degree adjacent markets:		
In the current year	0.00165	
	(0.00269)	
A year ago	0.00133	
	(0.00268)	
Two years ago	-0.00422*	
	(0.00224)	
Three years ago	-0.000806	
	(0.00237)	
Four years ago	-0.00151	
	(0.00208)	
Observations	1799	1799

Note. The dependent variable in the first and the second columns is the proportion of company-owned outlets and the number of company-owned outlets, respectively.
The set of the regressors not shown in the table is the same with the one in column 3 in Table 5.
We cluster the standard errors on the panel identifier (i.e., a market-chain combination).
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table W5: Importance Ranks of Typical Measures of Market Size

Predictor	Importance rank	Fit metric after randomized permutation
Sales	1	0.38
Population	2	0.67

Table W6: Calibrated Model Parameters for Simulations

Parameter	Calibrated value
Discount factor (ρ)	0.9
Revenue per outlet for franchised outlet (α_1^F)	1.1
Revenue per outlet for a company-owned outlet (α_1^C)	0.4
Population density in revenue function ($\alpha_{2,population}$)	0.02
Income per capita in revenue function ($\alpha_{2,income}$)	0.0002
Own-brand competition effect for a franchised outlet (α_3^F)	6
Own-brand competition effect for a company-owned outlet (α_3^C)	2
Rival-brand competition effect for a franchised outlet (α_4^F)	-2
Rival-brand competition effect for a company-owned outlet (α_4^C)	-0.1
Entry cost (EC)	Chosen from range [0.1, 0.5] in sensitivity analysis
Expansion cost for company-owned outlet (β_1)	Chosen from range [0.1, 0.5] in sensitivity analysis
Expansion cost for franchised outlet (β_2)	Chosen from range [0.1, 0.5] in sensitivity analysis
Operating cost (β_3)	0.18

Table W7: Transition Matrix for Discretized Income per Capita

		Year t+1			
		1	2	3	4
Year t	1	0.84	0.16	0	0
	2	0.03	0.80	0.17	0
	3	0	0.070	0.76	0.17
	4	0	0	0.11	0.89

Table W8: Transition Matrix for Discretized Population

		Year t+1			
		1	2	3	4
	1	0.98	0.02	0	0
Year t	2	0.03	0.96	1	0
	3	0	0.02	0.97	0.01
	4	0	0	0	1

Table W9: Revenue Regression

Baseline revenue per outlet for franchised outlet (α_1^F)	110.3***
	(2.955)
Population density ($\alpha_{2,population}$)	1.929***
	(0.400)
Income per capita ($\alpha_{2,income}$)	0.0199***
	(0.00109)
Own-brand competition effect for a franchised outlet (α_3^F)	613.0***
	(17.40)
Rival-brand competition effect for a franchised outlet (α_4^F)	-201.6***
	(9.027)
Across-type difference in revenue per outlet (α_1^C-α_1^F)	-42.05**
	(20.05)
Across-type difference in own-brand competition effect ($\alpha_3^C - \alpha_3^F$)	-470.5***
	(93.52)
Across-type difference in rival-brand competition effect ($\alpha_4^C - \alpha_4^F$)	187.5**
	(75.04)

Note. The regression includes market fixed effects. The unit of the parameters is million yen per year. A unit of observation is a market-year-chain combination.

Figure W1: 47 Prefectures in Japan

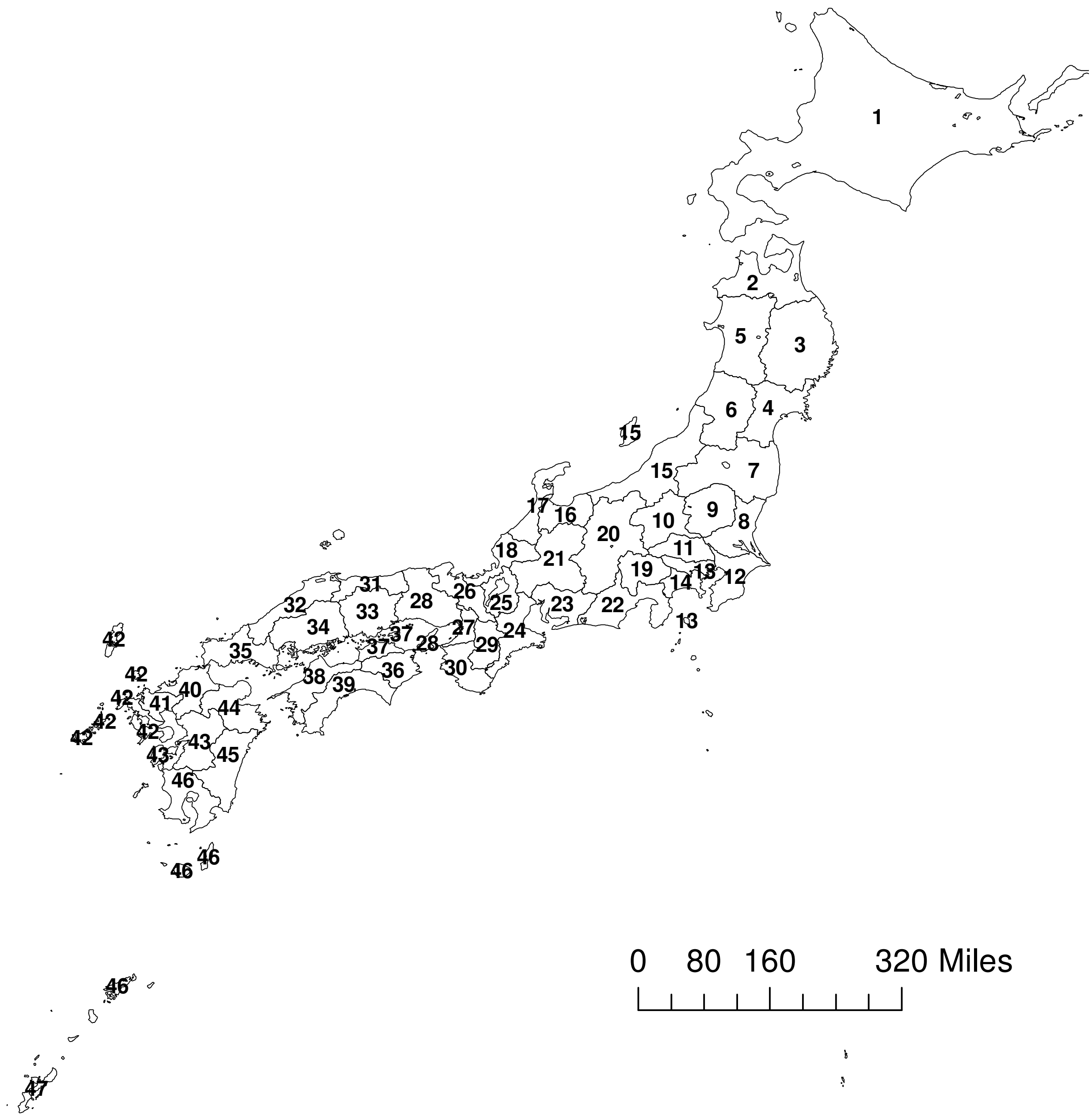


Figure W2: 7-Eleven's Newsletter on July 10, 2019, Announcing Entry in Okinawa Prefecture

言語 / Language

株式会社 セブン-イレブン・ジャパン

企業情報 | 加盟店オーナー募集 | 物件募集 | CSR | 採用 | ネットショッピング

このページを印刷する

2019年7月10日

株式会社セブン-イレブン・沖縄

7月11日（木）沖縄県内に14店舗同時開店　セブン-イレブン沖縄県への出店開始

株式会社セブン-イレブン・沖縄（本社：沖縄県那覇市、代表取締役社長：久鍋 研二）は、2019年7月11日（木）に沖縄県内へ初出店し、那覇市内に7店舗、糸満市内に3店舗、豊見城市内に2店舗、北谷町1店舗、八重瀬町内に1店舗、合計14店舗を同日午前7時にオープンいたします。

セブン-イレブンは「既存中小小売店の近代化と活性化」「共存共栄」の実現を創業の理念とし、地域に根ざしたコンビニエンスストアとして、製造・物流インフラの整備に伴う出店を、積極的に推進してまいりました。このたびの沖縄県出店に際しては、沖縄県浦添市、うるま市に新設されたセブン-イレブン専用工場を中心に製造体制を整え、オリジナル商品の開発や質の高い商品の製造を通じ、地域のお客様のニーズにお応えできるコンビニエンスストアを目指します。

セブン-イレブンは、本年6月末現在、46都道府県に合計20,973店を展開しております。 今回の出店によって、国内全都道府県でのチェーン展開となり、沖縄県内においては、今後2024年7月末までに約250店舗の出店を目指してまいります。

今後の新規出店についても、地域のお客様のニーズに即した、皆様に愛されるセブン-イレブンを目指してまいります。

【オープン店舗】　7月11日(木)　7:00　14店舗同時オープン店舗

店舗名	住所
糸満兼城サンプラザ糸満(いとまんかなぐすくサンプラザいとまん)店	沖縄県糸満市兼城400
糸満座波(いとまんざは)店	沖縄県糸満市字座波1071-1
糸満真栄里東(いとまんまえざとひがし)店	沖縄県糸満市字糸満1582
国際通OTSビル（こくさいどおりOTSビル）店	沖縄県那覇市松尾1丁目2番3号
国際通松尾1丁目（こくさいどおりまつお１ちょうめ）店	沖縄県那覇市松尾1丁目4-5
東風平JAおきなわ（こちんだJAおきなわ）店	沖縄県島尻郡八重瀬町東風平388
新天地浮島(しんてんちうきしま)店	沖縄県那覇市松尾2丁目20-5
北谷北前1丁目（ちゃたんきたまえ１ちょうめ）店	沖縄県中頭郡北谷町北前1丁目20番1
豊見城金良(とみぐすくかねら)店	沖縄県豊見城市字金良108-1
豊見城中央(とみぐすくちゅうおう)店	沖縄県豊見城市字豊見城458-1
那覇小禄1丁目（なはおろく１ちょうめ）店	沖縄県那覇市小禄1丁目19-20
那覇金城2丁目(なはかなぐすく２ちょうめ)店	沖縄県那覇市金城2丁目2番1
那覇新都心公園前(なはしんとしんこうえんまえ)店	沖縄県那覇市おもろまち4丁目17-1
那覇松山1丁目（なはまつやま１ちょうめ）店	沖縄県那覇市松山1丁目3番9号

Figure W3: Distribution of the Percentage of Company-Owned Outlets across Markets, 1999 and 2000

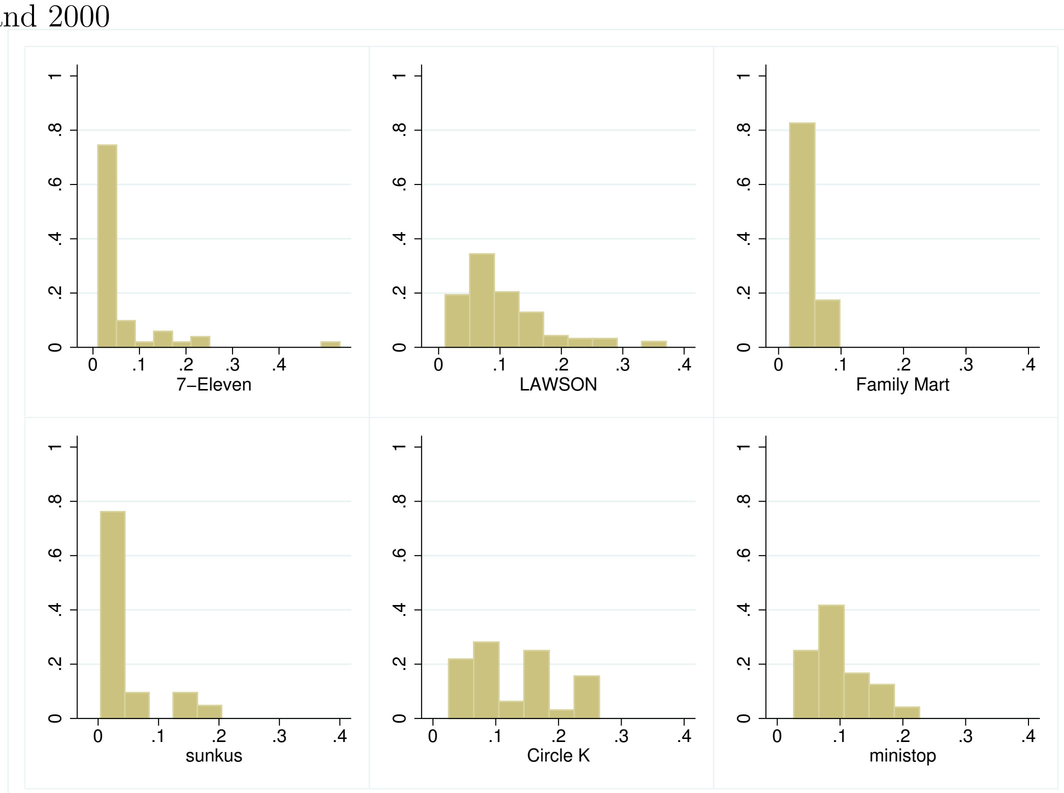


Figure W4: Evolution of the Total Number of Outlets

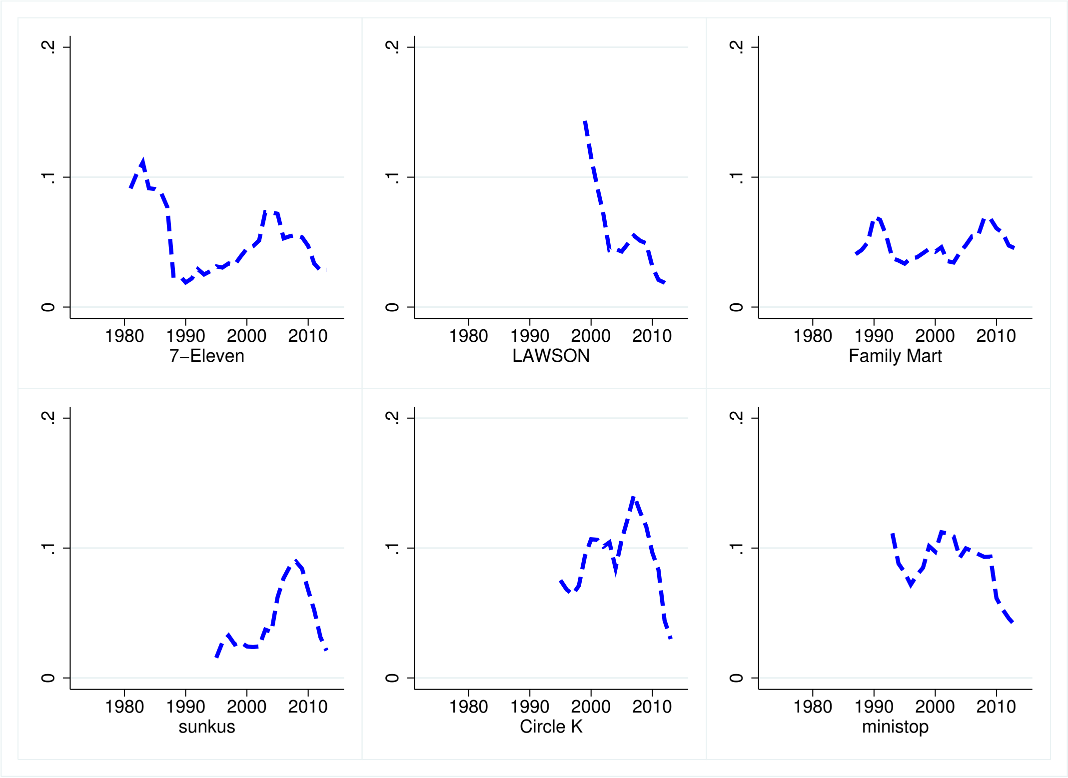
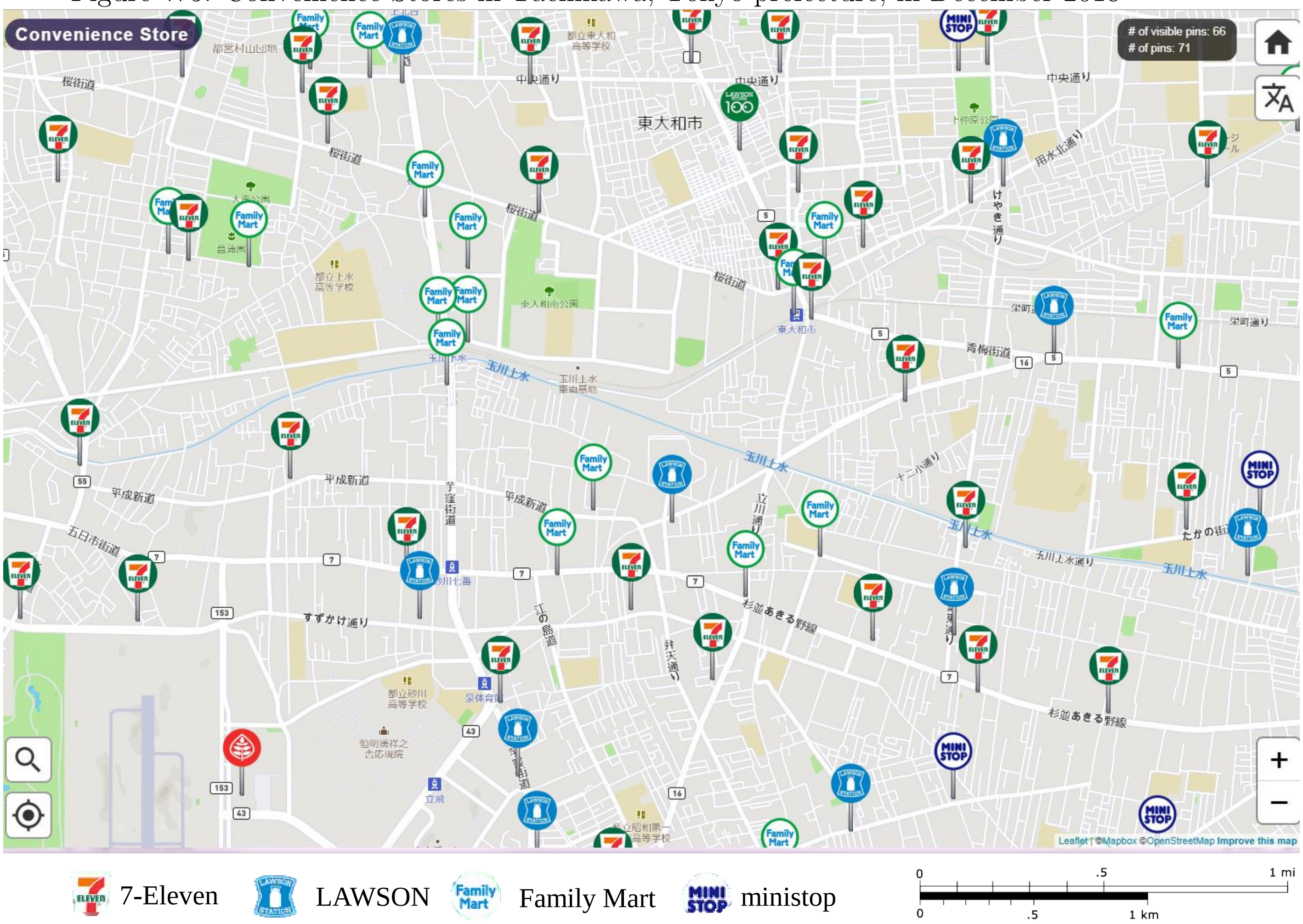


Figure W5: Convenience Stores in Tachikawa, Tokyo prefecture, in December 2018



References

[1] Bai, Chong-En, and Zhigang Tao (2000), "Contract Mixing in Franchising as a Mechanism for Public-Good Provision," *Journal of Economics & Management Strategy*, 9 (1), 85–113.

[2] Carney, Mick, and Eric Gedajlovic (1991), "Vertical integration in franchise systems: Agency theory and resource explanations," *Strategic Management Journal*, 12 (8), 607–629.

[3] Caves, Richard, and William Murphy (1976), "Franchising: Firms, markets, and intangible assets," *Southern Economic Journal*, 42 (4), 572–586.

[4] Combs, James, and David Ketchen (2003), "Why do firms use franchising as an entrepreneurial strategy?: A meta-analysis," *Journal of Management*, 29 (3), 443–465.

[5] Gal-Or, Esther (1995), "Maintaining quality standards in franchise chains," *Management Science*, 41 (11), 1774–1792.

[6] Kawano, Moriya. (2016, May 30), "Konbini tantei chousa houkokusho [Convenience-store detective's research report]." Retrieved March 19, 2020, from http://www.itmedia.co.jp/business/articles/1605/30/news025.html.

[7] Kosová, Renata, Francine Lafontaine, and Bo Zhao. (2012), "Scale, Scope, Ownership Changes, and Performance," Working paper.

[8] Lafontaine, Francine, and Margaret Slade (1996), "Retail contracting and costly monitoring: Theory and evidence," *European Economic Review*, 40 (3), 923–932.

[9] Lafontaine, Francine, and Margaret Slade (2001), "Incentive contracting and the franchise decision," in *Game theory and business applications*, ed. by K. Chatterjee, and W. Samuelson, pp. 133–188. Kluwer Academic Press.

[10] Martin, Robert (1988), "Franchising and risk management," *The American Economic Review*, 78 (5), 954–968.

[11] Minkler, Alanson (1990), "An empirical analysis of a firm's decision to franchise," *Economics Letters*, 34 (1), 77–82.

[12] Nikkei (2011, October 8), "Konbini keiryo tenpo de kosei [Convenience stores expand through light-weight outlets]," Retrieved March 19, 2020, from https://www.nikkei.com/article/DGKDZO35442500Y1A001C1TJ0000.

[13] Nishida, Mitsukuni (2017), "First-Mover Advantage through Distribution: A Decomposition Approach," *Marketing Science*, 36 (4), 590-609.

[14] Oya, Hiroyuki (2015, September 2), "Famima Yuni togo ni tachihadakaru futatsu no kenen [Two concerns about the merger between Family Mart and UNY]," *Weekly Diamond*, Retrieved March 19, 2020, from https://diamond.jp/articles/-/77605.

[15] Pakes, Ariel, and Paul McGuire (1994), "Computing Markov-Perfect Nash Equilibria: Numerical Implications of a Dynamic Differentiated Product Model," *The Rand Journal of Economics*, 25 (4), 555–589.

[16] Srinivasan, Raji (2006), "Dual distribution and intangible firm value: Franchising in restaurant chains," *Journal of Marketing*, 70 (3), 120–135.

[17] Yin, Xiaoli, and Edward Zajac (2004), "The strategy/governance structure fit relationship: Theory and evidence in franchising arrangements," *Strategic Management Journal*, 25 (4), 365–383.