Why Do Firms Behave Similarly?
A Study on New Product Introduction in the Japanese Soft-drink Industry

Abstract

We analyze new product introduction in the Japanese soft-drink industry to distinguish among theories of why firms exhibit similar behavior. Some theories suggest that firms mimic others with comparable resource endowments in order to mitigate rivalry or to minimize risk. Other theories suggest that imitation economizes on information costs.

In the Japanese soft-drink industry, there is often bunching of new product introductions and imitation of competitors' offerings. As a result, Japanese beverage manufacturers duplicate each other's product lines. In the US, by comparison, the extent of such duplication is much less.

The empirical results provide support for both sets of theories, but in different contexts. The analysis of firms' initial entry into brand-new products suggests that firms enter when they observe larger competitors doing so. Entry by large firms provides information that demand for the product is likely to grow; indeed, such entry may give legitimacy to the product and stimulate consumer demand. On the other hand, the analysis of new product introduction within established product categories suggests that firms often mimic competitors that share a similar resource base. One interpretation is that the bunching of entry into emerging product markets is largely the result of economizing on information costs, whereas the bunching of product introductions within established categories is caused more by competitive interaction among similar firms.

Key Words: Behavioral similarity, New product introduction, Competitive interaction

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1. Introduction

Competitors often imitate the actions of rivals. Such behavior can be observed worldwide in many industries, but it is one of the most prominent characteristics of Japanese firms. The list of Japanese anecdotes is endless: immediate imitation of successful new products, diversification into similar business areas, and simultaneous capacity and foreign direct investment (Tsurumi, 1976; Abegglen and Stalk, 1985; Itami, 1989; Shintaku, 1994; Cooper 1995)[1]. Until the 1980s it was

[1] These phenomena are observed not only in Japan but also in the world. See Greve (1996) and Kennedy (1997).

believed that such characteristics may have contributed to Japan's economic success. In the 1990s, however, Japanese firms have begun to reconsider their behavior, given pressures imposed by the economic downturn and intensive global competition. To evaluate the behavioral characteristics of Japanese firms, it is necessary to understand the underlying causes and mechanisms. Except for a few recent empirical studies (Asaba and Lieberman, 1997; Miyagawa et al., 1997; Asaba, 1998) the causes of similar behavior among competitors have not been systematically investigated[2].

Similar behavior among rivals is often called "YOKONARABI" with a negative meaning. Japanese firms with such a characteristic are regarded as copycats and criticized for a lack of creativity[3]. At least in some Japanese industries, however, this type of behavior seems to promote competition in the industries and capabilities of the firms. Japanese firms consider that being behind their rivals is a more serious risk than incurring a deficit and always monitor each other (Abegglen and Stalk, 1985). If one firm succeeds, the others immediately find the source of the success, and imitate and follow it. Moreover, for fear of being caught up by their rivals, firms try to innovate and improve their ways to go slightly ahead of the competitors.

There are several theories of why firms exhibit similar behavior, which can be broadly classified into two categories. The first set of theories argues that firms adopt similar behavior because of competitive interaction. As the studies of resource-based view of the firm suggest, firms are constrained by their resource endowments (Collis, 1991; Teece et al., 1997). Thus, firms can mimic others when they have comparable resource endowments. At the same time, resource homogeneity means that any firms do not have distinctive competitive advantage and they face intense competition (Peteraf, 1993). Therefore, firms with similar resource endowments have to mimic others to minimize the risk of asymmetry of competitive position (Knickerbocker, 1973) or to mitigate rivalry, as the studies on strategic groups (Porter, 1979) and multimarket contact (Karnani and Wernerfelt, 1985; Bernheim and Whinston, 1990: Gimeno and Woo, 1996) predict.

Theories in the second category argue that mimicry economizes on information costs. Sociological studies on mimetic isomorphism (Hawley, 1986; DiMaggio and Powell, 1983) and economic theories on herd behavior (Baherjee, 1992; Bikhchandani et al., 1992; 1998; Scharfstein and Stein, 1990; Palley, 1995) argue that firms under uncertainty mimic others instead of collecting information by themselves.

The purpose of this paper is to distinguish among theories of why firms exhibit similar behavior, taking new product introduction in the Japanese soft-drink industry as an example. In the Japanese soft-drink industry, new product introductions occur frequently and are an important form of competitive behavior. New product introductions are often imitated quickly by competitors. As a result, Japanese beverage manufacturers duplicate each other's product lines. In the US, by comparison, the extent of such duplication is much less.

The Japanese soft-drink manufacturers differ greatly in size and industry origin. The manufacturers include not only beverage specialists but also diversified firms from other industries such as beer,

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[2] Other behavioral characteristics of Japanese firms are orientation toward long-term survival, internal resource accumulation (Kagono et al., 1985), and growth preference (Odagiri, 1992), the mechanisms of which have been studied.

[3] *Wall Street Journal*, July 12, 1988. In spite of the title, it is argued that Japanese copycat is not cultural or genetic, but that Japanese (patent) system encourages the firms to borrow from others.

food, milk, pharmaceutical, and so on. The first set of theories on similar behavior predicts that firms tend to mimic similar rivals, while the second predicts that they tend to follow informative rivals. This paper tries to distinguish the theories by examining what kinds of firms adopt similar behavior with whom in their new product introductions.

The structure of this paper is as follows. In the next section, we point out the characteristics of the Japanese soft-drink industry, making some comparisons with the US. Next, we briefly review the theories on why firms adopt similar behavior and propose several hypotheses that allow for distinction among the theories. Data and methods are described in section 4, and the results are reported in section 5. Finally, we interpret the results and draw conclusions.

2. Japanese Soft Drink Industry

2.1. Frequent introduction of new products

In this study we focus on new product introduction by Japanese soft-drink manufacturers. We select the Japanese soft-drink industry for several reasons. First, the Japanese soft-drink industry has grown rapidly, with high rates of new product introduction. Firms in the industry have created and expanded numerous new product categories such as RTD (ready-to-drink) coffee, RTD tea, sports drink, flavored water, and so on. Many marketers from Asia and Europe have visited Japan to observe the trend of the Japanese soft-drink market. Second, there is an industrial journal that gives us comprehensive data on new product introduction in the Japanese soft-drink market.

In the soft-drink industry, new product introduction is a very important type of competitive behavior. In the late 1980s and early 1990s, an average of 980 new soft drink products were introduced annually in Japan, as compared with approximately 700 in the United States (Tollison et al., 1986). In the case of Asahi Beverage, the fifth largest manufacturer in Japan, its product line includes about 170 items, including 40 new products added annually.[4]

Frequent new product introductions are requested in Japan by distribution channels, especially convenience stores, which account for about one-third of soft drink sales. To increase their sales, convenience stores ask soft-drink manufacturers to introduce new products, which the manufacturers advertise more than existing products. Since several convenience stores started expanding their stores aggressively in the mid-1980s, the categories of soft drinks have proliferated. As convenience stores change the product assortment on their shelves in March and in September, many new products are introduced in those two months.

Japanese beverage manufacturers also have their own vending machines, which account for an additional one-third of total sales. In order to fill the machines with their own products, they have to offer many items. However, they do not have to hold about 1,000 items because a vending machine can hold at most 20 items. In the US, by comparison, soft-drink vending machines are a less important distribution channel. Moreover, smaller US manufacturers can distribute their products through the bottlers of Coca-Cola and Pepsi. Therefore, they have little

[4] Based on the author's interview. Note that new product introductions include new package sizes as well as new flavors and formulas.

incentive to hold many items.

2.2. Product line duplication and bunching of product introduction

Table 1 shows the strong tendency of soft drink manufacturers to duplicate each other's product lines in Japan, as compared with such practices in the United States. The table denotes the offerings of the ten largest Japanese and US firms for 10 selected products that are available in both countries. The numbers in the table are 1 if the firm sells the product and 0 if the firm does not.

Coca Cola, the largest soft drink producer (in both countries), offers all 10 of the products in Japan. The table shows that seven of Coke's Japanese competitors maintain overlap with Coke in at least nine of the product categories, and one firm (Pepsi) overlaps in seven categories. Only one of the top Japanese producers, Otsuka Pharmaceutical, has avoided extensive duplication of competitors' lines.

In the US market by comparison, Coke and Pepsi have largely duplicated each other's products, but the other eight soft drink firms remain more specialized with little product overlap. Thus, except for the top two producers, there is little evidence that US soft drink firms have sought to mimic each other's product lines. We further quantified the extent of product line duplication by computing distance measures; the results imply that duplication was more than twice as prevalent in Japan than in the US.[5]

New products are introduced frequently in Japan, and fashions change every year. A typical example from the 1980s is honey drinks. Nisshin Seiyu, (a producer of edible oils, with a small beverage business) introduced the first drink of this type, "HACHIMITSU DORI" (honey street), in 1985. The product slowly gained popularity; however, once Suntory introduced "HACHIMITSU LEMON" (honey lemon) in 1986, many firms followed. In 1989, 28 firms introduced this kind of product, and sales of honey drinks grew by 500% from the previous year. Figure 1 shows the rate at which firms entered the market for honey drinks over time. Other product categories such as canned RTD coffee, woo long tea, Japanese tea, canned RTD black tea, small bottled functional drink, and flavored water also came into fashion and attracted many firms.

3. Theories and Hypotheses

4. 3.1. Theories of competitive interaction

Introduction of similar products, or similar behavior among rivals in general, may be a common response toward the same environmental shock. However, firms with completely different resource endowments might not be able to behave similarly even if they face the same environment. This is because strategy is constrained by, and dependent on, the current level of

[5] Based on Table 1, we have a product line vector for each firm, which has 10 elements taking the value 1 or 0. Then, we calculate the angle (θ) between each pair of vectors. If two firms have the same product line, $\cos\theta$ has the maximum value, which is equal to 1, and it decreases as the product lines of two firms become different. The average value of $\cos\theta$ is much larger in Japan (0.87) than in the US (0.41).

resources, as many scholars of resource-based view of the firm point out (Collis, 1991; Teece et al., 1997). Therefore, firms may be able to mimic others only when their resource endowments are comparable.

On the other hand, when firms with comparable resource endowments compete with each other, the competition should be very intense, because rent can be easily eroded without resource heterogeneity (Peteraf, 1993). Some firms may choose to differentiate their resources and market position from those of competitors; however, pursuing such a strategy is often difficult and risky. Other firms may find themselves locked in competition with similar rivals. In such situations, if firms do not respond to moves by rivals, competitive balance can be lost, and firms expose themselves to the risk of deterioration of their competitive position.

Thus, it is often argued that firms adopt similar behavior to minimize risk. Examining bandwagon effects in foreign direct investment of US firms, Knickerbocker (1973) argues that under the uncertain circumstances, matching each other's moves minimizes risk. As far as rivals match with each other, none of them would be better or worse off. From the point of matching firms, this strategy guarantees that their competitive capabilities would remain roughly in balance.[6] Abegglen and Stalk (1985) point out that Japanese firms make every effort not to be behind. Cooper (1995) also argues that Japanese lean enterprises cannot differentiate themselves from their rivals because of the mechanisms of rapid technological diffusion; therefore they have to adopt a "confrontation" strategy. These arguments suggest that behavioral similarity among Japanese firms stems from risk-minimization.

When resource homogeneity causes intense competition, firms might try to mitigate rivalry. According to the studies on strategic groups, firms within the same strategic group behave similarly (Caves and Porter, 1977; Newman, 1978; Porter, 1979). This is because "Divergent strategies reduce the ability of the oligopolists to coordinate their actions tacitly … reducing average industry profitability" (Porter, 1979, P. 217). In other words, firms within the same strategic group adopt similar strategy to constrain competition and to keep tacit collusion.

The theory of multiple point competition suggests that multimarket contact (a consequence of one type of similar behavior) between two firms will reduce the intensity of rivalry, because the opportunities for cross-market retaliation increase (Karnani and Wernerfelt, 1985; Bernheim and Whinston, 1990: Gimeno and Woo, 1996). Based on the theory, firms duplicate each other's product lines to mitigate competition. Klemperer (1992) also shows that if firms offer identical product ranges, each consumer purchases from one firm only because of costs of using additional suppliers, so the market may be less competitive.

3.2. Theories of information costs and legitimacy

Organization theory gives another explanation for behavioral similarity, that is, institutional isomorphism. DiMaggio and Powell (1983) argue that rational actors make their organizations increasingly similar as they try to change them. This process of homogenization is best captured by the concept of isomorphism. Isomorphism is a constraining process that forces

[6] Motta (1994) gives a game theoretic explanation for this "follow-the-leader" or "bunching" of foreign investments.

one unit in a population to resemble other units that face the same set of environmental conditions (Hawley, 1986).

Mimetic isomorphism is the process that organizations model themselves on other organizations when the environment is uncertain. Mimetic behavior is rational because it economizes on search costs when faced with uncertainty (Cyert and March, 1963).[7] Mimetic behavior also gives legitimacy to mimicking organizations. It is often pointed out that managers are seldom fired for making the same mistake as their rivals, but they are badly blamed for their mistake when their rivals do the correct thing (Lieberman, 1987). This is because the manager gets legitimacy by making the same decision as others.

Recently, economists are also interested in imitative behavior or herd behavior. The studies are broadly classified into two types. One type of argument is about information cascades (Banerjee, 1992; Bikhchandani et al., 1992). Suppose each agent has his own private information about the state of nature. An agent behaves based on his prior belief, however his behavior reveals his private information to followers. This information then causes the followers to change their prior beliefs. As the revealed information is accumulated, the followers can ignore their own information and mimic the observed behavior.

The second type of argument is about manager's behavior evaluated by the market. There are superior and inferior managers who have private information about investment. Managers are evaluated based on their investment behavior and the ex post performance. The market does not know the type of each manager, but know that superior managers have the same information. Therefore, in order to be evaluated as a superior type, the inferior managers ignore their own information and imitate others (Scharfstein and Stein, 1990; Palley, 1995).[8]

3.3. Hypotheses

The product line comparisons in Table 1 suggests that Japanese manufacturers behave more similarly than their US counterparts. Using data on product introductions, we performed a series of tests to distinguish among the theories that might explain the similarity of behavior among the Japanese soft-drink manufacturers. These tests, which identify the characteristics of firms that are followed in the market, are based on the following hypotheses.

First of all, we have a general hypothesis that firms tend to introduce new products when other firms do. The competitive explanation predicts this because all firms compete with each other in the soft-drink market. The informational explanation also predicts this because early movers give some information about the market. Moreover, following prior movers might pick up the effect of a simple common response to external shock. Therefore, we have a basic hypothesis (H1) that firms adopt similar behavior as others in the market.

H1: The likelihood that a firm introduces a new product in a product category is

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[7] Using the concept of mimetic isomorphism, Fligstein (1985) explains the widespread adoption of the multidivisional structure by firms, and Haveman (1993) explains the parallel diversification patterns of California savings and loan associations.

[8] Using such theories, Zhang (1997) theoretically studies on strategic delay and cascade of investment. Kennedy (1997) empirically examines prime-time television program introduction, and shows that there is strategic imitation in this industry.

positively related to the number of new products in the product category recently introduced by the other firms.

Some researchers argue that there is heterogeneity of interorganizational influences (Strang and Tuma, 1993; Greve, 1995, 1996; Gimeno et al., 1998; Bikhchandani et al., 1992); all early movers are not influential for all late movers. Some early movers may be more influential, and some late movers may be more susceptible to influence. This occurs partly because firms regard different firms as their rivals and reference groups (Porac et al., 1995; Fiegenbaum et al., 1996).

Japanese soft-drink manufacturers can be characterized in several ways. One important characteristic is the relative rank of the firm. In this study, firms are ordered based on their total sales in the soft-drink market, and divided into ranks of "top five," "top ten," etc. The arguments on competitive interaction predict that large and small firms behave differently and therefore would be unlikely to follow each other. On the other hand, theories on information cascades predict that larger firms are more likely to be followed because the behavior of larger firms is regarded as being of higher informational quality. High-status firms, which are worthwhile to be imitated, promote mimetic processes (Peteraf and Shanley, 1997). They are "fashion leaders" in several cases (Bikhchandani, et al., 1998)[9]. Therefore, the information-based theories lead to the hypothesis that firms are more likely to mimic others in higher ranks.

H2: The likelihood that a firm introduces a new product in a product category is positively related to the number of new products in the product category introduced by the other firms in higher ranks.

On the other hand, the competitive arguments predict similar behavior among the firms in the same rank. Firm size is an important measure of firm capabilities and the firms of similar sizes are direct rivals (Porac et al, 1995). If a firm does not respond to the moves of others with similar size, the firm might lose its competitive position. Therefore, competitive arguments predict that firms in the same rank are more likely to adopt similar behavior.

H3: The likelihood that a firm introduces a new product in a product category is positively related to the number of new products in the product category introduced by the other firms in the same rank.

Another important characteristic of the Japanese soft-drink manufacturers is their industry of origin. Some firms deal with soft drinks only, but others are from the industries of beer, food, confectionery, milk, and so on. Firms from the same origin should have similar resource endowments and would regard each other as rivals. Therefore, the theory of competitive interaction predicts that firms from the same origin behave similarly.

H4: The likelihood that a firm introduces a new product in a product category is positively related to the number of new products in the product

[9] Gilbert and Lieberman (1987) find that smaller firms follow larger firms to increase their capacity in the US chemical industries.

category introduced by the other firms from the same origin.

Firms from the same origin also have similar frames of reference, so the informational explanation is also consistent with this hypothesis. However similar firms are not the only information sources. Indeed, larger firms are likely to be more informative, as discussed earlier. Therefore, we expect that the "origin effect" would be weaker than the "larger firm effect" if the informational explanation holds.

In summary, competitive explanations predict that firms adopt similar behavior with similar firms, while informational explanations predict that firms behave similarly with informative firms. Thus, support for *H2* would agree with predictions derived from informational explanations, while support for *H3* or *H4* would agree with the predictions derived from competitive explanations.

5. Data and Variables

6. The primary data in this paper are for new product introductions by the Japanese beverage manufacturers between 1985 and 1991. We collected the data from the industrial journal, *Beverage Japan*, which annually reports the new products in the previous year by product categories, by firms, and by months. All Japanese manufacturers that introduced more than 10 new soft drink products during the observation period were identified and included in the sample. We estimated new product introduction by using a logit model in which the probability that a firm introduces a new product at each moment of time is taken to be a linear function of independent and control variables.

We performed this logit analysis on two data sets which differ in their degree of product aggregation. The first data set is at the level of individual products; the second is at the more aggregate level of product categories. The first data set covers 10 specific products for which we were able to collect historical data going back to the very first introduction of the product by any firm in Japan.

Table 2 lists the names of the products and product categories in these two data sets. A product category, such as canned coffee, contains a number of product types (e.g., black coffee, caf au lait, non-sugar coffee, and premium coffee). The product types can be further broken down (primarily on the basis of package size and type) to yield specific products. For example, the product, anned premium coffee is included in the first data set, while anned coffee, is one of the categories in the second, more aggregate data set.

4.1. Data Set on New Products

We identified 10 products with historical data going back to the very first introduction by any firm in Japan. With monthly observations covering 48 firms, this data set includes 40896 observations. The introduction patterns for the 10 products are shown in Figures 1-10.

The analysis of this data set focuses on the date of first introduction of the product by each firm. The dependent variable, $y_{i,k,s,t}$, was set equal to 1 for all observations where firm i introduced for the first time the specific new product, k during the observation month s in year t. Note that this dependent variable can be 1 only once. (The dependent variable in the second data set can be 1 many times, because one firm may introduce slightly different new products in the

same product category repeatedly.)

The measures used to test the four hypotheses are based on the rates of new product introduction by other firms in the sample during the prior six months. We adopted a six-month window because it takes up to six months for a firm to imitate a new product introduced by other firms.[10]

The first explanatory measure, $OTHERS_{i,k,s,t}$, is the number of other firms that introduced the specific new product, *k*, during the previous six months of the observation month *s* in year *t*. Hypothesis 1 implies a positive sign for this variable.

As pointed out previously, *OTHERS* might pick up a simple common response to external shock. Therefore, we constructed additional explanatory variables that reflect firm characteristics. By estimating the models with such variables as well as *OTHERS*, we can control for any common response of firms.

We constructed three measures that reflect firm characteristics. First, the variable, $ORIGIN_{i,k,s,t}$ is the average number of other firms from the same origin as the observation firm, which introduced the specific new product, *k*, during the previous six months of the observation month *s* in year *t*. The firms in the sample are classified into seven origins, *Alcohol*, *Beverage*, *Confectionery*, *Foods*, *Milk*, *Tea/Coffee*, and *Other*, as shown in Table 3. Hypothesis 4 implies that *ORIGIN* will have a positive coefficient.

Second, the variable, $RANK_{i,k,s,t}$ is the average number of other firms in the same rank as the observation firm, which introduced the specific new product, *k*, during the previous six months of the observation month *s* in year *t*. The firms in the sample are classified into four ranks based on the sales in the whole soft drink market[11]. The largest five firms are classified into the rank, TOP5. The sixth through the tenth largest firms are classified into the rank, TOP10. The eleventh through the twentieth largest firms are classified into the rank, TOP20. The firms beyond top twenty are classified into the rank, UNDER20. Given hypothesis 3, the expected sign of the coefficient is positive.

Third, we constructed the variable, $TOP5_{k,s,t}$, which is defined as the average number of (other) firms in the rank of TOP5, which introduced the specific new product, *k*, during the previous six months of the observation month *s* in year *t*. Hypothesis 2 implies a positive coefficient for this variable.

In addition to these explanatory variables, we constructed a series of control variables. These include a category dummy and a month dummy. Further control variables include measures of market concentration, market growth, and annual average frequency of new product introduction. Market concentration ($CR5_{k,t}$) is defined as cumulative concentration among the five largest firms in the product category to which the specific new product, *k*, belongs in year *t*.[12] We do not have any expectation about the sign of the coefficient. Market growth ($GROW_{k,t}$) is defined as follows,

$$GROW_{k,t} = Q_{k,t} / Q_{k,t-1,}$$

where $Q_{k,t}$ is the shipment for product category to which the specific new product, *k*, belongs in

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[10] Author's interview with marketing personnel in several Japanese beverage manufacturers.

[11] The largest 20 firms in the Japanese soft-drink market are listed in *Production and Sales Share in the Alcoholic Liquors and Food Industries*, Nikkan Keizai Tsushin-sha. The rank is quite stable during the observation period.

[12] The source of the data is *Production and Sales Share in the Alcoholic Liquors and Food Industries*, each year.

year t[13]. In the study of new product introduction, the market concentration and market growth of the category of the new product are used. The expected sign of *GROW* is positive. Finally, the annual average frequency of new product introduction ($AVEFREQ_{i,t}$) is average number of new products introduced annually by firm i among the observation years except for year t[14]. This variable controls for the fact that firms have different average rates of new product introduction.

4.2. Data Set on Product Categories

All product categories where at least one of the manufacturers introduced new products in any year during the observation period are included in this sample. These criteria resulted in a sample of 48 manufacturers in 11 product categories. In total, we have 35,712 observations.[15]

We set the binary dependent variable, $y_{i,j,s,t}$ equal to 1 for all observations where firm i introduced a new product in category j during the observation month s in year t.
This dependent variable can equal 1 repeatedly for a given firm, even within a product category. We constructed independent variables in the same way as the product-level data set.[16] Also, category and month dummies and $AVEFREQ_{i,t}$ were defined in the same way as in the product-level data set.[17] Table 4 provides summary statistics, including mean, standard deviation, and a matrix of correlation coefficients for the two data sets.

Our predictions can be summarized as follows. If the competitive explanation such as restriction of competition and risk minimization holds, (in other words, if firms adopt similar behavior with similar rivals), we would see strong effects of *OTHERS*, *ORIGIN*, and *RANK*, but no effect of *TOP5*. On the other hand, the information-based explanation suggests that firms adopt similar behavior with leading firms, leading to strong positive coefficients for *OTHERS* and *TOP5* but weak effects of *ORIGIN* and *RANK*.

7. Results

8. The results of the logit analysis of product introduction for the two data sets are shown in Table 5. While the explanatory variables are almost identical, the results should be

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[13] The shipment data are collected either from *Production and Sales Share in the Alcoholic Liquors and Food Industries*, Nikkan Keizai Tsushin-sha or *Beverage Japan.*

[14] To avoid an identification problem, we took the average during observation periods except for the year t.

[15] The data in 1985 are used to calculate independent variables, and are not included in the sample. For one of the 11 product categories, market growth data until 1989 were not available. Therefore, for 10 categories, we have 34,560 observations (= 10 categories * 48 firms * 6 years * 12 months), for one category, we have 1,152 observations (= 1 category * 48 firms * 2 years * 12 months), and the total number of observations is 35,712.

[16] $OTHERS_{i,j,s,t}$ is the number of new products in the product category j introduced by the other firms during the six months prior to the observation month s in year t. $ORIGIN_{i,j,s,t}$., is the average number of new products in the product category j introduced by the other firms from the same origin as the observation firm during the previous six months of the observation month s in year t. $RANK_{i,j,s,t}$. is the average number of new products in the product category j introduced by the other firms in the same rank as the observation firm during the previous six months of the observation month s in year t. $TOP5_{j,s,t}$ is defined as the average number of new products in the product category j introduced by (other) firms in the rank of TOP5 during the previous six months of the observation month s in year t.

[17] Market concentration ($CR5_{j,t}$) is defined as cumulative concentration among 5 largest firms in product category j in year t. Market growth ($GROW_{j,t}$) is the growth rate of the product category.

interpreted differently, given that the dependent variables and level of data aggregation differ between the data sets. The results in the left half of the table point to factors that influence the decision of a firm to make its first entry into a new product market, whereas the results in the right half of the table reflect the more general decision to introduce a new product into an established product category. Many of the latter introductions involve relatively incremental product changes. Conceivably, these two types of product introduction might be influenced by different factors, given that a firm's first entry into a new product market is generally a more significant and uncertain step.

5.1. Initial Entry into New Products

The results of the study on firms' initial entry into new products are reported in the left half of Table 5. Model (1) includes the control variables and *OTHERS* only. In this model, *OTHERS* has a significantly positive coefficient. Therefore, firms were more likely to enter a new product market when many other firms were observed to have entered in recent months, and *H1* is strongly supported. In the case of a brand-new product, recent introduction by other firms gives a signal that there is potential demand for the product. However, the positive coefficient for *OTHERS* does not necessarily mean that firms imitated other companies, as they might have all been responding to the same external shock.

In addition to *OTHERS*, model (2) includes *TOP5*, which reflects the influence of large firms. *TOP5* is positive and highly significant, suggesting that the prior moves of larger firms have special influence, and *H2* is strongly supported. Thus, firms tended to enter new beverage markets when they observed that other firms were doing so, and particularly, when they observed entry by the largest soft drink companies.

Models (3) and (4) include *ORIGIN* and *RANK*, the variables associated with the prior moves of similar firms. Neither of these variables is significant, indicating lack of support for hypotheses *H3* and *H4* in the case of entry into new products. Thus, firms' initial entry into new product markets seems not to have been influenced by the observation that other firms of similar size or industry origin were entering.

As to the control variables, *GROW* and *AVEFREQ* have significantly positive coefficients as expected. *CR5* is negative but insignificant.

5.2. Introductions into Product Categories

The right half of Table 5 reports the logit analysis of firms' decisions to introduce new products into established product categories. The results differ from those in the left half of the table in a number of salient respects.

First, the measure, *OTHERS*, is significantly positive in models (5) and (6), but it loses significance in models (7) and (8) when *ORIGIN* and *RANK* are added. The latter measures are both positive, as predicted by hypotheses *H3* and *H4*, although *RANK* is insignificant. *ORIGIN* is significant in model (7) and (8). Therefore, after controlling for the effect of a common response to external shock, which might be picked up by *OTHERS*, firms tended to introduce new products if others from the same industry origin recently introduced products into the category, and *H4* is supported.

Second, there is a difference in the result of *TOP5*, which reflects the influence of large

firms. *TOP5* is not significant, and it appears with a negative sign. This suggests that the prior moves of larger firms had no special influence on decisions to introduce products into established categories, and *H2* is not supported.

The results for the control variables are mostly similar to those in the left half of the table. *GROW* has a significant and positive coefficient as expected; firms tended to introduce new products in categories that were expanding. *CR5* is significantly negative, suggesting that firms tended to introduce new products within product categories with lower market concentration. *AVEFREQ* is significant and positive as expected.

9. Discussion and Conclusion

This study has considered the reasons why firms may imitate their rivals. Using data on new product introduction by the Japanese soft-drink manufacturers, we have attempted to distinguish among two sets of theories: those that yield similar behavior as the result of competitive interaction, and those showing that such behavior economizes on information costs.

The empirical results provide support for both sets of theories, but in different contexts. The analysis of firms' initial entry into brand-new products suggests that firms enter when they observe larger competitors doing so. Entry by large firms provides information that demand for the product is likely to grow; indeed, such entry may give legitimacy to the product and stimulate consumer demand. On the other hand, the analysis of new product introduction within established product categories suggests that firms often mimic others from the same industry origin, who share a similar resource base. One interpretation is that the bunching of entry into emerging product markets is largely the result of economizing on information costs, whereas the bunching of product introductions within established categories is caused more by competitive interaction.

These contrasting results are reasonable. In the case of a brand-new product, it is uncertain whether the product will sell well or not. Under such a highly uncertain situation, firms try to acquire information by looking at larger firms, which are expected to have more or better information. Therefore, firms are more likely to introduce a new product when they observe that one or more of the largest five firms have done so. In other words, larger firms are "fashion leaders" (Bikhchandani, 1998).

In the case of product introduction within an established product category, on the other hand, the firm is certain that the category exists. Rather, firms might be afraid that new product introduction by their rival damages their position within the category or the other categories. Therefore, the findings suggest that clustering within product categories arises largely because firms follow competitors with similar characteristics.

Such findings contribute to the developing literature on behavioral similarity. While our ability to distinguish among the alternative theories is limited in extent, this study is one of the first to attempt to make such assessments empirically. The theoretical literature on behavioral similarity has grown dramatically in recent years, but there has been a dearth of empirical work. We hope that this early study can stimulate additional work by others. Moreover, we are

continuing to refine the measures and tests developed here.[18]

One final question is the normative implications of our findings for business firms and more generally for society. Such issues are complex to assess and beyond the scope of the present paper. Nevertheless, it is clear that the imitative behavior of firms can have a major impact on profits (both the average level in an industry and the degree of variation among firms), and the development of firm capabilities. Also, there are implications for the social allocation of resources, in that firms may make redundant investments and they may invest too quickly (or too slowly) in emerging areas, depending on bandwagon effects.

While the negative implications of imitative behavior are often obvious, we suggest that the competition among firms to match each other and attempt to gain a small lead often has positive effects. The Japanese soft-drink industry has been successfully developing. It created many new categories such as RTD coffee, various kinds of tea, sports drinks, and functional drinks. These new product categories are exported in other countries in Asia and Europe. In the US, on the other hand, these product categories, which have been called "new generation drinks" and expected to grow, have not grown as much as in the Japan.

The expansion of these categories in Japan is partly due to the competitive behavior of bunching of product introductions. In the process of bunching, firms advertise the brand-new product extensively in order to lead their competitors slightly or to catch up with rivals. Their efforts help the new product to be perceived by consumers as a fashion. In this process, firms improve their products incrementally. This improvement promotes the demand and expands the product category.

Therefore, similar behavior among competitors has a positive side that it promotes competition. The competition expands the market and strengthens the capability of individual firms, although it might have a negative impact in some industries or it might lead to inefficient resource allocation. This type of behavior, when combined with creative effort, has been an important factor in the past success of many Japanese firms.

[18] There are several technical problems in our analysis for which better approaches may be found. For example, we adopt a six-month window to count prior introduction influencing the introduction of a focal firm. However, even if prior moves have some positive effects on the probability of introduction of a focal firm, the focal firm does not necessary imitate prior movers. The firm might happen to introduce the products without imitation, or it might actually imitate prior movers but beyond a six-month window. We might have tried different length of window. Even with the results of this study, however, we can say that firms adopt (not imitate) new product introduction similar to some kinds of other firms.

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JAPAN	Coca Cola	Otsuka	Suntory	Kirin	Asahi	Dydo	UCC	Pokka
Cola	1	0	0	0	1	1	1	1
Lemon Lime	1	0	1	1	1	1	1	1
Orange Drink	1	0	1	1	1	1	1	1
Sports Drink	1	1	1	1	1	1	1	1
RTD Tea	1	1	1	1	1	1	1	1
100% Juice	1	0	1	1	1	1	1	1
PET Bottled Water	1	0	1	1	1	0	0	1
Flavored Water	1	0	1	1	1	1	1	1
Sparkling Fruit Drink	1	1	1	1	1	1	1	1
RTD Coffee	1	1	1	1	1	1	1	1

US	Coca Cola	Pepsi	Dr. Pepper	Seven Up	Cadbury Schwepps	Royal Crown	A&W	Monarch
Cola	1	1	0	1	0	1	0	0
Lemon Lime	1	1	0	1	1	0	1	1
Orange Drink	1	1	0	0	1	0	0	0
Sports Drink	1	1	1	0	0	0	0	0
RTD Tea	1	1	0	0	0	0	0	0
100% Juice	1	1	1	0	0	0	0	0
PET Bottled Water	0	1	0	0	0	0	0	0
Falvored Water	0	0	0	0	1	0	0	0
Sparkling Fruit Drink	1	1	0	0	1	0	0	1
RTD Coffee	0	1	0	0	0	0	0	0

Table 2: The List of Products and Categories

Study on Initial Entry into New Products

#	Product	Abbreviation	Obs. Period	Product C
1	Honey lemon	Honey Lemon	1986-1991	None of th
2	100% juice in a wide-mouth bottle	Juice	1987-1990	Juice 100%
3	Canned straight black tea	Straight Tea	1987-1992	Black Tea
4	Non-grapefruit flavor sports drink	Sports	1985-1990	Sports
5	Carbonated non-juice drinks in a 350ml can	Carb2 350	1986-1992	Carbo2
6	Canned Mugi-tea	Mugi Tea	1984-1992	Other Tea
7	Canned green tea	Green Tea	1985-1992	Other Tea
8	Canned premium coffee	Coffee	1985-1991	Coffee
9	Functional drinks with Fiber	Fiber Func	1988-1990	Functional
10	Water with geographical name	Water	1984-1992	Water

Table 2: The List of Products and Categories

Study on Introductions into Product Categories

#	Product Category	Abbreviation	Obs. Period
1	Canned Carbonated Drinks with less than 10% Juice	Carbo1	1986-1991
2	Canned Carbonated Drinks without Juice	Carbo2	1986-1991
3	Canned Coffee	Coffee	1986-1991
4	Canned Black Tea	Black Tea	1986-1991
5	Canned Woo Long Tea	Woo Long Tea	1986-1991
6	Canned Other Tea	Other Tea	1990-1991

Table 2: The List of Products and Categories

7	Sports Drinks	Sports	1986-1991
8	Functional Drinks (Except for Vegetable Juice)	Functional	1986-1991
9	100% Natural Juice	Juice 100%	1986-1991
10	Canned Drinks with 10-50% Juice	Juice 10-50%	1986-1991
11	Bottled Water	Water	1986-1991

Table 2: The List of Products and Categories

#	FIRM	ORIGIN	RANK
1	Coca Cola	Beverage	TOP5 (1)
2	Pepsi	Beverage	TOP10 (9)
3	Dydo	Beverage	TOP10 (6)
4	Pokka	Beverage	TOP10 (8)
5	Calpis	Beverage	TOP10 (10)
6	Cherio	Beverage	UNDER20
7	Sangalia	Beverage	UNDER20
8	Yakuruto	Beverage	TOP20 (12)
9	Asahi	Alcohol	TOP5 (5)
10	Kirin	Alcohol	TOP5 (4)
11	Sapporo	Alcohol	TOP20 (18)
12	Suntory	Alcohol	TOP5 (3)
13	Takara	Alcohol	UNDER20
14	Godo Seishu	Alcohol	UNDER20
15	Takeda	Others	UNDER20
16	SB	Foods	UNDER20
17	Kikkoman	Foods	UNDER20
18	Kanebo	Foods	TOP20 (13)
19	Meiji-ya	Foods	UNDER20
20	Ajinomoto	Foods	UNDER20
21	Kagome	Foods	TOP20 (11)
22	Yukijirushi	Foods	UNDER20

Table 3: The List of the Firms

23	Shiseido	Foods	UNDER20
24	Yamazaki-pan	Foods	UNDER20
25	House	Foods	UNDER20
26	Fujiya	Confectionery	TOP20 (20)
27	Meiji Seika	Confectionery	UNDER20
28	Morinaga Seika	Confectionery	TOP20 (19)
29	Lotte	Confectionery	UNDER20
30	Meiji Nyugyo	Milk	TOP20 (17)
31	Morinaga	Milk	TOP20 (16)
32	Takanashi	Milk	UNDER20
33	Yukijirushi	Milk	TOP20 (14)
34	UCC	Tea/Coffee	TOP10 (7)
35	JT	Otthers	UNDER20
36	Ito-en	Tea/Coffee	TOP20 (15)
37	Mitsui Norin	Tea/Coffee	UNDER20
38	Nihon Seikyo	Others	UNDER20
39	Zenkoku-Nokyo	Others	UNDER20
40	Art Coffee	Tea/Coffee	UNDER20
41	JR Kyushu	Others	UNDER20
42	Kinki Sain	Beverage	UNDER20
43	JR Higashi	Others	UNDER20
44	Maruzen-shokuhin	Beverage	UNDER20
45	Cadburry	Beverage	UNDER20
46	Nestle	Tea/Coffee	UNDER20
47	Prio	Beverage	UNDER20
48	Nagano Tomato	Foods	UNDER20

Table 3: The List of the Firms

The number in parenthese is the rank of the firm.

Data Set on Initial Entry into New Products

	Y	*GROW*	*CR5*	*AVEFREQ*	*OTHERS*	*ORIGIN*	*R*
Y	1.0000						
GROW	0.0183	1.0000					
CR5	-0.0118	-0.2348	1.0000				
AVEFREQ	0.0258	-0.0107	0.0074	1.0000			
OTHERS	0.0613	0.1424	-0.1264	-0.0259	1.0000		
ORIGIN	0.0466	0.0852	-0.0760	0.0114	0.5978	1.0000	
RANK	0.0456	0.0958	-0.0897	0.0524	0.6811	0.5030	1.
TOP5	0.0516	0.0665	-0.0236	-0.0133	0.6758	0.4072	0.
Mean	0.0047	0.1792	75.5704	3.7108	1.3239	0.0244	0.
Std Dev.	0.0682	0.2746	7.9609	2.6093	2.1722	0.0662	0.

Table 4: Summary Statistics and Correlation Matrix

Data Set on Introductions into Product Categories

	Y	*GROW*	*CR5*	*AVEFREQ*	*OTHERS*	*ORIGIN*	*R*
Y	1.0000						
GROW	0.0057	1.0000					
CR5	-0.0176	-0.1372	1.0000				
AVEFREQ	0.1075	-0.0124	0.0042	1.0000			
OTHERS	0.0492	0.0123	-0.1224	-0.0343	1.0000		
ORIGIN	0.0591	0.0071	-0.0724	0.1032	0.6289	1.0000	
RANK	0.0728	0.0082	-0.0898	0.2375	0.6777	0.5422	1.
TOP5	0.0300	0.0503	-0.0118	-0.0094	0.6721	0.4290	0.
Mean	0.0346	0.1801	71.7903	4.2945	9.7061	0.1770	0.
Std Dev.	0.1829	0.2547	10.6411	2.8899	7.4791	0.2152	0.

Table 4: Summary Statistics and Correlation Matrix

		Initial Entry into New Products				Introd
		(1)	(2)	(3)	(4)	(5)
constant		-8.52	-7.78	-8.52	-7.79	-4.44
		(-4.59)**	(-4.10)**	(-4.58)**	(-4.41)**	(-5.77)**
GROW		1.05	1.02	1.06	1.03	0.71
		(3.01)**	(2.94)**	(3.02)**	(2.94)**	(4.28)**
CR5		-5.64e-03	-0.02	-5.69e-03	-0.02	-0.03
		(-0.24)	(-0.74)	(-0.25)	(-0.74)	(-3.62)**
AVEFREQ		0.14	0.14	0.14	0.14	0.19
		(5.58)**	(5.56)**	(5.46)**	(5.44)**	(20.27)**
OTHERS	*(H1)*	0.25	0.18	0.24	0.18	0.02
		(9.40)**	(4.98)**	(6.54)**	(4.09)**	(3.58)**
TOP5	*(H2)*		1.56		1.56	
			(2.83)**		(2.82)**	
RANK	*(H3)*			-0.47	-0.64	
				(0.48)	(-0.68)	
ORIGIN	*(H4)*			1.12	1.03	
				(1.29)	(1.20)	
MONTH DUMMIES		YES	YES	YES	YES	YES
CATEGORY DUMMIES		YES	YES	YES	YES	YES

Table 5: Logit Analysis of Product Introduction

Log Likelihood	-1072.43	-1068.53	-1071.58	-1067.71	-4668.07
No of Obs.	40896	40896	40896	40896	35712

Numbers in parenthes are t statistics.

Significance levels are using 2-tailed test: *=5%, **=1%.