# Brand History, Geography, and the Persistence of Brand Shares

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We document evidence of a persistent "early entry" advantage for brands in 34 consumer packaged goods industries across the 50 largest U.S. cities. Current market shares are higher in markets closest to a brand's historic city of origin than in those farthest. For six industries, we know the order of entry among the top brands in each of the markets. We find an early entry effect on a brand's current market share and perceived quality across U.S. cities. The magnitude of this effect typically drives the rank order of market shares and perceived quality levels across cities.

## I.    Introduction

Our goal herein is to test empirically for a persistent effect of early entry on the market shares of branded consumer goods. The study of the economic underpinnings of industrial market structure has been central to the industrial organization literature at least since Bain (1956), as has the related theme of first-mover, or "pioneering," advantage. Researchers have questioned whether early entry can generate a persistent advantage for a firm in the long-run market structure of an industry. In particular, early entry by one firm may constitute a barrier to future entry and thus may constitute a persistent source of market concentration. For instance, in differentiated products markets, Schmalensee (1982) demonstrates theoretically how consumer learning could give an early entrant, about which consumers have already learned the quality, a persistent advantage over later entrants, about which consumers would need to invest in additional learning. Others have studied theoretical contexts in which a firm can leverage its early-mover status strategically either through preemptive product positioning decisions or through preemptive investments in fixed and sunk costs, such as advertising (e.g., Lane 1980; Shaked and Sutton 1987; Moorthy 1988; Donnenfeld and Weber 1995; Lehmann-Grube 1997). Therefore, documenting early entry advantages empirically has important ramifications for our understanding of industrial market structure.

We use scanner data from consumer packaged goods (CPG) to study the persistence effect of historic early entry on current brand market shares. CPG industries provide a unique opportunity for researchers to study the formation of industrial market structure because information on most of the marketing investments and the resulting brand sales performance is available for a wide cross section of product categories and local U.S. markets. Many CPG products are differentiated primarily by their brand identity, with little or no physical product differentiation.[1] Finally, the overall food industry reached roughly $950 billion in 2004, with almost 50 percent deriving from retail sales, making CPGs a branding case study of considerable economic importance (Food Marketing Institute 2007).

We collect a unique and comprehensive database for the purpose of describing industrial market structure in CPG industries. Our main data, covering 34 CPG industries, come from AC Nielsen and Information Resources Inc. (IRI). The typical CPG industry in our database consists of longitudinal scanner marketing data for all the brands covering 36–39 months for a cross section of 50 large city-market areas, as designated by either AC Nielsen or IRI. We supplement these data with Young and

[1] In some cases, consumers cannot distinguish between competing CPG brands in blind tests (Allison and Uhl 1964; Keller 2003, 62).

Rubicam Brands' survey-based information on geographic variation in brand quality perceptions and brand attitudes. Finally, and perhaps most notably, we collected manually the historic launch patterns for the largest brands in six of the CPG industries across the 50 geographic markets in our database. Consulting various sources including company archives, history books, and published company histories, we trace the entry patterns (i.e., the year a brand entered a local market) across our geographic cross section of markets.

Our analysis exploits the geographic variation in the market shares of branded CPG goods documented in Bronnenberg, Dhar, and Dubé (2007). To establish persistence in the observed differences across markets, we match the scanner data with manually collected historic entry data, enabling us to focus on a much longer time horizon than 2 or 3 years (i.e., the typical time span of a scanner database). In the cases documented in this paper, CPG brands typically launched more than a century ago, during the middle to late nineteenth and early twentieth centuries.

We report the results of two tests for historic persistence in the geographic variation in market shares. The first test is based on the relationship between a brand's current market share and the proximity to its city of origin, that is, the city in which the brand first launched and, hence, in which it has operated the longest. Across 49 current leading national CPG brands, dating back to the late 1800s and early 1900s, we find that the current share in markets close to the city of origin is, on average, 12 share (i.e., percentage) points higher than the national average of 22 percent. Most brands in the sample launched much later in markets most distant from their city of origin. We find that the current share in the markets most distant from the city of origin is 5 share points lower than the national average of 22 percent. These findings imply that a brand's market shares are systematically higher in markets that were entered relatively early versus markets entered relatively late. The results further suggest that proximity to the city of origin, the location in which a brand entered earliest and has therefore operated the longest, generates geographic variation in a brand's market share.

For six industries, we were able to collect rollout data consisting of the year in which a brand was first sold in a specific region. Using these data, we devise a second test to relate the brand shares in a given industry to the order of entry in each of the 50 geographic markets in our sample. The empirical identification of this "early-mover effect" requires a distinction between the impact of early entry ("state dependence") and differences in the relative marketing competencies of firms ("heterogeneity"), a problem analogous to the incidental parameters problem (Heckman 1981). The extant literature on the "pioneering advantage" has documented early-mover effects across a wide range of industries.

Typically, this literature uses a single time series within an industry (see Golder and Tellis [1993] for a historical analysis and Kalyanaram, Robinson, and Urban [1995] for a detailed literature survey).[2] In contrast, our identification strategy uses the observed variation in the identities of the early movers across markets within a given industry. By focusing on CPG industries with origins dating back to the nineteenth century, we can safely rule out a coordinated national brand rollout strategy. One can therefore think of our 50 geographic markets roughly as 50 independent replications of the underlying game generating our data.

For the six industries for which we obtained the historic entry data across geographic markets, order of entry appears to be a good predictor of a brand's current market share levels across geographic markets. Order of entry also appears to be a good predictor of the identity of the current market share leader in a given market. These findings support the notion that early entry generates a persistent advantage for CPG brands, even more than a century after the initial launch of the brands. For CPG industries, early entry clearly plays an important role in the formation of the long-run market structure at the city-market level.

We also use the brand quality measures to show a comparable correlation between entry and perceived brand quality levels across geographic areas. Thus, early entrants in a geographic market tend to be perceived as higher-quality brands in our current data. Even though our data collection effort limits us to documenting the entry effect in six of the industries, we nevertheless observe comparable geographic variance in market shares and quality perceptions for all 34 industries. These findings are suggestive that the early-mover status might have an influence on intangible aspects of a product, such as its perceived brand quality.

To confirm the importance of entry patterns in explaining the geographic variance in brand market shares, we also investigate several alternative economic sources of asymmetry. These explanations include local cost advantages based on proximity to a brand's production facilities and relationships with large national supermarket chains. Several of these features could be inherently driven by historic entry. For example, a firm might build its plant closest to its largest market, which in turn may just be its city of origin. Similarly, a firm might form the deepest relationships with retailers in those markets in which it has

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[2] An exception is the paper by Brown and Lattin (1994), who use a similar multimarket approach to study entry effects for an industry that launched during the late 1980s. However, they observe the same first entrant in 37 out of 40 markets analyzed. Furthermore, it is much harder to justify the cross-market independence of launch in the late twentieth century given the prevalence of national rollouts with nationally coordinated television advertising campaigns.

operated the longest. In spite of these arguments, the effect of early entry on brand shares is found to be robust to these alternative sources of brand asymmetry across markets. None of these sources predicts the observed geographic asymmetries in brand shares better than early entry. Moreover, the effect of early entry is significant even after we control for these other factors.

The relationship between historic entry and brand share is consistent with the aforementioned literature on pioneering advantage. However, our analysis makes several novel contributions in this area, including our identification strategy based on historic national diffusion and our use of brand quality information in addition to market shares. The persistence of the early-mover effect on current shares is also related to the recent findings of persistence in dominance of manufacturers across a large cross section of Japanese manufacturing sectors by Sutton (2007). Our findings of important geographic differences in market structure also contribute to a growing literature on the economics of geography (cf. Krugman 1991; Ellison and Glaeser 1997, 1999). In this regard, we demonstrate the persistent effect of historic brand entry on the geographic variation in current CPG brand market shares. To the best of our knowledge, we are the first to link historic entry patterns to the spatial variation of market shares across large U.S. city-markets.

The remainder of this paper is organized as follows. In Section II, we describe our data and document several regularities in the market shares of the leading brands in our 31 industries. In Section III, we test for a relationship between historic order of entry and relative brand shares. Section IV explores several alternative explanations for these geographic patterns. Section V presents conclusions and discusses several directions for future research.

## II.    Data and Geographic Patterns in Market Shares

### A.    The Data

Our primary data source is AC Nielsen scanner data for 31 CPG food industries in the 50 largest AC Nielsen–designated Scantracks as in Dhar and Hoch (1997). These are large CPG industries representing a wide range of both edible grocery and dairy products, with collective annual national revenues of roughly $26 billion. We treat the 50 Scantracks as independent markets, as is typically done in practice by large CPG manufacturers that use AC Nielsen scanner data for market analysis and strategic planning.[3] The data are sampled at 4-week intervals between

[3] Each Scantrack covers a designated number of counties, with an average of 30 and a range of one to 68. All markets include central city, suburban, and rural areas. This practice also has a legal precedent in the merger trial against Coca-Cola and Dr Pepper, during

June 1992 and May 1995. For each market, time period, and industry, we observe sales, prices, and promotional activity levels for each of the brands. Brand sales are measured in "equivalent units," which are scaled measures of unit sales provided by AC Nielsen to adjust for different package sizes across products.

For the longitudinal analysis in subsection B, we compute a brand $i$'s market share in industry $c$ and market $m$ during month $t$ by dividing its sales (in equivalent units) by the total industry sales (in equivalent units):

$$\text{Share}_{icmt} = \frac{\text{Sales}_{icmt}}{\text{Total Sales}_{cmt}}.$$

For the cross-sectional analysis in Section III, we compute a brand $i$'s cross-time market share in market $m$ as follows:

$$\text{Share}_{icm} = \frac{\sum_t (\text{Sales}_{icmt})}{\sum_t (\text{Total Sales}_{cmt})}.$$

The promotion data partition the total equivalent unit sales of a brand by the promotional conditions under which they were sold (i.e., on in-aisle display and/or feature ad and/or temporary discount). We construct a promotion variable by computing the fraction of a brand's products that were sold under any form of in-store promotion. For the 31 industries from AC Nielsen, analogous sales and marketing data are also reported at the retailer account level for those retailers in each market with local annual revenues exceeding $2 million. Account-level data encompass all stores in the retail chain for the geographic market. There are 67 such retailers in the data, which jointly cover 48 of the 50 Nielsen markets.

Table 1 lists the CPG food industries covered, along with each of the geographic markets and retailers in the database. In the analysis below, we report results across the 31 industries. We report a nine-group classification to identify the industries. For example, the bread industry is included in the "bread and bakery" group, the candy industry is included in the "candy and gum" group, the butter and cream cheese industries are contained in the "dairy products" group, the pizza industry is contained in the "frozen entrees/side dishes" group, the frozen toppings industry is contained in the "frozen/refrigerated desserts" industry, the juices and coffee industries are contained in the "nonalcoholic beverages" group, the pasta industry is contained in the "packaged dry groceries" group, the mayonnaise and fruit spreads industries are contained

which the courts ruled that Scantracks represent a legally valid market definition (*F.T.C. v. Coca-Cola Co.*, 641 F. Supp. 1128 1986). The geographic areas encompassed by a Scantrack are also roughly consistent with the supermarket distribution regions designated in Ellickson (2007).

TABLE 1
Structure of the Main Data Set

| | |
|---|---|
| Industry groupings | Bread and bakery, candy and gum, dairy products, frozen entrees and side dishes, frozen and refrigerated desserts, nonalcoholic beverages, packaged dry groceries, processed canned and bottled foods, refrigerated meats* |
| Markets | Albany, Atlanta, Baltimore, Birmingham, Boston, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Denver, Detroit, Des Moines, Grand Rapids, Harrisburg, Houston, Indianapolis, Jacksonville, Kansas City, Los Angeles, Louisville, Little Rock, Memphis, Miami, Milwaukee, Minneapolis, Nashville, New Orleans/Mobile, New York, Oklahoma City/Tulsa, Omaha, Orlando, Philadelphia, Phoenix, Pittsburgh, Portland, Raleigh/Durham, Richmond/Norfolk, Sacramento, San Antonio, San Diego, Seattle, San Francisco, St. Louis, Syracuse, Tampa, Washington |
| Retailers | A & P, ABCO, ACME, Albertsons, Almac's, AWG, Big Bear, BiLo, Bruno's, Del Champs, Demoulas Market Basket, Dominick's, Eagle Food Centers, Farm Fresh, Farmer Jack, Fiesta Mart Inc., Food4Less, Food Lion, Food Mart, Fred Meyer, Gerland's, Giant, Giant Eagle, Grand Union, Great American, H.E.B., Harris Teeter, Harvest Foods, Homeland Food Stores, Hughes Market, Hy Vee Foods, Jewel Food Stores, Kash N Karry, King Soopers, Kohl's, Kroger, Lucky, Lucky Stores, Minyard Food Stores, National, Omni, P&C, Pathmark, Publix, Purity Markets, Raley's, Ralphs, Randall's, Riser Foods Inc., Safeway, Save Mart, Schnuck's, Schwegmann, Sentry Markets, Shaw's, Shoprite, Smith's Food and Drug Centers, Smitty's, Star Market, Stop and Shop, Super Fresh, Tom Thumb, Tops Markets, Vons, Waldbaum's, Wegman's Food Markets, Winn Dixie |

* We classify the 31 industries from AC Nielsen into nine groupings.

in the "processed canned/bottled foods" group, and dinner sausages are contained in the "refrigerated meats" group.

For the historic analysis reported in Section III, we supplement these 31 industries with analogous scanner data for three additional CPG industries: beer, ketchup, and soft drinks. These data span a more recent time horizon and cover a slightly different set of geographic markets and do not contain the retailer-level information.[4] However, these additional industries enable us to extend our city of origin analysis to 34 industries and our historic entry analysis to six rather than three industries.

In the data, a "brand" encompasses all the stock-keeping units (SKUs)

[4] Two data sets (beer and ketchup) are taken from IRI and cover demand data for three years (2001–3). The soft drinks data cover the entire year 2005. There are slight differences in the set of markets covered in these three industries. The ketchup data span 50 IRI city-markets (not the Nielsen city-markets). The beer data span 47 IRI city-markets because in three of the 50 markets, beer is not sold through supermarkets. The soft drinks data span the 50 Nielsen Scantracks. To avoid unnecessary repetition of detail, we will refer to the share data of the 31 plus three industries as all covering a cross section of 50 markets.

TABLE 2
AVERAGE DESCRIPTIVE STATISTICS BY BRAND ACROSS GEOGRAPHIC MARKETS

| Industry | Brand | Share | Perceived Quality | Promotion* | Minimum Distance[†] |
|---|---|---|---|---|---|
| Beer | Budweiser | .267 | 21.037 | .552 | .219 |
| Beer | Miller | .149 | 15.169 | .501 | .295 |
| Coffee | Folgers | .310 | 26.170 | .343 | .704 |
| Coffee | Maxwell House | .256 | 21.874 | .407 | .571 |
| Coffee | Hills Bros. | .059 | 15.623 | .510 | .578 |
| Ketchup | Heinz | .432 | 35.831 | .464 | .399 |
| Mayonnaise | Kraft | .497 | 37.080 | .328 | .714 |
| Mayonnaise | Unilever | .292 | 29.982 | .264 | .738 |
| Soft drinks | Coca-Cola | .273 | 33.794 | .630 | .286 |
| Soft drinks | Pepsi-Cola | .223 | 27.610 | .633 | 2.115 |
| Soft drinks | Dr Pepper | .062 | 21.722 | .271 | .499 |
| Yogurt | Dannon | .307 | 23.484 | .215 | .427 |
| Yogurt | Yoplait | .162 | 22.685 | .209 | .587 |

* Promotion is the percentage of sales volume sold on promotion.
[†] Minimum distance is the average distance to the closest manufacturing facility in 1,000 miles.

sold bearing a given brand name. For instance, in the ground coffee category, the Folgers brand aggregates all the SKUs with the Folgers label, which embodies a wide array of can sizes. Even though many of the brands are jointly owned by a small number of large food conglomerates, we examine each brand in our database as a separate entity. For instance, Folgers is now owned by Procter and Gamble, a large brand conglomerate, but has its own separate management team responsible for its marketing. Similarly, according to the company Web site, Ben and Jerry's continues to operate "to a large extent independently" and "separately from Unilever's current U.S. ice cream business" even after its acquisition by Unilever.[5] Table 2 provides descriptive statistics for the largest brands in those six industries for which we will also provide details on entry data, as discussed below.[6]

To explore the sources of persistence in the geographic brand share patterns, we supplement the Nielsen data with information on the city of origin of a brand. Focusing on the top two brands in each of the 34 industries, on the basis of their share of national equivalent unit sales, we successfully identified the city of origin and year of entry for 49 of the 68 top brands. The data were collected by consulting various sources including the Internet, company relations agents, and business history books. We list the market of origin for each of these brands in table 3. We can see that CPG brand launches vary widely across the nineteenth

[5] For additional documentation, see http://www.benjerry.com/our_company/press_center/press/join-forces.html.
[6] Comparable descriptive statistics for the remaining 28 categories are available on request.

TABLE 3
MARKET OF ORIGIN FOR 49 OF THE TOP TWO BRANDS ACROSS THE 34 CPG INDUSTRIES

| Industry | Brand | City of Origin | Year of Launch |
|---|---|---|---|
| Bagels | Lender's | New Haven, CT | 1927 |
| Bagels | Sara Lee | Greenville, SC | 1985 |
| Beer | Budweiser | St. Louis | 1876 |
| Beer | Miller | Milwaukee | 1855 |
| Bread | Wonder | Indianapolis | 1921 |
| Bread | Sunbeam | Philadelphia | 1942 |
| Breakfast sausage | Jimmy Dean | Plainview, TX | 1969 |
| Breakfast sausage | Bob Evans Farm | Gallipolis, OH | 1948 |
| Butter | Land o'Lakes | Saint Paul, MN | 1924 |
| Butter | Challenge | Los Angeles | 1911 |
| Cereal | Kellogg's | Battlecreek, MI | 1906 |
| Cereal | General Mills | Minneapolis | 1924 |
| Chunk cheese | Kraft | Chicago | 1903 |
| Coffee | Folgers | San Francisco | 1872 |
| Coffee | Maxwell House | Nashville | 1892 |
| Cottage cheese | Knudsen | San Diego | 1919 |
| Cream cheese | Philadelphia | Chester, NY | 1880 |
| Cream cheese | Temptee | Louisville | 1927 |
| Dinner sausage | Thorn Apple Valley | Detroit | 1969 |
| Dinner sausage | Eckrich | Fort Wayne, IN | 1894 |
| Dried rice | Uncle Ben's | Beaumont, TX | 1943 |
| Dried rice | Mahatma | Abbeville, LA | 1911 |
| Frozen topping | Cool Whip | Avon, NY | 1967 |
| Frozen topping | ReddiWip | St. Louis | 1948 |
| Fruit spreads | Smucker's | Orrville, OH | 1897 |
| Fruit spreads | Welch's | Concord, MA | 1869 |
| Hot dogs | Oscar Mayer | Chicago | 1900 |
| Hot dogs | Hygrade | Southfield, MI | 1957 |
| Ketchup | Heinz | Pittsburgh | 1876 |
| Ketchup | Hunts | Santa Rosa Valley, CA | 1890 |
| Marshmallows | Campfire | Elk Grove Village, IL | 1917 |
| Mayonnaise | Kraft | Salem, IL | 1931 |
| Mayonnaise | Unilever | New York City | 1905 |
| Mustard | French's | Rochester, MO | 1904 |
| Mustard | Gulden's | New York City | 1867 |
| Pickles | Vlasic | Imlay City, MI | 1930 |
| Pickles | Claussen | Chicago | 1870 |
| Pizza | Tombstone | Medford, WI | 1970 |
| Pizza | Totinos | Minneapolis | 1960 |
| Pizza bread | Boboli | San Raphael, CA | 1986 |
| Pizza sauce | Contadina | San Jose, CA | 1918 |
| Pourables/salad dressing | Kraft | Salem, IL | 1931 |
| Pourables/salad dressing | Wishbone | Kansas City, MO | 1940 |
| Refrigerated pasta | Contadina | San Jose, CA | 1918 |
| Sauces | Heinz | Pittsburgh | 1869 |
| Soft drinks | Coca-Cola | Atlanta | 1886 |
| Soft drinks | Pepsi-Cola | New Bern, NC | 1896 |
| Yogurt | Dannon | New York City | 1943 |
| Yogurt | Yoplait | Detroit | 1974 |

and twentieth centuries, with the average launch date in 1919, but with a standard deviation of 34.3 years.

To dig deeper into the sources of persistence in geographic patterns, we also collected manually data on the exact year a brand launched in each of our 50 markets. Since such data are not readily available, we are able to conduct this entry analysis for only six of the 34 industries: beer, ground coffee, ketchup, mayonnaise, soft drinks, and yogurt. These data were obtained from a large number of sources. The beer entry data were assembled from a combination of published business histories (Plavachan 1975; John 2005) as well as the generous provision of access to company archives by Budweiser and Miller.[7] For ground coffee, the entry data were obtained from historic publications (e.g., Gale Group 1993; Pendergrast 1999), the trade press, the manufacturers themselves, and the Internet, mainly at manufacturer Web sites. In addition, we consulted the Hills Brothers Coffee Company archives at the National Museum of American History, Washington, DC, which contain marketing and sales records from the nineteenth and early twentieth centuries.[8] The ketchup data were assembled primarily from two very thorough business histories of the Heinz family (Alberts 1973; Koehn 2001).[9] For the mayonnaise industry, entry data were collected mainly through industry contacts and from available histories on company Web sites and are available only at a regional level. The soft drink entry data were obtained from several published business histories (Pendergrast 1993; Rodengen 1995), the Coca-Cola company archives, and the public Dr Pepper archives at the Dr Pepper Museum in Waco, Texas.[10] Finally, the yogurt data were obtained from industry contacts.[11] In some instances, an exact entry date would need to be inferred, for example, by interpolation based on geographically "close" markets. For this reason, our entry analysis will focus on whether a firm entered first instead of using the exact entry date of a brand.

For the same six industries for which we collected entry data, we also collected information on the exact geographic location of the manufacturing plants for the brands. The plant locations provide a measure of a brand-specific cost asymmetry based on the distance from a given geographic market to the plant. The plant locations were obtained from interviews with managers, Web sites, and other secondary data sources.

Finally, to look at a more intrinsic measure of a brand's performance other than its market share, we also obtained measures of perceived brand quality from the 2004 Brand Asset Valuator, an annual survey conducted by Young and Rubicam (Y&R), a multinational advertising agency.[12] The brand value measures constructed by Y&R are used by many large national consumer goods manufacturers to assess brand performance and brand equity. Consumers are surveyed by Y&R on a large number of yes/no brand characteristics such as whether a particular brand is "high quality," "good value," and "best brand in category." Responses to these ratings are tallied and reported by Y&R as fractions of the sample at the census subregion level.[13] For each brand and subregion, we use the average across the three quality measures as a proxy for perceived quality.

### B. The Geographic Patterns in Current Market Shares

In this subsection, we briefly discuss the geographic patterns in market shares, using the 31 AC Nielsen industries. Owing to differences in timing and market definitions, we do not include the three industries with IRI data in this analysis; however, we find analogous geographic patterns therein. For each industry, we focus on the two largest brands on the basis of their respective shares of national equivalent unit sales, generating a sample with two brands, 50 geographic markets, and 36 months for each of the 31 industries.

A simple analysis of the pooled variance in market shares across time and markets for each of the 62 top two national brands reveals the important role of geography (Bronnenberg et al. 2007). The geographic variance is considerably larger than time-series variation. Across the 62 brands, the distribution of $R^2$ for market fixed effects had a minimum of 50 percent and a mean of over 80 percent. The two right-side panels of figure 1 illustrate a typical example of the relative importance of geography versus time using the top two brands in the mayonnaise

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[12] Although the brand quality data are sampled roughly 10 years later than brand share data, this difference seems small compared to the timing of historic entry. Therefore, we do not think that this slight discrepancy will invalidate the comparison of the entry effect on share vs. on brand quality.

[13] These regions divide the continental United States into nine regions that consist of clusters of adjacent states, e.g., New England, Pacific, etc.
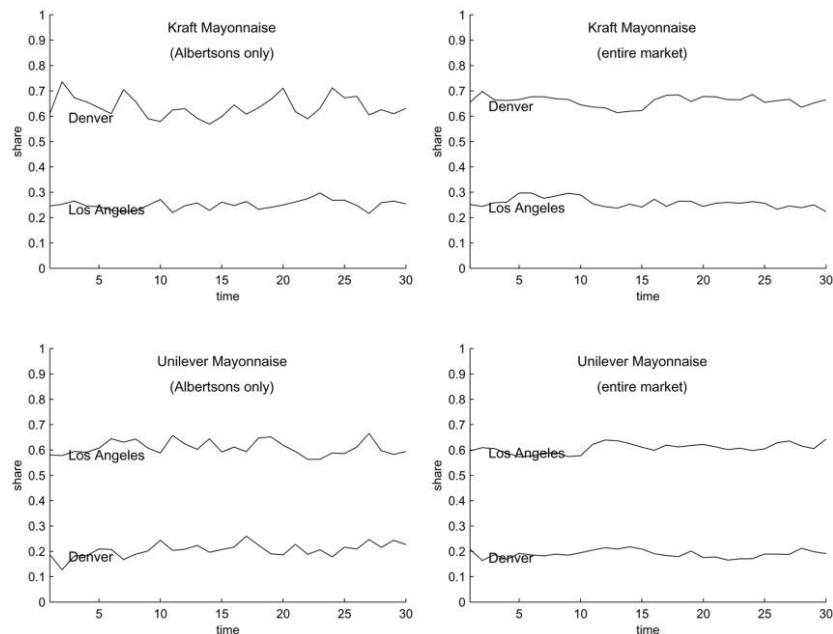
FIG. 1.—Brand shares in the mayonnaise industry with retailers and in markets (time is measured in 4-week intervals).

industry.[14] The variation in each of the brands' shares between the two markets is considerably larger than the variation over time within each market.

We also observe variation across markets in the identity of an industry's brand share leader. Within an industry, a local leader dominates a maximum of 64 percent of the markets, on average. In only three of the 31 industries do we observe a single consistent share leader across all markets: cereals, cream cheese, and frozen toppings. In some of the more fragmented industries, we see even more variation in brand leadership if we expand our focus to all top two brands in each geographic market. Across industries, we see an average of eight different brands that are a local share leader in at least one market, with a range of one to 20 (i.e., the dinner sausage industry has 20 different brands that are a local leader in at least one market). Therefore, the identity of the leading brand in an industry varies from market to market. This variation creates a striking degree of asymmetry in brand shares across markets.

Figure 2 illustrates the cross-market asymmetry in brand shares in the

[14] Unilever mayonnaise is sold under the brand name Best Foods west of the Mississippi and Hellmann's east of the Mississippi.

Fig. 2.—The joint geographic distribution of share levels and early entry across U.S. markets in ground coffee. The areas of the circles are proportional to share levels. Shaded circles indicate that a brand locally moved first.

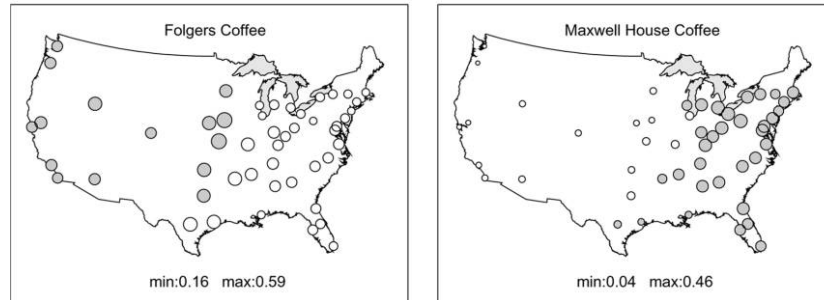coffee industry by plotting the shares of the two top national brands, Folgers and Maxwell House, on a map of the United States. Each circle pertains to one of the 50 markets in our data, and the circle's area is proportional to the size of the brand's cross-time market share in that market. Folgers' market share ranges from 0.16 in New York City to 0.59 in Des Moines. Maxwell House's market share ranges from 0.04 in Seattle to 0.46 in Pittsburgh. More interesting is the variation in the relative shares of these two brands across U.S. cities. Maxwell House shares are largest in the Northeast, precisely where Folgers shares are smallest. In general, Folgers clearly dominates the ground coffee industry in the West and North Central markets. But Maxwell House dominates the East Coast.

## III.    The Persistence of CPG Brand Shares

In this section, we tie the geographic patterns in market shares to a persistent effect of historic brand entry. We begin with an anecdotal discussion of some of these industries to motivate the potential persistence of historic entry timing.

As seen in table 3, many of the current leading brands originated during the late nineteenth and early twentieth centuries. Typically, the current leading brands in an industry originated in different parts of the United States. For instance, in ground coffee, Folgers launched in San Francisco in 1872,[15] whereas Maxwell House launched in Nashville in 1892. Similarly, Heinz ketchup originated in Pittsburgh in 1876, whereas Hunts ketchup originated in Santa Rosa Valley in 1890, just

[15] Taken from the Folgers Web site (http://www.folgers.com/pressroom/history.shtml). Pendergrast (1999, 56ff.) lists an earlier date, which for the purpose of our analysis is equivalent.

south of San Francisco. Most of these brands continue to be the share leaders in their respective cities of origin.

We can also find examples of markets that are not the city of origin of any of the current top brands, but where an early entrant nevertheless currently has the highest market share. In ground coffee, Folgers has the largest share of national equivalent unit sales. But in Chicago, for example, Folgers is ranked third. Interestingly, Folgers did not enter the Chicago market until 1958, more than 25 years later than Hills Brothers, the leading brand. In the beer industry, Budweiser is the top brand at the national level and in the majority of the 50 cities in our database. However, Budweiser is ranked second in Chicago, where it entered in 1878. Even before the launch of its Budweiser brand, Anheuser-Busch had decided as early as 1865 to relinquish Chicago to the Milwaukee brewers and to focus on the Southwest (Ogle 2006). Miller had been selling in Chicago since 1856 (1 year after its launch), and it established a permanent sales agency in 1873 (John 2005). It is still ranked first there today.

Some of the variation in the identity of the early entrant stems from the slow diffusion of a brand across the United States. During the mid to late nineteenth century, when many of these brands diffused, the technology to coordinate a national product launch was not widely available (e.g., this period predates national radio and national television advertising campaigns). In ground coffee, for instance, it took more than a century for Folgers to achieve true national distribution. In 1978, it finally entered New England following a halt to a Federal Trade Commission consent decree from 1971, when Folgers was acquired by Procter and Gamble. Similarly, Miller beer launched in Milwaukee in 1855, but it did not enter many southwestern markets until just after the turn of the century, 50 years later.

It is important to note that in most of our industries, the current set of top brands does not consist of the true first entrants per se. For example, Heinz was not the first seller of ketchup,[16] Budweiser was not the first commercial brewer of beer, and Folgers was not the first vendor of coffee. Technically speaking, our analysis focuses on the survivors rather than on the first entrants (see Golder [2000] for a discussion of potential survivor bias). However, as business historians will attest, the entrepreneurs who launched these survivor brands were nevertheless pioneers in their aggressive use of grassroots marketing to build their brands both locally and, eventually, nationally. We view these survivors as first movers in the creation of branded food in their respective in-

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[16] Tomato ketchup existed as early as 1801 (a recipe for tomato ketchup was printed in an American cookbook, the *Sugar House Book*; http://en.wikipedia.org/wiki/Ketchup), 75 years before Heinz started selling it.

dustries (Koehn 2001; Keller 2003). Similarly, these entrepreneurs were quick to adopt the latest technology for distribution. Adolphus Busch, son-in-law of Eberhard Busch, the company's founder, and eventual president of Anheuser-Busch, was the first to use pasteurization and refrigerated rail technology commercially for the purposes of distributing keg beer across the United States (Plavachan 1975).

This anecdotal discussion highlights several important features of the entry data that will help us with our tests below. First, most current leading brands in an industry originated in different parts of the United States and then diffused slowly across geographic markets. This means that there is variation in how long a brand operated within a market, allowing us to test for share differences between markets in which a brand has operated relatively long and markets in which it has operated relatively short. There is also variation in the identity of early entrants across markets within an industry, allowing us to test early-mover effects versus brand heterogeneity. Finally, even though we focus on the set of surviving brands, we nevertheless consider them the true pioneers since they were typically the first to invest in serious marketing and brand building.

### A.    The City of Origin Effect on Market Shares

In this subsection, we test for persistence in a brand's share by looking at the relative shares in markets closest to the city of origin versus in markets more distant from the city of origin. Since the city of origin represents the geographic area in which a brand has operated the longest, it is also the area with the highest probability that the brand was an early entrant. Owing to the long geographic diffusion of most CPG brands, we conjecture that markets more distant from the city of origin would also represent the areas in which the brand entered more recently and, hence, in which the brand is less likely to have been an early entrant. Because the analysis uses only the location of brand origin, we were able to collect the necessary data for this test for a large cross section of brands and industries. Specifically, our analysis uses 49 brands from the set of 68 top two national brands in each of the 34 industries. These brands are listed in table 3.

To allow for nonlinearity in the effect of distance to city of origin on shares, we use a step function approximation. The distances between a local market and a brand's city of origin, which range from 0 to 2,702 miles, are partitioned into 11 intervals each covering 250 miles. For each interval, we create a dummy variable, $\text{Dist}_{icm}^{k}$, indicating whether the distance from market $m$ to brand $i$'s city of origin falls into interval $k$. A separate dummy variable, $\text{Dist}_{icm}^{0}$, is used to indicate whether market $m$ is the city of origin. The number of observations in each distance
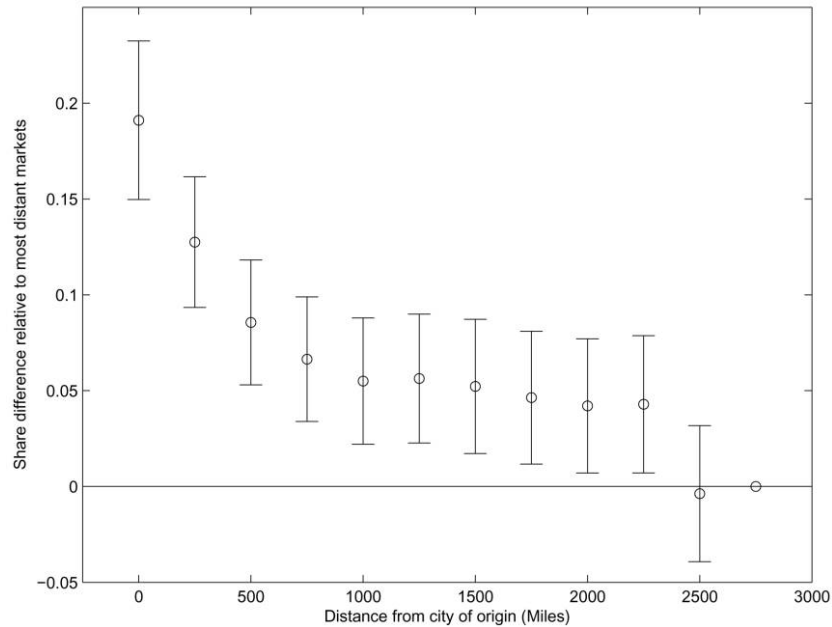
FIG. 3.—Effect of distance from city of origin on market share (net of brand-specific fixed effects). Whiskers indicate 95 percent confidence intervals.

interval ranges from 42 (2,500–2,750 miles) to 490 (750–1,000 miles). To test for an effect of distance from city of origin on brand shares, we run the following regression:

$$\text{Share}_{icm} = \alpha_i + \sum_{k=0}^{11} \delta_k \text{Dist}_{icm}^k + \epsilon_{im}, \tag{1}$$

where $\text{Share}_{icm}$ is the market share of brand $i$ in industry $c$ and market $m$ and $\alpha_i$ is a brand fixed effect.

We report the distance results from (1) graphically in figure 3. We graph the distance effects, $\delta_k$, against their respective distance intervals. Recall that $\delta_{11}$, which corresponds to the effect at distances between 2,500 and 2,750 miles, is normalized to zero. We can see that, net of the brand-specific effects $\alpha_i$, a brand's market share falls as we move to markets that are increasingly distant from its city of origin. In particular, we see an approximately 20 share point difference between the market share in the city of origin versus in a market more than 2,500 miles away. In the graph, we also report 95 percent confidence bands to indicate that these effects are statistically significant. Given that the overall average market share for these 49 brands is roughly 22 percent,

the differences between close versus distant markets are quite substantial.[17]

We conclude that close proximity to a brand's city of origin correlates positively with the brand's current market share. In view of the fact that the average launch year of these brands is 1919, we also conclude that the difference in market shares between markets entered early versus markets entered later is persistent. This persistence is remarkable given that the industries studied typically consist of fairly physically undifferentiated products that tend to be available in most of the geographic markets. With these findings alone, it is difficult to assess a specific source for the persistence. There are other potential explanations for why a brand would have a higher market share closer to its city of origin. In the next subsection, we explore the role of order of entry among the current largest surviving brands in six of the 34 industries. We also explore several alternative sources of geographic brand asymmetry that could also introduce persistence.

### B.    The Order of Entry Effect on Market Shares

In this subsection, we run a second test for persistence in six separate industries using variation in the order of entry of the current top brands. With the exception of ketchup, where we have a complete national history only for Heinz, in each industry we have entry data on more than one brand and typically use the union of all top two to three brands from each of the 50 cities. Hence, in beer we look at Budweiser and Miller; in ground coffee we look at Folgers, Maxwell House, and Hills Brothers; in ketchup we look at Heinz; in mayonnaise we look at Kraft and Unilever (Hellmann's/Best Foods);[18] in soft drinks we look at Coca-Cola, Pepsi, and Dr Pepper; and in yogurt we look at Dannon and Yoplait.

Before we move to a regression analysis, it is helpful to look at the joint geographic distribution of market shares and entry. Referring back to figure 2, we map this distribution for the ground coffee industry. Shaded circles indicate those markets in which a brand entered before the other. For example, Folgers started in the West and moved east, whereas Maxwell House started in the East and moved west. The maps

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[17] The Unilever brand is complicated because it comprises the merger of Hellmann's and Best Foods, giving it two home markets effectively. The results herein are robust qualitatively to the inclusion or exclusion of Unilever.

[18] In mayonnaise, we exclude Duke's and Blue Plate because they operate in too few markets to separate heterogeneity and state dependence. However, we use the information on their entry to determine those markets in which neither Unilever nor Kraft entered first.

reveal a strong positive correlation between a brand's share level and its early entry status in both industries.

We now test this relationship more formally. For each industry, we run several regressions using the within-market mean share for each brand as the dependent variable. Our regressors consist of brand fixed effects and "Early Entry," an indicator for whether a brand was the early entrant in a market:

$$\text{Early Entry}_{icm} = \begin{cases} 1 & \text{if brand } i \text{ entered market } m \text{ earlier} \\ 0 & \text{else.} \end{cases}$$

We report the results from our market share regressions in table 4. In each industry, we run three regressions. The first conditions only on early entry, the second conditions on the brand identities, and the third conditions on both. The entry effect is statistically significant in all six industries, even after we control for brand fixed effects. It is helpful to look first at the regressions with brand effects only to understand the magnitude of the early entry effect. With the exception of the ketchup industry, for which we could obtain data only for the leading brand, we routinely find evidence of asymmetries in the average brand shares across markets. But, after conditioning on early entry, we find that the magnitude of the early entry effect exceeds the brand effects. This result is suggestive that early entry determines the rank order of brand shares even in the soft drinks (at least for Coca-Cola and Pepsi) and yogurt industries, where the early entry effect is relatively small compared to coffee and mayonnaise. According to our point estimates, early entry accounts for the majority of the predicted share differential in each industry except for ketchup. For example, in coffee, the rank order of brands across markets is associated with early entry.

In several instances, the definition of early entry was problematic. In the Appendix, we check the robustness of our regression results to alternative definitions of the early entry variable. Our findings herein are qualitatively the same under these alternative definitions.


## C.    The Entry Effect on Perceived Brand Qualities

In this subsection, we look at the effect of early entry on perceived brand quality differences across markets. Given that the leading brands in each of the six industries invest heavily in national television advertising, one might expect to observe more uniformity in consumers' perceptions of the brand qualities. In table 5, we report the results for each industry of the analogous three regressions used in the last section with the brand quality data. Since the brand quality is measured on an ordinal scale, it is hard to assign any quantitative meaning to the coefficients. The effect of early entry is positive; is statistically significant,

TABLE 4
Early Entry and Market Share

| Variable | Entry Effect (1) | Brand Effects (2) | Entry and Brand Effects (3) |
|---|---|---|---|
| Beer ($N = 94$): | | | |
| Intercept | .141 (.010) | .149 (.011) | .139 (.011) |
| Budweiser | | .118 (.016) | .020 (.026) |
| Miller | | | |
| Early entry | .134 (.014) | | .117 (.026) |
| $R^2$ | .483 | .372 | .487 |
| Coffee ($N = 150$): | | | |
| Intercept | .139 (.011) | .059 (.014) | .052 (.011) |
| Folgers | | .251 (.020) | .206 (.015) |
| Maxwell House | | .197 (.020) | .088 (.018) |
| Hills Bros. | | | |
| Early entry | .208 (.019) | | .175 (.015) |
| $R^2$ | .440 | .533 | .755 |
| Ketchup ($N = 50$): | | | |
| Intercept | | | .388 (.019) |
| Heinz | | | |
| Early entry | | | .072 (.025) |
| $R^2$ | | | .149 |
| Mayonnaise ($N = 100$): | | | |
| Intercept | .248 (.019) | .292 (.027) | .189 (.020) |
| Kraft | | .205 (.039) | .144 (.025) |
| Unilever | | | |
| Early entry | .332 (.029) | | .303 (.026) |
| $R^2$ | .576 | .222 | .682 |
| Soft drinks ($N = 156$): | | | |
| Intercept | .144 (.009) | .062 (.009) | .058 (.008) |
| Coca-Cola | | .211 (.012) | .171 (.015) |
| Pepsi-Cola | | .161 (.012) | .158 (.012) |
| Dr Pepper | | | |
| Early entry | .126 (.016) | | .056 (.014) |
| $R^2$ | .295 | .682 | .713 |
| Yogurt ($N = 100$): | | | |
| Intercept | .171 (.014) | .162 (.013) | .154 (.014) |
| Dannon | | .145 (.019) | .111 (.025) |
| Yoplait | | | |
| Early entry | .126 (.020) | | .051 (.025) |
| $R^2$ | .286 | .379 | .404 |

Note.—Standard errors are in parentheses.

with the exception of the beer industry; and has a fair amount of explanatory power in all the industries. Thus, the effect of entry, often during the nineteenth and early twentieth centuries, continues to persist in the geographic differences of current brand quality perceptions.

## IV. Alternative Explanations for the Geographic Variance in Shares

In the previous section, we found that entry appears to have a fairly strong and persistent effect on current market shares. We now explore

TABLE 5
EARLY ENTRY AND PERCEIVED QUALITY

| Variable | Entry Effect (1) | Brand Effects (2) | Entry and Brand Effects (3) |
|---|---|---|---|
| Beer (N = 94): | | | |
| Intercept | 15.461 (.426) | 15.169 (.382) | 15.055 (.389) |
| Budweiser | | 5.868 (.540) | 4.765 (.962) |
| Miller | | | |
| Early entry | 5.284 (.602) | | 1.330 (.962) |
| $R^2$ | .456 | .562 | .571 |
| Coffee (N = 150): | | | |
| Intercept | 19.385 (.504) | 15.623 (.516) | 15.455 (.460) |
| Folgers | | 10.547 (.730) | 9.456 (.672) |
| Maxwell House | | 6.251 (.730) | 3.648 (.770) |
| Hills Bros. | | | |
| Early entry | 5.513 (.873) | | 4.198 (.668) |
| $R^2$ | .212 | .590 | .677 |
| Ketchup (N = 50): | | | |
| Intercept | | | 33.634 (.700) |
| Heinz | | | |
| Early entry | | | 3.544 (.889) |
| $R^2$ | | | .249 |
| Mayonnaise (N = 100): | | | |
| Intercept | 30.240 (.595) | 29.982 (.649) | 27.842 (.538) |
| Kraft | | 7.098 (.918) | 5.839 (.696) |
| Unilever | | | |
| Early entry | 7.481 (.897) | | 6.296 (.701) |
| $R^2$ | .415 | .379 | .661 |
| Soft drinks (N = 156): | | | |
| Intercept | 24.920 (.511) | 21.722 (.596) | 21.450 (.577) |
| Coca-Cola | | 12.072 (.842) | 9.555 (1.060) |
| Pepsi-Cola | | 5.888 (.842) | 5.684 (.812) |
| Dr Pepper | | | |
| Early entry | 8.366 (.885) | | 3.537 (.962) |
| $R^2$ | .367 | .573 | .608 |
| Yogurt (N = 100): | | | |
| Intercept | 22.002 (.394) | 22.685 (.420) | 22.202 (.409) |
| Dannon | | .799 (.593) | −1.253 (.754) |
| Yoplait | | | |
| Early entry | 2.166 (.558) | | 3.018 (.754) |
| $R^2$ | .133 | .018 | .158 |

NOTE.—Standard errors are in parentheses.

several alternative supply-side sources of firm and market heterogeneity that could also potentially contribute to the observed geographic variation in market shares. Since several of these sources could also be a result of early entry, it is interesting to see whether our entry effects are mitigated by these additional controls. First, we consider geographic cost advantages based on a brand's proximity to its production plant (Greenhut, Greenhut, and Li 1980). Second, we test for relationships with specific multimarket retailers. For example, manufacturers frequently pay slotting allowances to retailers to obtain premium shelf space

for their products (Federal Trade Commission 2001; Israilevich 2004; Sudhir and Rao 2006). Third, we look for parent company effects whereby a large food company might possess regional advantages that are passed on to each of its brands. We also look at the potential role of trade promotions, such as price discounts and other point-of-purchase merchandising that could also potentially influence a brand's market share.

## A.    Costs and Promotions

For the six industries for which we have entry data, table 6 contrasts the entry effect with two other sources of firm heterogeneity across markets: location of plants and local differences in promotional intensity. In column 4, we report a regression that reports the entry effect after controlling for both these alternative sources of geographic variation. Column 1, titled Brand Effects, provides a baseline with only the brand effects for an industry.

Column 2, titled Distance Effects, adds the effect of the distance from a given market to a brand's geographically closest manufacturing plant. There are two reasons why proximity to a production plant might depend on or be confounded with entry. First, firms may tend to have their plants in their oldest markets, where they first began operations and, hence, where they were more likely to have been the early entrant. Second, if there is an entry effect on market share, firms might subsequently build new plants closest to these markets if they prefer to invest near their largest markets. In either case, cost would likely appear to have a large effect and, if so, could potentially offer an explanation for the entry effects documented in the previous section. For most of the industries, the effect is found to be insignificant, suggesting that cost advantages are not the driving force of the geographic patterns in those industries. Nevertheless, proximity to a plant is found to be negative and significant for the beer and ketchup industries. Thus, in these industries, a brand's share appears to decline in markets further from production facilities. In spite of this finding, we see that the entry effect remains positive and significant in both industries, suggesting that the effect of entry is robust to the effects of proximity to a plant.

Column 3, titled Promotion Effects, instead adds promotional intensity (i.e., share of equivalent unit sales sold on promotion). A potential concern is that the promotion variable is confounded with the entry effect, which could indeed arise if firms systematically target higher promotional effort to their largest-share markets. Many CPG firms do use what is termed a "high-BDI" allocation rule for promotional budgets. BDI refers to the Brand Development Index, and the rule implies that promotions are allocated to markets in which the brand is strong as a

<div align="center">

TABLE 6

ALTERNATIVE EXPLANATIONS FOR THE GEOGRAPHIC PATTERNS IN MARKET SHARES

</div>

| Variable | Brand Effects (1) | Distance Effects (2) | Promotion Effects (3) | All (4) |
|---|---|---|---|---|
| Beer ($N = 94$): | | | | |
|   Intercept | .149 (.011) | .182 (.016) | .234 (.025) | .239 (.024) |
|   Budweiser | .118 (.016) | .109 (.016) | .105 (.015) | .021 (.024) |
|   Miller | | | | |
|   Early entry | | | | .096 (.024) |
|   Minimum distance | | −.112 (.038) | | −.086 (.033) |
|     from plant | | | | |
|   Log(promo) | | | .118 (.031) | .101 (.028) |
|   $R^2$ | .372 | .428 | .459 | .584 |
| Coffee ($N = 150$): | | | | |
|   Intercept | .059 (.014) | .065 (.020) | .077 (.031) | .087 (.026) |
|   Folgers | .251 (.020) | .253 (.021) | .262 (.026) | .217 (.020) |
|   Maxwell House | .197 (.020) | .197 (.021) | .203 (.022) | .090 (.019) |
|   Hills Bros. | | | | |
|   Early entry | | | | .179 (.015) |
|   Minimum distance | | −.011 (.025) | | −.039 (.018) |
|     from plant | | | | |
|   Log(promo) | | | .027 (.039) | .019 (.029) |
|   $R^2$ | .533 | .534 | .535 | .762 |
| Ketchup ($N = 50$): | | | | |
|   Intercept | .432 (.013) | .510 (.025) | .486 (.072) | .486 (.070) |
|   Heinz | | | | |
|   Early entry | | | | .050 (.025) |
|   Minimum distance | | −.194 (.057) | | −.154 (.058) |
|     from plant | | | | |
|   Log(promo) | | | .069 (.091) | .030 (.081) |
|   $R^2$ | .000 | .196 | .012 | .266 |
| Mayonnaise ($N = 100$): | | | | |
|   Intercept | .292 (.027) | .310 (.040) | .294 (.112) | .315 (.075) |
|   Kraft | .205 (.039) | .204 (.039) | .204 (.043) | .126 (.028) |
|   Unilever | | | | |
|   Early entry | | | | .307 (.026) |
|   Minimum distance | | −.024 (.040) | | −.031 (.026) |
|     from plant | | | | |
|   Log(promo) | | | .002 (.082) | .079 (.053) |
|   $R^2$ | .222 | .225 | .222 | .693 |
| Soft drinks ($N = 156$) | | | | |
|   Intercept | .062 (.009) | .070 (.010) | .157 (.024) | .138 (.024) |
|   Coca-Cola | .211 (.012) | .207 (.012) | .146 (.019) | .126 (.020) |
|   Pepsi-Cola | .161 (.012) | .189 (.021) | .097 (.019) | .117 (.027) |
|   Dr Pepper | | | | |
|   Early entry | | | | .045 (.014) |
|   Minimum distance | | −.017 (.010) | | −.006 (.010) |
|     from plant | | | | |
|   Log(promo) | | | .067 (.016) | .054 (.016) |
|   $R^2$ | .682 | .687 | .716 | .736 |
| Yogurt ($N = 100$): | | | | |
|   Intercept | .162 (.013) | .189 (.025) | .277 (.035) | .275 (.040) |
|   Dannon | .145 (.019) | .138 (.020) | .136 (.018) | .107 (.024) |
|   Yoplait | | | | |
|   Early entry | | | | .038 (.025) |

TABLE 6
(*Continued*)

| Variable | Brand Effects (1) | Distance Effects (2) | Promotion Effects (3) | All (4) |
|---|---|---|---|---|
| Minimum distance from plant | | −.047 (.035) | | −.021 (.035) |
| Log(promo) | | | .069 (.020) | .065 (.020) |
| $R^2$ | .379 | .390 | .449 | .468 |

NOTE.—Standard errors are in parentheses.

defensive tactic (Blattberg and Neslin 1990). In half of the industries, the correlation between market share and promotions is very small and insignificant. Nevertheless, the correlation is positive and significant in the beer, cola, and yogurt industries. Clearly one must be cautious in interpreting these effects because of the potential simultaneity of promotions and shares. In spite of this limitation, it is surprising to observe relatively little correlation between promotion levels and the cross section of shares in the industries.[19] Column 4 adds the entry variable to the regression with the distance and local promotion effects concurrently. With the exception of yogurt, the entry effect remains positive and significant in all the industries even after we control for promotions and plant locations.

## B. Relationships with Retail Chains

Another potential source of geographic variation in market shares is the impact of retail intermediaries. The practice of slotting fees could enable a manufacturer to establish relationships with specific multi-market (or national) retail chains, which could in turn generate regional advantages in distribution. The conventional wisdom is that slotting fees are paid to the corporate headquarters of a large chain and not to individual store managers (Alexander 2003). In spite of the entry effects documented earlier, such relationships with retailers might nevertheless be the main driving force of the geographic patterns in our data. We can test this effect by checking whether brand share variation exhibits a retail account component in the retail account–level data. A retail

[19] In contrast, promotions are more correlated with shares within a specific market over time. A separate regression of shares on promotions for each of the top two brands was run for each industry and each of the 50 markets. That is, we ran 100 regressions per industry (two brands and 50 markets). On average, the $R^2$ of a linear regression using price promotions and display promotions to explain market share is 0.38. As before, we cannot establish a causal relationship from these results. However, it is interesting to observe such a strong correlation between promotions and shares over time within a market vs. no or weak correlation across markets.

account roughly corresponds to the set of stores for a retail chain located in a specific geographic market, which may consist of multiple city-markets.

We exploit the retail account–level information for the top two brands in each of the 31 industries for which we use AC Nielsen data. We recompute the analysis of variance in shares, as in Section III.B, except that we now study the role of retail accounts in addition to time and geographic market. A separate regression is run for each industry. Although not reported, the $R^2$'s from retail account fixed effects are very small compared to those from market fixed effects. Across all industries, the retail component accounts for 20 percent of share variation, on average, whereas the market component accounts for more than 51 percent. For a few of the smaller industries, retailer effects are larger because not all retailers carry them (e.g., refrigerated pasta) or private labels are strong in some chains and not in others. The left panels of figure 1 illustrate these findings by plotting the market share history of the top brands in the mayonnaise industry in two separate large retail accounts: Albertsons in Los Angeles and Albertsons in Denver. By comparing these plots with the right-side panels, with time-series plots at the city level, we can see that the market-specific component of the share histories is considerably more influential than the retailer component. In summary, the evidence suggests that retailers are not the driving force of the geographic variation in market shares. Note that we can focus this analysis only on those chains with operations in at least two distinct geographic markets (e.g., Albertsons, Safeway, and Kroger) since we cannot separately identify a retailer and a market effect for single-market retailers. Thus, we cannot rule out that single-market chains sell a higher share of the local leading brand because of slotting fees.

## V.   Conclusions and Discussion

Herein we have documented a persistent effect of early entry on a brand's market share and on its perceived quality. First, we found a city of origin effect for the leading brands across 49 brands covering almost all the industries studied. Nationally distributed brands have larger market shares in markets that are geographically close to their city of origin and smaller market shares in markets far away from the city of origin, where they were typically launched later. We conjectured that this city of origin effect arises because most current surviving brands were early entrants in their markets of origin. To test the early entry effect more carefully, we exploited the geographic variation in the identity of the early entrants among the top surviving brands for six of the industries. In all six industries, we found not only that early entry correlated sig-

nificantly with brand shares, but also that it correlated with quality perceptions and with the rank order of brand shares. Thus, for the CPG industries studied, early entry appears to generate a persistent advantage for a brand, in some cases even a century after its launch. Moreover, part of the effect may be demand-driven since we find an analogous effect of early entry on the current perceived quality of brands. These findings were found to be robust to several alternative economic sources of asymmetry across markets.

These results should offer several opportunities for future research. First, one might consider trying to understand the underlying economic forces that sustained the persistence of geographic patterns for over a century. There are at least two possible economic explanations for the persistence. One line of argumentation arises from the endogenous sunk costs (ESC) theory developed and tested in Sutton (1991). Sutton provides empirical support for the role of endogenous fixed and sunk advertising costs in the determination of industrial market structure for food industries across several European countries. Bronnenberg, Dhar, and Dubé (2008) also provide supporting evidence for the ESC theory using the CPG industries and U.S. geographic markets studied herein. With regard to the entry patterns and geographic effects, stylized versions of the ESC model can be extended to accommodate sequential entry in a multiperiod game. This extension introduces a strategic preemptive motive whereby an early entrant invests more aggressively in advertising than subsequent entrants, thereby enabling the former to establish higher perceived quality brands (Lehmann-Grube 1997). The order of entry can, for some specifications, predict which firm secures the share leadership position. Doraszelski and Markovich (2007) derive an analogous result for a persistent (long-run) early advantage in an infinite-horizon version of the ESC game with ongoing marketing investments over time. While the entry-related predictions of these dynamic ESC games are less robust to model specification, they nevertheless conform with our empirical findings of covariance between order of entry and market structure in our data.

An alternative line of argumentation is that persistence arises from inertia in brand preferences. That is, consumers form brand-buying habits that create an early-mover effect. Schmalensee (1982) suggests that consumer learning could theoretically give early entrants an advantage, even in the absence of any advertising or other marketing investments. Alternatively, over a much shorter horizon (i.e., a couple of years), several studies have documented brand inertia empirically using analogous CPG marketing data (cf. Erdem 1996; Keane 1997; Shum 2004; Dubé, Hitsch, and Rossi 2008). However, none of these studies have made a connection between inertia and any initial advantages (such as entry) for a given brand and its market share. Testing

this theory against the ESC with sequential entry is beyond the scope of the data used herein. But such a test would be an important step toward understanding the underlying economic forces driving these striking, persistent entry effects.

In addition to research focusing on theoretical explanations for the patterns in our data, a second avenue for future research could focus on the conditions under which the documented persistence can potentially be broken. Herein, we have focused on mature CPG industries for which there have not been many recent radical new product innovations. Sutton (2007) studies the role of product innovations and the speed of competitor responses on market dominance. An interesting question for future work would be to ask whether an industry can be reinitialized through such product innovations and to ask what constitutes "early entry."

### Appendix

#### Robustness Checks for the Order of Entry Effect

In some instances, the exact definition of early entry was difficult and required a judgment call. We briefly explore the robustness of the precise way we defined early entry in certain industries to confirm that our findings are robust.

In the ketchup industry, we observe the entry dates only for Heinz, and we define early entry to be one if Heinz entered a market before 1890, which is the initial launch year for its main rival, Hunts.

In the mayonnaise industry, it was not always possible to determine the exact year for each city, but only for a broader geographic region. In Section III.B, we assumed that Kraft was the early entrant in the midwestern and southern markets for which we could not locate an exact date. Two alternative, and possibly more conservative, approaches would be to assume that Unilever was the early entrant in these markets or, simply, to reestimate the model dropping the problematic markets entirely. In table A1, we report the results from the market share regressions for these two alternative approaches. Early entry is found to be positive and significant under both alternative definitions.

In the soft drink industry, we faced a different issue. Unlike Coke and Dr Pepper, Pepsi was never the first brand to roll out in any of the 50 cities in the data. Technically, Coca-Cola was the first to enter the Northeast, even though Pepsi is the current share leader in that region. According to Bob Stoddard, a leading brand historian with expertise in the soft drinks industry, Pepsi intentionally relaunched with aggressive marketing in the Northeast during the early 1930s, precisely because of the lack of major marketing effort by incumbents (see also Stoddard 1997, 69ff.). In Section III.B, we defined Pepsi as the early entrant in the Northeast. In table A1, we rerun the market share regression defining Coca-Cola as the early entrant in the Northeast. We find that the entry effect is robust to this alternative definition and that most of the parameters do not change qualitatively.

Finally, in the beer industry, Miller was first to launch in the Chicago market

TABLE A1
ROBUSTNESS OF THE ENTRY EFFECT

|  | Entry and Brand Effects |
| --- | --- |
| Beer ($N = 94$): | |
|   Intercept | .144 (.011) |
|   Budweiser | .043 (.032) |
|   Miller | |
|   Early entry | .085 (.032) |
|   $R^2$ | .419 |
| Mayonnaise (A) ($N = 100$): | |
|   Intercept | .193 (.029) |
|   Kraft | .304 (.038) |
|   Unilever | |
|   Early entry | .292 (.050) |
|   $R^2$ | .426 |
| Mayonnaise (B) ($N = 100$): | |
|   Intercept | .146 (.078) |
|   Kraft | .351 (.082) |
|   Unilever | |
|   Early entry | .166 (.083) |
|   $R^2$ | .253 |
| Soft drinks ($N = 156$): | |
|   Intercept | .059 (.009) |
|   Coca-Cola | .175 (.023) |
|   Pepsi-Cola | .164 (.012) |
|   Dr Pepper | |
|   Early entry | .042 (.023) |
|   $R^2$ | .689 |

NOTE.—Standard errors are in parentheses. Alternative assumptions for early entry are different from the ones in the main text as follows: beer: Budweiser is assumed to enter Chicago prior to Miller; mayonnaise (A): Unilever leads in the Northeast (Hellmann's) and West (Best Foods), except in markets in which Duke's and Blue Plate were likely first; Kraft is not first anywhere; mayonnaise (B): Unilever leads everywhere except in markets in which Duke's and Blue Plate were likely first; soft drinks: Dr Pepper enters the Texan markets first; Coca-Cola is first everywhere else.

(John 2005; Ogle 2006). However, Miller company records track entry on the basis of the year a permanent bottling operation was established in a market. Miller did not establish a permanent bottling operation in Chicago until after Budweiser. In Section III.B, we defined Miller as the early entrant in Chicago. In table A1, we rerun the market share regression defining Budweiser as the early entrant. The early entry parameter is still found to be positive and significant.

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