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WORKING PAPER SERIES

Economies of Scale in Imitative Consumption and the Size of the Firm: Theory and an Application to Chain Restaurants

by

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Working Paper Series
No. 287

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January 1987

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Economies of Scale in Imitative Consumption and the Size of the Firm: Theory and an Application to Chain Restaurants

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The economies of scale that economists normally rely on to explain the size of firms involve only firms; examples are economies of scale in production, in management and in advertising. This paper argues that there are also entirely different types of economies of scale that determine the size of firms, types that do not involve firms at all. These are "economies of scale in imitative consumption," and as their name suggests, they involve only consumers. A particular good is subject to these economies if consumers are better off consuming brands of the good that almost all other consumers also consume.[1] For example, there are economies of scale in imitative consumption in the consumption of soft drinks if, among the different local and national brands available, the consumer is better off picking, say, Coke, only because almost everybody else does too. The larger the economies of scale in imitative consumption, the larger will be the size of firms in the industry producing this good.

What goods are subject to economies of scale in imitative consumption? Food, clothing and cars are some examples. Some industries whose firms' sizes are determined, at least in part, by these economies are the jeans, sneakers, breakfast cereal, and soft-drinks industries. Of course, economies of scale in imitative consumption are not the only factor that determine firms' sizes in these industries; our analysis implies, however, that because of economies of scale in imitative consumption there would be large firms in all these cases even if

the economies of scale in provision (i.e., economies of scale that involve only firms) were all exhausted at small firm sizes. The effect of economies of scale in imitative consumption is, therefore, quite prevalent. How important is this effect relative to other factors in explaining the structures of industries? No general answer can be given since the answer could vary from industry to industry, but to demonstrate the possible significance of economies of scale in imitative consumption we will analyze here in detail one case - the restaurant industry.

In the first part of the paper we discuss two alternative explanations to ours for the structure of the restaurant industry. The first explanation attributes the structure of the industry to economies of scale in provision (economies that involve only firms); the second attributes it to reputation enforcement via chain-stores (and hence is similar to our explanation in so far as it does not view the restaurant industry as subject to significant economies of scale in provision). The second is the more serious contender because the chain-store literature was specifically designed to deal with structures such as that of the restaurant industry. We show that each of these two contending explanations has implications which contradict various empirical facts concerning restaurants. These facts are consistent with an explanation based on economies of scale in imitative consumption.

The second part of the paper analyzes the characteristics of consumers that lead to the existence of economies of scale in imitative consumption. It is shown that if (i) consumers' tastes are learned and (ii) consumers are mobile, economies of scale in imitative consumption will exist. The third part analyzes the effect of economies of scale in imitative consumption on the structure of the restaurant industry. It is shown that in equilibrium there will be many

restaurants that are unique, and some restaurants that are identical replications of each other and have outlets in all locations (chains). It is also shown that the units that are identical will necessarily form one large firm only if trademarks are protected; otherwise each outlet of a chain could form an independent firm.

I. Alternative Explanations for the Structure of the Restaurant Industry

I.1. Economies of Scale in Provision

Even though making a hamburger or french fries seems simple, there are economies of scale in their provision. This may help account for large chains in the restaurant industry. But the range of sizes of restaurant-firms is so wide that it would be difficult to explain this range only by such economies . Indeed, the restaurant industry provides an excellent illustration for the argument that economies of scale in production are not sufficient to determine the size of firms. In particular, the existence of one-outlet firms indicates that a small size is already efficient in spite of the existence of economies of scale in provision. How could this be?

Different restaurant firms use different methods to exploit these economies. Chain-restaurants exploit economies of scale in provision by preparing hamburger patties or pizza dough mixes and sauces at their own central plants. One-outlet firms are not at a disadvantage, however; they exploit the same economies by buying these items from firms that specialize in production for restaurant use[2]. In similar fashion, chains achieve efficient production by supplying their individual outlets with efficient equipment and with training on how to use it; single-outlet firms buy all these from specialized suppliers. The same also applies to economies of scale in the production of

other items.

Economies of scale in advertising are a different matter. Small firms are at a clear disadvantage in this respect: the advertising cost, say, of a T.V. message is the same whether the advertiser has just one outlet or many, and small firms obviously cannot exploit these economies. If economies of scale in advertising were the explanation for the existence of large firms, however, it would be necessary to explain how one-outlet firms manage to survive in spite of them. It might be suggested that the reason is that there are two different types of consumers: locals who already have the necessary information about stores in their neighborhood, and non-locals who rely on advertising. Since the distinction between locals and non-locals is also the crux of the chain-store model, we will return to economies of scale in advertising when we discuss this literature.

1.2. The Chain Store Literature

Before we discuss the chain store literature it is important to note that once they have explained the existence of chains, some of the articles in this literature go on to inquire about the internal structure of chains. In particular, some articles investigate the question why some chains are organized as franchises (Caves and Murphy, Minkler, Mathewson and Winter, Rubin). For our purposes, however, the distinction between the different forms of organization, e.g. franchising vs. complete integration, is of no consequence; by "the chain store literature" we mean only that part of the literature that explains why chain stores exist for reasons other than economies of scale in provision -- not that part which is concerned with their internal structure.

If just one outlet is large enough to exploit the scale economies in provision, the question is why there are also chain restaurants. The chain store

literature attributes the existence of chains to the predicament of the non-local buyer. Under normal circumstances, buyers can discipline non-performing sellers by ceasing to trade with them. But when a buyer cannot be a repeat customer in a specific retail outlet, as when he is away from home, the threat of ceasing to trade is not a potent disciplining device unless the outlet is a member of a broadly based chain of stores. By buying from a chain store, a non-local (i.e. non-repeat) buyer can turn many one-time purchases from different sellers into a chain of repeated purchases from just one seller. Ceasing to trade becomes a credible threat even though many different stores are involved. But the ability to pose this threat is not costlessly acquired.

Simply by belonging to a chain, an outlet provides the non-local customer with the means to retaliate. If disappointed buyers can bring about a diminution in the chain's general reputation, a cheating outlet will lose customers even though the customers who were actually cheated were only one-time buyers. But even if the damage done to the chain's reputation were substantial, the loss to the outlet that has cheated might not be sufficient to make cheating unattractive to that outlet. This is because lost patronage will be "shared" by all the outlets. To internalize this externality, the chain will monitor its outlets--a costly activity.

The difference between a local and a non-local customer, then, is that the local customer is able to inflict the whole wrath of his retaliation on the particular store that cheated him, while the non-local customer needs to employ a monitor - the chain. But monitoring is costly. Therefore, from the vantage point of the local buyer, it will appear as if the chain is charging a higher price per unit of quality than local stores do; locals will not eat at chains. [3] The non-local buyer, on the other hand, regards the food of the chain and that of the

local restaurant as two different goods altogether. The first is of known quality while the second is not. Thus, one-outlet restaurants and chains can exist side by side, the former catering to locals, the latter to non-locals.

Two common, empirical observations about chains are inconsistent with the foregoing theory, however. Chains do in fact have a substantial number of local customers, and chain stores do exist in local, off-the-road neighborhoods. Why should locals be willing to buy from chains if their prices are higher? A demand by non-locals for the costly monitoring that would be provided by sellers cannot be the only explanation for the existence of chains. We shall see that the existence of economies of scale in imitative consumption can explain these apparent anomalies.

The chain store literature has also failed to recognize the significant ability of the market to protect non-local customers. We shall show that in all but very special (and unlikely) cases, the presence of locals reduces the probability that a local store will deceive non-locals. Nonetheless, chain stores are not dispensable. Although non-local consumers do not have to buy from a chain store (except in special cases) when seeking to guarantee quality, they must buy from a chain store when seeking known taste. This would be true even if fraud was (for whatever reason) not possible. (In the language introduced below, this observation will help us to rationalize the existence of chains, but not necessarily of formal chains.)

Two clarifications are in order at this point. First, it is necessary to clarify what we mean by a chain store. We begin by defining the term "trademark": a trademark is any label that completely identifies the exact type and quality of the product bearing that label. We call a group of stores a "non-formal chain" if all of them bear the same trademark but the trademark is

not registered (i.e. it is not protected by law). We call a group of stores a "formal chain" if all of them bear the same registered trademark. (In the literature it is typically assumed that trademarks can exist only when given protection, i.e., that only formal chains exist. But we will show that this is not necessarily the case.)

Second, it is necessary to distinguish between quality and taste. For simplicity we provide definitions only for our paradigmatic good--food. The extension to other goods is immediate.

We define an attribute of food as a quality attribute if almost all consumers' rankings of the food are the same for this attribute. We define an attribute as a taste attribute when these rankings vary substantially among consumers. (The meaning of the terms 'almost' and 'substantially' will become clear below.) Quality attributes can sometimes be measured objectively, as in the case of the fat content of a hamburger or the freshness of its beef, but this is not required. Moreover, no claim is made that quality attributes necessarily exist. For example, if most consumers prefer low-fat hamburgers but a substantial number prefers high-fat meat, fat content will be a taste attribute. Similarly, if a substantial number of consumers like their beef (slightly) rotten, freshness will also be a taste attribute. However, assuming that both quality and taste attributes do exist, the question becomes "when buying from a chain, does the consumer seek a given level of quality or the satisfaction of a particular taste?"

1.2.A. Quality Monitoring

We will now show that formal chains are necessary to assure quality only in very special cases. To do so, we distinguish the following cases.

1) All shoppers at a shopping area are non-locals. This situation might occur, for instance, alongside a freeway that all travellers (even individual truck drivers) use only infrequently. Under such conditions, there are no repeat purchases and communication between different customers of the restaurants at this location is very unlikely. Cheating by an independent store could, therefore, go unabated, and as a result all buyers will prefer a formal chain store. A formal chain store, however, would be all that could exist because all consumers would prefer such a chain. There would be no non-chain restaurants in that shopping area (or any non-formal chains). Clearly, this scenario cannot explain the frequent co-existence of both formal chains and local restaurants in the same shopping area.

2) The shopping area has such a large number of local shoppers that they can keep at least one restaurant in business by themselves. On the other hand, the number of non-locals is so small that the non-locals by themselves could not maintain even one restaurant. This case is probably the most common, since every neighborhood that is not on an interstate freeway and is not a tourist attraction meets this description. Since a non-local shopper would know that a local restaurant at his home shopping area provides good-quality food for a lower price than a formal chain restaurant, he would expect the same in the unfamiliar area. Thus, to be assured of good quality, all the non-local buyer would have to do is buy at a local store. Since the number of non-locals is not sufficient to keep even one store in business, each and every local store must be patronized also by locals and have a lower price per unit of quality than any (potential) formal chain. Notice that there would be no formal chain

restaurants in equilibrium in the second case. (Local outlets of non-formal chains would be the same as local restaurants and might or might not exist.)

3) There are at least some easily identified local shoppers in the shopping area. Whether their number is large or small is immaterial. Only local restaurants would be viable, and formal chain restaurants could not exist because non-locals could simply observe which establishments the locals patronize. This probably explains the viability of truck-stops on freeways, since the presence of truckers is easily discernible through the presence of their vehicles in the parking lot. (But at a place that has a separate dining room for truckers, make sure you pretend to be a trucker!) The truckers are the locals in this example because they drive repeatedly on the same road, while occasional/holiday travellers are the non-locals. A similar situation exists where occasional/holiday travellers can exchange information between themselves. Local restaurants can thus develop a reputation, and therefore there is no need for formal chains.

4) The local shoppers lack a specific character and thus are not easily identifiable, and there are so many non-locals that by themselves they can keep at least one store in business. In such neighborhoods local restaurants could be viable even without local customers. As a result non-locals who want to be sure of what they are buying will have to buy from formal chains. Note, however, that only non-locals will buy from the formal chains. Which neighborhoods meet this description? Tourist attractions are good candidates, but this designation is not sufficient, since the locals might be identifiable[4].

Notice the market will be able to guarantee quality in the more common cases, (2) and (3), while a formal chain will be needed to guarantee quality

only in the rare cases (1) and (4). The two latter cases, however, fail to take into account the facts that locals often eat at chains and that chains often locate where they can only survive if locals patronize them. Having considered these four case, we can now explain the terms "almost all consumers" and "substantially" as used in the definitions of quality and taste attributes above. In order to conclude from the mere viability of a restaurant that its quality is high, a consumer must share the judgment of the customers of that restaurant as to what is high quality . If the number of customers with whom the consumer does not agree is large enough to keep at least one restaurant in business, the existence of a restaurant could not serve as a signal to the consumer that he will also find it to be of high quality. Thus "almost all consumers" means all consumers except a number not sufficiently large to keep at least one restaurant in business at any shopping area. Rankings vary "substantially" when the preceding does not hold.

I.2.B. Taste Monitoring

We have shown that only in some of the cases in which formal chain outlets exist could a demand for quality monitoring by the chains explain their viability. Furthermore, in no case could such a demand explain why locals would buy from formal chains. If not information about quality, could information about taste be the reason for the existence of chains? We show that the answer is mixed. A consumer who seeks a restaurant he surely likes[5] cannot rely on other people's recommendation since he might not share their taste. When at home such a consumer will return to the very same restaurant he has tried before; when away from home he will buy from an outlet of a chain. A demand for known taste indeed creates a demand for chains, then; but the

demand for chains would exist even if fraud were impossible (e.g., consumers recognize the taste of a food just by looking at it).

While the demand for chains does not depend on the possibility of fraud, it is interesting to investigate to what extent this demand could be met by non-formal chains in a world in which fraud is possible. (It should be noted once again, though, that a theory that explained the existence of chains by the demand to reduce fraud would still have to contend with the presence of local customers in chains.) The question before us is the following. A non-local will find the taste he expects at a particular outlet only if the food at that outlet has the same taste as the food at all the other outlets of the same chain. Can a non-local trust locals to monitor such taste consistency on his behalf? The answer is a qualified yes. The presence of local customers in a restaurant is not as effective in monitoring taste consistency as it is in monitoring quality levels, but it is effective nonetheless. It makes deception costly to the seller, and thus reduces the probability that a particular outlet will mislead non-locals. The reason is the following.

Assume that the number of non-locals in a shopping area is so small that all stores in the area must have some local customers in order to be viable (case 2 of quality monitoring). A non-local who enters a restaurant in that area can be certain, then, that it has at least some local customers. Assume also that all the chains are non-formal. Let the vector of possible tastes be $\mathbf{V} = (v_1, \ldots, v_n)$ and let v_i denote both a particular taste and the chain that serves food of that taste. Define an outlet as deceiving if it carries a logo that says "Outlet of Chain v_i" yet it sells another food, say, v_j $(i \neq j)$. In order to maintain its local clientele (which prefers v_i to v_j), a deceiving outlet will have

to deliver to locals (but not to non-locals) the message that, its logo not withstanding, it is continuing to serve v_j. Deception is costly because of the need to transmit two messages instead of one: the cost of deception is the cost of transmitting the additional message. Because of this cost, deception will be undertaken only in special cases, as the following demonstrates.

To simplify the discussion assume that when deception is not profitable prices equal minimum average costs, and when deception is profitable, prices equal minimum average costs plus the cost of deception.

In a particular shopping area, $\forall\ i \in 1,....n$ L_i is the number of local v_i customers, N_i is the number of non-local v_i customers, n_i is the number of outlets that carry a logo "Outlet of Chain v_i", n_i^t is the number of outlets that carry this logo and are truthful, and n_i^d is the number of outlets that carry this logo but mislead. By this notation, $n_i = n_i^t + n_i^d$. Let C_i be the number of customers that an outlet of chain v_i must have in order to be viable when it sells at the market price.

Under what conditions will an outlet mislead and sell v_j instead of v_i? If the number of local and non-local v_j customers is sufficiently large to keep at least one truthful v_j outlet in business ($L_j + N_j \geq C_j$), deception will not be profitable; a truthful v_j outlet will be viable, and because its costs are lower (it does not have to produce split messages), will attract all the local customers of a deceiving outlet. One condition that must be fulfilled for deception to be profitable, then, is that the number of v_j customers will not be

too large: $L_j + N_j < C_j$.

On the other hand, to sustain at least one deceiving outlet requires that $L_j + N_i / n_i \geq C_j$. Combining the two conditions yields that the number of local customers who prefer v_j to v_i must fall within a bracket:

$$(A.1) \qquad C_j - N_i / n_i \leq L_j < C_j - N_j .$$

Note that the left hand side of (A.1) increases with n_i. Thus, the bracket within which L_j must lie to make deception profitable shrinks with each additional deceiving outlet, whether the deceiving outlet is selling v_j or any other food that is not v_i.

It is now possible to calculate n_i^t and n_j. Assuming that v_i is a popular food -- $L_i + N_i \geq C_i$ -- the existence of local customers guarantees that every outlet that sells v_i will truthfully advertise that it is doing so. The number of customers that each v_i outlet has is $L_i / n_i + N_i / n_i \geq C_i$. The minimum number of v_i outlets that are necessary to meet local demand for v_i (all the outlets that sell v_i to locals being truthful) is

$$(A.2) \qquad n_i^t \geq \frac{L_i}{C_i - N_i/n_i} \geq \frac{L_i}{C_i}$$

There could be more than one outlet that sells v_j and deceives. Assuming that each of these outlets pretends to be selling v_i, a deceiving outlet will have

$L_j / n_j + N_i / n_i$ customers[6] (L_j / n_j is the number of its local v_j customers, N_i / n_i is the number of deceived non-locals), and in order to be viable the number of customers must be at least C_j. Combining this condition with equation A.1 we get

$$(A.3) \quad n_j = \begin{cases} 0 & \text{if } L_j \geq C_j - N_j \text{ or } L_j \leq C_j - N_i / n_i \\ \leq \dfrac{L_j}{C_j - N_i/n_i} & \text{if } C_j - N_i / n_i \leq L_j < C_j - N_j \end{cases}$$

Notice that $\dfrac{L_j}{C_j - N_i/n_i}$

decreases with n_i. Thus, if $n_j \neq 0$, n_j will decrease when more deceiving outlets are added, whether the additional outlets sell v_j or any other food.

From equations A.2 and A.3 we can derive the probabilities of deception. For example, if $C_i = C_j$, the probability that a particular outlet will sell food v_j instead of food v_i (n_j/n_i^t) is zero if $n_j = 0$ and L_j/L_i otherwise. The probability that a particular outlet will sell any other food instead of v_i, $p^d(v_i)$, is

$$(A.4) \quad p^d(v_i) = \sum_{\substack{j \\ j \neq i,\ n_j \neq 0}} L_j/L_i$$

Notice that the larger the demand for a particular food (L_i), the smaller the probability that an outlet that claims to be selling this food will be deceiving . If most consumers[7] shared a subset of common tastes then a traveler who entered an outlet that claimed to be serving one of these common tastes

could be fairly confident that he would be getting what had been promised. The theory developed in this paper indicates that a common subset of tastes will emerge endogenously.

Regional Tastes

If there are regional tastes (e.g. in the Northeast people like their Margaritas less sour than in the West), it might be profitable for all the local outlets to commit fraud. If the proportion of consumers who prefer food v_j is higher in the population of region j than in the population of region i, it might pay all outlets in j to sell v_j while advertising that they are selling v_i. The locals everywhere inside the region will simply know food v_j by the name v_i; non-locals, however, will not be repelled. (The term "fraud" is not entirely fitting here. A slight difference in language is more to the point, since although sellers benefit from this difference, they might not be aware of it.) Formal chains (but not non-formal chains) could, of course, make sure that their outlets in j will indeed serve food v_i, but it appears that in general they choose not to.

Had the chains been providing consistency between regions while the differences in tastes described above existed, the chains' outlets in whole regions would have been unpopular among locals. Also, since monitoring by locals in these regions would virtually not exist, the cost of monitoring would be high, making, say, food C in region d more expensive than food D in region d, even if production costs were the same. Yet chains rely on the patronage of local customers in all the regions in which they operate, although maybe not in every single location inside each region. Hence whereas theoretically formal

chains could provide protection against fraud in cases in which fraud might be systematically profitable, in practice they do not. Such protection, then, cannot be the reason for the existence of chains.

Two explanations that might complement each other are possible for chains having substantial local patronages everywhere they operate: (1) Consumers in different regions could have a common subset of tastes, and the chains could be providing foods that fall within this subset, or (2) the chains could find it more profitable not to provide consistent taste, but rather to cater to regional tastes. The latter could result if monitoring by the chains is so expensive that most travelers would rather settle for the much cheaper and the less familiar local food than insist on consistency. As for the former, we will see below that where a difference in tastes actually poses a problem, consumers are motivated to create a subset of common tastes. The complementarity of the two explanations comes from the possibility that the chains will provide consistency in those food items for which the distributions of tastes are the same in all regions, while catering to regional tastes in items for which this is not the case. Notice, however, that this will be true for both non-formal and formal chains.

B.1 Ambiguous Characteristics: Price

Some characteristics are hard to classify. Is price, for instance, a quality or a taste characteristic? Depending on consumers' demands it could be one or the other. For example, if all consumers want to see the lowest possible price in each and every outlet or if all consumers want to see the same price in all outlets, price is a quality characteristic. If , however, only a fraction of consumers are interested the lowest price possible, while another fraction is

interested in having identical prices everywhere, then price is a taste characteristic. It was shown that in general locals can monitor both quality and taste on behalf of non-locals (although monitoring quality is easier). It is worthwhile, however, to elaborate a bit on the detail of this monitoring , since the nature of the monitored characteristic will determine the variety of restaurants that will be available, and this variety, in turn, will make monitoring possible.

If price is a quality characteristic, one type of restaurant would be sufficient to meet all consumers' demands since quality involoves unanimity; if, however, price is a taste characteristic, then there will be a variety of chains that cater to the different demands. Chain v_i might be the one that will sell food v_i for a price that is consistent across locations. Chain v_j, on the other hand, will be the one that sells the same food as v_i, but has the lowest price possible in each and every location. The presence of locals with the respective tastes creates the proper incentives, so that an outlet will not name itself v_i or v_j unless it is providing either a low price or a consistent price respectively.

B.2 Economies of Scale in Advertising

Since the distinction between locals and non-locals is by now clear, we can return to the question whether economies of scale in advertising are the reason for the existence of chains. Advertising by chains could have two possible targets: both non-local and local customers, or only non-local customers. If the target of advertising is both non-local and local customers, economies of scale in advertising imply that a chain can relay information to all customers at a lower cost than independent restaurants, which would make the

chain cheaper than local restaurants. But local restaurants co-exist with chains, and many customers buy from both. Why would either a local (or a non-local) ever buy from the more expensive local restaurant?

On the other hand, if the target of advertising is only non-locals (either because local customers have the necessary information already, or because they can obtain it in the same manner that they obtain information about local restaurants: through word of mouth, flyers, advertising in local media and other local means) and if there are economies of scale in such advertising, non-locals will prefer chains over local stores. But since the locals do have all the necessary information, they would find the local restaurants that do not advertise on wide-coverage media cheaper. Why would locals sometimes buy from the more expensive chains?

It is, of course, possible that all channels of information are open at the same time; consumers get information about some restaurants through local channels and about others through wide-coverage advertising. The argument could be made that in this case, consumers who seek variety will buy both from local restaurants and from chains. This argument requires, however, a very peculiar information structure. On the one hand, restaurants that are less known locally will have to advertise more; on the other hand restaurants that are very similar could form chains in order to exploit economies of scale in advertising. But why would restaurants in different locations, which consumers exchange relatively little information about, be so similar? Consider the case of pizza for instance. In each location consumers exchange information about local pizza restaurants. The likelihood that in many of these locations they would simultaneously <u>not</u> exchange information about the local restaurants that sell a Pizza Hut type of pizza must be very low.

In addition, new outlets of chains are added all the time. Continuing our example, how does the firm Pizza Hut know that in a certain new location consumers will not exchange information about a Pizza Hut type of Pizza? (If consumers did exchange such information, a restaurant that serves that type of pizza but does not belong to the chains would be cheaper.) Since this special structure of information seems peculiar to us, we conclude that even though consumers may be collecting information through numerous channels, economies of scale in advertising cannot fully rationalize the existence of chains that both locals and non-locals patronize and the coexistence of local, non-chain establishments.

Advertising by chains does raise an interesting question, though. If chains do not enjoy advantages in economies of scale in production or management, and if chains have local customers, why would advertising be effective anyway? (See Klein and Leffler, Nelson for the argument that advertising is informative even if the advertiser merely advertises that he advertises.) After all, it would seems that under these circumstances a store that did not advertise could sell at a price that is still lower. Moreover, the question is even more puzzling since the same local consumer may sometimes buy from a local outlet of a chain restaurant that advertises heavily, and at other times buy from a local restaurant that in comparison advertises hardly at all. What explains this seemingly inconsistent behavior? Rather than using economies of scale in advertising to explain the structure of the restaurant industry, we find that advertising by chains becomes one of the factors that needs to be explained. We return to this problem after we develop our theory.

Evidently, economies of scale in provision or the need for protection against fraud do not adequately explain the existence of restaurant chains.

Something else is necessary. We turn now to develop the theory of economies of scale in imitative consumption.

II. Economies of Scale in Imitative Consumption

A particular good is subject to economies of scale in imitative consumption if consumers are better off consuming some brand of this good that almost all other consumers also consume. For example, there are economies of scale in imitative consumption in the consumption of soft drinks if among the different local and national brands the consumer is better off picking, say, Coke only because almost everybody else does too.

We will show that two conditions together are sufficient to create economies of scale in imitative consumption:

1. Tastes are learned.
2. Consumers are mobile.

II.1. Learned Taste and Specialization in Consumption

The utility function of a consumer k is defined over n foods or restaurants. We use the terms foods and restaurants interchangeably because when going to a specific restaurant consumers seek more than just a particular food; they also seek characteristics such as a particular arrangement of the food and a particular ambiance that is produced by the furnishing and design. Hence it is impossible to fully describe a food without reference to a restaurant; in order to convey, for instance, that eating a pizza is exactly like eating a Pizza Hut pizza-- considering "ambiance" as well as "taste" as factors in eating-- reference must be made to the name Pizza Hut. We call a restaurant 'i' if it contains all those characteristics that a consumer expects to find in i. We call

a food 'i' if it is served by an i restaurant. Of course, different restaurants can serve the same food. We therefore introduce the following definition:

Definition: Chain Restaurant. A chain restaurant is a group of restaurants that serve the same food; such a group is a chain whether or not the restaurants comprise a firm (that is, we do not distinguish between formal and non-formal chains).

A restaurant that serves a pizza that is the same as Pizza Hut's is a Pizza Hut, then, whether or not it is part of the same firm.

We will show that if tastes are learned a consumer will specialize in consumption; in the case of restaurants this means that given a large choice, a consumer will prefer eating more than once at each of a smaller number of establishments to eating just once at a larger number. This part of the analysis draws on Stigler's and Becker's idea of "consumption capital" (Stigler & Becker, Adler, 1985).

Let U^k, the utility function of consumer k, be additively separable

$$(1) \quad U^k(\mathbf{x}) = \sum_{i=1}^{n} u^{k,i}(x_i)$$

where $\mathbf{x}$ is the n dimensional vector of foods and x_i is the number of meals eaten at restaurant i during a consumer's lifetime. We assume the marginal utility of k from consumption is always positive, so $u_i^{k,i}(x_i) > 0$ for all i and all $x_i \geq 0$, where $u^k{}_i$ is the first derivative of u^k with respect to i.

Definition: Learned Taste. A taste for a good is learned if for each of its brands, i, there is a $0 < s^k{}_i \leq \infty$ such that

$$u^k_{ii}(x_i) > 0 \quad \text{when } x_i < s^k_i$$

where u^k_{ii} is the second derivative of u^k with respect to i. Thus, taste is learned if marginal utility from a brand increases, at least up to a point, with past consumption. We will assume that consumers' taste are learned, but that beyond s^k_i marginal utility is decreasing:

$$(2) \quad \begin{cases} u^k_{ii}(x_i) \geq 0 & x_i \leq s_i \\ u^k_{ii}(x_i) < 0 & x_i > s_i \end{cases}$$

Figure 1 depicts the marginal utilities from i and j.

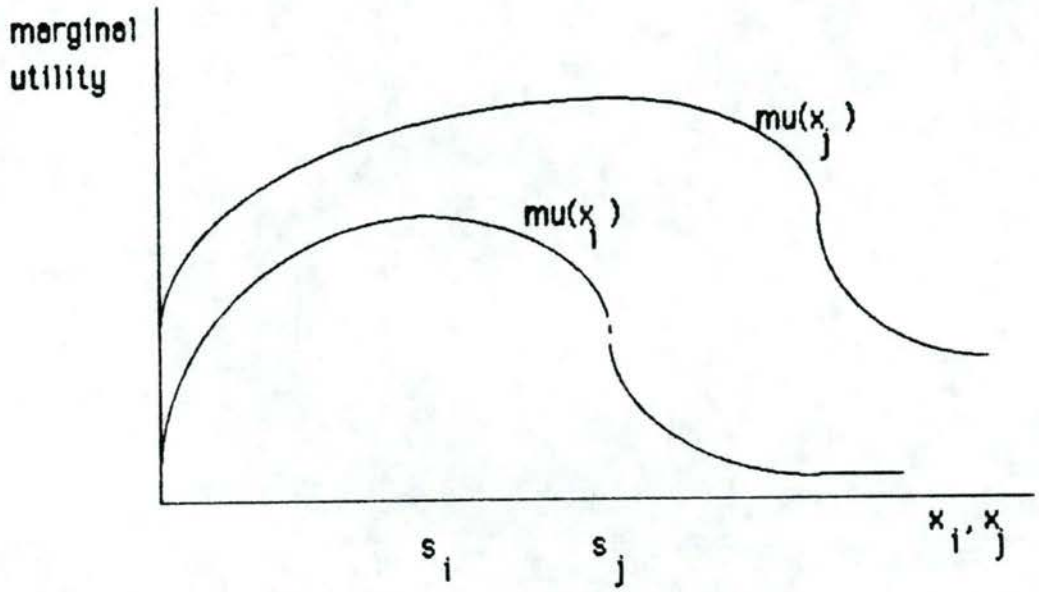

Figure 1: marginal utilities from i and j.

Figure 2 depicts two indifference curves between i and j for different levels of U.

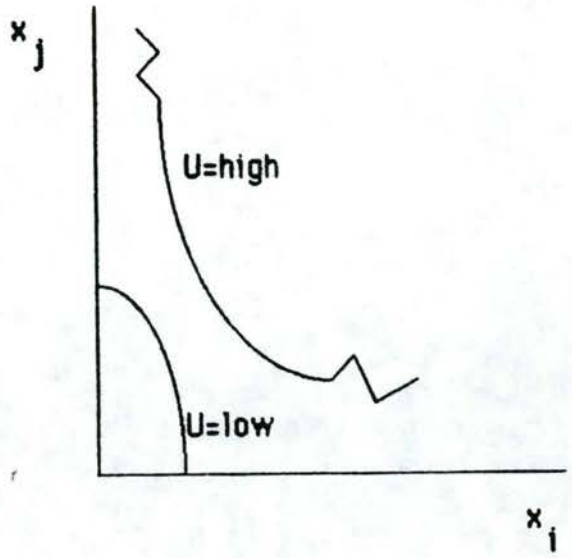

Figure 2: The Indifference Map

The indifference curve representing the high utility level is not smooth at the edges because it might have concave portions there (near the axes the marginal utility of one good may be increasing while the marginal utility of the other is decreasing).

II,1,A, Consumer's Choice

It is clear from the figure that when his income is low the consumer will choose, depending on prices, either i or j, but not both. But when income is high, there is an interior solution including both i and j. This observation generalizes as follows.

The Lagrangian, L, is

$$(3)\quad L = \sum_{i=1}^{n} u^{k,i}(x_i) + \lambda\left(I - \sum_{i=1}^{n} p_i x_i\right)$$

where λ is the Lagrange multiplier and I is the consumer's income. The Kuhn Tucker conditions for this problem are:

$$u^{k,i}{}_i(x_i) + \lambda p_i \leq 0 \qquad x_i \geq 0 \quad \text{and} \quad x_i\,(u^{k,i}{}_i(x_i) + \lambda p_i) = 0, \qquad i=1,\ldots,n.$$

$$(4) \qquad I = \sum_{i=1}^{n} p_i x_i$$

Suppose $\mathbf{x}^* = (x_1,\ldots,x_n)$ solves the consumer's problem. Call the set of brands that he actually consumes his "consumptive set", **A**, where $\mathbf{A}=\{i : x^*_i > 0\}$.

Proposition: At most, one of the foods in a consumer's consumptive set has increasing marginal utility.

Proof: Notice first that for each i, $p_i > 0$ since $u^{k,i}{}_i(x_i) > 0$. Assume the proposition is false, and there are two foods with increasing marginal utility. Without loss of generality we can assume that the first m foods constitute the consumptive set, so $\mathbf{A} = \{i=1,\ldots,m\}$ where $m \leq n$, and that the first two foods in **A** fulfill $u^k{}_{11}>0$ and $u^k{}_{22}>0$. Since U^k is separable, x^*_1 and x^*_2 must be the solution of the truncated problem:

$$\max\ u^{k,1}(x_1) + u^{k,2}(x_2)$$

$$\text{s.t.}\ \ p_1x_1 + p_2x_2 = I - \mathbf{p}_{-1,-2}\mathbf{X}^*_{-1,-2}$$

where $\mathbf{p}_{-1,-2} = (p_3,\ldots,p_m)$ is the vector of prices without the first two elements, and $\mathbf{X}^*_{-1,-2}$ is $\mathbf{x}^*$ without its first two elements. Since x^*_1 and x^*_2 are an interior solution to the this problem, the second order condition for a maximum must be met. However, since $u_{ij}=0\ \forall\ i\neq j$, the bordered Hessian is

$$(5) \qquad |H| = -p_1{}^2u^k{}_{22} - p_2{}^2u^k{}_{11} < 0$$

which is a sufficient condition to indicate that x^*_1 and x^*_2 are a minimum: a

contradiction. Q.E.D.

Corollary: Let $\underline{p}$ be the lowest price among the n foods, and let $\underline{s}$ be the lowest of the s^k_i's. Then the consumer has at most m restaurants in his consumptive set, where $m \leq (I/\underline{p}\,\underline{s}) + 1$.

Proof: Recalling the Proposition, let i^* be the one restaurant in A such that $x^*_i < s^k_i$ (if there is no such restaurant, let i^* be any one restaurant in **A**.)

Then, since for all $i \in \mathbf{A}$ except perhaps i^*, $p_i \geq \underline{p}$ and $x_i \geq \underline{s}$, we see that

$$\sum_{\substack{i \in \mathbf{A} \\ i \neq i^*}} p_i x_i \geq (m-1)\underline{p}\,\underline{s}.$$

Thus, since $p_i x_i \geq 0$ for all i, $I = \sum_i p_i x_i \geq (m-1)\,\underline{p}\,\underline{s}$. So, $m \leq (I/\underline{p}\,\underline{s}) + 1$. Q.E.D.

Hence consumers specialize in consumption: given a large choice of brands, a consumer prefers eating more than once at each of a smaller number of establishments to eating just once at a larger number. Specialization does not mean that the consumer chooses just one restaurant, though; with sufficiently high income there will be several restaurants in the consumptive set.

II.2 Consumer Mobility

Consumers are mobile and do not do all their restaurant eating throughout their lives in just one neighborhood. Yet since he specializes in consumption, a consumer might at times prefer eating at a restaurant that offers familiar food to eating at an establishment whose food is unfamiliar when he is away from

home. This is especially true during trips to different neighborhoods in the same town; encountering unfamiliar environments in high frequency will be taxing if tastes are learned. If the consumptive sets of almost all consumers had a common subset, each consumer would be more likely to find a restaurant that he surely likes, wherever he might be. Hence a mobile consumer whose tastes are learned would rationally choose to have some popular restaurants in his consumptive set simply because they are popular. (The consumer does not actually have to calculate his choice. If he prefers known food, he will enter known restaurants on his trips to the different neighborhoods. The restaurants that are known and available in different neighborhoods are the chains. The consumer will end up with "consumptive capital" which will make the chain attractive to him also when he is at home. For simplicity we will analyze consumer's behavior as if it is explicitly calculated.)

The significance of this point becomes clear when we notice that a popular restaurant j could be chosen over an unpopular restaurant i even if, had they both been available everywhere, i would have been chosen over j. To see this point let the number of meals that a consumer eats of i and j together be fixed at N. Let t be the number of meals that will be eaten on trips away from home. If the consumer does not specialize in consumption but eats i when at home and j when away from home, then N-t i-meals will be eaten at home and t j-meals will be eaten away from home; otherwise N j-meals will be eaten wherever the consumer might be. Dropping the consumer's index, k, for simplicity, the consumer would choose to specialize in j as long as

(6) $u^j(N) \geq u^j(t) + u^i(N-t)$.

Equation (6) is depicted in figure 3.

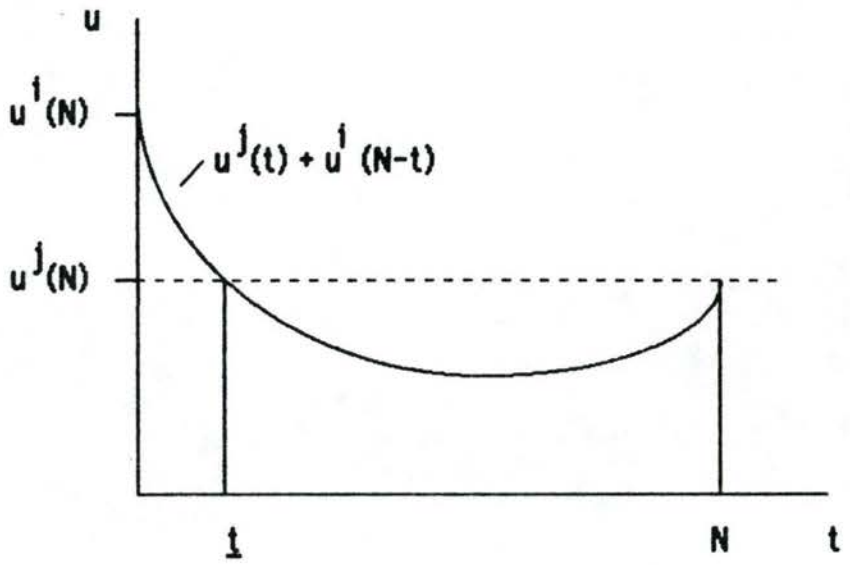

Figure 3: Utility from consuming i and j as a function of t_j.

In figure 3, had i been available everywhere, the consumer could achieve utility level $u^i(N)$. If he chose to specialize in j his utility level would be $u^j(N)$; if he chose i wherever it is available and j everywhere else, his utility would be $u^j(t) + u^i(N-t)$. It is clear that if the number of meals eaten away from home is greater than $\underline{t}$, the consumer will choose to eat j everywhere, including at home. This point is also illustrated in figure 4, which depicts the consumer's choice on the indifference map, assuming $p_i = p_j$. In the figure, u_1 is the level of utility that the consumer would achieve with the depicted t if he eats at i wherever it is available.

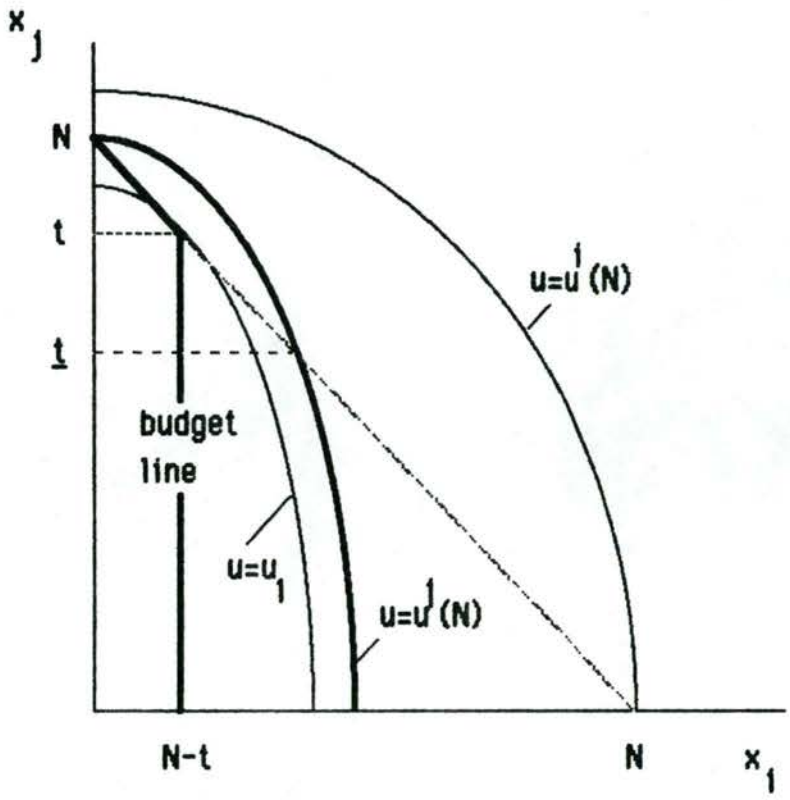

Figure 4: j more popular than i

(Notice the lack of availability of i out of town produces a kink in the budget constraint at $x_j = N-t$.

A. Consumers with Different Tastes

Even if their tastes are substantially different, mobile consumers might all pick j over i if j is more popular (j is available everywhere, i is only available at home). To see this point let k and l be two consumers such that if both i and j are available everywhere k will pick i and l will pick j. Assume also that each consumer will eat the same number of meals, t, at outlets of restaurant j when he is away from home. Figure 5 depicts this situation. u^k indicates the highest attainable indifference curve for consumer k and u^l the highest one for l. It is clear that both k and l will choose to consume j also at home if j is more popular. Hence the existence of a common subset in the consumptive sets of all consumers does not require that consumers have similar

tastes.

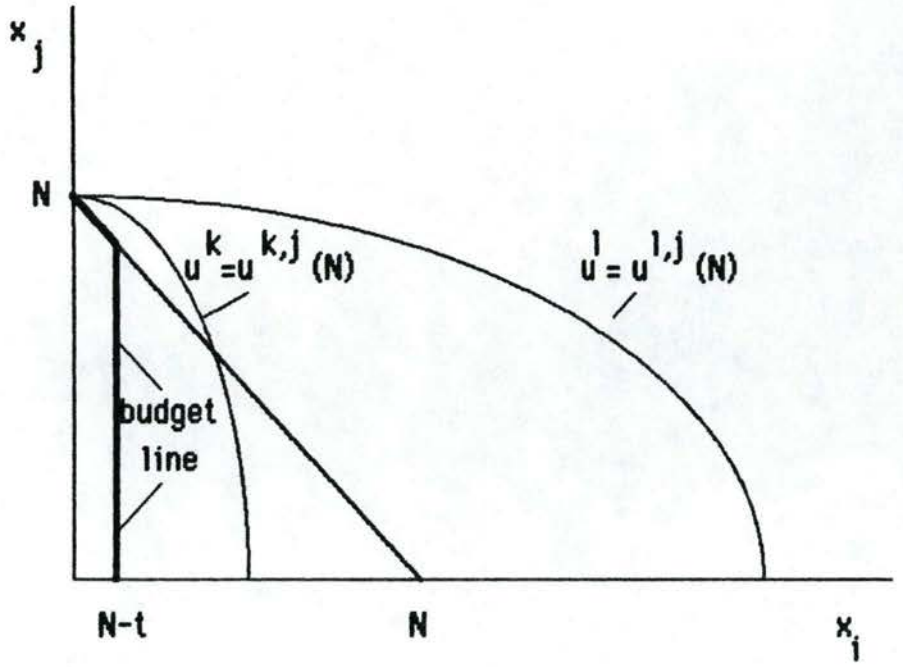

Figure 5: different tastes- same choice

Of course, even though tastes in figure 5 are different in the sense that the indifference curves are different, it is important to note that once j is being consumed, the marginal utility of j is higher than the marginal utility of i even for consumer k, who *a priori* would have preferred i! Given the choice of one more meal at one of the two restaurants, then, both would pick j. In this *a posteriori* sense, then, tastes ultimately become the same. Thus learned tastes help explain the possibility of the existence of McDonald's' hamburgers as the national taste in one country and, say, Picadilly[7] fish and chips as the national taste in another. They also help explain why inside cities ethnic restaurants are located in ethnic neighborhoods even though the same foods could be potentially available everywhere: people of a particular ethnic background are more likely than others to eat that ethnic food. Thus, polish restaurants in Chicago are located mainly in polish neighborhood[8]; chinese restaurants in San Francisco are located mainly in Chinatown.

In a way, then, learned tastes constitute both the problem of the

consumer and its solution. Because tastes are learned, consumers sometimes seek known foods even when they are away from home; they are able to find what they are looking for, however, because they can learn tastes for foods that are available everywhere.

III. The Chain Restaurant / Local Restaurant Mix

We can now discuss the structure of the restaurant industry. In particular, we will show that coexistence of local and chain restaurants is entirely consistent with our theory, and that no specific proportion between the two is necessary. In addition, we will suggest some scenarios by which a structure like the actual structure of the industry might emerge.

The following additional simplifying assumptions are made:

(A.1) All consumers have the same income.

(A.2) Production costs of all foods are the same. All average cost curves (AC) are U shaped, with a minimum c_0 at quantity q_0.

(A.3) There are e shopping areas with f local consumers each.

(A.4) Each consumer makes i trips to other shopping areas.

(A.7) Each shopping area receives the same share, $1/e$, of all the business done by non-locals.

Given these assumptions and the preceding analysis, in equilibrium each consumer has the same number of different foods in his consumptive set, and he will eat the same number of meals of each. Let g be the number of foods in a consumptive set, and let h be the number of restaurant meals of each food eaten over the consumer's lifetime. Not all meals are eaten at the consumer's local shopping area. Let the number of different meals eaten by each consumer on each trip be $t=kq$, where k is the number of different kinds of foods, and q the number of meals eaten of each kind. Under these assumptions and notations, fgh meals are sold at each shopping area[9] and the number of restaurants, r, at

each area is $r=fgN/q_0$, $r \geq g$.

Given these assumptions, each consumer has a choice of r restaurants in his local neighborhood. The consumer chooses his g restaurants that serve g different foods from the available r. Each of the r restaurants could serve a different food, but this is not necessary. Consumers are free to choose any kind of food they wish, and if f_i consumers chose food i, $f_i N/q_0$ restaurants would serve this food. Recall that when different restaurants sell the same food, we call them a chain. The minimum number of different foods available in each particular area is, then, g, and the maximum is r.

In choosing restaurants, a consumer is taking into consideration that he will consume ikq meals away from home . Since his marginal utility from a particular food increases, our consumer prefers not to eat an entirely new food on each of his trips. For simplicity, suppose that the consumer tries new foods only at his local shopping area. When away from home only known food is chosen. If the consumer knows the number of trips that he is going to take, but not their destinations, he will choose at least $m=ikq/h$ chains with outlets in each and every shopping area, including his local shopping area. He will be eating $iq \leq h$ meals at outlets of chain j when he is away from home, and the remaining $h-iq$ meals at an outlet of the same chain when he is at home.

Notations

c_0	the minimum average cost of producing a food
e	the number of shopping areas
f	the number of consumers in each shopping area
f_i	the number of consumers in each shopping area who choose food i
g	the number of different foods in the consumptive set of each consumer
h	the number of meal of each food eaten over the consumer's lifetime
i	the number of trips that a consumer makes to other shopping areas
k	the number of different kinds of food eaten by the consumer on each trip
m	the number of chains in the consumer's consumptive set
q	the number of meals of a particular food eaten by a consumer on each trip
q_0	the quantity at which minimum average cost of production is achieved
r	the number of restaurants available in each shopping area
t	the number of different meals eaten by each consumer on each trip

All consumers could choose the same chains, in which case the minimum total number of chains is the same as the minimum for an individual consumer-m.[10] (If the minimum is obtained, each chain will have $f_i kq/q_0$ outlets at each location.) But each consumer could also choose to have more than m chains in his consumptive set (in which case $iq < h$), and different consumers could choose

different chains. It is clear, then, that we have a case of multiple equilibria. At the one end of the spectrum there is a large number ($ef(g-m)/q_0$) of independent restaurants, each serving a different food, and only a minimal number (m) of chains ; in this equilibrium consumers eat at the chains only when they are away from home. At the other end there are no independent restaurants at all, only g different chains, each serving one of g foods; in this case consumers eat only at chains both when they are at home or away from home.

It is desirable to narrow this span of possibilities at least to some degree. An equilibrium with only chains and no independent restaurants seems particularly removed from reality. As in other cases where "increasing returns to adoption" are involved (Arthur, David), historical circumstances plus dynamic considerations probably determine which equilibrium ultimately exists. But before we turn to a description of a possible path that leads to only a limited number of chains, it is important to mention that below we show that when a trademark law is in effect chains would be more expensive than local restaurants. In such a situation consumers would obviously wish to minimize the number of chains in their consumptive set.

Nevertheless, we do not claim that in a world where chains are just as cheap as local restaurants (e.g. in the absence of a trademark law) all restaurants will be chains. As was mentioned above, the exact unfolding of events will determine the outcome. To illustrate a path that yields many independent restaurants and only a minimal number of chains, consider an initial condition with no chains and with one location (center) that develops into the destination of more trips than does any other location. Denote by ν the number of times that a consumer has eaten in each of the local restaurants in his consumptive set before the opening of any chains. Since there are no chains in

this scenario, there is no food that is served both at the center and in the suburbs (outlying areas). However, if equation (7) below holds (not too much consumptive capital has been built in the local restaurants), a suburbanite will be willing to switch from a local restaurant i for which he has already developed some taste to chain j that sells the same food at home that he buys at the center. This is because the utility derived from splitting consumption between two different foods, one served at the center and one in the suburb, is smaller than the utility from switching to the center's food also in the suburb, once it becomes available (when a chain opens). Switching will take place if the following condition holds:

$$(7)\quad \int_0^{h-iq} u^i_i + \int_0^{iq} u^j_j < \int_0^{v} u^i_i + \int_0^{h-v} u^j_j$$

where u^i_i, u^j_j stand for the marginal utilities of i and j respectively. The left hand side of inequal (7) is the utility derived when different foods are consumed at home and at the center. The right hand side is the utility derived if after v meals a switch from one of the local restaurants to a chain takes place. The integrals in (7) are simply utility levels. The condition in (7) is given in utility terms, after rearranging the terms by

$$(8)\quad u^j(iq) - u^i(v) < u^j(h-v) - u^i(h-iq)$$

Figure 6 depicts this condition for the case $u^i = u^j$.

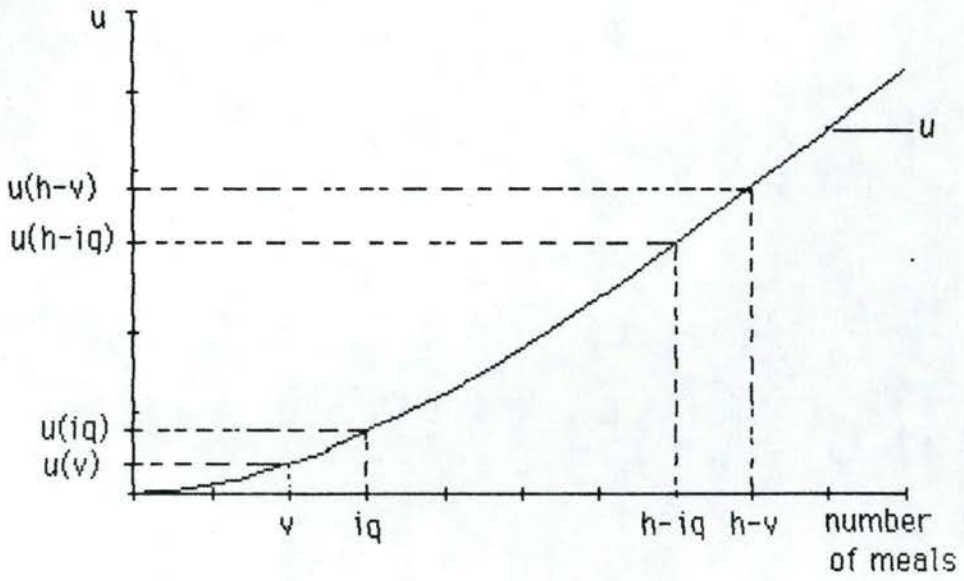

Figure 6

Notice that the existence of chains in equilibrium does not depend on the existence of a trademark protection law. In fact, the equilibrium will be exactly the same under the assumption that sellers will not cheat buyers under any circumstances[11]. This result is particularly important since, as was discussed in the first part of the paper, the market is capable of protecting buyers unassisted by the law.

A. Rents

It would seem that restaurants have the potential to "hold-up" customers who have developed taste for their food. After all, if a consumer derives greater utility from consumption of food that he already knows than from consuming an unknown food, couldn't a restaurant raise its price once the investment in consumptive capital has already taken place? The answer depends on the existence of a trademark protection law. Without such protection, if restaurant i tried to raise its price, an entrant to the market could produce identical food (recall that this includes identical ambiance). No rents could be collected by restaurants in this case. With trademark protection, however, the

potential for a hold-up does exist because (identical) duplication is not possible.

The analysis of the hold-up resulting from a trademark protection law is similar to the analysis of switching from a local restaurant to a chain, above. Assume that the income that a consumer sets aside for the consumption of either i or j is fixed. Denote this income I, and let ν be the number of meals already eaten at restaurant i. The utility from staying with chain i must exceed the utility of switching to chain j that charges a lower price and, like i, has outlets everywhere. P_i must, therefore, satisfy the condition

$$(9) \quad u^i(I/p_i) > u^i(\nu) + u^j((I-\nu p_i)/p_j) \ .$$

Thus, because of the existence of consumptive capital (v), an established chain can extract rents.

Following the argument presented here, a trademark law would also allow local restaurants to charge a price higher than c_0 once they are established. For two reasons, however, the price that chains charge will be higher than the price charged by local restaurants. Firstly, consumers eat in chains when they are away from home. A consumer who wishes to search for a substitute to the over-charging chain will have to do so in all the locations that he travels to. It is therefore more costly to replace a chain in the consumptive set than it is to replace a local restaurant. Secondly, the chain has many outlets and is therefore earning more total rents. If protecting a trademark is costly and this cost does not rise proportionally with the size of the rents, a chain is more likely than a local restaurant to engage in such protection.

B. Entrepreneurship, Advertising and the Trademark Law

Above we have sketched a scenario by which a trademark that is shared by

many restaurants can come into being through a gradual, de-centralized process. But this process is not the only possible one. With a trademark law in effect, an entrepreneur could organize different stores into a new chain and earn part of the rent thus generated. A consumer who wishes to add a new chain to his consumptive set needs, of course, to be assured that a particular restaurant is indeed part of an extensive chain. Advertising can provide this information, because advertising by a chain implies that it has a large volume of sales and, therefore, many stores. Notice also that where there are economies of scale in imitative consumption and therefore focal points are necessary, advertising might provide the focal points since rational consumers would respond positively to advertising if all other consumers do the same. Hence the rents that the trademark law facilitates are not only necessary to provide an incentive to the entrepreneur; they are also necessary to pay for advertising that in this case is informative. Is the trademark law as it applies to chain restaurants efficient after all?

Since the existence of the law is itself not necessarily a result of a market process only , we cannot know the answer for sure. Presumably competition between entrepreneurs could minimize the rents earned by chains. But this competition is curtailed by the investment consumers make in consumptive capital. Thus there is no necessary relationship between the rents that the trademark protection law enables chains to collect and the necessary returns to entrepreneurship or the cost of informative advertising. It could very well be that consumers are better off paying lower prices for restaurant meals and losing the possible benefits of the trademark law -- the formation of a greater number of new chains (although as our analysis has shown it is not certain that the market will not produce an even greater number of new chains in the absence of the law) and the existence of informative advertising.[12] Whichever the case

may be, though, notice that the possible benefits are due to innovation --the introduction of new chains-- not to the maintenance of quality. But where the purpose of the law is to foster innovation, protection that is limited in duration, such as in the case of patents, is the preferred device (see Landes and Posner).

At this point it is important to clarify what the nature of the innovations that are protected by the trademark law is. Invention of a new food does not require the protection of the trademark law; a patent law is all that is required. A new process for producing flakes from corn, for instance, could be patented. This process would thus be protected with or without an exclusive right to the use of the words "corn flakes." The innovation that would be protected by the trademark law in the case of chain restaurants involves the creation of a new chain that will sell already existing food. When weighing the costs and benefits of the trademark law, the distinction between a patent and a trademark should be recognized.

Conclusion

This paper has introduced the concept of economies of scale in imitative consumption and used it to explain why there might be standardization even where the usual economies of scale, e.g. in production, management, or advertising, are not present, and even where the quality of goods could be assured without relying on brand names. We have argued that where a trademark law is in effect, economies of scale in imitative consumption will lead to large firm size. The analysis was developed through an application to chain restaurants, but this is just one example. Economies of scale in imitative consumption exist in all cases where tastes are formed and consumers are

mobile.

Economies of scale in imitative consumption might therefore explain the large size of firms that produce soft and hard beverages and many canned and packaged foods. Such economies might also be present where style is a characteristic of the good, since tastes for style are also formed. Thus economies of scale in imitative consumption may help explain why large firms exist in the production of clothing (Jordache, Calvin Klein, etc.) and perfumes.[13] The tendency of the economy towards standardization is therefore endemic. Individuals who espouse "small is beautiful" should consider the possibility that smallness does not necessarily mean diversity. Standardization might be due not to technology but to our needs as consumers.

Footnotes

* I wish to thank Louis Makowski for improving the paper substantially, both in content and in form. Harold Demsetz, Tom Russell, Steve Shmanske and Larry White offered very helpful comments and criticism. I benefitted also from discussions with Joe Ostroy, Steve Sheffrin , David Schwartzman, Michael Waldman Leon Wegge and the participants of workshops at Cornell Graduate School of Administration , CSU Hayward, NYU Graduate School of Business Administration, UCLA, University of Chicago and at Stanford.

1. There are some similarities between economies of scale in consumption and "network externalities," a concept used to explain the existence of standards in telephones, computers and other communication systems (see David and the reference there). The factors that give rise to economies of scale in consumption are different, however,. No communication or any other interaction between consumers is necessary for economies of scale in consumption to exist. Also, in networks a consumer must use a system that is only compatible, not identical, with the systems of other consumers. This implies that some comoponents of the the equipment will be standardized, but otherwise different consumers could have different equipment. As will be clear from our discussion of taste vs. quality below, economies of scale in consumption relate to complete products rather than to some components of products. Robert Frank (1985) develops a theory of signalling by consumption and shows that such signalling produces consumption externalities.
2. I discovered this fact by interviewing operators of local restaurants of different types in my home neighborhood.
3. Compare Darby and Karni p. 81, Caves and Murphy, p.573.
4. There is another case, however, in which chain-stores and local stores could exist side by side. This is the case where there is a large turnover of local

stores. New stores continually enter into the market, and because they sell low-quality goods, fail. A newcomer, presumably, would not know which store is new, and he might, therefore, choose the chain-stores. (Presumably, because new restaurants usually advertise that they are new.) This is, of course, possible, but a newcomer who enters such a store would not be taking a greater risk than a local who enters the same store. The only difference between them is that the local would be taking the risk knowingly, while the newcomer would be doing it unknowingly. (Stores could put a sign with the date of their establishment. The only question is whether newcomers could trust such a sign.) This case was suggested to me by Steve Sheffrin.

5. Of course, consumers do not alway behave in this way; sometimes they are adventurous and seek unknown tastes.
6. Since by assumption the outlet cannot be viable without local customers, $Ni / ni < Cj$.
7. An invented trademark-the English counterpart of MacDonald's, whichever it may be.
8. Sherwin Rosen brought to my attention both the relationship between ethnic background and ethnic food and the example of the location of polish food in Chicago.
9. Each local consumer eats $gh - ikq$ meals at her local shopping area, and all the locals together eat $f(gh - ikq)$ meals there. Each shopping area is the destination of $fei/e = fi$ trips and, therefore, $fikq$ meals are sold to non-locals there. Adding these numbers yields that fgh meals are sold at each shopping area.
10. The minimum would be obtained if consumers bought from chains only when away from home. Chains will not have local customers in this case.

11. See Landes and Posner (p.8) for the argument that brand names will be destroyed without the protection of the law.

12. Different stores that share a common trademark could create a voluntary association that would advertise. Thus, advertising is also possible without the trademark law. The association might suffer from the free-rider problem, however, since a restaurant that does not pay for the advertising will still benefit from it. Nonetheless, voluntary associations do exist; advertising by Sunkist™, an association of citrus growers, is an example.

13. Of course, unlike in the case of food and beverages, consumers away from home do not normally shop for clothing or perfume; they do not need, therefore, to be able to buy familiar clothing or perfume in every location to which they travel. However, such consumers are exposed to what other people wear, and the opposite is also true. In order not to be in an unfamiliar environment whenever they are away from home, and in order not to "stand out" on such occasions, consumers might choose to form common tastes with people in other locations.

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