

Pashigian, B. Peter; Gould, Eric D.

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## Contracts, Externalities, and Incentives in Shopping Malls: An Empirical Analysis

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Contracts, Externalities, and Incentives in Shopping Malls:

An Empirical Analysis

by

B. Peter Pashigian\*

and

Eric D. Gould\*\*

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ABSTRACT

Most economists view the shopping mall as a mechanism which primarily economizes on search costs. This belief disregards the huge subsidies that are given to large department stores. Using a far richer set of data than has ever been available on this issue, this study analyzes a large sample of malls with store-level data on rent, sales, and contractual specifications. In our sample, anchors occupy about 60% of mall space, but pay less than 10% of the total rent collected by the developer. The median anchor rent is zero. This evidence strongly suggests that malls solve an important externality problem: anchors generate customer traffic which benefits their neighboring stores. Malls represent a market solution to this problem since it provides a way for anchors to be compensated for the externalities they generate, rather than letting those rents go to the beneficiaries of the externalities or the landlord. This hypothesis is tested by comparing the rent and sales of anchor and non-anchor stores, as well as testing whether certain types of anchors generate more externalities and are compensated accordingly. In addition, we study the contractual provisions of anchors and non-anchors within the context of externality and agency issues. Non-anchor stores pay a fixed rent plus an "overage" rent which is a fraction of their sales when their sales exceed a certain threshold. In contrast, anchor stores (when they do pay rent) pay much lower fixed portions and are taxed at a much lower rate on their sales above their thresholds. This result is consistent with the externality hypothesis, since developers do not want to discourage the success and traffic-generating power of the anchors. While the overage rent provision provides an incentive for the developer to not shirk, the base rent component represents 93.6% of the developer's total rent. This suggests that externality considerations are primary, and alternative mechanisms exist to mitigate the agency problems.

Many economists view shopping malls as a mechanism to economize on the search costs of consumers by locating stores in close proximity. While some suspect that large department stores receive a rent subsidy compared to other stores in malls, they are astounded to learn of the extent of the subsidy. In our data sample, large department stores occupy 60% of the total leasable space in shopping malls and yet pay only 10% of the total mall rent collected by a developer. Furthermore, the median rent paid by department stores is zero. The magnitude of these subsidies suggests that malls do more than economize on search costs -- malls constitute a classic market mechanism of compensating large department stores for the positive externalities that they convey onto other mall stores.

The imbalance between space occupied and rent paid by anchors is the focus of our paper. We suggest that the very proximity of stores within a shopping mall, which benefits consumers by reducing search costs, creates demand externalities among the stores. The more important of these externalities are created by anchor department stores with well-established reputations for quality, fashion, and reliability. Department stores attract consumers to malls, and in so doing, create external economies by attracting customers to other mall stores as well. The scope of these externalities, however, is not well appreciated in the current literature. In this paper we rely on a unique data set, generously supplied by a large mall developer, that includes financial data for every store in a large number of malls owned and operated by the developer. We use these micro data to show the pervasive nature of these external economies. Our empirical strategy relies on the fundamental proposition that anchors who create more externalities by drawing more consumers to the mall will pay lower rents per square foot to the developer, while those mall stores (i.e., non-anchor stores) that benefit from these spillovers will pay higher rents per square foot. By analyzing the pricing of space within shopping centers and estimating the effect of anchors on mall store sales, we quantify the scope of externalities that exist within these miniature but complicated mall economies.

The pervasive role of externalities is manifest by the substantially lower rent per square foot that anchors pay compared to mall stores *and* by the distinctive differences between anchor and mall store contracts. To explain these differences, we enlist both agency and externality explanations. Of the two, we find the externality explanation indispensable and most convincing. We call upon agency theory to explain a distinct feature of virtually all mall store contracts whereby each mall store pays, in addition to a *base (fixed) rent*, an *overage* rent that equals a share of the excess of mall store sales over a *pre-specified threshold* amount. In contrast, few anchor contracts contain overage rent clauses. We believe that this distinct provision is included in mall store contracts so that the developer will have an enduring interest in the long term success of mall tenants. While this agency explanation for overage rent is plausible and receives some supporting evidence, we note that an alternative substitute incentive mechanism exists and may be put to greater use in the future. Our overall assessment is that externalities play an essential role in explaining the pricing of space in shopping malls and the provisions of anchor and mall store contracts, while agency aspects play a lesser role.

While anchors attract consumers to malls, not all department stores are alike. This heterogeneity implies that some anchors create greater external economies than others. With our unique data source, we can probe more deeply into which types create greater external economies than has previously been possible. Department stores differ along several dimensions -- in the quality of merchandise carried, in the services offered, and in their reputations. Do *prestige/fashion* anchors that serve the narrow upper income segment of the total market create more externalities for their respective mall store neighbors than do well-known department stores that sell somewhat lower priced merchandise to a select but larger market? And not to be forgotten are the numerous department stores that sell a still lower quality merchandise but to a much larger mass market. Which of these types of department stores create greater externalities? We use our unique data set to estimate the externalities created by different types of department stores by determining different department stores affects the sales and rents paid by other mall stores.



After briefly reviewing the shopping mall and incentive contracting literature in Section I, we describe our unique data set in Section II. Significant differences in the provisions of anchor and mall store contracts are identified in Section III. In section IV, we compare the explanatory power of agency and externalities to explain differences between anchor and mall store contracts, and suggest that these contractual differences exist because anchors create substantial externalities while mall stores largely do not. We enlist the role of agency considerations to explain those contractual provisions that are common in mall store but not in anchor contracts. The four types of anchors are defined in Section V and we present estimates of the large subsidies that each type of anchor receives in Section VI. In Section VII, we find that anchors that had well-established reputations in local markets when the mall industry began to develop still create greater externalities compared to prestige/fashion type of anchors as well as other anchors with lesser reputations.

## I. LITERATURE REVIEW

Although malls represent a classic example of a market solution to an externality problem, the theoretical and empirical literature on shopping malls is surprisingly sparse. Brueckner (1993) presents a theoretical treatment of externalities among stores in a shopping mall where pervasive demand externalities exist among all stores in the mall. The developer's problem is to allocate space to each store after taking account of all spillovers so that the developer's profits are maximized. The developer has a constant marginal cost of space. The developer maximizes profits by allocating space so that net marginal revenue, which takes account of all external effects from an increase in store  $i$ 's space on the rents paid by other stores, equals the marginal cost of space. Given any two stores with the same rent elasticity of demand (with respect to space) and shadow price of space, the theory implies that the store that creates a greater (positive) net externality will pay a lower rent per unit of space. If the rent elasticity is less elastic for a store that creates a larger net externality, the developer may or may not charge a higher rent per unit of space to the store that creates a large net externality.

When each developer has monopoly power, the theory does not unambiguously predict that the store that creates the largest net externality pays the lowest rent per unit of space. On the other hand, when developers act competitively, the store that creates the largest net external economy will pay the lowest rent per unit of space.

Surprisingly, comprehensive evidence supporting the externality hypothesis has emerged only recently in Pashigian and Gould (1998). Lacking individual store data, Pashigian and Gould relied on aggregated data published in Dollars and Cents. They found that anchors create external economies and pay substantially lower rent per unit of space than do mall stores. In addition, they reported that anchors in larger malls with more anchors pay lower rents per square foot while mall stores pay higher rents per square foot and have higher sales per square foot. These patterns suggest that the anchors in larger malls create larger spillover effects and developers reward these anchors by charging a lower rent per square foot.

The Pashigian & Gould paper follows in the spirit of Rauch's interesting 1993 paper on the pricing of space in industrial parks where agglomeration economies are present. Rauch argues that developers will charge lower rents for space initially and then gradually raise rents in a new industrial park as the park fills because late arriving tenants experience greater agglomeration economies. When Rauch examines the data, he finds land prices in industrial parks increase by a factor of 7 to 10 times as the park fills, suggesting substantial agglomeration economies. Shopping mall developers follow a similar practice by signing anchors first with large rent subsidies and mall stores later at higher rental rates, not because of agglomeration economies, but because anchors create external economies that attract other mall stores and allow developers to obtain lower cost financing.

Surprisingly few other empirical studies of shopping malls exist. Benjamin et. al. (1990) studied lease characteristics in 5 smaller strip shopping centers in a single market where the anchor was often a supermarket. Differences in rent per square foot ("rent psf" hereafter) between anchors in large versus smaller shopping centers were better explained by

differences in contract features and not by differences in the scale of the externalities created. In a later paper, Benjamin et. al. (1992) tested for external effects. The authors used estimated store *sales per square foot* ("sales psf" hereafter) as a proxy variable for the presence of positive externalities -- arguing that a store with higher sales psf generates more store traffic that, in turn, creates positive externalities for other stores in the mall. They found that store sales psf were inversely related to store rent psf. However, both of these studies used very small samples to examine neighborhood shopping centers which are quite different from large shopping malls. Our sample size is much larger and we are able to use actual rent and sales data (as well as the specifics of the mall store contract), whereas these studies had to impute the actual rent and sales data from the average sales data for similar shopping centers which was reported elsewhere.

The large and expanding literature on incentive contracting will not be reviewed here but interested readers may turn to Prendergast's (1998) recent extensive review of the predictions of the theory and the known empirical regularities in labor contracts. Labor contracts are similar to the leases of mall stores in the sense that both are designed to address agency considerations and are comprised of some fixed portion plus some variable component which is dependent upon performance. As Prendergast notes, empirical tests of the theory indicate that workers do respond to incentives. A recent demonstration is in Lazear (1997) where substantial productivity increases were experienced by an autoglass firm after it shifted from paying hourly wages to a piece rate compensation scheme. However, researchers have been less successful in explaining the specific structure of the contracts. We face this difficulty as well. From our perspective, an analysis of labor contracts is somewhat limiting since most labor models assume worker risk aversion. In contrast, we will be analyzing incentive contracting when the contracting parties are firms, some quite large, where risk aversion should be less important. Throughout the paper, we assume that risk aversion plays a lesser role in explaining the contracts of anchors and mall stores.



## II. SOURCE OF DATA

The dearth of empirical studies of malls is partially explained by the absence of detailed and extensive mall store data. Developers (and especially their lawyers) are reluctant to give researchers access to confidential data. Given this obstinacy, we are truly fortunate to have discovered a developer with a more enlightened outlook. A developer of a large number of shopping malls generously agreed to provide detailed data on sales, rent, size, and other pertinent information for all mall stores and anchors located in a comparatively large number of malls that were either owned or operated by the developer in 1994. This is by far the largest sample of major shopping malls ever made available for systematic analysis. As a condition to making the data available, we agreed not to reveal the names of individual stores or shopping malls or the developer.<sup>1, 2</sup> While we are fortunate to have this level of detailed store data, our data set has only limited information about the consumers in a mall's market area.

## III. DIFFERENCES BETWEEN ANCHOR AND MALL STORE CONTRACTS

By having access to individual store financial data and contracts, we can identify systematic differences between anchor and mall store contracts. This section reports on the major contractual differences that we have uncovered. Explanations for these differences are presented in the next section.

### Anchor Contracts:

Anchor stores in our malls range from the most upscale department stores to stores that sell more modestly priced merchandise. To avoid any confusion, we do *not* have any discount department stores in our sample. Some of our department stores are members of a very small chain of stores and others are members of large and long-established department store chains. To give the reader a sense of our sample size, we have over **100** anchor contracts in our sample. Column 1 of the top panel of Table 1 shows the form of actual rent payments made by all anchors

in 1994, while column 2 classifies anchors by the specifications for rental payments reported in their contracts. **Seventy-three** percent of anchor stores *did not* pay any rent in 1994. In these situations, the anchor owns its building and sometimes the land, an arrangement that is often negotiated between the developer and the anchor before the mall opens. Some anchors are in such a strong bargaining situation that the developer pays for some or all of the construction costs and agrees to pay for remodeling costs even though the anchor owns the structure. A possible reason why many anchors own their buildings and sign long term contracts is that shirking by anchors imposes higher costs on other mall stores because anchors, not mall stores, create externalities. When an anchor owns the structure, it is less likely to shirk because it incurs the reduced value of the structure.<sup>3</sup>

Thirteen percent of our anchors paid only a base rent (row 2). The remaining 14% of anchors paid a *base* monthly rent *and/or* an *overage* rent ( $V$ ) that equals a share ( $s$ ) of the excess of actual sales ( $S$ ) over a negotiated *threshold* value ( $S^*$ ) (i.e.,  $V = s(S - S^*)$  whenever  $S - S^*$  is positive).<sup>4</sup> Most anchors never pay rent and even those that do, because their sales exceed the threshold, have a lower average sharing percentage ( $s$ ) than the average for mall stores. The average sharing percentage is only .47% for anchors and 6.27% for mall stores. Evidently, the developer imposes a much lower tax rate on sales that exceed the threshold for anchors than for mall stores.

Unlike column 1, which considers *actual* rental payments, column 2 shows the contractual *specifications* of anchor stores. **Seventy** percent of anchor stores had no rent specified in the contract and this type of contract is displayed in the upper panel of Figure 1. Six percent of anchors are obligated to pay only a base rent and 24% have contracts where a threshold and a sharing percentage (and possibly a base rent) are specified. By comparing columns 1 and 2, the reader can infer that 10% of the anchor stores did not pay overage rent in 1994 even though an overage provision was included in the contract. Clearly, the thresholds are set so that the probability of exceeding the threshold is low.

### Mall Store Contracts:

As Table 1 shows, all mall stores, unlike anchors, pay rent with virtually all mall store contracts specifying a base or fixed rent (B) and an "overage" component (V). Nevertheless, **eighty-two** percent of mall stores paid only a base rent even though **ninety-nine** per cent of the mall store contracts specified an overage rent provision. The lower panel of Figure 1 displays a typical mall store contract. Obviously, the sales of most mall stores failed to reach the stores' thresholds in 1994. The probability of a mall store's sales exceeding the threshold value was only 18%. While 18% of mall stores paid overage rent, overage rent accounted for only 4% of total rental payments by mall stores. For anchors, overage rent represents 18% of total anchor rent paid to the developer even though 24% of anchors have an overage contract clause. Considering mall stores and anchors together, overage rent accounts for only 6.4% of the total rent collected by our developer.

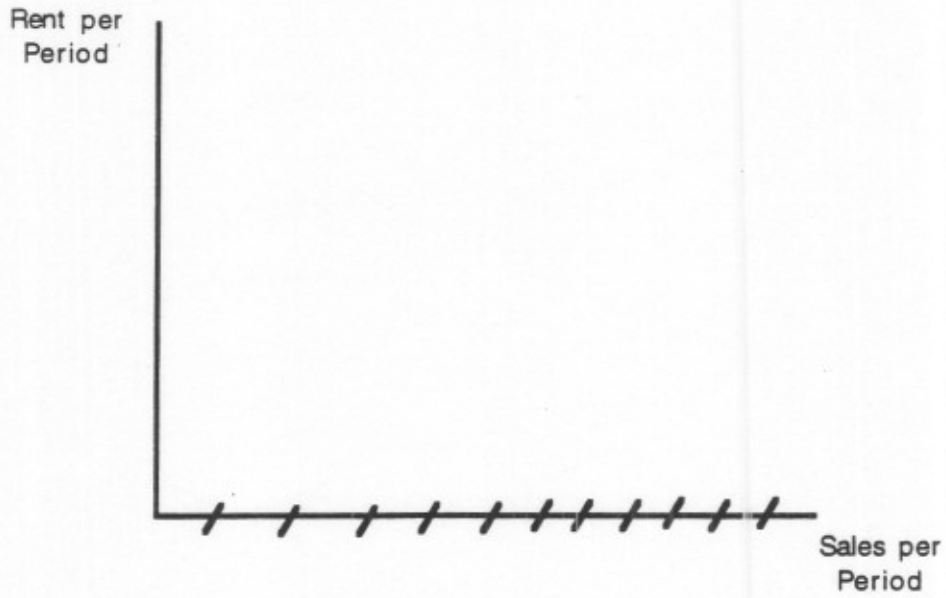
While these results are only for one developer and for one year, they are consistent with estimates derived from Dollars and Cents. Using median rent data, we estimate that overage rent accounted for 14% of total rent collected by developers of larger ("super-regional") shopping malls in 1987, 13% in 1990, 8% in 1993 and 6% in 1995. Like our developer, other developers also write contracts such that overage rent accounts for a small and apparently decreasing percentage of the total rent collected by developers. This reliance on base rent could reflect the response of developers to lenders' demands for higher coverage ratios (ratio of base rent to interest payments) when arranging for mall financing, or could reflect the growing importance of developers' reputations.<sup>5</sup>

### IV. USING AGENCY AND EXTERNALITY EXPLANATIONS TO EXPLAIN MALL CONTRACTS

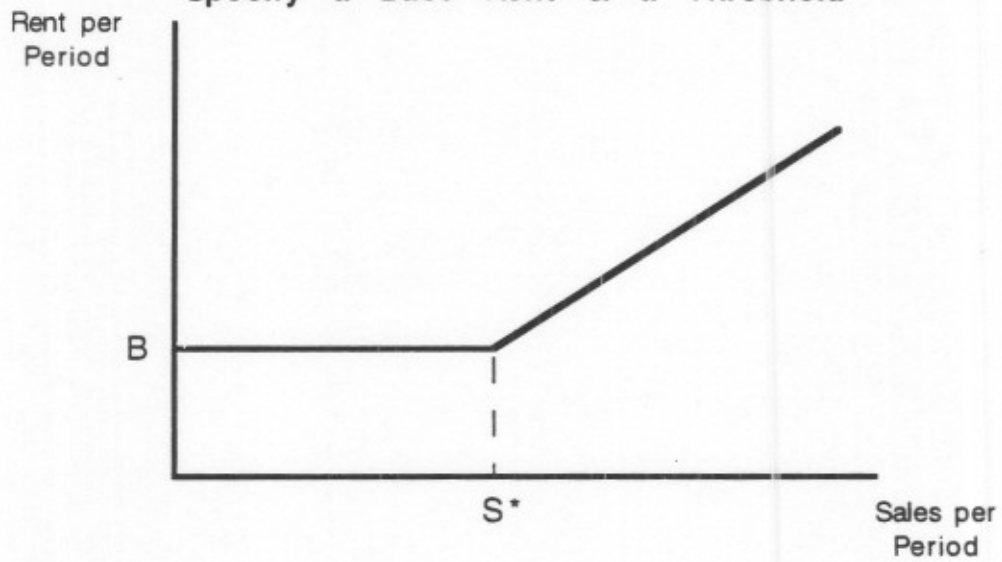
Most anchors do not pay rent and their contracts have lower sharing percentages (s) than those of mall stores. To explain these long-standing and systematic differences, we consider two possible explanations -- agency and externalities. It seems clear that external economies created

FIGURE 1

Seventy Percent of Anchor Contracts  
Require No Rental Payment



Ninety-Nine Percent of Mall Store Contracts  
Specify a Base Rent & a Threshold





by anchors explain why most anchors do not pay rent. Otherwise, it would be very hard to explain why a rational developer would just give away such a large portion of their leasable mall space. Externalities can also explain why anchors pay lower sharing percentages. If successful anchors create externalities, developers do not want to limit anchor sales by placing higher tax rates on sales in excess of the threshold.

We turn to the principle-agency literature to explain the contract design of mall stores. In the standard principal-agent literature, the principal (developer) cannot monitor the effort of the agent (mall store). In the context of a mall, the developer may have difficulty distinguishing between the effects of the mall store's effort, the anchors' efforts, or the site on a mall store's sales. A developer may realize that anchors create external effects but can still have difficulty measuring the size of the externalities created by an anchor or the effort of the store. In this uncertain situation, the principal-agent model predicts the principle (developer) prefers a contract whereby the agent (mall store) pays only a base rent. The mall store receives all of the profit from its effort, as the principal-agent literature prescribes, and is therefore less inclined to free ride on the anchors' efforts. So far so good. However, the use of a non-zero threshold means that the agent obtains all of the benefits from its effort as long as sales are less than the threshold. If sales exceed the threshold, the agent only receives a fraction of the benefits of its effort. This arrangement is at odds with the standard principal agent model.<sup>6</sup> What appears strange with this type of contract is that, after sales reach the threshold, the agent's reward decreases with still greater effort by the agent. Thus, with the inclusion of the overage provision, the principal appears to discourage effort by the agent by assessing a tax on mall stores sales above the threshold.

Therefore, in order to explain the existence of the overage rent provision, the principal's incentives, not the agent's, appear to be relevant.<sup>7</sup> Overage rent provisions in mall store contracts are in the self-interest of mall stores because they give the developer a stake in the long term success of a mall. For example, assume the sales of a mall store depend on the efforts of

the store, the anchor, and the developer. Just for illustrative purposes, assume that the developer's site selection is a key determinant of the sales of mall stores, but we could easily imagine that it could be the continued maintenance of the mall, the selection of anchors, or the signing of the proper mix of stores. Assume that the developer has private information about the probability that a particular site will be a superb site, and as a consequence, mall store sales will be unusually high. Greater effort by the developer increases the probability that the developer will discover a prime site and will therefore result in higher mall store sales. Mall store owners cannot verify the developer's effort and are unwilling to pay high base rents simply on the word of the developer that this will be a prime site.

If mall store sales turn out to be just average or low, it will be unclear what is the cause of this lackluster sales performance. Is it due to inadequate efforts of the anchor, the mall store, or the developer? If, on the other hand, mall store sales are exceptional, the more likely reason is that the developer did put in the effort and uncovered a prime site. To give the developer an incentive to find prime sites (or to maintain the mall, select appropriate anchors, etc.), mall stores are willing to tie their rental payments to their sales levels by rewarding the developer, but only when their sales exceed their thresholds. Mall store thresholds are not set at zero because there are multiple causes for low mall store sales. Thresholds are an incentive mechanism to reward the developer's effort. Given the long term nature of their contracts, mall stores prefer contracts that include thresholds to encourage developer effort.<sup>8</sup>

We believe this is a plausible explanation and can marshal some but not unqualified support for it. As we mentioned above, overage rent accounts for only 6.4% of the total rent collected by the developer. The developer's ex post reward for effort is not minuscule, but is it large enough to induce the proper effort? We cannot say with certainty since we do not know how the elimination of overage rent would affect developers' incentives. A qualification to this explanation for overage rent is that developers would appear to have sufficient motivation to maintain their reputations for operating successful malls without relying on overage rent.

Increasingly, developers own many malls and periodically buy, sell, and develop malls. Our developer has little incentive to shirk and has every incentive to maintain its reputation for operating successful malls. Preserving their reputations should be sufficient motivation to discourage developers from opportunistic behavior even if the developer's rent comes mostly from base rent. Thus, the declining reliance on overage rent over time reported above could therefore be due to a growing reliance on the reputation of developers as insurance against opportunistic behavior by the developer. In addition, since lease renewals are staggered over time across mall stores, a shirking developer bears an immediate cost by receiving a lower base rent when the next lease is up for renewal. This constant turnover of store leases also should provide a strong penalty against shirking behavior on behalf of the developer.

#### V. DEFINING TYPES OF ANCHORS

To compare the rents and contract specifications of different anchor types while preserving confidentiality, we assigned each anchor store to one of four classes, based primarily on the quality of merchandise stocked by and the reputation of the anchor. Below, we summarize the four types and show the percentage of anchors in each type.<sup>9</sup>

Type 1. Prestige/fashion department stores: (11% of anchor stores)

Type 2. High to moderate quality department stores: (18% of anchor stores)

Type 3. Lower quality department stores: (30% of anchor stores)

Type 4. Department stores that are members of several well-known *and* long-standing *national* chains: (41% of anchor stores)<sup>10</sup>

Table 2 presents summary statistics, some of which capture the historical evolution of the mall industry. We begin with type 2 anchors because many of these department stores were the original anchors in their respective malls (rows 4 and 5). Type 2 anchor stores were among the first to enter malls that were constructed in the fifties, sixties, or early seventies. They

were considered higher-quality department stores during that period and developers eagerly recruited them. Type 2 anchors, and to a lesser degree type 4 anchors, had established reputations in their respective local retail markets or possessed nationally known reputations when they began locating stores in shopping malls. Row 1 shows that type 2 anchors occupy more space on average and row 3 indicates that type 2 anchors account for a larger share of total mall space. Also, the malls in which type 2 and 4 anchors are located have more anchors per mall (row 2).

These inferences are consistent with the rents paid by these anchors in 1994. A smaller fraction of type 2 anchors pay rent than the anchors in the other classes (row 7a).<sup>11</sup> Type 2 anchors have the lowest average rent psf, averaging only \$.48 psf in rental payments (row 7b). These very attractive rental arrangements reveal just how eager developers were to include these anchors in their malls when the malls were built. Type 4 anchors are members of well-known national chains and paid an average of only \$.66 psf in rent in 1994. To give the reader a sense of proportion, stores selling women's ready-to-wear clothing paid an average of \$18.31 psf in 1994. Type 2 and 4 anchors, with their established reputations, also have lower average sharing percentages (row 8). Type 2 anchors paid an average rent of ten cents per \$100 for sales above the threshold while type 4 anchors paid slightly less than *thirty cents* per \$100 for sales exceeding the threshold.

Type 1 "prestige/fashion" department stores have well-known names and have established reputations in their respective local markets. Many are owned by companies that expanded regionally, and in some cases nationally, by placing their new stores in malls, but their expansion into malls came somewhat later. Type 1 anchors have a later average starting date (1983) and, interestingly, entered the developer's malls after the malls had been open for an average of more than 8 years (row 5). The malls that type 1 anchors entered had been open for some time and were being expanded to include prestige/fashion anchors.



Table 2 indicates that type 1 anchors pay a higher average rent psf and have higher average sales psf (row 6). Type 1 anchors have the highest percentage of anchors that pay rent and report sales while type 2 anchors have the lowest percentage. Even though a portion of the higher rent psf paid by type 1 anchors is due to their higher sales psf, all of the higher rent psf cannot be explained by their higher sales psf. These summary statistics suggest that type 1 anchors create fewer external economies than do type 2 anchors.<sup>12</sup> The same conclusions apply to type 3 anchors, since type 2 and 4 anchors pay lower rents psf than either types 1 and 3.

#### VI. RENT DIFFERENCES BETWEEN ANCHORS AND MALL STORES

As we noted at the beginning of this paper, developers treat anchors differently from mall stores by granting anchors substantial rent concessions. To estimate the per square foot (psf) subsidies that the different types of anchors receive, we compare the rents paid by mall stores with that of anchors after controlling for sales and store size.

Because the sales psf of mall stores are often larger than the sales psf of anchors, the psf rents paid by mall stores will be higher as well. To correct for sales and store size differences, we use two methods to estimate the psf rent subsidy received by anchors. In both, we compute the difference between the rent psf paid by each department store type with the rent psf paid by mall stores after controlling for sales psf, etc. In the first method, we only include those anchors who report both rent *and* sales. As we noted above, strong anchors will be excluded because they do not pay rent and therefore do not have to report their sales to the developer. In the second method, we include all anchors and assign the mean sales psf of the reporting anchors in each type to the unreported sales of an anchor. We know from other sources that anchors that do not pay rent have higher sales psf. So, the second method will also underestimate the psf subsidy received by each type of anchor, but by less than the first method since all anchors are included.

In Table 3, we regress each store's rent psf ( $rent_i$ ) on (1) store sales psf ( $sales_i$ ), (2)  $1/gla$  ( $gla_i$  is gross leasable area store  $i$ ), (3) dummy variables representing the different types

of department stores in the mall,  $d_1$ ,  $d_2$ ,  $d_3$  and  $d_4$ , (4) a dummy variable for food service, food court, and food specialty groups( $d_f$ ), and (5) a dummy variable for the recreational product group ( $d_r$ ). The dummy variables for the food service and recreation groups were introduced because the rent psf paid by both groups was higher relative to their sales psf, which suggests that stores in these particular groups enjoy greater external benefits created by the anchors than the average group.<sup>13</sup>

The estimated regression equation is

$$\text{Rent}_i = a_0 + a_1 \text{Sales}_i + a_2(1/\text{glai}) + a_3 d_1 + a_4 d_2 + a_5 d_3 + a_6 d_4 + a_7 d_f + a_8 d_r + u_i.$$

Table 3 shows regression results for the two methods. For every \$100 increase in sales psf, rent psf increases by \$4.71. We also find that rent psf declines with store size. The estimated coefficients of the four department store dummies are all negative and statistically significant at the 5% probability standard in both columns 1 and 2. When we exclude anchors that do not pay rent (column 1), department stores receive large subsidies compared to a hypothetical mall store with the same sales psf and the same store size. The psf rent subsidies are \$10.36, \$12.69, \$7.92, and \$8.37 for department store types 1, 2, 3, and 4 respectively.<sup>14</sup> Not surprisingly, the dollar subsidies are larger under method 2 when all anchors are included. The psf subsidies are \$13.70, \$14.41, \$10.67, and \$10.47. Under both methods type 2 department stores receive the largest psf subsidy.

Measuring the psf subsidy in dollars is not as informative because the sales and size of the four anchor types differ. A more informative measure is the actual rent psf paid *relative* to

and 4 anchors respectively under method 1, and 25%, 3%, 10%, and 6% under method 2. Even the weakest anchors (type 1) pay on average only 34% of the rent psf that a typical mall store would pay under method 1 and 25% under method 2. Note that types 2 and 4 anchors receive more attractive deals. They only pay 15% and 25% respectively of what a mall store would pay under method 1 and 3% and 6% under method 2. These psf subsidy estimates give the reader an idea of the huge subsidies that anchors receive. These rent discounts are even more impressive when compared to the commercial office market where externalities are less important and rent discounts to large tenants seldom, if ever, reach these magnitudes (Pashigian and Gould, 1998).

## VII. EXTERNAL EFFECTS OF ANCHORS ON THE RENT AND SALES PSF OF MALL STORES

As we have suggested above, developers offer anchors large rent discounts because anchors increase the gross profit margins of their mall store neighbors by increasing sales and/or reducing promotion costs. If anchors create external economies, the rent psf of anchors should be inversely related to the rent psf paid by mall stores. In other words, anchors that create larger external economies will pay a lower rent psf, and mall stores that benefit from the externality should be willing to pay a higher rent psf.

In this section we test the externality hypothesis directly. We propose a simple three-equation model to determine how mall store sales psf and rent psf are affected as the relative importance of each type of anchor increases in a mall. Throughout, we take advantage of our unique data set by controlling for mall store fixed effects. For example, we observe many stores that appear in several different malls owned by our developer. Consequently, we can test to see whether a given store pays more to be in malls with certain anchors that generate larger external benefits for the other stores within the mall. In this manner, we exploit the richness of our data by abstracting from store-specific heterogeneity across malls which might lead to spurious conclusions.

The three equations of the model are more a description of the regularities in the data than a structural model developed from a theory of a mall. The first equation relates mall store rent psf to: (a) sales psf of the mall store, (b) the mean rent paid psf by the mall's anchors, and (c) other exogenous mall specific variables.<sup>15</sup> We included mean anchor rent in this equation to determine if the rent psf paid by a mall store is higher in malls where the mean rent paid by a mall's anchors is lower. An observed inverse relation would suggest that mall stores are willing to pay a higher rent psf because they experience reduced promotion and other expenses in malls when their neighboring anchors create greater externalities as reflected in a lower average rent psf.

The second equation relates sales psf, which was an independent variable in equation one, to the following: (a) the mean rent psf of anchor stores, (b) the share of total space occupied by each type of anchor in the mall, and (c) other exogenous variables -- among which are the mall's market size. If anchors create external effects by increasing the sales psf and/or lowering the costs of mall stores, then we expect the sales psf of non-anchor stores to be inversely related to the mean rent psf of a mall's anchors. The reason for including the share of space occupied by each type of anchor in this equation is discussed below.

The third equation relates the mean rent psf of a mall's anchors to: (a) the share of total space occupied by each type of department stores in the mall, and (b) other exogenous variables at the mall level. The mean rent psf paid by a mall's anchors should be inversely related to the size of the externality created by the anchors. We do not have a direct measure of the externalities created by a mall's anchors (e.g., the number of customers that shop at an anchor and at other mall stores), so we cannot determine how the unavailable direct measure is related to mall store sales or rent. Consequently, we adopt a different approach. We define variables that can tell us how the *relative* presence of each type of mall anchor affects mall store sales or rent psf. Using the share of mall space occupied by each anchor type as a measure of relative



prominence in the mall, we estimate how mall store rent or anchor rent changes with changes in the relative importance of each anchor type.

The model's specifications are:

$$(1) \text{ Mall Store Rent PSF} = f(\text{Mall Store Sales PSF}, \text{Mall Mean Anchor Rent PSF}, \dots)$$

$$+ u_1$$

$$(2) \text{ Mall Store Sales PSF} = g(\text{Mall Mean Anchor Rent PSF}, T_1, \dots, T_4, \dots) + u_2$$

$$(3) \text{ Mall Mean Anchor Rent PSF} = h(T_1, \dots, T_4, \dots) + u_3$$

where  $T_1, \dots, T_4$  represent the *share of total leasable mall space* accounted for by each of the four anchor types. The first two equations are run using individual mall stores as the unit of observation, while mall level data is the unit of observation in the third equation. As mentioned above, the first two equations also control for fixed store-name effects. Therefore, identification in the first two equations is coming from within store-name variation across malls.

We expect to find a negative coefficient on anchor rent in equation (1) if anchors that pay lower rent psf raise the profit margins of other mall stores. The coefficient on anchor rent should also be negative in equation 2 since anchors that generate the most externalities (by increasing malls store sales) should be compensated with lower rents. In both of these equations, the mean rent of the anchors in the mall is proxying for the quality of the anchors in terms of their ability to generate positive externalities.

Before presenting the results, we discuss some of the special characteristics of our mall sample. Two malls in our sample are in the *same* unique retail market. Average mall store sales and rent psf in these two malls are much larger than in the other malls in our sample, as is the ratio of rent psf to sales psf.<sup>16</sup> Clearly, some unobserved factor is responsible for the

systematically higher sales psf and rent psf (conditional on the sales psf) mall stores in the two malls. The likely reason is that these two malls are located in a popular retail market where the opportunity cost of the land is higher. To adjust for the special circumstances surrounding these two malls, we created two new variables. First, we introduced a dummy variable, *higher rent market*, for this particular market in recognition that these two malls are in the same prominent retail market. Second, we try to account for the higher cost of land in larger cities by including the area population surrounding the mall as a separate exogenous variable. We also noticed that rents psf paid by mall stores that are located in one state were systematically higher. Rents for residential and industrial property in this state are also higher. Clearly, this state is a high rent state. So, we created a dummy variable entitled *higher land value state*.

Because the three-equation system is recursive, we estimated each equation by OLS. Table 4 presents OLS estimates of equation (1) where the number of observations equals the number of mall stores in our sample (which exceeds 1,000 mall stores). The results in Table 4 indicate that mall store rent psf increases by \$5.20 for every \$100 increase in mean mall store sales psf. Rent psf is higher in larger cities and in the state with higher urban land values. From our perspective, the more interesting result is that mean rent psf of mall stores is inversely related to the mean rent psf paid by a mall's anchors. Our interpretation of this result is that mall stores pay higher rent psf when mall anchors are more successful in attracting customers to the mall, and this reduces their promotion and other costs and raises the profit margins on goods sold by mall stores. The regression results indicate that a dollar *decrease* in the mean rent psf paid by mall anchors *increases* the mean rent psf paid by mall stores by 94.6 cents.<sup>17 18</sup>

In the specification of equation two in Table 5, we include mall-specific variables that directly affect the sales of stores, which include the population of the area and the *NUMBER OF UPPER INCOME CONSUMERS* (defined as the number of households above the median household income in the area).<sup>19</sup> In addition, a mall store's sales will depend on its own reputation and the reputation of the other stores in the mall. Do most of the stores in a mall have nationally

recognized names or are they primarily local stores? Lacking an obvious measure of a store's reputation, we created a new reputational variable by counting the number of times that a mall store was present in the developer's malls (*Nationally Known Mall Store*). The larger is the number of times that a mall store is present in the developer's malls, the higher is the probability that it is a nationally recognized store.<sup>20</sup> There is obviously no variation in this variable within a given store name across malls, so we take the mean of this variable for all stores within a mall to proxy for the mean reputation of stores within a given mall. The inclusion of this variable (row 7 in Table 5) measures whether the sales of any given store is enhanced by the mean reputation of stores in the mall.

We also include the date when the mall opened (*Date Mall Opened*) to determine if more recently opened malls have achieved a better match between the products sold by the mall's stores and the current demand configuration of consumers. This variable should also reflect the effects of a mall's physical deterioration since older malls often lose sales to newer malls.

Coefficient estimates for equation 2 are presented in Table 5. Sales psf increase by \$1.60 from a one percentage point increase in the share of space occupied by type 1 anchors, by \$3.86 if occupied by type 2 anchors, by \$2.77 if occupied by type 3 anchors, and by \$3.27 if occupied by type 4 anchors. In 1994, it appears that an increase in the share of space occupied by types 2 & 4 anchors increases mall store sales psf by more than type 1 and 3 anchors, holding mean rent psf of anchors constant. We can reject the hypothesis that all four share-of-anchor-space coefficients are equal. In pairwise tests with the coefficient of type 1 anchors, all tests reject equality with the other three share coefficients. In addition, the hypothesis that the coefficients of type 2 and type 3 anchors are equal is rejected.

An increase in the number of upper income consumers increases mean sales psf of mall stores. Mall store sales psf are higher in more recently opened malls, and in the two malls located in the higher rent market. Mall store sales psf are lower in markets with a larger population, which suggests that the population may not be a good measure of the relevant market

size. Some malls located in sparsely populated places can nevertheless draw consumers from distant locations. Or, the population variable may be measuring the effect of increasing number of people less than the median income since the number of households above the median income is already included in the regression.

The regression results in Table 5 indicate that mall store sales psf are significantly higher, the *higher* is mean anchor rent psf. Table 4 showed that mall store rent psf is lower as mean anchor rent psf increases. While the result in Table 4 implies that anchors create external economies, the result in Table 5 does not. We suspect that these conflicting results are due to our imperfect proxies for the unmeasured quality of the mall site in the second equation. Unlike the mall store rent equation, where we have a clean measure of the sales psf of the mall store to capture this form of unobserved heterogeneity, our proxies for site quality are poorly measured in equation two (recall the population variable has a negative coefficient). Consequently, we believe that the coefficient for the mean anchor rent psf variable captures two effects, the positive effect of a larger and/or more prosperous market (i. e., unmeasured location quality), and the negative effect due to the spillover effects on a mall store's sales.

We have suggested that the reputation of the anchor is an important determinant of the rent that an anchor pays because an anchor's reputation is the magnet that draws consumers to the mall. If there are differences among the four types of anchors in drawing consumers to malls, then we should expect anchors that have more drawing power to be compensated with more attractive rent provisions. Table 6 presents the coefficient estimates of equation 3 where we identify several determinants of mean rent psf paid by a mall's anchors. The largest decrease in the mean rent psf paid by anchors occurs when the share of mall space occupied by type 2 anchors increases by one percentage point. However, the coefficients for types 1, 2, and 4 are sufficiently similar that it is difficult to distinguish statistically among them. Indeed, we cannot reject the hypothesis that all of the share space coefficients are equal.



We can solve equations 1 - 3 and derive reduced form equations for rent and sales psf of mall stores. The estimated coefficients of the reduced form equations are presented in Table 7. The dependent variable in column 2 is the mall store's rent psf and the dependent variable in column 3 is mall store's sales. The unit of observation is at the mall store level, and similar to equations 1 and 2, the regressions control for fixed store name effects. To preserve space, Table 7 only shows coefficient estimates for the share of space variables. The anchor share differences are significant determinants of the mall store rent and sales psf. In the rent equation, we can reject the hypothesis that all the coefficients are equal. In pairwise tests, the hypothesis that the coefficients of types 2 & 3 or types 3 & 4 are equal is rejected. The results for the sales regression show even greater statistical discrimination among the different types of anchors. Not only can we reject the equality of all four coefficients, we reject the equality of coefficients in all pairwise tests except between types 2 and 4 and between types 3 and 4.

Again, we find that the coefficient of type 2 has the largest coefficient in both the rent and sales psf equations, followed closely by the coefficients of type 4. These results are consistent with our earlier findings in Table 2 that showed that these two types paid the lowest rent psf, and in Table 3 which showed that these two types received the largest psf subsidies. Overall, our rent results indicate that type 2 anchors probably create the largest external effects while type 3 anchors appear to create the smallest effects.

#### VIII. SUMMARY

While anchors fill about 60% of mall space, they pay less than 10% of the total rent collected by the developer. There is a method to this apparent madness. The rent evidence suggests that anchors create substantial positive externalities. Consequently, mall anchors not only sign long term contracts but seventy-three percent of our anchors do not pay any rent whatsoever. When anchors do, developers assess a low tax rate on anchor sales above the threshold because anchor sales create externalities. In contrast, all mall stores pay a base rent and an overage rent when sales are above their thresholds. Nevertheless, only a small fraction of

mall stores exceed their thresholds, so *ninety-six* percent of the developer's rental income from mall stores comes from the base rent component. Overall, base rent represents 93.6% of the total rent collected by the developer.

Our explanation for the overage provision is that it creates an incentive for the developer to find attractive sites, maintain the mall, and to select successful anchor stores so as to increase mall store sales. Still, this effect appears to be of diminishing importance since base rent accounts for a growing share of developers' rental income. A substitute incentive mechanism, the reliance on a developer's reputation, may be becoming more important. The preservation of a developer's reputation for operating successful malls discourages developers from engaging in opportunistic behavior by walking away from a mall.

We have found that the size of external economies generated by anchors depend upon the type of anchor. Our estimates indicate that our type 2 anchors, those that were among the first to enter malls, continue to create the largest positive externalities. Mall stores pay a higher mean rent psf and have higher sales psf as the share of space occupied by type 2 anchors increases. Surprisingly, the higher rents psf paid by prestige/fashion anchors indicate they are responsible for fewer externalities. Consumers who patronize these upscale anchors appear to purchase fewer items from neighboring mall stores.

Our study suggests that malls are an efficient organizational form for internalizing externalities. The efficient manner in which externalities are accounted for within a mall contrasts with the difficulties that appear when this organizational form is absent. A comparison with independently owned stores located near each other in central business districts is instructive. It appears that internalizing store externalities within central business districts is more difficult to achieve.

An illuminating example of these difficulties occurred on the Magnificent Mile (North Michigan Avenue) in Chicago, a street with numerous upscale department and specialty stores. When a discount store entered into a tentative agreement with the owner of a prime location on the Mile to lease the first floor of a building, members of the North Michigan Business Association became alarmed at the prospect of having a discounter amongst them. It appears that the opposition of the association managed to delay the project, perhaps with the implied threat of local government action. Finally, a compromise was reached whereby the discount store agreed to construct a steep escalator that would bring customers to the second floor and to rent the second and third floors of the building instead of the first floor.

Store externalities exist on Michigan Avenue as they do in a mall. The discount store found the location on Michigan Avenue desirable because its customers were drawn to the area by the existing upscale department and specialty stores. Yet there was no low cost mechanism by which the many upscale stores could bill the discounter for bringing consumers to it. Presumably, transaction costs prevented the diverse collection of upscale stores from coordinating the purchase of the property, and then leasing the property to (perhaps) the discounter at a lease rate that reflects the external benefits that the discount store would experience. If the creators of the externalities, the upscale stores, could have overcome such transaction costs, they would have been compensated, rather than the current owner of the property. This not uncommon example illustrates the difficulties of internalizing externalities when many existing owners of property rights are involved.

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Table 1: Contract Features: Anchors Versus Other Mall Stores		
	Based on Actual Rent Paid	Based on Specifications in Contract
	( 1 )	( 2 )
Percentage Distribution of Anchors		
1. No Rent	73%	70%
2. Base Rent Only	13	6
3. Overage Rent	14	24
Percentage Distribution of Mall Stores		
1. No Rent	0%	0%
2. Base Rent Only	82	1
3. Overage Rent	18	99

Table 2: Summary Statistics for Anchors

Variable	Type 1 (More than 10 anchors)	Type 2 (More than 15 anchors)	Type 3 (More than 30 anchors)	Type 4 (More than 45 anchors)
1. Mean Gross Leasable Area of Anchor (sq. ft.)	148,460	200,800	137,481	150,334
2. Mean Number of Anchors in Mall	3.79	3.88	3.78	3.85
3. Mean of Gross Leasable Area of Mall in Which Anchor is Located (1000 sq. ft.)	1,159	1,043	878	958
4. Mean Begin Date of Initial Lease	1983	1979	1982	1981
5. Average Difference Between Anchor Store's Lease Begin Date and Mall Begin Date (years)	8.6	1.7	3.2	2.7
6. Sales psf of Anchors Reporting Sales and Number of Anchors Reporting Sales	\$292 (N = 9)	\$220 (N = 2)	\$156 (N = 11)	\$140 (N = 13)
7. Mean Anchor Rent psf				
a) Anchors Paying Rent	\$7.14 (N = 9)	\$3.86 (N = 3)	\$3.78 (N = 13)	\$2.57 (N = 13)
b) All Anchors in Group	\$4.59	\$.48	\$1.23	\$.66
8. Mean Sharing Percentage for all Anchors in Group	1.39	.10	.66	.29

Table 3 : Estimated Rent Subsidy of Department Stores		
Variable	Method 1 Estimated Coefficient t	Method 2 Estimated Coefficient t
1. Constant	4.44 12.1	4.44 12.3
2. Sales psf	.047 46.5	.047 47.3
3. Department Store Type 1	-10.36 -3.2	-13.70 -5.7
4. Department Store Type 2	-12.69 6.4	-14.41 -7.8
5. Department Store Type 3	-7.92 -2.9	-10.67 -7.4
6. Department Store Type 4	-8.37 -3.3	-10.47 -8.4
7. 1/GLA	14890 35.1	14890 35.7
8. Dummy Variable for Recreation Group	3.66 2.6	3.66 2.6
9. Dummy Variable for Food Service and Food Specialty Groups	3.21 5.4	3.21 5.4
N	> 1,000	> 1,000
Adj. R <sup>2</sup>	.716	.741
RMSE	9.10	8.95

Table 4 : Effect of Anchor Rent on Mall Store Rent  
(Fixed Name Effects Model)

Variable	Estimated Coefficient t
1. Intercept	0.00 0.0
2. Sales psf of Mall Store	.052 33.8
3. Mean Rent psf Paid by Mall Anchors	-.946 -5.2
4. Population of Place Mall is Located	.0017 3.5
5. Mall Located in High Rent Retail Area	16.52 5.3
6. Higher Land Value State	4.50 6.5
R <sup>2</sup> (adj.)	.455
RMSE	6.83



Table 5 : Determinants of Mall Store Sales PSF

(Fixed Name Effects Model)

Variable	Estimated Coefficient t
1. Intercept	0.00 0.0
2. Share of Mall Space Occupied by Type 1 Anchors	160.14 3.0
3. Share of Mall Space Occupied by Type 2 Anchors	386.48 8.2
4. Share of Mall Space Occupied by Type 3 Anchors	276.57 6.7
5. Share of Mall Space Occupied by Type 4 Anchors	327.32 8.5
6. Number of Upper Income Consumers	.000573 9.4
7. Mean of the Number of Nationally Known Mall Stores	1.50 .8
8. Mean Anchor Rent psf	11.17 3.5
9. Date Mall Opened	1.68 3.2
10. Population of Place	-.0567 -7.2
11. Mall Located in Higher-Rent District	168.21 3.3
R2 (adj.)	.121
RMSE	108.0

Table 6: Determinants of Mean Anchor Rent PSF	
Variable	Estimated Coefficient t
1. Intercept	10.92 4.4
2. Share of Mall Space Occupied by Type 1 Anchors	-4.91 -2.0
3. Share of Mall Space Occupied by Type 2 Anchors	-5.72 -2.4
4. Share of Mall Space Occupied by Type 3 Anchors	-2.74 -1.2
5. Share of Mall Space Occupied by Type 4 Anchors	-4.42 -2.1
6. Mall Located in Higher-Rent Market	10.62 11.2
7. Date Mall Opened	-.10 -3.7
R <sup>2</sup> adj.	.82
RMSE	1.12

Table 7: Reduced Form Estimates of Mall Store Rent and Sales PSF (Fixed Name Effects Model)		
Independent Variables, (All Variables Expressed as a Difference from Sample Mean)	Dependent Variable	
	Rent Differences	Sales Differences
1. Share of Mall Space Occupied by Type 1 Anchors	15.0 3.6	132.9 2.5
2. Share of Mall Space Occupied by Type 2 Anchors	20.6 5.7	343.7 7.5
3. Share of Mall Space Occupied by Type 3 Anchors	13.1 4.1	254.5 6.2
4. Share of Mall Space Occupied by Type 4 Anchors	19.2 6.5	295.8 7.8
5. $R^2$ (adj.)	.149	.115
6. RMSE	8.5	108.4

Results for other variables in regression equations are not presented. The other variables in the equation are national reputation, number of upper income consumers, begin date of store, national reputation of store, population, and higher rent district. Most of the variables had significant coefficients in both the rent and sales psf regressions

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<sup>11</sup> Graduate School of Business, University of Chicago. Email:  
peter.pashigian@gsbpop.uchicago.edu.

<sup>\*\*</sup> Department of Economics, Hebrew University of Jerusalem. Email:  
mseric@mscc.huji.ac.il.

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<sup>1</sup>Two limitations of the micro data set deserve mention. First, the developer's existing rental properties represent the more successful malls since the developer has purchased and sold malls over time. It is possible that we have a self-selection problem since the more unsuccessful malls have been sold and the researcher is only observing the pricing practices of the successful malls. The developer's malls are not a random selection of all shopping malls because the developer has a comparative advantage in managing certain types of malls with respect to the size of mall and the quality of the merchandise sold at the malls. For example, we noticed that certain names of mall stores and anchors appear more frequently in our developer's malls than would appear if a random sample of malls was selected. While we recognize these deficiencies in the data, we believe the advantages of accessing such a rich data set more than offset these disadvantages.



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<sup>2</sup>While the availability of micro data opens up new research opportunities, all studies of shopping malls face a common problem. Because anchor contracts are often for 25 or more years, the rent that an anchor pays today was determined long ago and was a function of the anchor's expected sales and reputation at the time of signing. Between the initial signing of a contract and 1994, the year for which we have data, stores with stellar reputations for attracting consumers to malls in the fifties and sixties may no longer have exemplary reputations. Whether this is a serious or minor problem for a researcher depends on the magnitude of these reputational changes. According to our fundamental proposition, these changes will be reflected in changes in the rent paid by anchors. However, any change in an anchor's reputation cannot be inferred until a new contract is signed and, given the long term nature of most anchor contracts, a detection lag is inevitable.

<sup>3</sup>We are indebted to Jim Adams for this suggestion. The argument assumes that the anchor incurs a transaction cost if it did leave the mall.

<sup>4</sup>In only a few cases did we observe multiple thresholds with multiple sharing percentages.

<sup>5</sup>Another possible explanation is that developers are more risk adverse than the owners of mall stores. Since developers are often large firms while not all mall stores are, this hypothesis seems less plausible. However, if developers are constrained in financing projects themselves and must go to the credit market, then developers may appear risk adverse by writing their contracts so that base rent is a large percentage of rental income because of the demands of lenders.

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<sup>6</sup>See Bruckner for a model which predicts that a mall store contract should have a zero threshold.

<sup>7</sup>Lazear (1995 ) suggests that a policy of paying a salesperson a draw (minimum salary) and then paying a commission if sales exceed a certain level (threshold) is equivalent to requiring the agent to pay a fixed amount for the position and then to receive all the benefits from the agent's effort as long as the agent's sales equal or exceed the threshold. This explanation is not applicable for most mall stores since they pay rather than receive a monthly rent and their sales are often less than the threshold. Lazear's explanation is more appropriate if anchors are treated as agents that receive a fixed rent and an overage rent if the mall stores exceed the threshold. However, mall store sales often do not reach the threshold.

<sup>8</sup>Long term contracts are common in this industry and are presumably used to minimize switching costs and potential holdup problems between developers, anchors and mall stores. In our sample the average length of contract is 13 years for a mall store and 28 years for an anchor.

<sup>9</sup>To verify our assessments, we obtained independent assessments by members of the development firm which agreed with our assessments in most cases.

<sup>10</sup>While the average price level of the merchandise sold declines as we go from type 1 to type 3 department stores, we do not want to give the impression that the average price level is lowest in type 4.

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<sup>11</sup> Anchors that do not pay rent are not required to report their sales to the developer. Consequently, anchors with better reputations for attracting customers to a mall will not pay rent or report sales.

<sup>12</sup> Anchors that do not report sales or rents are probably also very successful in creating external economies so the comparisons across anchor types that are based on just those anchors that report sales and rent do not produce an unbiased estimate either.

<sup>13</sup> It is unlikely that the primary reason consumers go to malls is to eat at mall food stores and then, as an afterthought, to shop. A more likely scenario is that consumers go to the mall to shop and while at the mall they have a quick lunch. Hence, we believe that these groups are more likely to benefit from being in a mall and developers charge these stores a premium rent.

<sup>14</sup> These estimates measure only the effect on rent psf conditional on mean store sales and size and do not take account of any effect that anchors might have on rent psf through an increase in mean sales psf of mall stores in a product group.

<sup>15</sup> For this analysis the mean rent of anchors is calculated by including those anchors that do not pay rent which we set equal to zero.

<sup>16</sup> This can be demonstrated by regressing mean mall store rent psf on mean mall store sales psf for the other malls in the sample and then by comparing the actual versus predicted rent psf for these two malls. Since the standard error of the regression equation is \$2.78 psf, the actual mean mall store rent psf of the two malls in the high rent district exceeds the predicted rent comfortably by \$9.13 and \$5.70 or by 3.28 and 2.05 times the standard error.

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<sup>17</sup> A decrease in rent psf paid by an anchor implies that we are now considering an anchor that creates greater external economies.

<sup>18</sup> Since our results indicate that the average mall store would pay 94.6 cents less rent psf if the spillovers created by a mall's anchors decreased slightly so that the average rent psf paid by anchors increased by one dollar, we can multiply these figures by the gla of all mall anchors and the gla of all mall stores to determine for each mall by how much the developer's total rent would change if the developer hypothetically changed the anchors in the mall such that the average rent psf paid by the mall's anchors increased by a dollar. If such a change was introduced in each mall, the mean percentage change in total mall rent that the developer would collect *decreases* by .22 psf where the mean is calculated over all malls in the sample. It appears that on average the developer's pricing policies are not too far from the optimum.

<sup>19</sup> However, we do not know if this variable was created when the data base was originally developed and whether it has been updated thereafter. Nor can we say if the developer uses this income measure in the developer's own internal analyses.

<sup>20</sup> Of course, the number of times a store is included among the developer's malls will be inversely related to the price class of the merchandise sold by the store. A mall store that sells expensive merchandise will generally have lower sales psf and only be represented in the more upscale of the developer's malls.