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ABSTRACT

Contracts, Externalities and Incentives in Shopping Malls*

This Paper demonstrates that mall store contracts are written to internalize externalities through both an efficient allocation and pricing of space and an efficient allocation of incentives across stores. Certain stores generate externalities by drawing customers to other stores, while many stores primarily benefit from external mall traffic. Therefore, to varying degrees, the success of each store depends upon the presence and effort of other stores, and the effort of the developer to attract customers to the mall. Using a unique dataset of mall tenant contracts, we show that rental contracts are written to: (i) efficiently price the net externality of each store, and (ii) align the incentives to induce optimal effort by the developer and each mall store according to the externality of each store's effort.

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I. INTRODUCTION

This paper uses a unique data set of mall store contracts to analyze the complex economic issues that arise when stores are placed together in close proximity within a large shopping mall. While shopping malls economize on consumer search costs by bringing a large number of stores together in a single location, they also create a complicated web of externality and incentive issues between store owners and the mall developer.[1] Certain stores, such as anchor stores (department stores) and national name-brand stores, generate positive externalities by drawing customer traffic not only to their own store, but also to other stores. Meanwhile, many stores primarily benefit from the incidental mall traffic generated by other stores. Therefore, to varying degrees, the success of each store depends upon the presence and the effort of other stores, and also the effort of the developer to maintain the mall. However, contractual incentives designed to induce effort by an individual store often reduce the incentives for effort by the developer, and vice versa. This conflict is resolved with a contract which strikes a balance between the incentives of the store and the developer. But, in a mall, the importance of each store's effort to the overall performance of the mall is related to the net externalities generated by the store. Therefore, charging the same rent and designing the same level of incentives for each store would be highly inefficient: stores which generate the most externalities by their presence and effort should pay lower rents and have larger incentives to exert effort. Otherwise, the allocation of space and incentives would be sub-optimal.

This paper demonstrates that externalities are efficiently internalized by (i) subsidizing the rent of stores who generate mall traffic to other stores (and charging a rent premium to stores who primarily benefit from the traffic-generating efforts of other stores), and (ii) creating contractual provisions which align the incentives to induce optimal effort by the developer and each mall store according to the externality generated by each store's effort.

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[1] See Wolinsky (1983) for an explanation based on imperfect information for why similar stores want to locate near each other.

The analysis exploits a rich data set containing the rent, sales, and contractual provisions of over 2,500 stores in large shopping malls throughout the United States. The typical mall in our sample has three to four anchor stores (department stores) who are responsible for attracting most of the customer traffic to the mall. The size of the rent subsidies for anchor stores is astounding. On average, anchor stores occupy over 58% of the total leaseable space in the mall and yet pay only 10% of the total rent collected by the developer. The sheer size of this subsidy can only be explained by the vast externalities created by anchor stores. We demonstrate this hypothesis empirically by showing that an increasing presence of anchor stores in a mall generates higher sales, and consequently higher rents, of non-anchor stores. We also show that stores with a national name brand, who also tend to generate mall traffic, receive significant rent discounts. Furthermore, these results are not due to unobserved heterogeneity of store quality across malls. The data set includes multiple observations of the same store across different malls, and therefore, we are able to include a fixed-effect for each store in the analysis, thereby controlling for the unobserved quality of each store. Similarly, the results are not confounded by unobserved mall quality, as we also provide within-mall estimates to show how the rents of anchors are subsidized based on externality generation.

Beyond simply providing evidence that anchor stores are compensated in some way for the traffic that they bring to the mall, we argue that the contracts are designed to efficiently allocate space in the mall. We show that on the margin, sales from an additional square foot of anchor space are equal to those from an additional square foot of non-anchor space. Specifically, although sales per square foot for anchors are $133 less than those of non-anchors ($185 versus $318), an extra square foot of anchor space is predicted to increase the sales of non-anchor stores by roughly $120 through externalities, eliminating almost all the difference. Thus, our results are consistent with an efficient allocation of space within the mall.

However, externalities are created by anchor stores not merely by the act of locating in a mall. Instead, there are a multitude of unobserved actions taken by all stores which affect not only their own sales, but also those of other stores through the traffic that they bring to the

mall. Therefore, the developer depends on each store owner to exert effort not only to maximize their own store's profit, and consequently their willingness to pay more rent, but also to generate more traffic to other stores as well. At the same time, the success of the entire mall depends on how the developer maintains the mall over time – keeping it clean, remodeling it every few years, attracting the best stores, updating the mix of stores, keeping the mall competitive with other malls in the area, etc. As these actions from both parties are difficult to contract over, fixed rental contracts cannot be used to align incentives. This two-sided agency or team production problem is solved with a rental contract consisting of both a fixed rental component plus an *overage rent* provision which is contingent on store performance. The overage rent provision consists of two factors: a *threshold sales level* and a *sharing percentage*. When sales are below the threshold level, mall stores are required to pay only the fixed rental payment. Overage rent comes into play when mall store sales exceed the sales threshold. In this case, the store pays the fixed rental payment plus a fraction (the *sharing percentage*) of the store's sales in excess of the threshold level.

The contract, therefore, is general enough to accommodate large variation in the way incentives are allocated between the developer and the store. The more the contract is based on the fixed rental component (by increasing the threshold and/or lowering the sharing percentage), the store owner is increasingly rewarded for performance, thus incentives to stimulate effort by the store owner increase. However, incentives to the developer decrease as the marginal return to the developer's effort declines. Conversely, the more the contract is based on the overage component (by lowering the threshold and/or increasing the sharing percentage), incentives increase for the developer, but decrease for the store owner. Thus, incentives to one side come at the expense of incentives to the other side. Therefore, the contract trades off these conflicting incentives in order to elicit the efficient allocation of effort on both sides.

But, not all stores are alike. The effort of stores such as anchors generates externalities to other stores by attracting customers to the mall. Therefore, the flexible nature of these contracts allows the mall to internalize the externalities created by the effort of anchor stores,

by trading off the benefits of anchor effort compared to the effort of non-anchor stores. To see this, consider the effect of an anchor store generating more externalities through its sales. This has the straightforward effect that its rent should fall: we show that this is the case. Yet it is also the case that the marginal return to unobserved actions to increase sales by the anchor should increase. Seen from the perspective of agency theory, the marginal return to anchor effort should increase and so its "pay-for-performance" should rise (through higher thresholds and/or lower sharing percentages). We show that this is indeed the case, where anchors with greater externalities are typically offered not just lower average rents, but they also keep a higher fraction of their sales, in order to increase their incentives to generate externalities.

However, ceteris paribus, higher incentives for the anchor reduce the developer's marginal return to effort, thus decreasing incentives for the developer. We show that this reduction in incentives for the developer is compensated by increasing the developer's share of *non-anchor* sales (lowering non-anchor thresholds and increasing non-anchor sharing percentages), thus increasing the marginal return to effort to the developer. That is, incentives for the developer are still created, but mostly by the non-anchor stores. If anchors were required to stimulate effort by the developer equally with non-anchor stores, the effort of anchors would be inefficiently small, since their effort generates externalities. In this manner, externalities are internalized by shifting two burdens from externality generating stores to those stores which thrive off of them: (1) the rent burden, and (2) the burden of providing incentives to the developer to exert effort. This process allows the mall to achieve an efficient pricing and allocation of space, and an efficient allocation of incentives to exert effort by all participants.

Aside from developing a better understanding of how externalities are resolved in the context of shopping malls, we believe that the paper makes a contribution to the small empirical literature on agency theory. Empirical tests of the standard agency model typically concern the tradeoff of risk and incentives, where the marginal return to increased effort is traded against the cost of increased risk imposed on agents. Almost all tests of this model have examined the risk component of this tradeoff, by examining how changes in the volatility

of the environment affect incentives (see Prendergast (forthcoming) for details). Yet our data includes a very large developer and stores with large national name brands, so risk aversion should not be a major factor in determining the nature of their contracts. Furthermore, our empirical results cannot be influenced by variation in risk aversion across stores, since we control for the fixed-effect of each store in much of our analysis. Instead, our explanation is based on the idea that a team production problem needs to be solved where both the developer and the store owner are trying to elicit optimal effort from each other. As such, we are testing a more primitive implication of agency theory, namely, that incentives should increase when the marginal return to unobserved actions rises. We provide evidence in favor of this by showing that when the sales of anchor stores have a greater effect on the sales of other stores, the share of their own sales that they keep rises. Therefore, this paper provides direct evidence on how the desire to induce effort exertion increases observed incentives.

The paper is structured as follows. The next section describes our unique data set. The major differences in the contract provisions between anchor and non-anchor stores are identified in Section III. Section IV demonstrates the efficient pricing of externalities within the mall, and Section V analyzes the allocation of incentives provided by the contract provisions. Section VI concludes the discussion.

II. SOURCE OF DATA

The dearth of empirical studies of malls is partially explained by the absence of detailed and extensive mall store data.[2] Developers are reluctant to give researchers access to confidential data. We are fortunate that a large national developer of malls agreed to provide detailed data for over 2,500 stores in over 35 large malls across the United States. For each

[2] Pashigian and Gould (1998) did not examine contractual specifications at all, and used aggregated rent and sales data by product category to examine the pricing of externalities. Benjamin et al. (1990, 1992) examined contracts for stores in a very limited number of small shopping centers, not a large sample of large malls as in our case, and did not have data on actual sales, as we do.

store, the data include information such as sales, rent, size, store name, product category, lease length, year the lease began, and other contract provisions (base rent, sales threshold level, and sharing percentage). Variables for each mall include the name, size, age, surrounding population size (number of households with income above $35,000), and composition of stores. Data for the year 1994 is used in the analysis. This is by far the most comprehensive data set of store contracts in 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.[3]

III. THE CONTRACTS OF ANCHOR AND NON-ANCHOR STORES

The importance of externalities and incentives are reflected in the contractual differences between anchors (department stores) and non-anchor stores. For all stores, the rental payment is determined by three provisions in the contract: (1) the *fixed base rent*, (2) the *threshold level of sales*, and (3) the *overage sharing percentage*. Each month, a store must pay the specified fixed base rent. If the store's sales exceed the threshold level, the store must also pay an *overage component* equal to a percentage (determined by the overage *sharing percentage*) of sales above the threshold level. That is, some stores theoretically may have to pay a portion of their sales above the threshold, but if their sales do not exceed the threshold in practice, the store just has to pay the base rent. In this manner, the provisions of the lease are flexible enough to determine how much the rent will be based on the performance (sales) of the store, and how much is fixed in advance. Furthermore, the contract establishes conflicting

[3] Possible limitations of the data set deserve mention. First, the developer's existing rental properties may 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 may also have a comparative advantage in managing certain types of malls. Casual observation, however, indicates that the sample includes a fairly representative cross-section of malls and mall stores across the United States. Another limitation is that our data comes from one developer, and therefore, we do not have a cross-section of behavior by different developers. While we recognize these possible deficiencies in the data, we believe the advantages of accessing such a rich data set more than offset these disadvantages.

incentives between the store owner and the developer: the more the rental payment is determined by the fixed component (higher thresholds and/or lower sharing percentages), incentives to the store owner increase as its "pay-for-performance" rises, but incentives to the developer decrease as the marginal return to its effort falls. Conversely, the more the rental payment is determined by the variable component (lower thresholds and/or higher sharing percentages), incentives rise for the developer but fall for the store owner.

Table 1 presents the basic summary statistics regarding contracts provisions for anchor and non-anchor stores. The most striking feature of anchor contracts is that most anchors either do not pay any rent or pay only a trivial amount. According to Table 1, seventy-three percent of anchor stores pay nothing to the developer, in contrast to zero percent for non-anchor stores.[4] In some of these situations, the anchor owns its building and sometimes the land, an arrangement that is negotiated between the developer and the anchor usually before the mall opens.[5] However, the fact that many anchors own their structure cannot explain why anchors pay so little rent to the developer. Some anchors do not own their own store and explicitly pay no rent – as shown in Table 1 by the fact that 73% actually pay zero rent while only 70% are specified to pay zero rent according to their contract. That is, three percent of the anchors have a zero base rent and do not reach their threshold level of sales, thus paying no rent even though theoretically they could if their sales were high enough. Even if we look at

[4] A possible explanation for why anchors pay so little follows in the spirit of Rauch (1998) which examined the pricing of space in industrial parks where agglomeration economies are present. Rauch (1998) argues that developers will charge lower rents for space initially and then gradually raise rents in a new industrial park as the park fills up because late arriving tenants experience greater 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 signing them first also allows developers to obtain lower cost financing. It is difficult to justify why the developer would basically give away half of the total mall space for free based on agglomeration economies. In office buildings, space is also discounted for the first large renter, but it is never given away for free because externalities are not so important within office buildings.

[5] Anchors with well established local market reputations are often in a commanding bargaining situation so that developers pay for some or all of the construction costs and agree to pay for remodeling costs even though the anchor technically 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 since anchors, unlike other mall stores, create large externalities. When an anchor owns the structure, anchor shirking is less likely because it reduces the value of the structure. 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.

anchors which do pay rent, Table 1 shows that their average rent per square foot ("psf" hereafter) is only $4.13 versus $29.37 for non-anchors.[6] Clearly, ownership status of the store can explain only a small proportion of the substantial rent discounts received by anchors. Given that the average anchor store takes up 17% of the total space in a mall and there is an average of 3.4 anchors per mall, giving away space to anchors is a very costly endeavor for the developer. Therefore, in order to justify this behavior as rational, it must be the case that the developer is compensating the anchor for generating traffic to the mall, and thereby enabling the developer to charge higher rents for the remaining space. In later sections of this paper, we demonstrate this empirically by showing that stores who benefit from the externalities generated by anchors are indeed charged a premium for them, so that the pricing and allocation of space is efficient within the mall.

The second most striking feature of Table 1 concerns the sharing percentages. First, the non-anchor stores are more likely to have sharing provisions in their contracts, with only 1% of non-anchors stores required to pay base rent only, compared to 76% of anchor stores. Second, although 99% of non-anchor stores have a threshold level of sales specified in their contract, only 18% of them reach this threshold level. In contrast, few anchors (24%) are eligible to pay overage, but similar to non-anchors, many of them do not reach the threshold level (only 14% reach the threshold). Overage rent accounts for 5.8% of the total rent collected by our developer in 1994.[7] Apparently, the threshold levels are set so that the probability of exceeding them is not high, and therefore, the store owner keeps the entire marginal return to his additional effort in most cases.

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[6] These results are not unique to our developer. "Dollar and Cents of Shopping Centers 1993" reported that department stores that owned their own structure paid just $0.87 per square foot for rent while department stores that leased mall space paid $1.95 per square foot. These rental figures pale in comparison to the mean rent per square foot of $16.42 received from all stores (anchors and mall stores) by mall owners. See also Pashigian and Gould (1998).

[7] These results are similar to the industry average. Using median rent data from Dollars and Cents, 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.

These findings present clear evidence that these contracts are not designed to share risk, since risk is not being shared very evenly. In most cases, the store owner is paying only the fixed component, and therefore, bearing all the risk. These results contrast with the existing literature on similar contracts (such as sharecropping and franchising) which usually focuses on the role of risk sharing to explain the form of contracts with a fixed and variable component.[8] Another stark difference is that franchise contracts are determined mostly by the variable component, whereas here they are clearly based more on the fixed component (see Lafontaine and Shaw (1999)). Therefore, we argue that the rental contract in this case is designed more to align incentives when effort is not fully observable and difficult to contract over. Specifically, the evidence suggests that high sales are informative that the developer's effort played a crucial role in its success, and consequently, the developer is rewarded only when sales exceed a high threshold level. In this manner, stores are encouraged to exert effort by letting them keep the entire marginal return to effort up to a certain point, and then after that point, developers are rewarded for the effort required to make the stores sufficiently successful. As a result, both the developer and the store owner provide incentives against shirking behavior by the other side.

The third striking regularity in Table 1 is that anchors have much lower sharing percentages than non-anchor stores. The average sharing percentage is 0.47% for anchors and 6.27% for mall stores; developers assess a much lower marginal tax rate on sales above the threshold for anchors than non-anchors. This is consistent with the idea that not only is the rent burden shifting from anchor stores to non-anchor stores, but in addition, the burden of providing incentives to the developer is also being shifted to non-anchor stores.[9] We argue that this is just another mechanism to internalize the externality generated by the effort of

[8] See Cheung (1969), Stiglitz (1974), and Holmstrom (1979) for some of the classic papers. Recent evidence is summarized and provided in Prendergast (1999) and Lazear (1995, 2000). Analyzing a market for the services of agents in a principal-agent setting, McAfee and McMillan (1987) show that the optimal contract is linear in performance, which clearly is not the case here.

[9] This result is consistent with the model in Brueckner (1993).

anchors stores: if store effort needs to be "taxed" to generate incentives to the developer, it is more efficient to tax the effort of stores who do not generate externalities. Further support is demonstrated later by showing that non-anchor stores with larger brand reputations are also "taxed" less on their marginal effort, due to the externalities they generate for other stores with no brand name recognition.

This section presented the striking differences in contracts between anchors and non-anchor stores, and discussed how the contract internalizes externalities through differential rent payments and incentive parameters across stores. The remaining sections of the paper analyze these issues more formally and extensively.

IV. THE EXTERNALITIES OF ANCHORS

This section demonstrates that a primary function of malls is to price the net externality of anchor stores in order to achieve an efficient allocation of space. The analysis shows that anchors generate positive externalities by increasing the sales of non-anchor stores, and in turn, non-anchor stores pay for those benefits through higher rents. We show this by demonstrating the effect of all anchors together, and also by exploiting heterogeneity across types of anchor stores. Therefore, we begin by distinguishing different types of anchor stores by classifying them into four types based upon their reputation and quality of merchandise.[10] The four types of anchors are broadly defined as follows:

Type 1: Prestige/fashion department stores. These stores usually operated in only one or a few markets until recently when they expanded into more regional and national markets, often by entering into existing malls. (11% of anchor stores.)

[10] To verify our assessments, we obtained independent assessments by members of the development firm who overwhelmingly agreed with our assessments.

Type 2: High to moderate quality department stores with national reputations since the 1950s and 1960s. These stores were usually in the mall right from the beginning and were eagerly recruited by developers to establish the mall. (18% of anchor stores.)

Type 3: Lower quality department stores with mostly local or regional reputations. (30% of anchor stores.)

Type 4: Department stores that are members of very well-known *national* chains that have long operated in many markets. These stores were also usually in the mall right from the beginning and were eagerly recruited by developers to establish the mall.[11] (41% of anchor stores.)

Table 2 presents the summary statistics for all anchors and for each type of anchor.[12] The type 1 anchors are noticeably different from the other anchors. For example, row 5 shows that type 2 and 4 anchors were usually part of the mall when it opened, while type 1 anchors entered the mall an average of 8.6 years after the mall was opened. Consequently, malls were typically built around the original type 2 and type 4 anchors in the mall, which can explain why type 1 anchors pay the most rent and have the highest sharing percentages (row 9) – the developer is not relying on the type 1 anchors so much for generating externalities, and therefore, charges them a higher rent and taxes their effort more than the other anchors. Among the other anchors, the type 3 anchors are considered the weakest due to their smaller size (row 1), later entry into the mall (row 5), higher likelihood of paying rent (row 7), higher sharing percentage (row 9), and higher probability of paying overage (row 10). Overall, Table 2 indicates that type 2 and type 4 anchors play a particularly important role which suggests that

[11]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.

[12]Anchors that do not pay rent are not required to report their sales to the developer. Consequently, the sales data is incomplete.

they generate the most externalities.[13] The empirical analysis will generally confirm this first impression.

To measure the importance of anchors within a mall, we use the percent of total mall space occupied by anchors (mean = 58%, standard deviation 9.8%). The premise here is that the higher the percentage of mall space occupied by anchors, the higher the externalities generated for the benefit of non-anchor stores. Consequently, the analysis aims to identify whether the increased presence of anchors generates larger sales for non-anchor stores, and if so, whether those stores pay for the externalities through higher rents. Recognizing that our classification of anchors is not an exact science, the entire analysis is performed with and without using the classification scheme. In this manner, the results will speak to the main effect of anchors in general, and then reveal some interesting patterns by exploiting the heterogeneity across the different types of anchors.

We begin our analysis of externality generating in Table 3 by presenting the effect of anchors on non-anchor store sales after controlling for other store and mall characteristics designed to capture unobserved store and mall quality. The control variables include store brand recognition (defined as the number of times the same store appears in our sample of malls: mean = 8.8, standard deviation = 8.3), store size, age of the store's lease, mall characteristics (number of households within a 10 mile radius with income above $35,000, size of the mall, age of the mall, and mean store brand recognition of stores within the mall), and 23 product category dummy variables.

As shown in column (1) of Table 3, increasing the percentage of mall space occupied by anchors increases the sales psf (per square foot) of non-anchor stores. This result shows

[13] Because anchor contracts often extend for 25 or more years, the rent that an anchor pays today was often 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. 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.

that if developers dedicate more space to anchors, which in most cases means practically giving it away, more customer traffic will be generated to the mall, thus increasing the sales of non-anchor stores. Furthermore, column (2) of Table 3 demonstrates that the increasing presence of type 2 and type 4 anchors increase the sales of non-anchor stores more than types 1 and 3.

Yet if anchors generate sales for other stores, what implications does this have for the rents of the non-anchor stores? Table 4 presents the regressions explaining non-anchor rents with the same control variables specified in Table 3. Column (1) shows that non-anchor stores pay more to be in malls with more space occupied by anchors. These results are consistent with the results in Table 3 in the sense that non-anchor stores are shown to pay for the increased sales that stem from the presence of more anchor space. Column (2) of Table 4 shows that non-anchor stores pay more to be with anchors of type 2 and type 4, which are exactly the anchor types shown to most increase the sales of non-anchor stores.

Columns (3) and (4) in Table 4 replicate the regression specifications in the first two columns but also include the sales psf of the store as an independent variable. The coefficients on anchor space are dramatically reduced once we control for sales. However, this is to be expected since non-anchor stores are paying higher rents because of the higher sales generated by anchor stores. Once we control for sales, the positive (albeit dramatically reduced) effect of anchors on non-anchor rents says that non-anchor stores are paying a premium to be with certain anchors regardless of their effect on sales. Since this effect is weakest for type 3 anchors, which are considered to be the weakest (less fashionable and/or less well-known), the results suggest that being in the same mall with strong anchors either lowers their costs or benefits the image of a non-anchor store, and therefore, non-anchor stores are willing to pay a premium for this external benefit as well. However, the main result stemming from columns (3) and (4) is that most of the premium charged to non-anchor stores is directly related to the increased sales generated by the presence of the anchor stores.

Table 4 also shows that stores with a higher brand name recognition pay lower rents. This result holds up if we control for sales or not, which is consistent with the results in Table

3 which showed that brand name recognition does not increase sales. Therefore, developers discount the rents for brand name stores, which suggests that they too are producing benefits to the mall which demand compensation. These benefits could include drawing customers to the mall by their brand recognition or by national advertising campaigns.

The generation of externalities carries implications not only for the rents paid by non-anchor stores but also those paid by anchors. Specifically, anchors should receive rent discounts in order for their externalities to be internalized. Indeed, Tables 1 and 2 showed that anchors on average pay much less rent than non-anchor stores, and more support is found in Table 5 which regresses the rent of anchor stores (only the ones that actually pay rent) on the percent of mall space occupied by anchors. Table 5 shows that a higher anchor presence in the mall reduces the rent paid by anchors in the mall, even conditioning on the sales and anchor type. Furthermore, a higher anchor presence does not significantly affect the sales of anchor stores, and therefore, the rent discounts appear to be a result of the higher externalities.

IV.1. Heterogeneity Problems

So far, we have shown that those malls which have more anchor space, and certain types of anchors, have non-anchor stores with high sales and rents. The interpretation that we ultimately place on this is that the anchors are the causal factor in this correlation. However, to do so we must first consider some heterogeneity issues that could cause such a correlation with no causal inference.

1. Heterogeneous Store Quality

A potentially serious problem in the regressions above is that the percent of space occupied by anchors could be correlated with the quality of stores in the mall. More precisely, if higher quality stores generate higher sales and are charged higher rents, then the results in Table 3 and 4 would be spurious if higher quality stores tend to be in malls with more anchor space. Fortunately, the data set is rich enough to control for unobserved store quality because we observe the same exact store in an average of 8.8 malls in our sample. By including a dummy variable for the specific store, we can control for unmeasured store quality by seeing if

the same store pays more to be in the presence of more anchor space. The results for the "fixed store effects" regressions are presented in Tables 6 and 7. Since multiple observations are needed for the same store, the sample is restricted to non-anchor stores which appear in at least five different malls. This restriction reduces the number of observations significantly, but the remaining sample is still very sizeable (over 1,500 observations). The regressions include the same covariates used in Tables 3 and 4.[14]

The sales results in Table 6 are very similar to the results in Table 3 (which did not include fixed store effects). An increased overall anchor presence generates higher sales, and the effects generated by the type 2 and type 4 anchors are now more pronounced. The rent results in Table 7 are also unchanged from the results in Table 4 – an increased anchor presence generates higher rents, especially the type 2 and type 4 anchors. Again, controlling for sales in the rent regressions dramatically reduces the effect of the presence of anchors, which is expected since the effect of anchors is primarily through the effect on sales. As shown in the last two columns of Table 7, non-anchor stores are still willing to pay a premium to be with more anchors regardless of the effect on sales, but this is mostly limited to the premium associated with being near prestigious high-fashion (type 1) anchors. Most likely, non-anchor stores receive reputational benefits by being near type 1 anchors, and these are priced accordingly by the developer.

2. Heterogeneous Malls

Another concern is that there is variation in the quality of malls. For example, some malls could be located in better areas, and have high quality anchors. This would explain the high rents and sales of non-anchor stores, but would not imply any causal relationship between anchors and non-anchor stores. Our regressions have included several measures designed to capture the location quality of the mall, such as the number of households in the area with income above $35,000. However, these measures are not perfect, and if total anchor space is

[14] The fixed store effect implicitly controls for name brand recognition and product category, so these dummy variables had to be dropped due to perfect multicollinearity.

positively correlated with unobserved mall location quality, then this could be responsible for the positive relation between anchor space and the rents and sales of non-anchor stores found in Tables 3 and 4. However, it is likely that unobserved location quality is negatively correlated with total anchor space, since location quality and anchor space should be substitutes rather than complements in the production of customer traffic to the mall. In other words, developers should be less likely to give away more space (practically for free) to anchors if the location is very good. If this is the case, our coefficients should be biased towards zero. However, this section is designed to show that our results are robust to controlling for unobserved mall location quality.

To control for unobserved mall heterogeneity, it is not possible to simply use mall-specific fixed-effects in the preceding analyses, since as our data are cross sectional these dummy variables would be perfectly collinear with our anchor size measures. Instead, our empirical strategy relies on the stark differences in the importance of externalities and incentives across product categories. For example, a fast-food restaurant, which presumably relies heavily on mall traffic created by anchors, will receive relatively more benefits by the increased presence of anchors than say a women's clothing store, which relies less on externally driven customer traffic.[15] Therefore, the empirical strategy is to control for the mean performance of all non-anchor stores in the mall, and then see if anchor size has differential effects on stores according to their product group. In other words, in contrast to previous analyses, we now assume that the effect of anchor size differs across product groups, thus requiring an interaction between product group and anchor size in the regression specifications. To do this, we develop the following two-stage strategy. In the first stage, the dependent variable is the deviation of a store's sales psf from the mean sales psf in the mall:

$$sales_{ijk} - meansales_k = \alpha + \left(\sum_{j=1}^{23} \beta_j \cdot group_j \cdot anchorsize_k \right) + u_{ijk}$$

[15] This is verified by the dummy coefficients for each product category in Tables 3 and 4. The sales coefficients for the regression in Table 3 (column 1) are 158.92 for fast-food stores and -96.52 for women's ready-to-wear. The rent coefficients for the regressions in Table 4 (column 1) are 23.24 for fast-food stores and –6.12 for women's ready-to-wear stores. All coefficients are significant.

where $sales_{ijk}$ is sales psf for store *i* in product group *j* in mall *k*, $meansales_k$ is the mean sales psf for all non-anchor stores in mall *k*, $group_j$ is a dummy variable for belonging to product group *j*, $anchorsize_k$ is the percent of all space in mall *k* occupied by anchor stores, and u_{ijk} is a random store-specific disturbance term. By using the "sales deviation" from the mean sales in the mall, the regression controls for any unobserved mall heterogeneity which may effect the sales of all stores in the mall. Using the estimates from this regression, the predicted "sales deviation" for each store is then used as a regressor in the second stage:

$$rent_{ijk} - meanrent_k = \delta + \mu \cdot \text{PREDICTED}(sales_{ijk} - meansales_k) + \pi \cdot (x_{ijk} - meanx_k) + v_{ijk}$$

where $rent_{ijk}$ is rent psf for store *i* in product group *j* in mall *k*, $meanrent_k$ is the mean rent psf for all non-anchor stores in mall *k*, x_{ijk} is a vector of store-level characteristics, $meanx_k$ is a vector of means for variables x_{ijk} in mall *k*, and v_{ijk} is a random store-specific disturbance term. Therefore, we take the "sales deviation" which is predicted only by the interaction of group dummies and anchor size from the first stage, and see if it can explain variation in "rent deviations" in the second stage. Again, "deviations" from mall means are used to control for unobserved mall heterogeneity which should effect all non-anchors stores in the mall. Identification of the externality effect, therefore, comes from the differential externalities generated by anchors to the various product groups.

The results for the second stage are presented in Table 8.[16] Similar to our previous results, an increase in the relative sales of a store significantly increases the relative rent paid by that store within a mall. That is, stores pay for the external benefits derived from being in the presence of more anchor space by paying higher relative rents, so we are confident that our earlier results are not generated by unobserved mall quality.

[16] The store-level control variables are the same ones used in previous analyses. Estimation of the two stages is performed using a standard Two-Stage Least Squares procedure where both the rent and sales deviations are treated as endogenous variables and the instrumental variables are the interactions of anchor space with 23 product group dummy variables. The standard errors, therefore, are properly calculated using this procedure.

Overall, this section shows that anchors generate externalities through higher sales of non-anchor stores, and consequently, non-anchor stores are charged according to the benefits they receive. Due to the rich source of data, this is the first empirical analysis that can control for unobserved store quality in the analysis – the same exact store pays a premium to be with more anchors due to the higher sales generated by those anchors. These results justify the enormous rent discounts for anchors observed in Tables 1, 2, and 5. In addition, the evidence suggests that non-anchor stores with a national brand name also receive rent discounts, which is likely due to their ability to attract customer traffic to the mall. Consequently, the developer charges and compensates stores according to the net externalities generated by each store.

IV.2. The Efficient Allocation of Space

Economists are concerned with externality issues as they potentially involve the misallocation of goods. In this context, a failture to internalize the benefits of the anchor stores would imply too little space allocated to anchors, as they may fail to garner all the returns to their activities on the margin. Our results suggest that the rental contracts offered to the relevant parties result in an efficient allocation of space in the mall. To see this, note from Table 1 that the mean sales psf of anchors are $185, below the equivalent figure of $317 for non-anchor stores. Yet from Table 3 the marginal effect of increasing anchor space by 1% is to increase the sales of non-anchor stores by $277. Appropriately renormalizing into a square foot calculation yields that total sales by non-anchor stores rise by $120 when an anchor is increased by one square foot. Adding this to the sales of a typical anchor store yields $305, which is not statistically different to our estimate of $317 for the non-anchor stores. As such, we feel that the contracts offered by the developer not only offset some of the externalities generated by the anchor, but do so in an efficient fashion, at least on the dimension of total mall sales.[17]

[17] Ideally we would like to know profits rather than sales, to identify whether the developer maximizes joint profits rather than sales. However, such data are not available.

V. THE INCENTIVES OF THE OVERAGE PROVISIONS

The previous section showed that the presence of certain stores generates externalities, and consequently, rent subsidies and premiums are charged in order to achieve an efficient allocation of space within the mall. However, externalities are also generated by the actions that anchors take, such as marketing campaigns, maintaining cleanliness, courtesy, product variety, and so on. We argue here that the structure of the three provisions in each contract: the fixed base rent, the threshold level of sales, and the overage sharing percentage, is designed with such incentives in mind. As shown in Table 1, the sharing percentages of non-anchor stores are much higher than anchor stores, and the probability of reaching the threshold is roughly equal for all types of stores. These results are suggestive of a desire by developers to stimulate the effort of anchor stores by not taxing the value of their marginal activities.

Consider a simple model of incentives where the output (profits) of the anchor stores depends additively on the effort of the anchor store and the developer:

$$y_a = e_a + \delta_a e_d,$$

where *y* refers to output, *a* (*d*) refers to the anchor (developer), and δ_a is the marginal product of the developer's effort on anchor profits. For non-anchors, there is an additional effect in that the effort of all parties affects their profit:

$$y_n = e_n + \delta_n e_d + \alpha e_a,$$

where *n* refers to non-anchor stores and α measures the extent of externalities.

For simplicity, assume that each agent has a cost of effort, $c(e_i) = e_i^2 / 2, i = a, n, d.$ The contracts offered to the parties are rental contracts, which consist of a fixed rent $\overline{r_i}$ and a variable part, where the rent paid by the store is discounted on average[18] by β_i per unit of sale:

[18] This average is the probability of reaching the threshold times the sharing percentage.

$$r_i = \overline{r_i} + \beta_i y_i .$$

This is a simple team production problem where incentives need to be provided to all parties through the $\beta_{i.}$ Routine calculations show that:

$$\beta_a = \frac{\delta_a^2 + \delta_n \delta_a - \frac{\delta_a^2 \delta_n^2 + \delta_a \delta_n^3}{1+\delta_n^2} - \alpha}{1+\delta_a^2 - \frac{\delta_a \delta_n^2}{1+\delta_n^2}}$$

and

$$\beta_n = \frac{\delta_n \delta_a + \delta_n^2 - \delta_n \beta_a}{1+\delta_n^2}$$

Externality generation then has two effects on the sharing rules. First, the sharing percentage of the anchor is decreasing in α, the extent of externality generation. Second, the sharing percentage of the non-anchor is *increasing* in α. We test and validate both of these predictions empirically.

First note from Table 2 that anchor types 2 and 4, those which yield the most externalities, pay lower sharing percentages than the average of 0.48%. They are also less likely to exceed the threshold for paying overage rent. These results support the first prediction of the effect of externalities on incentives.

To address our second prediction, that non-anchor sharing percentages rise with anchor externalities, Table 9 presents regressions explaining the sharing percentage of non-anchor stores using the same variables used in the previous analyses. The regressions are performed with and without controlling for fixed store effects, although the results are again very similar using both methods. The estimates reveal that an increase in the percentage of anchor space in the mall significantly increases the sharing percentages of non-anchor stores. This result is consistent with our hypothesis. A higher presence of anchors in a mall generates larger externalities, as seen in the previous sections, and therefore, anchor effort is stimulated through lower sharing percentages. But this reduces the incentives of the developer, ceteris

paribus, so contracts with the non-anchor stores compensate for this by increasing the developer's share on the margin. In other words, the burden of stimulating the effort of the developer is increasingly placed upon the non-anchor stores when anchor effort is shown to generate more externalities. Otherwise, anchor effort would be inefficiently small.

Table 10 presents logit regressions which explain whether a store pays overage or not (i.e. whether the store's sales exceed the threshold or not). Although only 18% of non-anchor stores reach this threshold (Table 1), Table 10 shows that an increased anchor presence increases the likelihood that a store will reach the threshold, and this is true even controlling for fixed-store effects. This result is consistent with the results in Table 9 in the sense that both sets of results show that in increasing presence of anchors increases the importance of the overage rent component by: (i) increasing the likelihood that the store will reach the threshold (Table 10); and (ii) increasing the sharing percentage once that threshold is reached (Table 9). For the same reasons stated above regarding the results to Table 9, an increasing anchor presence generates more externalities, and therefore, non-anchor stores increasingly pick up the burden of stimulating developer effort by decreasing the threshold and making their rents more dependent upon sales performance.

The results for name brand stores in Tables 9 and 10 tell a complex story. On the one hand, an increased brand reputation decreases the sharing percentage (Table 9). However, larger brand recognition increases the likelihood that the store will reach the threshold (Table 10). Both of these work in opposite directions on the importance of the overage rent component. One possible interpretation of these results is that the developer does not want to tax the effort of national brand stores because they generate externalities to other stores in the mall, thus they have a low sharing percentage. However, the national brand store still wants to provide incentives to the developer, so they request a low threshold. Typically, a developer does not like a low threshold since it provides disincentives for effort by the store owner, but for a store trying to establish a national brand reputation, these incentives are likely to be less important. Therefore, contracts for brand name stores result in lower sharing percentages and lower thresholds than stores with weaker reputations.

Overall, this section demonstrates another important way that externalities are internalized within a mall. The last section explained variation in the rents of stores according to their net externality, thus showing how space is allocated efficiently within the mall. In this section, we demonstrated that variation in contractual incentive parameters across stores can be explained by their net externality. In this manner, contracts are written to achieve an efficient allocation of incentives across stores, and an alignment of incentives between the stores and the developer.

VI. CONCLUSION

While shopping malls economize on consumer search costs by bringing a large number of stores together in a single location, they also create a complicated web of externality and incentive issues between the mall developer and the various types of store owners. The empirical literature on incentives and externalities within shopping malls is surprisingly sparse, most likely to due to the lack of data at the store level.[19] Although the structure of rental contracts is similar to those in other principal-agent settings (such as sharecropping, salespersons, franchising, etc.), rental contracts in malls appear to be functioning in a very different way. Using a unique data set of mall store contracts, we show that mall contracts are

[19] Empirical support for the externality hypothesis has emerged only recently in Pashigian and Gould (1998). However, Pashigian and Gould (1998) did not have data at the store level, and consequently, did not examine the structure of the contract or the interplay of agency and externality issues. Benjamin et al. (1990, 1992) examined the contracts of stores in a small number of neighborhood shopping centers, but small shopping centers are different creatures than large shopping malls and their samples were much smaller than ours. Neighborhood shopping centers are typically anchored by a supermarket, while malls are anchored by a few large department stores. Benjamin et al. (1990) studied the lease characteristics in five shopping centers in a single market. Differences in rent 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) as a proxy variable for the presence of positive externalities -- arguing that a store with higher sales generates more store traffic that, in turn, creates positive externalities for other stores in the mall. They found that store sales per square foot were inversely related to store rent per square foot. In addition, these studies used imputed rent and sales figures based on the average sales and rent data for similar shopping centers. In contrast, our data set is very large and includes actual rent and sales data (as well as the contract specifications).

written to internalize externalities not only through the efficient pricing of space in the mall, but also through the induced optimal effort of the various store owners and the developer.

Controlling for the fixed-effects of individual stores and for malls, the analysis shows that a greater presence of anchors in a mall directly increases the sales, and consequently the rents, of non-anchor stores in a mall. Furthermore, the analysis shows that externality generating stores, such as anchors and name-brand stores, receive rent subsidies. Our calculations show that this differential pricing of space within the mall yields an efficient allocation of space.

Beyond showing that differential rents are used to price the net externality of each store, we show that contracts are designed specifically to distribute the optimal amount of incentives to exert effort to each of the three major participants in a mall: the developer, the anchors, and the non-anchor stores. Incentives need to be created for all three, but the contract between any given store and the developer can only increase incentives for one side at the expense of the other side. Considering that the effort of some stores generates externalities for all stores, treating each store contract equally would result in an inefficient allocation of incentives, since too little effort would be induced by the externality generating stores. Therefore, the effort of stores which generate externalities should be stimulated more, while the burden of providing incentives to the developer is shifted to the stores which benefit from externalities. Our analysis verifies this prediction: anchor stores have much lower sharing percentages than non-anchor stores, and variation in the sharing percentages of non-anchor stores is significantly explained by the externalities they enjoy (even after controlling for fixed store-effects). Furthermore, the probability that a non-anchor store exceeds their sales threshold is also explained by the externalities they receive. Consequently, we show that externalities are internalized by an efficient allocation of space and incentives across stores in the mall.

In this manner, this paper makes a contribution to the small empirical literature on agency theory. Empirical tests of the standard agency model typically concern the tradeoff of risk and incentives, where the marginal return to increased effort is traded against the cost of

increased risk imposed on agents. Almost all tests of this model have examined the risk component of this tradeoff, by examining how changes in the volatility of the environment affect incentives (see Prendergast (forthcoming) for details). In contrast, we show that mall contracts are written to solve a team production problem where both the developer and the store owner are trying to elicit optimal effort from each other. As such, we are testing a more primitive implication of agency theory, namely, that incentives should increase when the marginal return to unobserved actions rises. We provide evidence for this by showing that the unobserved actions of stores which generate externalities are stimulated through contracts which are mostly independent of performance, thus increasing their marginal return to unobserved activities. Consequently, this paper provides direct evidence on how the desire to induce effort exertion increases observed incentives.

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Table 1: Contracts of Anchors Versus Non-Anchor Stores

	Anchors	Non-Anchors
	(1)	(2)
	Actual Rental Payments and Sales	
Pay No Rent	73%	0%
Pay Base Rent Only	13%	82%
Pay Overage Rent	14%	18%
Mean Rent PSF	$4.13	$29.37
Mean Sales PSF	$185.34	$317.68
	Specified by Contract	
Pay No Rent	70%	0%
Pay Base Rent Only	6%	1%
Pay Overage Rent	24%	99%
Mean Overage Sharing Percentage	0.48%	6.27%

Notes: For anchor stores, the mean rent psf are only for stores which pay a positive rent, and the mean sales psf are only for anchor stores which report sales psf. Anchor stores which do not pay any overage rent are not required to report sales, so the sales data is incomplete for anchor stores. If an overage provision is specified in the contract, it does not mean that the store will actually pay overage. The store actually pays overage only if sales exceed the specified threshold.

Table 2: Summary Statistics for Anchors

		All Anchors	Type 1	Type 2	Type 3	Type 4
1	Mean Gross Leasable Area (sq. ft)	155,378	148,460	200,800	137,481	150,334
2	Mean Number of Anchors in Mall	3.83	3.79	3.88	3.76	3.85
3	Mean Size of Mall (sq. ft)	970,346	1,158,948	1,043,470	877,727	957,787
4	Mean Lease Start Date (year)	1981	1983	1979	1982	1980
5	Mean Difference Between Anchor's Lease Start Date and Mall's Start Date (years)	3.31	8.64	1.67	3.20	2.75
6	Mean Sales PSF for Anchors Reporting	185.34 (N=34)	291.57 (N=8)	220.45 (N=2)	155.66 (N=11)	139.68 (N=13)
7	% Paying Rent	29%	64%	13%	33%	25%
8	Mean Rent PSF (for those that pay)	4.13	7.14	3.86	3.78	2.57
9	Mean Sharing Percentage	0.48%	1.21%	0.08%	0.63%	0.33%
10	Percent Paying Overage	14%	36%	8%	17.5%	9%
11	N	133	14	24	40	55

Table 3: Explaining Sales PSF (Per Square Foot) of Non-Anchor Stores

Independent Variables	OLS Regressions Dependent Variable: Sales PSF (1)	(2)
Percent Mall Space:		
All Anchors	277.30** (40.67)	
Type 1 Anchors		294.75** (49.75)
Type 2 Anchors		462.07** (56.14)
Type 3 Anchors		285.08** (45.99)
Type 4 Anchors		335.44** (45.09)
Store Brand Recognition	0.41 (0.41)	0.39 (0.41)
Store Size	-0.003** (0.00006)	-0.003** (0.0006)
Year Store's Lease Began	-0.43 (0.59)	-0.49 (0.59)
Mall Characteristics	Yes	Yes
Product Category Dummy Variables	Yes	Yes
N	>2,500	>2,500
R-square	0.33	0.34

Standard errors are in parentheses. * indicates significance at the 10% level, ** indicates significance at the 5% level. All regressions include a constant. Store brand recognition is calculated as the number of times (malls) the same store appears in the sample. Additional mall characteristics include: number of households within 10 mile radius of the mall with income above $35,000, age of mall, size of mall, and mean store brand recognition in the mall. Product category dummy variables are for the following types of stores: athletic shoes, children's shoes, family shoes, fast food, food specialty, general merchandise, gift, health, hobby, furniture, jewelry, men's shoes, men's ready-to-wear, music, other apparel, other retail, personal services, recreation, restaurants, unisex apparel, women's ready-to-wear, women's shoes, woman's specialty clothing.

Table 4: Explaining Rent PSF of Non-Anchors

Independent Variables	OLS Regressions Dependent Variable: Rent PSF			
	(1)	(2)	(3)	(4)
Sales PSF			0.05**	0.05**
			(0.001)	(0.001)
Percent Mall Space:				
All Anchors	18.04**		4.38*	
	(3.27)		(2.61)	
Type 1 Anchors		21.34**		6.91**
		(4.00)		(3.20)
Type 2 Anchors		28.81**		6.18*
		(4.52)		(3.63)
Type 3 Anchors		14.64**		0.68
		(3.70)		(2.96)
Type 4 Anchors		23.85**		7.43**
		(3.63)		(2.91)
Store Brand Recognition	-0.13**	-0.13**	-0.15**	-0.15**
	(0.03)	(0.03)	(0.03)	(0.03)
Store Size	-0.0005**	-0.0005**	-0.0003**	-0.0003**
	(0.00005)	(0.00005)	(0.00004)	(0.00004)
Year Store's Lease Began	0.12**	0.11**	0.14**	0.14**
	(0.05)	(0.05)	(0.04)	(0.04)
Mall Characteristics	Yes	Yes	Yes	Yes
Product Category Dummy Variables	Yes	Yes	Yes	Yes
N	>2,500	>2,500	>2,500	>2,500
R-square	0.45	0.46	0.66	0.66

Standard errors are in parentheses. * indicates significance at the 10% level, ** indicates significance at the 5% level. All regressions include a constant. See notes to Table 3 for definitions of store brand recognition, mall characteristics, and product dummy variables.

Table 5: Explaining Rent and Sales PSF of Anchors

Independent Variables	OLS Regressions Dependent Variables			
	Rent PSF			Sales PSF
	(1)	(2)	(3)	(4)
Sales PSF			-0.001 (0.008)	
Percent Mall Space:				
All Anchors	-18.09** (7.03)	-16.69** (6.61)	-14.76** (7.29)	-101.92 (168.47)
Anchor Type Dummy Variables:				
Type 1 Anchors		4.20** (1.48)	4.94** (1.99)	148.88** (37.18)
Type 2 Anchors		0.63 (2.21)	-0.02 (2.77)	83.72 (62.48)
Type 3 Anchors		0.90 (1.33)	1.06 (1.45)	14.48 (33.69)
Type 4 Anchors				
N	39	39	34	34
R-square	0.15	0.32	0.36	0.40

Standard errors are in parentheses. * indicates significance at the 10% level, ** indicates significance at the 5% level. All regressions include a constant. The rent regressions contain observations only for anchor stores which do not own their own building (i.e. report rent). The sales regression contains only anchor stores which are required to report their sales (i.e. do not own their own building and have a non-zero sharing percentage specified in their contract).

Table 6: Explaining Sales PSF of Non-Anchors with Fixed Store Effects

Independent Variables	OLS Regressions Dependent Variable: Sales PSF (1)	(2)
Percent Mall Space:		
All Anchors	235.93** (41.17)	
Type 1 Anchors		98.61* (55.45)
Type 2 Anchors		424.12** (56.29)
Type 3 Anchors		282.54** (45.75)
Type 4 Anchors		330.67** (44.35)
Store Size	-0.01** (0.002)	-0.01** (0.002)
Year Store's Lease Began	-0.38 (0.64)	-0.36 (0.64)
Store Name Fixed Effect	Yes	Yes
Mall Characteristics	Yes	Yes
N	>1,500	>1,500
R-square	0.09	0.11

Standard errors are in parentheses. * indicates significance at the 10% level, ** indicates significance at the 5% level. All regressions include a constant and dummy variables for every specific store name (sample is restricted to non-anchor stores who appear at least 5 times in the sample). See notes to Table 3 for the definition of mall characteristics.

Table 7: Explaining Rent PSF of Non-Anchors with Fixed Store Effects

Independent Variables	OLS Regressions Dependent Variable: Rent PSF			
	(1)	(2)	(3)	(4)
Sales PSF			0.05** (0.002)	0.05** (0.002)
Percent Mall Space:				
All Anchors	13.46** (3.21)		2.18 (2.56)	
Type 1 Anchors		12.93** (4.36)		8.19** (3.45)
Type 2 Anchors		22.54** (4.42)		2.18 (3.57)
Type 3 Anchors		13.49** (3.59)		-0.07 (2.88)
Type 4 Anchors		18.05** (3.48)		2.17 (2.81)
Store Size	-0.001** (0.0001)	-0.001** (0.0001)	-0.0003** (0.0001)	-0.0003** (0.0001)
Year Store's Lease Began	0.18** (0.05)	0.18** (0.05)	0.20** (0.04)	0.19** (0.04)
Store Name Fixed Effect	Yes	Yes	Yes	Yes
Mall Characteristics	Yes	Yes	Yes	Yes
N	>1,500	>1,500	>1,500	>1,500
R-square	0.14	0.15	0.46	0.47

Standard errors are in parentheses. * indicates significance at the 10% level, ** indicates significance at the 5% level. All regressions include a constant and dummy variables for every specific store name (sample is restricted to non-anchor stores who appear at least 5 times in the sample). See notes to Table 3 for the definition of mall characteristics.

Table 8: Controlling for Mall Fixed-Effects

Independent Variables	Second Stage Regressions: Rent Deviations
Predicted Sales Deviation from the First Stage	0.085** (0.002)
Store Brand Recognition Deviation	-0.231** (0.027)
Store Size Deviation	-0.0002** (0.00004)
Year Store's Lease Began - Deviation	0.168** (0.046)
N	>2,500
R-square	0.40

Standard errors are in parentheses. * indicates significance at the 10% level, ** indicates significance at the 5% level. All regressions include a constant. The term "deviation" refers to having the mean of the variable within the store's mall subtracted from the store's value for that variable. The predicted "sales deviation" is the predicted value from the first stage regression where the dependent variable is the actual sales deviation and the explanatory variables are the interactions of the 23 product dummy variables with the percent of all mall space occupied by anchors. The two stages were estimated using a Two-Stage Least Squares procedure where the sales and rent deviations were treated as endogenous variables and the exogenous instruments included the interactions just described. See notes to Table 3 for definitions of store brand recognition, mall characteristics, and product dummy variables.

Table 9: Explaining Sharing Percentages of Non-Anchors

Independent Variables	OLS Regressions Dependent Variable: Sharing Percentage			
	No Fixed Store Effects		Fixed Store Effects	
	(1)	(2)	(3)	(4)
Percent Mall Space:				
All Anchors	0.01** (0.004)		0.01** (0.003)	
Type 1 Anchors		0.007 (0.004)		0.008* (0.004)
Type 2 Anchors		0.006 (0.005)		0.009** (0.004)
Type 3 Anchors		0.008** (0.004)		0.008** (0.003)
Type 4 Anchors		0.014** (0.004)		0.010** (0.003)
Store Brand Recognition	-0.0001** (0.00003)	-0.0001** (0.00003)		
Store Size	-0.000001** (0.00000005)	-0.000001** (0.00000005)	-0.0000001 (0.0000001)	-0.0000001 (0.0000001)
Year Store's Lease Began	-0.00009 (0.00005)	-0.00008 (0.00005)	-0.00008* (0.00004)	-0.00008* (0.00005)
Store Name Fixed Effect	No	No	Yes	Yes
Mall Characteristics	Yes	Yes	Yes	Yes
Product Category Dummy Variables	Yes	Yes	No	No
N	>2,500	>2,500	>1,500	>1,500
R-square	0.40	0.40	0.02	0.02

Standard errors are in parentheses. * indicates significance at the 10% level, ** indicates significance at the 5% level. All regressions include a constant. Specifications in columns (3) and (4) include dummy variables for every specific store name (sample is restricted to non-anchor stores who appear at least 5 times in the sample). See notes to Table 3 for definitions of store brand recognition, mall characteristics, and product dummy variables.

Table 10: Explaining the Probability of Paying Overage (Non-Anchors)

Independent Variables	Logit Regressions Dependent Variable: Prob(store pays overage)			
	No Fixed Store Effects		Fixed Store Effects	
	(1)	(2)	(3)	(4)
Percent Mall Space:				
All Anchors	2.06** (0.70)		3.06** (1.11)	
Type 1 Anchors		1.99** (0.86)		2.09 (1.46)
Type 2 Anchors		2.38** (0.98)		3.27** (1.54)
Type 3 Anchors		2.36** (1.90)		3.27** (1.26)
Type 4 Anchors		1.90** (0.80)		3.51** (1.24)
Store Brand Recognition	0.01** (0.007)	0.01** (0.007)		
Store Size	-0.000006** (0.00001)	-0.000005** (0.00001)	-0.0002** (0.0001)	-0.0002** (0.0001)
Year Store's Lease Began	-0.05** (0.01)	-0.05** (0.01)	-0.06** (0.02)	-0.06** (0.02)
Store Name Fixed Effect	No	No	Yes	Yes
Mall Characteristics	Yes	Yes	Yes	Yes
Product Category Dummy Variables	Yes	Yes	No	No
N	>2,500	>2,500	>1,500	>1,500

Standard errors are in parentheses. * indicates significance at the 10% level, ** indicates significance at the 5% level. All regressions include a constant. The dependent variable equals one for a store if two criteria are satisfied: (1) the store has a positive sharing percentage specified in the contract, and (2) the store's sales are above the threshold level of sales specified in the contract. Specifications in columns (3) and (4) include dummy variables for every specific store name (sample is restricted to non-anchor stores who appear at least 5 times in the sample). See notes to Table 3 for definitions of store brand recognition, mall characteristics, and product dummy variables.