CONTRACTS, EXTERNALITIES, AND INCENTIVES IN SHOPPING MALLS

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Abstract—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, whereas 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 data set 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.

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] First, 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. As a result, contracts should reflect these benefits provided to other stores. Second, the sales of a store depend on the actions of other stores and the developer. For instance, customer traffic to the mall is likely to be affected by the cleanliness of the mall and the upkeep of each store. The purpose of this paper is to understand how rental contracts reflect these concerns. We show that externalities are internalized by (i) subsidizing the rent of stores that generate mall traffic to other stores (and charging a rent premium to the beneficiaries) so that mall space is efficiently allocated, 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.

To do so, we use 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 or four anchor stores (department stores), which 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 leasable space in the mall and yet pay only 10% of the total rent collected by the developer. We argue that this subsidy can only be explained by the 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 nonanchor stores. We show that stores with a national name brand, which also tend to generate mall traffic, receive significant rent discounts. We also provide a variety of robustness checks on these results. Beyond simply showing that anchor stores are compensated for the traffic that they bring to the mall, we argue that the contracts are designed to efficiently allocate space in the mall. To do so, we show that the total sales from an additional square foot of anchor space are equal to those from an additional square foot of nonanchor space. Thus, our results are consistent with an efficient allocation of space within the mall.

Externalities are created by anchor stores not merely by the act of locating in a mall. Instead, a multitude of unobserved actions are taken by all stores that affect not only their own sales, but also those of other stores through the traffic that they bring to the mall. The relevant actions by stores and developers that affect sales are difficult to contract over, so some form of contract where rents are dependent on sales seems appropriate. 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 form of the contract, therefore, allows for considerable variation in how incentives are allocated between the developer and the store owners. The more the contract is based on the fixed rental component, the greater are the store owner's incentives, but incentives to the developer decrease as he no longer shares in gains in output. Incentives

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

to the developer increase when rents are more contingent on sales performance, but this reduces incentives to the store owners. As is common in team production problems, 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.

However, not all stores are alike. The effort of stores such as anchors generates externalities to other stores by attracting customers to the mall. To see how this affects incentives, consider the effect of an anchor store generating more externalities through its sales. This has the straightforward effect that its rent should fall. Yet it is also the case that the marginal return to unobserved actions by the anchor that increases sales should increase. Seen from the perspective of agency theory, the marginal return to anchor effort should go up by increasing its *pay for performance* (through higher thresholds and/or lower sharing percentages). We show that this is indeed the case. But we also test an indirect effect. Higher incentives for the anchor reduce the developer's marginal return to effort. We show that this reduction in incentives for the developer is compensated for by increasing the developer's share of *nonanchor* sales (lowering nonanchor thresholds and increasing nonanchor sharing percentages). That is, incentives for the developer are still created, but the burden of stimulating anchor effort is shifted from anchor stores to nonanchor stores. In this way, we show that malls not only achieve an efficient allocation of space, but also design incentive contracts efficiently in response to this.

The paper is structured as follows. The next section describes our unique data set. Section III demonstrates the efficient pricing of externalities within the mall; section IV checks the robustness of these results. Section V analyzes the allocation of incentives provided by the contract provisions. Section VI concludes the discussion.

II. 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 in 1994. This is by far the most comprehensive data set of store contracts in shopping malls ever made available for systematic analysis. As a condition on making the data available, we agreed not to reveal the names of individual stores, the shopping malls, or the developer.[3]

Table 1.—Contracts of Anchors Versus NonAnchor Stores

	Anchors (1)	Nonanchors (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%

For anchor stores, the mean rent per square foot (psf) is 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 are 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.

For each mall, the data contain information about the mall's location, name, size, age, surrounding population size (number of households with income above $35,000), and composition of stores. Variables for each store include sales, rent, size, store name, product category, lease length, year the lease began, and the three components of each store's contract: (1) a fixed base rent, (2) a threshold level of sales, and (3) an 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 pays only the base rent. In this manner, the provisions of the contract are flexible enough to determine how much the rent is based on the performance (sales) of the store, and how much is fixed in advance.

Tables 1 and 2 present the basic summary statistics of the data for anchor stores (department stores) and nonanchor

[2] A few empirical papers have examined externalities in retail contracts, but none of them have actual data on sales. Pashigian and Gould (1998) did not examine contractual specifications, and used aggregated rent and sales data by product category to examine the pricing of externalities. Benjamin, Boyle, and Sirmans (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. A more recent study by Wheaton (2000) uses data on contractual specifications, but his data also are missing actual sales performance. In contrast to the existing literature, our data set is very large and includes actual rent and sales data as well as contract specifications. The issue of externalities generated by large stores on the labor market is investigated by Basker (2005).

[3] Possible limitations of the data set deserve mention. First, the developer's existing rental properties may represent the more successful malls, because the developer has purchased and sold malls over time. It is possible that we have a self-selection problem in that 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 come from one developer, and therefore, we do not have a cross section of behavior by different developers.

TABLE 2.—MEAN STATISTICS FOR ANCHORS

	All Anchors	Type 1 Anchors	Type 2 Anchors	Type 3 Anchors	Type 4 Anchors
Gross leasable area (sq. ft)	155,378	148,460	200,800	137,481	150,334
Number of anchors in mall	3.83	3.79	3.88	3.76	3.85
Size of mall (sq. ft)	970,346	1,158,948	1,043,470	877,727	957,787
Lease start date (year)	1981	1983	1979	1982	1980
Age of mall when anchor first arrived (years)	3.31	8.64	1.67	3.20	2.75
Sales psf for anchors reporting (sample size in parentheses)	185.34 ($N = 34$)	291.57 ($N = 8$)	220.45 ($N = 2$)	155.66 ($N = 11$)	139.68 ($N = 13$)
Dummy for paying rent	0.29	0.64	0.13	0.33	0.25
Rent psf (for those that pay)	4.13	7.14	3.86	3.78	2.57
Sharing percentage	0.48%	1.21%	0.08%	0.63%	0.33%
Percent paying overage	14%	36%	8%	17.5%	9%
Sample size	133	14	24	40	55

The mean sales psf is for the sample of anchors who report sales data, and the sample for computing rent psf includes only those anchor stores which pay rent.

stores. Mall owners typically count on anchor stores to generate customer traffic to the mall, and the importance of these externalities is immediately apparent in the summary statistics. 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, 73% of anchor stores pay nothing to the developer, in contrast to 0% for nonanchor 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 though only 70% are specified to pay zero rent according to their contract. That is, 3% 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 anchors which do pay rent, table 1 shows that their average rent per square foot (psf) is only \$4.13, versus \$29.37 for nonanchors.[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 are 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 seems likely 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 the next section, we demonstrate this empirically by showing that stores that benefit from the externalities generated by anchors are indeed charged a premium for them, so that the pricing and allocation of space are efficient within the mall.

III. The Efficient Allocation of Mall Space

This section demonstrates how malls price the net externality of anchor stores in order to achieve an efficient allocation of space. We do this by showing that anchors generate positive externalities by increasing the sales of nonanchor stores, and in turn, nonanchor 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.[7] 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.)

[4] As we will demonstrate, anchors pay much less rent because of the externalities they create. We see many anchors paying zero rent, but theoretically, it is not clear why there should be bunching at 0 with no one paying a negative rent (receiving money from the developer). We do know, however, that many stores (particularly anchors) receive money from the developer to pay for the costs of "building out" their store. In some instances, we suspect that some negative transfers are being paid, as the developer will sometimes pay for things like building or development costs. However, we cannot observe these in our data, and are restricted to observed rent.

[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 because 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 does leave the mall.

[6] These results are not unique to our developer. Urban Land Institute (1993) reported that department stores that owned their own structure paid just \$0.87 psf for rent, whereas department stores that leased mall space paid \$1.95 psf. These rental figures pale in comparison with the mean rent psf of \$16.42 received from all stores (anchors and mall stores) by mall owners. See also Pashigian and Gould (1998).

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

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.[8] (41% of anchor stores.)

Table 2 presents summary statistics for all anchors and for each type of anchor.[9] In contrast to the type 1 and 3 anchors, the type 2 and 4 anchors tend to be bigger in size, have a lower probability of paying rent, and pay low rents. In addition, the type 2 and 4 anchors are more likely to have been in the mall when the mall was established, as indicated by the lower mean age of the mall when the anchor first arrived in it. These patterns suggest that developers rely more on type 2 and 4 anchors to establish the mall and generate externalities for the other stores. The empirical analysis will examine this first impression.

To measure the importance of anchors within a mall, we use the percentage of total mall space occupied by anchors (mean 58%, standard deviation 9.8%). The premise is that the higher the percentage of mall space occupied by anchors, the higher the externalities generated for the benefit of nonanchor stores. Consequently, the analysis aims to identify whether the increased presence of anchors generates larger sales for nonanchor stores, and if so, whether those stores pay for the externalities through higher rents. Recognizing that our classification of anchors into types is not an exact science, the entire analysis is performed with and without differentiating anchors by type.

We begin our analysis of externalities in table 3 by presenting the effect of anchors on nonanchor store sales after controlling for several other store and mall characteristics. 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 significantly increases the sales psf of nonanchor stores. This result shows that if developers dedicate more space to anchors, which means practically giving it away according to table 1, the sales of nonanchor stores increase. The size of the coefficient is also substantial. A 1-standard-deviation change in the fraction of mall space devoted to anchors (equal to 0.10) increases the sales psf of a nonanchor store by $27.73. Relative to the mean sales psf of $317.68 for nonanchor stores (table 1), this represents an 8.73% increase.[10]

Furthermore, column (2) of table 3 demonstrates that these effects are considerably larger for type 2 and type 4 anchors than for types 1 and 3. The hypothesis that the coefficients for all types are equal is soundly rejected at the 1% significance level, as well as the hypothesis that the coefficient for type 2 anchors equals that of any one of the other three types. Although the coefficient on type 4 anchors is second only to type 2 anchors in size, it is not significantly different than type 1 anchors, but is significantly different than type 2 and type 3 anchors at the 10% significance level.

The evidence in table 3 that anchors generate sales for nonanchor stores is quite strong, so now we examine the implications of these findings in terms of the rents of the nonanchor stores. Table 4 presents the regressions

TABLE 3.—EXPLAINING SALES PER SQUARE FOOT OF NONANCHOR STORES

Independent Variable	(1)	(2)	(3)	(4)
Fraction of mall space:				
All anchors	277.30**		235.93**	
	(40.67)		(43.23)	
Type 1 anchors		294.75**		98.61*
		(49.75)		(58.23)
Type 2 anchors		462.07**		424.12**
		(56.14)		(59.11)
Type 3 anchors		285.08**		282.54**
		(45.99)		(48.04)
Type 4 anchors		335.44**		330.67**
		(45.09)		(46.57)
Store brand recognition	0.41	0.39		
	(0.41)	(0.41)		
Store size (thousands)	−3.34**	−3.37**	−11.16**	−10.83**
	(0.59)	(0.60)	(1.94)	(1.92)
Mall characteristics	Yes	Yes	Yes	Yes
Product category dummies	Yes	Yes		
Store name fixed effects			Yes	Yes
Sample size	>2,500	>2,500	>1,500	>1,500
R^2	0.33	0.34	0.65	0.66

Standard errors are in parentheses. * indicates significance at the 10% level, ** indicates significance at the 5% level. Store brand recognition is calculated as the number of malls the same store appears in the sample. All regressions include a constant, store size (divided by 1,000), the year the store's lease began, and additional mall characteristics, which 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, women's specialty clothing. The specifications including store name fixed-effects include dummy variables for the store's name, which implicitly controls for name brand recognition and product category. The fixed store effects regressions are restricted to a sample of stores which appear in at least five malls.

[8] Though 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.

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

[10] To get an impression of the effect size of the other variables, the R^2 increases from 0.06 to 0.10 when mall characteristics are added to a specification which regresses sales psf on the fraction of anchor space, store size, store reputation, and the age of the lease. Adding the product-category dummies increases the R^2 to 0.33 as indicated in table 3.

TABLE 4.—EXPLAINING RENT PER SQUARE FOOT OF NONANCHOR STORES

Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sales psf			0.05**	0.05**			0.05**	0.05**
			(0.001)	(0.001)			(0.002)	(0.002)
Fraction of mall space:								
All anchors	18.04**		4.38*		13.46**		2.18	
	(3.27)		(2.61)		(3.37)		(2.69)	
Type 1 anchors		21.34**		6.91**		12.93**		8.19**
		(4.00)		(3.20)		(4.57)		(3.63)
Type 2 anchors		28.81**		6.18*		22.54**		2.18
		(4.52)		(3.63)		(4.64)		(3.74)
Type 3 anchors		14.64**		0.68		13.49**		−0.07
		(3.70)		(2.96)		(3.77)		(3.02)
Type 4 anchors		23.85**		7.43**		18.05**		2.17
		(3.63)		(2.91)		(3.66)		(2.94)
Store brand recognition	−0.13**	−0.13**	−0.15**	−0.15**				
	(0.03)	(0.03)	(0.03)	(0.03)				
Store size (thousands)	−0.48**	−0.49**	−0.32**	−0.33**	−0.86**	−0.86**	−0.33**	−0.34**
	(0.05)	(0.05)	(0.04)	(0.04)	(0.15)	(0.15)	(0.12)	(0.12)
Mall characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Product category dummies	Yes	Yes	Yes	Yes				
Store name fixed effects					Yes	Yes	Yes	Yes
Sample size	>2,500	>2,500	>2,500	>2,500	>1,500	>1,500	>1,500	>1,500
R^2	0.45	0.46	0.66	0.66	0.68	0.68	0.80	0.80

Standard errors are in parentheses. The specification of the independent variables is identical to table 3.

explaining nonanchor rents with the same control variables specified in table 3. Column (1) shows that nonanchor stores pay more to be in malls with more space occupied by anchors. These results are consistent with the results in table 3 in that nonanchor stores are shown to pay for the increased sales that stem from the presence of more anchor space. A 1-standard-deviation change in the fraction of mall space devoted to anchors increases the rent psf of a nonanchor store by $1.80 relative to a mean of $29.37 in table 1 (a 6.13% increase). Furthermore, column (2) of table 4 shows that nonanchor stores pay more to be with anchors of type 2 and type 4, which are exactly the anchor types shown to increase the sales of nonanchor stores the most. The hypothesis that the coefficients across all four types are equal is rejected at the 1% significance level, and the type 2 coefficient, which is the largest, is significantly different than any of the other three at the 10% significance level. The smallest coefficient, which turns out to be for the type 3 anchors, is also found to be different than any of the other three at the same level of significance.

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 after controlling for sales. However, this result is to be expected, for nonanchor stores are paying higher rents because of the higher sales generated by anchor stores. Once we control for sales, the positive effect of anchors on nonanchor rents says that nonanchor stores are paying a premium to be with certain anchors for reasons above current sales. However, the main result stemming from columns (3) and (4) is that most of the premium charged to nonanchor stores is directly related to the increased sales generated by the presence of the anchor stores.[11]

The generation of externalities carries implications not only for the rents paid by nonanchor stores, but also for those paid by anchors. Specifically, anchors should receive rent discounts in order for their externalities to be internalized. Indeed, tables 1 and 2 show that anchors on average pay much less rent than nonanchor stores, and more support is found in table 5 which regresses the rent of anchor stores on the percentage 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 after conditioning on the anchor's sales and 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.

The results in tables 3–5 allow us to approximate how much the externalities generated by the anchor are captured by the various parties in an average mall where total space equals 890,198 square feet and anchors occupy 58% of the total area. In table 3, the implied externality on total sales is $60.1 million [the coefficient 277.30 in column (1) of table 3 multiplied by 0.58 and by the total nonanchor space]. The implied total rent externality is $3.9 million [the coefficient 18.04 in column (1) of table 4 multiplied by 0.58 and by the total nonanchor space]. The total rent reduction to anchors is

[11] Table 4 also shows that stores with higher brandname 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 brandname recognition does not increase sales. Therefore, developers discount the rents for brandname stores, which suggests that they too are producing benefits to the mall. These benefits could include drawing customers to the mall by their brand recognition or by national advertising campaigns.

TABLE 5.—EXPLAINING THE RENT AND SALES PSF OF ANCHORS

Independent Variable	Rent PSF (1)	Rent PSF (2)	Rent PSF (3)	Rent PSF (4)	Sales PSF (5)
Sales psf				−0.001	
				(0.008)	
Fraction of mall space devoted to all anchors	−08.69**	−18.09**	−16.69**	−14.76**	−101.92
	(2.73)	(7.03)	(6.61)	(7.29)	(168.47)
Anchor-type dummy variables:					
Type 1 anchors			4.20**	4.94**	148.88**
			(1.48)	(1.99)	(37.18)
Type 2 anchors			0.63	−0.02	83.72
			(2.21)	(2.77)	(62.48)
Type 3 anchors			0.90	1.06	14.48
			(1.33)	(1.45)	(33.69)
Type 4 anchors					
Sample size	133	39	39	34	34
R^2	0.07	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 regression in column (1) includes anchor stores which do not pay rent (rent psf = 0); columns (2)–(4) contain observations only for anchor stores which do report their rent. The sales regression contains only anchor stores which are required to report their sales (namely, anchors which pay rent and have a nonzero sharing percentage specified in their contract).

$2.6 million [the coefficient −8.69 in column (1) of table 5 multiplied by the total anchor space]. That is, anchors generate an average of $60.1 million sales, and $3.9 million of this amount goes to the developer in rent, while the developer gives $2.6 million back to the anchors in discounted rent. These approximations are admittedly rough, but they do suggest that anchor stores are able to capture most of the external rent revenue generated for the mall.

The coefficient estimates in tables 3 and 4 also suggest that there is 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 nonanchor stores. Yet from table 3 the marginal effect of increasing the anchor space by 1% is to increase the sales psf of nonanchor stores by $2.77. These results imply that total sales by nonanchor stores rise by $116 when an anchor is increased by 1 square foot. Adding this to the sales of a typical anchor store yields $301, which is not statistically different from the mean sales of $317 for the nonanchor stores at the 10% significance level. Consequently, an additional square foot of either an anchor or a nonanchor store yields roughly the same amount of sales.

When faced with open space in the mall, a developer frequently has to decide how to fill the space at the point of decreasing marginal returns. Therefore, perhaps a better way of looking at the tradeoff between anchor and nonanchor space is to compare the predicted effects of adding space for a weak anchor to those for a weak nonanchor store. A *weak* anchor is one which generates lower than average sales and externalities, and thus, is likely to pay higher rents than the average anchor store. A *weak* nonanchor store generates lower sales and pays lower rents than the average nonanchor store. Therefore, we define a weak anchor as having sales 1 standard deviation ($100) below the average sales for anchors ($185), and having an estimated impact on the sales of other stores 1 standard error (40.67) below the estimated coefficient (277.67) in table 3. A weak nonanchor store is defined as having sales 1 standard deviation ($191) below the mean sales for all nonanchor stores ($317). The resulting comparison yields an extra $111 in sales (including the externality) if an additional square foot is given to a weak anchor, and an extra $126 if given to a weak nonanchor. If we do a similar analysis for rents using estimates from table 4, an additional square foot given to a weak anchor yields an estimated increase in total rent of $14 compared to an additional $12 if the space is given to a weak nonanchor store.[12] Given the closeness of these numbers, the differential contracts offered to the anchor and nonanchor stores appear to 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 sales and rent in the mall.[13] If this were not the case, the result would likely be a misallocation of space: a failure to internalize the benefits of the anchor stores would imply too little space allocated to anchors, because anchors themselves would not consider the external benefits their presence has on the other stores when deciding how much space to lease.

IV. Robustness Checks

A. *Within-Product-Category-Results*

There is likely to be variation in the extent to which stores benefit from being in the presence of more anchor space. The performance of a store selling hot pretzels to passersby is likely to be heavily contingent on the overall mall traffic generated by the anchors, and this is likely to be reflected in the contract. Therefore, another way to test the externality hypothesis is to examine whether the rents and sales of

[12] A weak anchor is defined as an anchor which pays 1 standard deviation more than the average anchor in rent and has an estimated impact on the rents of nonanchor stores 1 standard error below the coefficient estimate in table 4. A weak nonanchor is defined as one paying a rent 1 standard deviation below the mean rent for nonanchor stores.

[13] 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.

TABLE 6.—THE EFFECT OF ANCHOR SIZE FROM REGRESSIONS WITHIN PRODUCT CATEGORIES

Category	Sales PSF (1)	Sales PSF (2)	Rent PSF (3)	Rent PSF (4)	Sharing Percentage (5)	Sharing Percentage (6)
Athletic shoes	249.88	160.81	15.15	10.49	0.017**	0.019**
	(261.05)	(262.12)	(14.91)	(15.10)	(0.006)	(0.005)
Family shoes	181.82	183.74	4.12	−0.65	0.027*	0.033
	(125.93)	(115.02)	(9.60)	(9.80)	(0.016)	(0.020)
Fast food	399.74**	561.09**	16.12	11.20	−0.0003	0.016
	(194.70)	(246.11)	(18.72)	(26.35)	(0.016)	(0.023)
Food specialty	298.63*	339.54	13.05	3.13	0.031*	0.042*
	(164.81)	(220.23)	(15.57)	(18.29)	(0.017)	(0.022)
Gifts	73.02	193.09*	8.73	9.78	0.028**	0.007
	(106.15)	(107.93)	(7.82)	(7.35)	(0.009)	(0.004)
Hobby	315.61**	309.18*	19.45**	19.03*	−0.002	0.011**
	(134.37)	(176.73)	(9.52)	(11.50)	(0.018)	(0.005)
Furniture	−222.39	−181.91	−5.32	2.40	0.024	0.001
	(154.55)	(152.40)	(13.25)	(13.32)	(0.017)	(0.011)
Jewelry	617.76**	176.96	17.16	27.52*	−0.011	−0.0001
	(290.31)	(257.35)	(15.75)	(15.63)	(0.013)	(0.010)
Men's ready-to-wear	189.27*	176.29	25.69**	20.84**	0.016	0.014*
	(112.95)	(111.59)	(8.18)	(9.02)	(0.011)	(0.007)
Music	332.85**	370.42**	25.72**	23.91**	0.027**	0.002
	(138.58)	(133.27)	(6.91)	(7.19)	(0.014)	(0.006)
Other apparel	245.19	447.28	−20.57	−6.89	−0.013	−0.003
	(489.34)	(311.75)	(21.53)	(17.62)	(0.020)	(0.012)
Personal services	319.46**	62.17	32.44**	5.68	0.014	0.014
	(128.24)	(222.07)	(11.36)	(12.76)	(0.015)	(0.014)
Restaurants	170.62	−5.67	12.00	−6.26	0.038*	−0.006
	(168.21)	(307.25)	(15.71)	(30.09)	(0.023)	(0.018)
Unisex apparel	258.97**	348.15**	5.58	−3.64	0.016	0.014
	(110.08)	(104.42)	(6.65)	(7.18)	(0.012)	(0.011)
Women's ready to wear	189.95**	144.10**	23.26**	17.51**	0.010*	0.013*
	(50.40)	(49.17)	(4.33)	(4.78)	(0.006)	(0.007)
Women's shoes	186.38	126.76	21.23*	0.40	0.025**	0.018
	(163.82)	(160.38)	(11.80)	(14.55)	(0.008)	(0.009)
Women's specialty clothing	133.50	65.91	20.16	12.38	−0.003	−0.006
	(154.84)	(137.17)	(13.57)	(10.39)	(0.009)	(0.008)
Store name fixed effects		Yes		Yes		Yes

* indicates significance at the 10% level, ** indicates significance at the 5% level. Each entry in the table represents the results from separate regressions using data from each of the indicated product categories. Specifically, each entry is the estimated coefficient from regressing the indicated dependent variable on the fraction of total mall space devoted to all anchors. The specification of each regression is identical to tables 3 and 4. The table includes results only for categories where the sample size in the fixed-effects regression exceeds 30 observations.

certain types of stores reflect the extent to which they depend on the externality generating power of the anchor.

Columns (1) and (3) in table 6 replicate the analysis in the first columns of tables 3 and 4 for subsamples within the various product categories. The samples are often too small to measure the effect of anchor size with a lot of precision, but almost all of the coefficients have the expected sign, which indicates almost every type of store benefits in some degree from anchor externalities. The groups which turn out to be the most significant in terms of size and statistical significance include women's ready-to-wear, music, fast food, hobby stores, jewelry, and men's ready-to-wear. The groups that are not strongly related to anchor size are furniture, family shoes, and restaurants. It is difficult to determine a priori which types of stores should benefit more or less from externalities, but the results confirm the intuition that restaurants and furniture stores are more likely to draw their own customers, as opposed to stores selling fast food and women's clothing, which are more likely to be drawing off the traffic generated by the big anchor stores.

B. Heterogeneous Store Quality

A potentially serious problem for our interpretation that anchors cause higher sales and affect rents would arise if space occupied by anchors was 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 up to now could be spurious if higher-quality stores tended 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 store in an average of 8.8 malls in our sample. By including a dummy variable for each 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 store fixed-effects regressions are presented in the last set of columns in tables 3 and 4.

The sales results in table 3 are very similar to the specifications which do not control for store fixed 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 4 are also similar to the results without fixed effects—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 because the effect of anchors is primarily through the effect on sales. However, the last two columns of table 4 show that nonanchor 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. Overall, the store fixed-effects regressions show that heterogeneity across malls in store quality is not responsible for the previous results.

C. Heterogeneous Mall Quality

Another possible concern is variation in the unobserved quality of malls. 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. If total anchor space is positively correlated with unobserved mall location quality, then this could produce the positive relation between anchor space and the rents and sales of nonanchor stores found in tables 3 and 4, but it would not imply any causal relationship. However, it is likely that unobserved location quality is negatively correlated with the fraction of total space devoted to anchors, for location quality and anchor space are both ways of producing customer traffic to the mall, and both are very costly to the developer. In other words, developers should be less likely to give away more space (practically for free) to anchors if the location is already good enough to attract lots of customer traffic. If this is the case, our coefficients should be biased toward 0. If, however, unobserved mall location quality increases with the fraction of space given to anchors, our previous estimates could be biased upward.

To control for unobserved mall heterogeneity, we cannot use mall-specific fixed effects, because the variable for the fraction of mall space devoted to anchors varies at the mall level. Instead, our empirical strategy relies on the differences in the importance of externalities across product categories, as seen in table 5. Put simply, we identify whether the rent differential between those stores (within a mall) which benefit the most and the least from anchor externalities increases with anchor space

The empirical strategy, therefore, is to control for the mean performance of all nonanchor 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 with 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:

$$sales_{ijk} - meansales_k = \beta_0 + \left(\sum_{j=1}^{23} \beta_j \cdot group_j \cdot anchorsize_k \right) + \lambda(x_{ijk} - meanx_k) + u_{ijk}, \quad (1)$$

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 nonanchor stores in mall k, $group_j$ is a dummy variable for belonging to product group j, $anchorsize_k$ is the fraction of all space in mall k occupied by anchor stores, x_{ijk} is a vector of store-level characteristics, $meanx_k$ is a vector of means for variables x_{ijk} in mall k, 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 that may affect 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 an independent variable in the second stage:

$$rent_{ijk} - meanrent_k = \alpha + \mu \cdot \text{PREDICTED}(sales_{ijk} - meansales_k) + \pi \cdot (x_{ijk} - meanx_k) + \nu_{ijk} \quad (2)$$

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 nonanchor stores in mall k, and ν_{ijk} is a random store-specific disturbance term. Therefore, we take the sales deviation which is predicted 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. Identification of the externality effect, therefore, comes from the differential externalities generated by anchors to the various product groups.

The estimated coefficient of μ in the second-stage regression is 0.085 (standard error 0.002).[14] Similar to our previous results, an increase in the predicted 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

[14] The store-level control variables are the same ones used in tables 3 and 4. 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.

that our earlier results are not generated by unobserved mall quality.

V. The Interaction of Externalities with Incentives

The previous section demonstrated that externalities are internalized by charging rent subsidies and premia in order to achieve an efficient allocation of space within the mall. There are many ways for rent subsidies to be incorporated into the form of the contract, but in this section we argue that the form of the contract should also consider the interaction of externalities with incentives. Externalities are generated not only by the presence of certain stores, but also by the actions that stores take, such as advertising, maintaining cleanliness, courtesy, and product variety. In addition, the performance of all stores is affected by the ongoing efforts of the developer, such as maintaining the right mix of stores, renovations, parking, cleanliness, and marketing campaigns. We argue that the structure of the leasing contract is designed to achieve the proper distribution of incentives to all parties within the mall, and that the allocation of incentives should at least partly depend on whether a store generates externalities or benefits from them.

As noted in section II, a leasing contract is composed of three elements: a fixed base rent, a threshold level of sales, and an overage sharing percentage. Each month, a store pays the fixed base rent, and if the store's sales exceed the predetermined threshold level, the store pays an additional amount equivalent to a percentage of sales (determined by the sharing percentage) above the threshold level. In this manner, the structure of the contract allows for the rental payment to be partly fixed in advance and partly based on the performance of the store. As a result, the contract establishes conflicting incentives between the store owner and the developer. If the rental payment is determined more 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 for the developer decrease as the marginal return to its effort falls.

Therefore, the variable component for a store can be considered a "tax" on the effort of the store owner, but a stimulant for the effort of the developer, as he now benefits from higher sales. The specification of each store's contract strikes a balance between these conflicting incentives, and this balance should depend on the size of the externality generated by the store. To see this, 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:

$$y_a = e_a + \delta_a e_d, \tag{3}$$

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 nonanchors, there is an additional effect in that the effort of all parties affects their profit:

$$y_n = e_n + \delta_n e_d + \alpha e_a, \tag{4}$$

where n refers to nonanchor 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 $\bar{r}_i$ and a variable part, where the rent paid by the store is discounted on average[15] by β_i per unit of sale:

$$r_i = \bar{r}_i + \beta_i y_i. \tag{5}$$

This is a simple team production problem where incentives need to be provided to all parties through the β_i. Routine calculations show that

$$\beta_a = \frac{\delta_a^2 + \delta_n\delta_a - \dfrac{\delta_a^2\delta_n^2 + \delta_a\delta_n^3}{1 + \delta_n^2} - \alpha}{1 + \delta_a^2 - \dfrac{\delta_a\delta_n^2}{1 + \delta_n^2}} \tag{6}$$

and

$$\beta_n = \frac{\delta_n\delta_a + \delta_n^2 - \delta_n\beta_a}{1 + \delta_n^2}. \tag{7}$$

Externality generation then has two effects on the sharing rules. Intuitively, the sharing percentage of the anchor is decreasing in α, the extent of externality generation. However, there is also an indirect effect in that the sharing percentage of the nonanchor store is *increasing* in α, as predicted by Brueckner (1993).[16] In other words, the developer is now given incentives by sharing in the sales of the nonanchor stores.

Evidence for these predictions is displayed in the descriptive statistics in tables 1 and 2, which display striking differences not only in the level of rent paid by anchors versus nonanchor stores, but also in the structure of the payment. For example, 76% of anchor stores do not have an overage component specified in the contract, versus only

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

[16] Wheaton (2000) presents an alternative theory for why percentage rent exists, which is also related to externalities. Wheaton's theory is that percentage rent exists to deter opportunistic behavior on the part of the developer. Because percentage rent gives the developer a stake in the performance of the store, the developer has disincentives to bring in a competing store in the future which hurts the store's performance. Though this effect may be important, it cannot explain why there is variation in sharing percentages within the same store across different malls, as we are able to do both empirically and theoretically. Also, there may be other contractual ways of preventing opportunistic behavior. For example, many anchor stores have clauses in their contracts giving them veto power over the entrance of other anchors into the mall.

TABLE 7.—EXPLAINING SHARING PERCENTAGES OF NONANCHORS

Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of mall space:						
All anchors	0.010**	0.010**		0.009**	0.008**	
	(0.004)	(0.004)		(0.003)	(0.003)	
Type 1 anchors			0.007			0.008*
			(0.004)			(0.004)
Type 2 anchors			0.006			0.009**
			(0.005)			(0.004)
Type 3 anchors			0.008**			0.008**
			(0.004)			(0.004)
Type 4 anchors			0.014**			0.009**
			(0.004)			(0.004)
Mean anchor sharing percentage in mall		−0.104*			−0.126**	
		(0.056)			(0.048)	
Store brand recognition (divided by 1,000)	−0.141**	−0.140**	−0.140**			
	(0.037)	(0.037)	(0.037)			
Store size (divided by 1,000)	−0.001**	−0.001**	−0.001**	−0.0001	−0.0001	−0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Mall characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Product category dummy variables	Yes	Yes	Yes			
Store name fixed effect				Yes	Yes	Yes
Sample size	>2,500	>2,500	>2,500	>1,500	>1,500	>1,500
R^2	0.40	0.40	0.40	0.74	0.74	0.74

Standard errors are in parentheses. * indicates significance at the 10% level, ** indicates significance at the 5% level. All regressions include a constant and the year the store's lease began. Specifications in columns (3) and (4) include dummy variables for every specific store name (sample is restricted to nonanchor stores that appear at least five times in the sample). See notes to table 3 for definitions of store brand recognition, mall characteristics, and product dummy variables.

1% for nonanchors. Also, anchors have much lower sharing percentages than nonanchors. The average sharing percentage is 0.47% for anchors and 6.27% for regular stores; developers assess a much lower marginal tax rate on sales above the threshold for anchors than for nonanchors. Although several potential explanations exist for these differences between anchors and nonanchors (such as differences in risk aversion), 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. As a result, the rents of nonanchor stores are much more likely to be based on performance, whereas the rents of anchor stores are much more fixed in nature.

Further evidence is provided by comparing the terms of the contract between types of anchors. In section III, the type 2 and type 4 anchors were found to generate the most externalities for nonanchors. Consistent with these results, table 2 shows that these types of anchors also have lower sharing percentages than the average of 0.48%. In addition, they are less likely to exceed the threshold for paying overage rent. Therefore, in accordance with the model's predictions, the types of anchors that generate the most externalities pay rent that is more fixed in nature than that of the other anchors, which pay more according to performance. We now examine the model's predictions that the sharing percentages of nonanchor stores should rise when they benefit from larger anchor externalities.

Table 7 presents regressions explaining the sharing percentage of nonanchor stores, using the same variables used in the previous analyses. The regressions are performed with and without controlling for store fixed effects. The results are very similar using the two specifications. The estimates reveal that an increase in the percentage of anchor space in the mall significantly increases the sharing percentages of nonanchor stores. This result is robust to including the mean sharing percentage of all anchors in the store's mall, which turns out to be significant and negative. This latter result indicates that sharing percentages between anchors and nonanchors are negatively related in the mall (that is, there is no unobserved reason why all stores in the same mall pay high sharing percentages). In addition, using a similar two-stage strategy to that described in section III, we can see whether a store's sales deviation from the mall's mean in the first stage (explained by the interaction of product dummy variables with anchor size plus the same additional controls) can explain the sharing percentage deviation from the mall's mean in the second stage.[17] The coefficient estimate on the predicted sharing percentage deviation in the second stage is 0.000022 with a t-statistic of 6.14, which indicates that product categories which enjoy greater externalities relative to the rest of the mall also have higher relative sharing percentages.

All of these results are consistent with our hypothesis. A higher presence of anchors in a mall generates larger externalities, as seen in section III, and therefore, anchor effort is stimulated through lower sharing percentages. But this reduces the incentives of the developer, ceteris paribus, so contracts with the nonanchor stores compensate for this by increasing the developer's share of their sales on the margin. In other words, the burden of stimulating the effort of the developer is increasingly placed upon the nonanchor stores when anchor effort is shown to generate more externalities.

[17] The specification of the control variables in both stages is identical to that in section III.

TABLE 8.—EXPLAINING THE PROBABILITY OF PAYING OVERAGE (NONANCHORS)

Independent Variable	Logit Regressions [Dependent Variable: Prob(Store Pays Overage)]			
	(1)	(2)	(3)	(4)
Fraction of mall space:				
All anchors	2.11**		3.06**	
	(0.70)		(1.11)	
Type 1 anchors		1.99**		2.09
		(0.86)		(1.46)
Type 2 anchors		2.38**		3.27**
		(0.98)		(1.54)
Type 3 anchors		2.36**		3.27**
		(0.81)		(1.26)
Type 4 anchors		1.90**		3.51**
		(0.80)		(1.24)
Store brand recognition	0.01**	0.01**		
	(0.01)	(0.01)		
Store size	−0.01	−0.01	−0.22**	−0.22**
	(0.01)	(0.01)	(0.09)	(0.09)
Mall characteristics	Yes	Yes	Yes	Yes
Product category dummy variables	Yes	Yes		
Store name fixed effect			Yes	Yes
Sample size	>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 and the year the store's lease began. The dependent variable equals 1 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 nonanchor stores that appear at least five times in the sample). See notes to table 3 for definitions of store brand recognition, mall characteristics, and product dummy variables.

Table 8 presents logit regressions which explain whether a store pays overage or not (that is, whether the store's sales exceed the threshold or not). Although only 18% of nonanchor stores reach this threshold (table 1), table 8 shows that an increased anchor presence increases the likelihood that a store will reach the threshold, and this is true even after controlling for store fixed effects. This result is consistent with the results in table 7 in that both show that an 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 8) and (ii) increasing the sharing percentage once that threshold is reached (table 7). For the same reasons stated above regarding the results in table 7, an increasing anchor presence generates more externalities, and therefore, nonanchor stores increasingly pick up the burden of stimulating developer effort by decreasing the threshold and making their rents more dependent upon sales performance.[18] 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

We believe that this paper makes a contribution to two distinct literatures. First, we have shown that mall contracts are written to internalize externalities to such an extent that space is efficiently allocated in the mall. In this sense, the paper shows how the ability to contract on relevant variables (in this case, sales) can help to counteract the inefficiencies sometimes characteristic of externalities. Second, we believe that the paper makes a contribution to the empirical literature on agency theory. It does so in the context of a situation of team production, where the efforts of all relevant parties (anchor stores, nonanchor stores, and developers) affect sales, and contracts are designed to induce efficient actions on all their parts, subject to a budget balancing constraint [see Prendergast (2002) for the relevant literature on these issues].

Many models of incentive contracts have been concerned with how risk sharing considerations affect the form of the contract.[19] We have abstracted from risk issues in this paper, and instead our results are based on the idea that a team production problem needs to be solved where both the developer and the store owners are trying to elicit optimal relative effort.[20] In this manner, 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 nonanchor stores, the share of their own sales that they keep rises. Therefore, this paper provides direct evidence on how the (relative) desire to induce effort exertion increases observed incentives.

[18] The results for name-brand stores in tables 7 and 8 tell a complex story. On the one hand, an increased brand reputation decreases the sharing percentage. However, larger brand recognition increases the likelihood that the store will reach the threshold. These two effect 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 it requests a low threshold. Typically, a developer does not like a low threshold, because it provides disincentives for effort by the store owner; but for a store trying to establish a national brand reputation, these disincentives are likely to be less important. Therefore, contracts for brandname stores result in lower sharing percentages and lower thresholds than for stores with weaker reputations.

[19] See Cheung (1969), Reid (1973), Stiglitz (1974), Rubin (1978), Holmstrom (1979), Eswaran and Kotwal (1985), Battacharya and Lafontaine (1995), Romano (1994), Lazear (1995, 2000), Prendergast (1999), and Lafontaine and Shaw (1999). Several papers, however, have argued that risk sharing does not play a large role [see Allen and Lueck (1995, 1998, 1999), Alston (1981), and Alston and Higgs (1982)]. 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.

[20] We have abstracted from risk considerations because we feel that they are of limited importance in this context. First, our data contain large developers and chain stores, which are unlikely to be very risk-averse. Second, controlling for store fixed effects, which could reflect variation in the ability of different stores to handle risk, has a negligible effect on the results. Finally, the risk-sharing story has not had a great deal of success in explaining observed contracts in many arenas (Prendergast 2002), so we have focused instead on what we feel is a more important incentive in this context; namely, the allocation of rents to better internalize externalities and also the role of sharing contracts in balancing the relative efforts of the parties.

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