THE CHOICE OF ORGANIZATIONAL FORM IN GASOLINE RETAILING AND THE COST OF LAWS THAT LIMIT THAT CHOICE*

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ABSTRACT

This paper uses a new data source to analyze the choice of organizational form of retail gasoline stations. In recent years, gasoline stations have tended to be less likely to be owned and operated by a lessee-dealer and more likely to be owned and operated by the refiner. We examine the determinants of organizational form and find them to be based on efficiency, not predatory concerns. We estimate the costs of recent laws that prohibit company ownership of gasoline stations and find that the annual cost of national divorcement legislation could easily exceed $1 billion.

I. INTRODUCTION

THE gasoline retail industry has evolved significantly since the early 1970s. Retail outlets now sell more gasoline, while the total number of outlets has declined. Whereas in the early 1970s, the overwhelming majority of stations provided full-service and repair facilities, that is no longer the case. Beginning in the 1970s, many oil companies also began to operate some of their retail outlets directly, while the number of dealers has declined.[1]

In response, several states have banned company-operated stations in the gasoline retail industry. This unusual restriction, known as divorcement, has been legislated in several states.[2] Similarly, several lawsuits and other legislation have sought to impose other restrictions on company-operated sta-

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[1] Company-operated stations are typically operated by salaried employees of the integrated refiner. The company sets retail price and other operating policies and retains profits. By contrast, dealers lease the station and equipment from the refiner, set retail prices, and retain the profits.

[2] Connecticut, the District of Columbia, Delaware, Maryland, Nevada, and Virginia had divorcement legislation in effect during the relevant time period of our study. In addition to these areas, Hawaii is currently a divorcement state.

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tions or on refiner-dealer relationships. The standard justification for these restrictions on company-operated stations is that the oil companies are engaged in predatory conduct to drive their lessee dealers out of business. We use a unique data set to investigate the determinants of organizational form for gas stations. We estimate an econometric model that shows how efficiency factors explain organizational choice. We use this model to estimate the cost of divorcement legislation. Finally, we discuss generally and use our data to show why the predation hypothesis is not supported.

The paper is organized as follows. After describing the efficiency reasons for organizational choice and the data in Section II, we estimate in Section III an econometric model of how firms decide whether a newly constructed station will be company operated or dealer operated. If market efficiency determined the form of retail operation, we would expect that company-operated stations might have different characteristics from dealer-operated stations. Specifically, we would expect to find relatively more company-operated stations in those instances where the monitoring of employees is less important. We indeed find that company-operated stations are relatively more prevalent if a station has no service facilities and more gasoline volume sold through self-service. This confirms the findings of Andrea Shepard from a different, narrower database.[3]

Next, in Section IV, we show how to use a probit analysis to see what difference it makes if the ownership form is chosen incorrectly, such as through divorcement legislation that bans company-owned operations. We estimate the cost of divorcement legislation, first under the assumption that station characteristics are exogenous, and then under the assumption that characteristics and mode are simultaneously determined.

Finally, in Section V, we discuss the predation hypothesis in more detail and use our data to show that integrated refiners' investment behavior is not the sort that one would expect if they were engaging in predatory conduct designed to drive their lessee dealers out of business. We conclude that the presence and growth of company operations appear to be an efficient response to market conditions and that restrictions on company operations are costly.

II. Efficiency Hypothesis and Data Description

A. *Efficiency Hypothesis*

According to the economics of franchising, the decision to operate a station directly or through a dealer should depend on cost considerations (see, for

[3] Andrea Shepard, Contractual Form, Retail Price and Asset Characteristics in Gasoline Markets, 24 Rand J. Econ. 58 (1993).

example, James Brickley and Frederick Dark and Margaret Slade).[4] Independent dealers hire employees, set prices, and retain profits. As such, they provide benefits when local supervision is required, compared to a company-operated station where the manager is not the residual claimant. Dealer operation is efficient, compared to company operation, when it can improve a company's responsiveness to local market conditions and can limit inventory and labor costs. This would be true if automotive repairs and services are provided at the station because in those cases it would be costly for outside monitoring to occur.

Dealers are less efficient than company-operated stations when per-unit labor costs are low, when customer service is unimportant, or when the refiner must make large site-specific investments. Such conditions are met in high-volume self-service stations. In those situations, little if any entrepreneurial skills are needed to monitor the station's operation, and there is a risk that a valuable, expensive facility will be poorly run with no ability (because of numerous legal prohibitions on terminations) to change management.[5]

The number of stations that provide full automotive service and repairs requiring on-site monitoring has declined. Indeed, stations today are much bigger than they were and are more likely to be configured as self-service or convenience stores. Such changes would reduce the need for on-site monitoring and so reduce the desirability of a lessee dealer compared to a company-operated station.

The efficiency hypothesis would predict that as dealerships are established, the decision of operation mode will be a function of cost. We expect to see relatively more lessee dealers with service bays and at low-volume stations.

B. Description of Data

We collected data from 10 integrated refiners whose sales constituted (as of 1986) approximately half of U.S. retail gasoline sales (about 108 billion gallons) as well as half of U.S. refining capacity. Indeed, this is, to our knowledge, the first national study that examines the question at hand. For each newly constructed station in the years 1984–87, the following variables were assembled: year of initial operation, 1988 mode of operation (dealer or company operated), 1988 volume, as well as number of service bays in 1988.

[4] James A. Brickley & Frederick H. Dark, The Choice of Organization Form: The Case of Franchising, 18 J. Fin. Econ. 401 (1987); Margaret E. Slade, Multitask Agency and Contract Choice: An Empirical Exploration, 37 Int'l Econ. Rev. 465 (1996); Margaret E. Slade, Strategic Motives for Vertical Separation: Evidence from Retail Gasoline Markets, 14 J. L. Econ. & Org. 84 (1998).

[5] The legal impediments to arrangements between refiners and their lessee dealers have thus led to fewer lessee dealers. See, for example, James A. Brickley, Frederick H. Dark, & Michael S. Weisbach, The Economic Effects of Franchise Termination Laws, 34 J. Law & Econ. 101 (1991); Howard P. Marvel, Tying, Franchising and Gasoline Service Stations, 2 J. Corp. Fin. 199 (1995).

TABLE 1

NEWLY CONSTRUCTED STATIONS IN NONDIVORCEMENT STATES, BY 1988 VOLUME (in Millions of Gallons)

Mode of Operation in 1988	<1.25	1.25–1.74	1.75–2.24	>2.25	Total
Construction in 1984–87:					
Company operated	78	119	109	95	401
Lessee dealer	30 (27.8)	31 (20.7)	29 (21.0)	22 (18.8)	112 (21.8)
Total	108	150	138	117	513
Construction in 1984–85:					
Company operated	22	45	38	35	140
Lessee dealer	21 (48.8)	16 (26.2)	16 (29.6)	11 (23.9)	64 (31.4)
Total	43	61	54	46	204

SOURCE.—The data were provided by nine refiners. Connecticut, the District of Columbia, Delaware, Maryland, Nevada, and Virginia are excluded.

NOTE.—Values in parentheses are percentages. $\chi^2_{(2)} = 8.11$ (significant at the 2 percent confidence level) for 1984–85 construction. See Alexander M. Mood, Franklin A. Graybill, & Duane C. Boes, Introduction to the Theory of Statistics 442–44 (1974), for details of the test.

In addition, we obtained data on investments in existing lessee dealers for 1986–88, conversions of company-operated stations, and volume data for open (that is, dealer-owned stations) versus lessee dealers (to test the predation theory) by state and year.

III. RESULTS—DETERMINANTS OF STATION MODE

If station organization is indeed efficiency based, we would expect to see more company-operated stations where the capital-labor ratio is high and where monitoring costs are low, specifically in those stations with high-volume gasoline sales but without car repair facilities. As seen in Tables 1 and 2, the evidence supports that hypothesis. Table 1 shows that newly constructed stations in nondivorcement states are more likely to be run by lessee dealers when volume is less than 1,250,000 gallons per year than when volume is above 1,250,000 gallons per year and that this difference is statistically significant at the 2 percent level.

Many newly constructed stations are run directly by the company for a start-up period until they are leased to a dealer. For that reason, volume differences among dealer-owned and company-operated stations constructed during 1984–85 may be more probative than an analysis of the entire 1984–87 period. For stations constructed in 1984–85, almost half of all low-volume stations are run by dealers, whereas 27 percent of the higher volume stations are run by dealers.

Table 2 describes the difference between company-operated and dealer-owned stations with respect to the number of bays. Only 18 percent of newly constructed stations without service bays are operated by dealers, while more than half of newly constructed stations with bays are run by dealers. The hypothesis that dealers and company-operated stations are no different and

TABLE 2

NEWLY CONSTRUCTED STATIONS IN NONDIVORCEMENT STATES, BY NUMBER OF BAYS IN 1984–87

Mode of Operation in 1988	No Bays	2 Bays	3 Bays	4 Bays	5 Bays	Total
Company operated	374	1	12	12	2	401
Lessee dealer	83 (18.2)	0 (.0)	13 (52.0)	15 (55.6)	1 (33.3)	112 (21.8)
Total	457	1	25	27	3	513

SOURCE.—The data were provided by nine refiners. Connecticut, the District of Columbia, Delaware, Maryland, Nevada, and Virginia are excluded.

NOTE.—Values in parentheses are percentages. $\chi^2_{(2)} = 33.04$ (significant at the 2 percent confidence level) for 1984–85 construction. See Alexander M. Mood, Franklin A. Graybill, & Duane C. Boes, Introduction to the Theory of Statistics 442–44 (1974), for details of the test.

that the relative shares of bay and nonbay stations is attributable to chance is strongly rejected ($\chi^2 = 33.04$).

We can further describe the likelihood of a newly constructed station to be run by a dealer or by the company using a probit analysis. According to the efficiency hypothesis, a company chooses its mode of operation on the basis of its profits. Profit is a function of volume and the number of bays as well as other unobserved variables. The mode of operation, conditional on observing the volume and number of bays, can therefore be predicted. As seen in Table 3, the probit coefficients on volume and bays have the correct signs and are generally significant. Columns 5 and 6 focus on stations built during 1984 and 1985. As already described, data from these stations are the most reliable to use since mode choice in 1988 is likely to be the intended mode of operation. The results show that both volume and bays are statistically significant determinants of mode choice. Specifically, low volume and number of repair bays positively influence the likelihood of a lessee dealer mode of operation. In the remaining columns, we present the results for the entire period.

The data set for the entire time range has the drawback that the mode choice variable is not as reliably measured for stations built in 1986 and 1987 as for stations built in 1984 and 1985. Still, the results in columns 1–4 generally confirm the findings in columns 5 and 6. (Analysis of the 1986 and 1987 data revealed that there was one company with an unusual proclivity to open stations initially as lessee dealers. Controlling for this company only with a fixed effect produces, in the 1984–85 analysis, a volume coefficient that is statistically significant.)

IV. THE COST OF DIVORCEMENT

We can use the probit analysis to obtain a rough measure of the cost of requiring divorcement on a national level—that is, of requiring company-operated stations in all 50 states to become lessee-dealer stations. We use

TABLE 3

PROBIT MAXIMUM LIKELIHOOD RESULTS, PROBABILITY OF LESSEE-DEALER OPERATION FOR NEWLY CONSTRUCTED STATIONS, NONDIVORCEMENT STATES, 1984–87

	All (1)	All (2)	All (3)	All (4)	1984–85 (5)	1984–85 (6)
Constant	−.63	−.63	1.58	3.72	−.06	7.05
	(.20)	(.20)	(2.38)	(2.47)	(.29)	(3.75)
Number of bays	.25	.28	.25	.28	.16	.16
	(.05)	(.05)	(.05)	(.05)	(.07)	(.07)
1988 volume (in millions of gallons)	−.13	−.22			−.30	
	(.10)	(.10)			(.15)	
Log volume			−.17	−.33		−.53
			(.16)	(.17)		(.26)
Company dummy		.74		.73		
		(.18)		(.18)		
% correctly predicted	78.56	78.56	78.56	78.56	71.08	71.08
Log likelihood	−255	−246	−255	−247	−121	−121

SOURCE.—The data were provided by nine refiners. Connecticut, the District of Columbia, Delaware, Maryland, Nevada, and Virginia are excluded.

NOTE.—Dependent variable: lessee dealer in 1988 = 1, company operated in 1988 = 0. There were 513 stations constructed in 1984–87, of which 204 were constructed in 1984–85. Standard errors are in parentheses.

two approaches, with the second being more sophisticated and complicated than the first.

A. Station Characteristics Are Exogenous

Assume first that the volume (x_1) and number of repair bays (x_2) of a station are exogenous and independent of mode of operation. The choice of mode of operation will depend on whether the average cost of operation at lessee dealers (c_d) exceeds the average cost of operation at company-operated stations (c_o).

Let

$$c_d = \gamma_d + \alpha_d x_1 + \beta_d x_2 + e_d$$

and

$$c_o = \gamma_o + \alpha_o x_1 + \beta_o x_2 + e_o,$$

where e_i are independently and identically distributed random normal variables.

It follows that the probability of a lessee-dealer configuration is

$$P = \text{prob}[c_d < c_o] = \text{prob}(-a - b_1 x_1 - b_2 x_2 + e < 0),$$

or

$$P = \text{prob}(e < a + b_1 x_1 + b_2 x_2),$$

or

$$P = F(a + b_1 x_1 + b_2 x_2),$$

where

$$a = \gamma_o - \gamma_d, \qquad b_1 = \alpha_o - \alpha_d,$$

$$b_2 = \beta_o - \beta_d, \qquad \text{and} \qquad e = e_d - e_o,$$

where $F(\cdot)$ indicates the value of the cumulative distribution that describes the distribution of differences in e_i. If we take the distribution of costs to be normal with standard deviation σ, then

$$P = N\left(\frac{a + b_1 x_1 + b_2 x_2}{\sqrt{2}\sigma}\right),$$

where $N(\cdot)$ indicates the value of the cumulative normal.[6]

The probit maximum likelihood results in Table 3 provide estimates of $a/(\sqrt{2}\sigma)$, $b_1/(\sqrt{2}\sigma)$, and $b_2/(\sqrt{2}\sigma)$. In order to estimate the difference in costs between configurations, it is necessary to know the size of σ, which represents the standard deviation of costs, conditional on mode of operation, volume, and bays. We assume that price variation is a reasonable proxy for the variation in average cost across stations—an outcome consistent with competition. Shepard showed that the standard deviations of lessee-dealer prices in eastern Massachusetts in 1987 ranged from 4.75 to 10.5 cents per gallon for regular unleaded gas according to type of service.[7] Controlling for capacity (which is presumably strongly correlated with volume), bays, and other variables reduces the standard deviations by about 20 percent.[8] Further removing the area-specific component of price dispersion reduces the conditional standard deviation of price for regular unleaded gas at lessee dealers in the Shepard sample to a range of 4–5 cents.[9]

That range, however, probably understates σ. One reason is that the price variation reflects a truncated distribution of e_d, as we only observe lessee dealers for whom e_d is not very high. Second, the area-specific effect may not be the same across modes of operation, in which case the variation over time in price will underestimate the σ required to calculate the variation of

[6] If e_d and e_o are independently and identically distributed, each with variance σ, then $e_d - e_o$ has variance $2\sigma^2$.

[7] The standard deviations for her much smaller sample of company-operated stations (38 stations versus 452 lessee dealers) ranged from 3.56 to 12.80 cents. See Shepard, *supra* note 3, table 1. Therefore, by assuming that the standard deviation of cost is based on the estimate for lessee-dealer stations, we probably are understating σ. This will lead our estimates for cost of divorcement to be conservative.

[8] Shepard, *supra* note 3, table 2 & table 1.

[9] The comparable range for company-operated stations is 3–6 cents.

$e_d - e_o$. However, in private correspondence with an anonymous referee, we have learned that an idiosyncratic time component may further reduce the range by up to 50 percent, so the range across all stations of σ could be as small as 2–3 cents (1987 price levels). Again, this reduction in range likely understates the true σ because the idiosyncratic component likely varies across station types. This range translates into a range of about 3–4 cents in 1998 dollars because the consumer price index rose by approximately 42 percent from 1987 until the first quarter of 1998. Accordingly, we assume conservatively that σ equals 3 cents. However, our results can readily be scaled linearly to higher, and probably more realistic, estimates of σ.

The average difference in average cost (that is, $E(c_d - c_o)$) between a station now company operated and one that is switched over to become a lessee dealer is therefore

$$\sqrt{2}\sigma[E(a^* + b^*x_1 + c^*x_2)$$

$$+E(e_d - e_o/\text{station was not lessee dealer})],$$

which exceeds

$$\sqrt{2}\sigma(a^* + b^*x_1 + b_2^*x_2) = .03\sqrt{2}\,(a^* + b_1^*x_1 + b_2^*x_2),$$

where a^*, b_1^*, and b_2^* are the (negative of) the estimated probit coefficients from Table 3.

The total cost difference for a 2 million gallon station (a typical volume for company-operated stations) with no bays (the most frequent configuration in the data and the one that companies tend to operate) is between $50,000 and $90,000 depending on the specification.[10] On the basis of these estimates, the costs of a hypothetical nationwide divorcement law (based on about 15,000 company-operated stations in the United States in the early 1990s) could easily exceed $1 billion annually.[11]

The foregoing analysis assumed that station characteristics are exogenous and independent of the mode of operation. Indeed, other authors such as Shepard also assumed that characteristics were exogenous and that firms choose the physical characteristics of the station on the basis of traffic flow and only later decide the optimal organizational form for the station. For older stations, it might be appropriate to assume that configuration (for example, number of pumps) is exogenous since the layouts of such stations were presumably chosen long ago, and once built, it is hard to enlarge a station. For new stations, however, we expect that the mode of operation will be chosen simultaneously with volume. (For simplicity, we focus on volume

[10] For example, using column 5 of Table 3, the total cost difference is $\sqrt{2}(.03)(.06 + .3 \times 2)(2 \times 10^6)$, or about $56,000.

[11] Stations could also cease operation. We ignore the operating cost savings from closure and ignore the harm to consumers from closure.

and ignore the number of bays.) Indeed, we understand from industry participants that it would be incorrect to assume otherwise. So for those stations it would be inaccurate to use the coefficients of a probit regression that predicts mode choice as a function of volume in order to estimate costs, since the probit model explicitly assumes that volume is exogenous.

B. Characteristics and Mode Simultaneously Determined

Accordingly, we now construct a model in which configuration and mode of operation are determined simultaneously. In our model, company-operated and lessee-dealer stations' profit functions are quadratic with respect to volume. The cost incurred from converting company-operated stations to lessee-dealer stations is the difference between expected profits under company operation and dealer management. In order to identify all the parameters, we must impose some assumptions about zero-profit volumes for company-operated and lessee-dealer stations, respectively. A station will be chosen to be company operated if $\Pi_o > \Pi_d$, where Π_i indicates profit to the oil company and i indicates the mode of operation (where the subscripts o and d indicate company operated and dealer operated, respectively). Assume that Π is a quadratic function of volume so that

$$\Pi_i = a_i V^2 + b_i V + c_i + e_i,$$

where V is station volume, a_i, b_i, and c_i are unknown parameters, and e_i indicates error.

For any mode i, we know that the station will choose to operate at volume $V_i^* = -b_i/2a_i$, at which point $\Pi_i = (c_i - b_i^2/4a_i) + e_i$. Company operation instead of dealer operation is chosen if $\Pi_o > \Pi_d$ or if

$$\left(c_o - \frac{b_o^2}{4a_o}\right) - \left(c_d - \frac{b_d^2}{4a_d}\right) > e_d - e_o. \tag{1}$$

Once all parameters are estimated, we can calculate the extra cost from converting an already built station from one ownership mode to another, but, unlike the previous calculation, we have explicitly accounted for the simultaneous choice of volume and mode of operation in estimating the parameters. Since the station is already built, its volume can, as a rough approximation, be taken as exogenous for purposes of estimating extra costs (although not for parameter estimation), and we can calculate $\Pi_o(V_o^*) - \Pi_d(V_o^*)$ as the extra cost incurred to switch each company-owned station to a dealer-operated station. (Notice that Π_d is evaluated at V_o^*, not V_d^*.)

In order to identify all parameters, we must either have some exogenous variable or impose some assumptions. Because we have no exogenous variable, we are forced to impose some simplifying assumptions to illustrate our approach. Our calculations should therefore be regarded as preliminary.

Let $a_o = a_d = a$. Then, using the average volume at stations of each type, we know that

$$\bar{V}_o = \frac{-b_o}{2a} \quad \text{and} \quad \bar{V}_d = \frac{-b_d}{2a}, \tag{2}$$

where $\bar{V}_i$ is the average annual volume at stations in operation mode i.

In our sample, $\bar{V}_o$ approximately equals 2 million gallons and $\bar{V}_d$ approximately equals 1.25 million gallons.

In our sample, we find very few owner-operated stations at an annual volume of 1 million gallons or below and very few lessee-dealer stations at an annual volume of .5 million gallons or below. Accordingly, we impose the conditions that (in expectation)

$$\Pi_o(1) = 0 \quad \text{and} \quad \Pi_d(.5) = 0. \tag{3}$$

Using (1) and the proportion of stations built in 1984–85 that are company operated in 1988, we can estimate (up to a scalar) the constant $c_o - c_d - (b_o^2/4a) + (b_d^2/4a)$ as .47.[12] We identify the scalar, as before, by using an estimate of price dispersion to estimate in this case the conditional dispersion of profits per unit. Using the same assumption as before (σ = \$0.03), it follows that, on average, the standard deviation of the error term in the profit equation equals .03 times average station volume (approximately 1.5 million gallons).[13] (This implies that the standard deviation of the probit error is at least $\sqrt{2}(0.03)(1.5 \times 10^6)$.)

Using the probit analysis together with equations (2) and (3), we are able to estimate all the parameters. Therefore, we can calculate the extra cost resulting from converting company-operated stations to lessee-dealer stations as $\Pi_d(\bar{V}_o) - \Pi_o(\bar{V}_o)$. That cost is estimated to be about \$70,000 per station, or about 3.5 cents per gallon. We understand that at many stations, average gross margins are about 20 cents, so the additional cost represents between 15 and 20 percent of gross margins. This leads to an overall annual cost estimate (based on 15,000 company-operated stations throughout the United States) of about \$1 billion.

Using a series of alternative reasonable assumptions, we obtain cost estimates ranging from \$.6 to \$2.1 billion. In Table 4, we present alternative cost estimates of divorcement based on different assumptions regarding zero profits.[14]

[12] That is, $F(.47) = .69$, where F is the cumulative normal and .69 is the fraction of stations that are company operated in 1988 of stations built in 1984–85.

[13] If the standard deviation of profit per gallon is .03, then the standard deviation of profit for a typical station is .03 times typical volume.

[14] A necessary condition for our method to work is that the difference between the average and minimum station volume for company-operated stations is larger than the difference for dealer-operated stations. This condition is satisfied in our data set.

TABLE 4

COST ESTIMATES OF DIVORCEMENT UNDER DIFFERENT ASSUMPTIONS

	(1)	(2)	(3)	(4)	(5)	(6)
Company zero-profit volume (millions of gallons)	1.0	1.1	.8	1.0	1.1	1.2
Dealer zero-profit volume (millions of gallons)	.5	.5	.4	.4	.6	.6
Cost of divorcement ($ billions)	1.02	1.81	.62	1.61	1.16	2.06

We regard both our approaches to measuring the cost of divorcement as crude but illustrative of the large cost likely to accompany a policy of divorcement. Moreover, we calculate the national cost of divorcement on the basis of estimates derived using data from only the major refiners. The cost for nonmajor refiners is likely higher because nonmajor refiners typically rely more heavily on company operations than major refiners in marketing their brand of gasoline. Divorcement therefore creates a barrier to entry for the nonmajor refiners.

Finally, we note that, in a recent Federal Trade Commission study using cross-sectional state data, Michael Vita estimated the overall annual consumer cost (based on 1999 volumes) following national divorcement to be even higher than our estimates (based on early 1990 volumes)—$2.5 billion.[15] One possible reason for his higher estimates is that, as mentioned above, our choice of 3 cents for σ is likely to be conservative and therefore leads to conservative estimates of costs.

V. PREDATION

Proponents of divorcement and those seeking other restraints have argued that integrated refiners can and supposedly have driven their dealers out of business.[16] One dominant theme is that the major oil companies discriminate against their own retail dealers by charging them too much for gasoline either relative to the prices charged to independent wholesalers[17] or relative to the

[15] Michael G. Vita, Regulatory Restrictions on Vertical Integration and Controls: The Competitive Impact of Gasoline Divorcement Policies, 18 J. Reg. Econ. 217, 231 (2000).

[16] The statements of the critics are contained in testimony supporting various state and federal initiatives (for example, federal bill S. 1111 in 1987; see also the industry trade press, for example, U.S. Oil Week, August 27, 1980, at 1; Houston Post, September 12, 1990).

[17] As a response, proposed legislation introduced into the U.S. Senate in 1987 would have permitted dealers to make open-market purchases of up to 30 percent of sales, even though the current agreements between the companies and dealers might require all gasoline to be purchased directly from the company. Michigan has recently considered legislation in which a dealer could purchase supplies from wholesalers rather than from the company that leases the station to the dealer.

retail prices set by company-operated stations.[18] Another claim is that the refiners expropriate excessive rents from their dealers in the form of unreasonably high lease fees.[19] As proof of the alleged predatory practices, the critics have pointed to the decline in the number of retail dealers and reduced profitability. Once retail competition from lessee dealers is eliminated, the company operations will harm consumers by raising prices. Critics conclude that only by imposing restrictions on the majors, specifically by preventing them from operating their own stations, can these predatory practices be curtailed, thereby enhancing consumer welfare in the long run.

Although the believability of a predation strategy is always problematic, it is particularly difficult here to understand the economic logic of the predation hypothesis. There is no compelling evidence of retail market power in many, if not most, geographic areas: entry is easy, competitors are numerous, and brand value is not believed to be significant. In such circumstances, there is no reason to expect that an integrated refiner could benefit from driving out its lessee dealers unless lessee dealers are inefficient, and there is no reason to expect consumers to be harmed. Even if one believed that there was significant market power at the retail level, it is still unclear how consumers could be hurt by company operations. In the presence of market power, it is well known that the vertical integration eliminates a double-marginalization problem (to the benefit of consumers). Moreover, the proponents of the predation hypothesis would have to explain why lessee dealers were set up in the first place and why their presence is suddenly no longer in the interest of the refiners. Finally, even if one could construct some theory of harm from the existence of company operations, one would also have to consider the loss from the higher costs estimated above in order to justify the imposition of restrictions on company operations. However, the empirical evidence indicates that consumers have not benefited from restrictions. Maryland, the first state to legislate divorcement in 1974, has actually admitted that divorcement has been harmful to consumers because gasoline retail prices were not lower than they would have otherwise been.[20]

[18] Shepard's results suggest lower retail prices by company-operated stations. Shepard, *supra* note 3.

[19] It should be noted that the Petroleum Marketing Practices Act (1978) already places restrictions on the way refiners can terminate or refuse to renew leases.

[20] Maryland Department of Fiscal Services, Gasoline Station Divorcement 1 (1988). In addition, station hours have been reduced, thereby further curtailing consumer welfare. John M. Barron & John R. Umbeck, The Effects of Different Contractual Arrangements: The Case of Retail Gasoline Markets, 27 J. Law & Econ. 313 (1984). Similarly, alleged "proof" of predatory pricing in nondivorcement states, such as the decline in the number of dealerships, can easily be explained by nationwide trends that show a marked decline in the demand for car repair services at gasoline stations and a simultaneous increase in specialty shop repairs. Temple, Barker & Sloane, Gasoline Marketing in the 1980s: Structure, Practices and Public Policy (Am. Petroleum Inst. 1988). The decline in the number of gasoline-retailing dealerships is by no means unique. In some industries such as the automobile repair business, the number of dealerships began to decline as early as the 1960s, even though in others franchises have flourished.

We can use our unique data to test some of the implications of the predation hypothesis. The predation hypothesis—by claiming that company operations are part of a predatory plot to eliminate lessee dealers so as to harm consumers and by denying that different costs across type of stations motivate company operations—would predict, contrary to our findings, that a station's configuration is unrelated to its operation mode. Furthermore, the predation hypothesis implies that refiners will not set up any new lessee dealers and would certainly not make additional investments in existing lessee dealers. Between 1984 and 1987, however, integrated refiners constructed 112 new lessee-dealer stations in nondivorcement states, which amounts to 22 percent of the total of newly constructed stations (based on information from the nine companies that provided relevant data).[21] Perhaps more interesting is the fact that between 1986 and 1988, nine integrated refiners chose to convert a total of 646 company-operated stations to lessee dealers. This finding is inconsistent with the predation hypothesis.

The predation hypothesis further predicts no new investment in existing lessee-dealer stations (since the goal is to drive them out of business). The integrated refiners, however, invested well over $1 billion in new and existing lessee-dealer stations from 1986 through 1988 (based on information from the nine companies that provided relevant data). This investment behavior is not the sort that one would expect if the refiners were engaging in predatory conduct.[22]

VI. Conclusions

We find robust support for the hypothesis that retail gasoline operations are motivated by efficiency considerations. We find no evidence to indicate that predation is a motivating factor in the choice between company operation and dealer operation of gasoline service stations. A policy of restriction on station choice adversely affects overall welfare and ultimately consumers. We present two empirical analyses to estimate the likely cost of such re-

[21] The number of newly constructed stations (112) actually understates the number of new lessee-dealer stations because it does not include stations acquired from other companies, many of which were retained as lessee dealers, nor does it include new dealerships that were previously operated as company-operated stations.

[22] Although the integrated refiners invest in new and existing lessee dealers, legislation that limited configuration choice would reduce the incentive for companies to invest in states that forbid the efficient ownership mode, for two reasons: (*a*) if it is more efficient for growth to occur in company-operated stations, then rates of investment growth in newly constructed stations should be lower in states that forbid company-operated stations. From 1984 to 1987, new investments increased by 153 percent in nondivorcement states (for all 10 companies in our survey) but decreased by 8 percent in divorcement states; (*b*) since company-operated stations are relatively capital intensive, we find, using an ordinary least squares regression for 1986 and 1987, that investment by state in newly constructed stations is dependent on the level of company-operated retail sales but not on the level of dealer sales—for every gallon sold in company-operated stations, almost 4 cents of investment will be made—so restricting company-operated sales lowers investment.

strictions. In one estimate, we ignore the simultaneous choice of mode of operation and station characteristics, while in the other, we explicitly account for this simultaneity. Although the calculations are crude, each indicates that a policy of divorcement is likely to impose significant costs on society.

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