The Dynamics of Franchise Contracting: Evidence from Panel Data

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This paper provides the first systematic evidence on how franchisors adjust their royalty rates and franchise fees as they gain franchising experience. This evidence comes from a unique panel data set that we assembled on these monetary contract terms for about 1,000 franchisors each year for the 1980–92 period. We find that there is much persistence, over time, in franchise contract terms within firms. We find this despite sizable across-firm differences in royalty rates and franchise fees. In addition, franchisors do not systematically increase or decrease their royalty rates or franchise fees as they become better established, contrary to predictions from some specific theoretical models. We conclude that variation in contract terms is mostly determined by differences across firms,

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not by within-firm changes over time. Finally, we find no negative relationship, within firms, between up-front franchise fees and royalty rates.

I. Introduction

A franchise agreement is typically defined as a contractual arrangement between two legally independent firms, whereby the franchisee pays the franchisor for the right to sell the franchisor's product or the right to use his trademarks in a given location for a specified time period. This form of organization is a well-established business phenomenon: in 1986, the last year for which such data are available, an estimated 35 percent of retailing in the United States took place through franchised chains, and the value of goods sold through these chains represented 13.4 percent of gross domestic product (Kostecka 1988). In a traditional franchise, franchisors sell a finished or semifinished product to franchisees at a markup, as in gasoline stations, car dealerships, and soft drink bottling franchises. In business format franchising, by contrast, the franchisee receives a trade name and a complete business plan in exchange for the payment of a franchise fee and royalties, as in fast-food and automotive repair franchises. In the last few decades, sales through business format franchised chains have grown from a negligible value to about 25 percent of all franchising, or 3.5 percent of GDP. This paper is about the key monetary terms of business format franchise contracts.

Consistent with its economic importance, one now finds in the literature a number of theoretical explanations for the existence of franchising and for the structure of franchise contracts. These models, however, as in much of the theoretical literature on labor and other contracts, have received only a limited amount of empirical attention. In fact, the empirical literature on franchising has followed its own path, focusing mostly on what determines franchisors' decisions to franchise outlets versus operating them directly.[1] The theoretical discussion, meanwhile, has been primarily concerned with the determination of the terms of the optimal contract between franchisor and franchisees given issues of incomplete information and moral hazard. In particular, authors have focused on factors influencing the choice of royalty rates and up-front franchise fees

[1] See Dant, Kaufmann, and Paswan (1992), Dnes (1996), Lyons (1996), and Lafontaine and Slade (1997, 1999) for reviews of this literature. To our knowledge, the only empirical studies of franchise contract terms have been those of Lafontaine (1992*a*, 1993), Sen (1993), Wimmer and Garen (1997), and Gagné, Sigué, and Zaccour (1998). All have relied on cross-sectional data.

in business format franchise contracts. In this paper, we explore empirically the variation in those same variables. Our overall goal is to provide information on contracting patterns that would help sort out existing theories of franchising, but also to suggest avenues for future theoretical work on franchising and on contracting more generally.

We model the determinants of royalty rates and franchise fees using a unique panel data set that we assembled on these monetary contract terms for about 1,000 franchisors each year from 1980 to 1992. These data allow us to address three related questions regarding franchise contract terms. First, how do firms adjust their franchise contract terms as they become established? Second, to what extent are these contract terms characterized by firm-specific fixed differences? And third, what is the relationship between franchise fees and royalty rates?

Our main results are as follows. First, there is a great deal of persistence in franchise contract terms within firms. We find this despite sizable across-firm differences in royalty rates and in franchise fees. Second, franchisors that do change their fees do not systematically increase or decrease their royalty rates as they become better established, contrary to predictions from some existing theoretical models. In fact, we find that variation in royalty rates and franchise fees is almost exclusively explained by across-firm differences, not by within-firm changes in fees over time. Third, despite contrary predictions from theory, there is little apparent trade-off between royalty rates and up-front franchise fees, even within firms. We expect the reason is that franchise fees are a small source of revenue to most franchisors.

The paper is organized as follows. In Section II, we define the franchise contract terms of interest and briefly discuss relevant theories. In Section III, we describe our data, their sources, and characteristics. Our empirical methodology and results are found in Section IV. In Section V, we summarize our results and present conclusions.

II. Franchise Contract Terms: Definitions and Theoretical Framework

A. *Franchise Contract Terms: Definitions*

In business format franchising, royalties, which are usually a constant percentage of the franchised unit's sales, and up-front franchise fees, which are paid only once at the beginning of the contract, are the main sources of revenues to franchisors. Typically, the franchise

fee and royalty rate demanded by a franchisor are the same for all franchisees joining a chain at a point in time. Thus one can meaningfully refer to, and examine empirically, the royalty rate and franchise fee offered by a franchisor at a point in time.

From a theoretical perspective, the relevant notion of the royalty rate includes all variable payments—as these payments affect decisions at the margin—whereas the relevant notion of franchise fee captures all fixed payments from the franchisee to the franchisor. Consequently, the "royalty rate" used herein is the percentage of sales paid to the franchisor, including any advertising fee given as a percentage of sales. The "franchise fee" is usually only the fixed up-front fee paid to the franchisor when opening a new outlet. However, when the franchisor requires a fixed payment each week or month (which arises for 700 of our 11,947 observations or 277 of our 3,625 franchisors), these payments are discounted and added to the up-front fee to generate what we call the franchise fee. (See the Appendix for more details.)

Though franchise fees receive a lot of attention in theoretical models, in reality, they usually represent a fairly small proportion of the total amount paid by franchisees to franchisors. In fact, on average, the up-front fee amounts to about 8 percent of the expected value of all payments from franchisee to franchisor (on the basis of our data on average fees and data on expected sales per unit from Kostecka [1988]).

As this paper is concerned with how firms adjust their contract terms over time, it is important to recognize that we are referring to the terms of the contracts offered to new franchisees each year. Contract terms are rarely renegotiated within the contract period. Existing franchisees continue to operate under the terms of their contracts until they are renewed. At that point, they are usually renewed at the "then-current" contract terms. Thus a franchisor that changes the terms of its contract will, after franchising some units under the new contract, have different franchisees operating under different contract terms.

Finally, while the monetary terms of a franchise contract are very central to the agreement, franchise contracts also stipulate many other aspects of the relationship (see Udell [1972] for a compilation of contract clauses), some of which can affect the level of fees. For example, the duration of the agreement, which varies typically between five and 30 years and averages around 15 (Kostecka 1988), will affect the commitment level and investments of both parties and, as such, affect the level of the fees. Similarly, the provision of an exclusive territory (about 60–65 percent of franchisors offer exclusive territories according to various surveys) may make the franchise

more attractive to the franchisee and allow the franchisor to charge higher fees. Finally, the franchisor can require franchisees to purchase some inputs from them. If sold at a markup, these purchases can be a substitute for franchise fees and royalties. However, input purchases (voluntary and required) are valued at less than 10 percent of franchisees' sales in most business format franchise sectors (see Lafontaine 1992*a*), largely because U.S. antitrust authorities have not allowed input purchase requirements when "quality" issues can be handled with approved supplier clauses.[2] Thus a number of features of franchising contracts that are typically unmeasured in franchising data can generate across-firm variation in the level of the fees.

B. An Overview of Relevant Theories

Few of the existing models of franchising have direct dynamic implications regarding contract terms. Exceptions include Gallini and Lutz's (1992) signaling model and Mathewson and Winter's (1985) reputation model, both of which imply that franchisors will want to reduce their royalty rates and increase their franchise fees over time. This occurs in the former because information about franchisor quality is revealed over time and in the latter because of the franchisor's increased reputational capital. Rubin (1978), on the other hand, expects franchisors to increase their royalty rates as they become established. This, he argues, must occur to counterbalance the reduction in franchisor incentives that is associated with the lower potential sales of franchised units in a saturated market.

Most other models of franchising do not have any dynamic component. They imply largely that contract terms should be different for different franchisees whose tastes and circumstances vary.[3] But in reality, each franchisor offers the same contract to all franchisees joining at a point in time. Thus if the tastes and circumstances of different franchisees play a role in the contracting decision, they do so only on "average," or because the different contract terms offered by different franchisors allow franchisees to self-select. In this setting, optimal contract terms will differ across chains that face different needs to align franchisee and franchisor incentives (or that

[2] See Hunt and Nevin (1975), Klein and Saft (1985), and Lafontaine (1993) for more on this.

[3] See Cheung (1969), Stiglitz (1974), Reid (1977), and Hallagan (1978) for early sharecropping models that are easily applied to franchising. See also Caves and Murphy (1976), Rubin (1978), Blair and Kaserman (1982), Mathewson and Winter (1985), Brickley and Dark (1987), Martin (1988), Lal (1990), Gallini and Lutz (1992), and Bhattacharyya and Lafontaine (1995) for franchising models.

face different "average" degrees of risk and risk aversion among their franchisees, or that simply want to attract different types of franchisees). In turn, these differences in franchisor needs must relate to the type of businesses they are involved in, the markets they operate in, or their specific monitoring or managerial capabilities. All these considerations imply an important role for sector- and firm-specific effects in the setting of franchise contract terms, but no systematic pattern over time within firms. Furthermore, as noted above, other contract components (such as exclusive territories) offered by franchisors can be complementary to, or substitutes for, the fees. As these other clauses tend to be constant over time within firms, their effect would be captured by dominant firm-specific effects in the data.

While there is no agreement in the theoretical literature as to how royalty rates and franchise fees should change as firms become established, most models agree that, everything else constant, an increase in royalty rate should be accompanied by a decrease in franchise fee, and vice versa. The reason is that the models assume that franchisees are kept at their reservation utility levels. Thus the royalty rates are determined first, on the basis of incentive, information, and risk issues, and then the fixed franchise fee is set equal to the profits left downstream by the royalty rate above those necessary to provide the franchisee with his or her reservation utility.

Finally, because the theories of franchise contracting are fundamentally static, none of them incorporates explicitly dynamic phenomena, such as learning, that could produce systematic changes in contract terms over time. In franchising models in which franchisor quality matters (e.g., signaling), quality is taken as a fixed characteristic that the franchisor knows and simply needs to communicate to franchisees. In reality, firms do not know how successful they will be in franchising before they actually experiment with it. The amount of entry, and even more so exit, in our data suggests that franchisors learn about themselves in the process of franchising. Of course, this learning should affect the terms of the contracts chosen by these firms and how the terms change as the firms become established. For example, if a firm gets a bad signal of its quality at a point in time, it may need to reduce both of its fees to continue to attract franchisees. These issues have not been addressed in the theoretical literature, but our empirical work can help assess their importance.

In what follows, we explore empirically how royalty rates and fixed fees charged to new franchisees each year evolve as franchisors become better established, and how they relate to each other. In keeping with our goal of increasing our understanding of franchising and contracting and to guide future theoretical work, we rely on

parametric and nonparametric methods to explore these patterns in our data.

III. The Data

As noted in the Introduction, the data we have access to are quite unique: for the first time, we have information on the contract terms—namely royalty rates, advertising fees, and franchise fees—offered to new franchisees by about 1,000 individual franchisors each year for 13 years, from 1980 to 1992 inclusively. Most of the data used here come from *Entrepreneur* magazine's "Annual Franchise 500" surveys, though some franchisor characteristics were obtained from other data sources (see the Appendix for details).

While the number of franchisors responding to *Entrepreneur*'s survey remains relatively constant over time, one does not find the same franchisors responding to the survey year after year. In fact, we have an average of four and a half years of data for each firm (for firms observed more than once), and we have a complete series of 13 years for only 103 franchisors. Our sample is unbalanced in large part because of entry and exit from franchising. On average, in any given year, about 15 percent of the franchisors covered in the survey have just started franchising. Also, according to Kostecka (1988), between 120 and 180 franchisors stopped franchising or went out of business annually between 1980 and 1986. These high entry and exit rates reflect the low cost of entry into, and fairly low cost of exit from, franchising: firms can get involved in franchising after having established just one pilot unit that is company-owned. According to Dixon (1988), on entry, typical franchisors sell three or four franchises per year, on average, if they do not opt out or go out of business. In our data, firms have seven company units and almost four franchises, on average, in their first year in franchising. The median number of company units and franchises, however, that first year is just one. Moreover, more than 50 percent of the firms we observe the year they start franchising exit franchising within the next five years.[4]

The lack of continuity in our sample also reflects factors specific to the survey we rely on. For many franchisors, responding to this survey is a way to increase their visibility vis-à-vis potential franchise buyers. Thus those franchisors that are not interested in attracting new franchisees may choose not to respond, so that our sample is biased toward new or expanding franchisors. Our sample is also unbalanced because we were fairly conservative in matching franchisors

[4] See Lafontaine and Shaw (1998*a*) for more on franchisor entry and exit.

across survey years. These reasons for the lack of balance in our sample introduce some possibility of sample selection bias, which we return to later. However, much of the variation in the sample also reflects random nonresponses.

Table 1 gives the means, standard deviations, and ranges of our variables, along with the number of observations over which they are calculated. Note that our final sample size of 11,947 observations (from 3,625 different franchisors) falls when the data for a variable were obtained from another source (see the Appendix).

A. *Some Preliminary Data Patterns*

Before we move on to the econometric evidence, it is useful to examine the raw data directly. Given our focus on how contract terms evolve over time, table 2 describes the number of times each fee went up, went down, or stayed the same between two consecutive years. It shows that most firms did not change their royalty rates or nominal fixed fees from one year to the next. For royalty rates, there is no change for 76 percent (or 5,897 of 7,711 in row 1) of all observations. Also, when a change is made, it is as likely to be up as down. However, changes are large when they do occur: the average change in royalty rates is more than two points up or down, representing more than 40 percent of the starting values (see row 1).

Table 2 also shows that in 60 percent (4,621 of 7,711) of the cases, there is no change in nominal franchise fees, despite underlying price inflation in the economy. When there is a change, it is more often up than down; but still one-third of the changes are down. The mean increase when this fee goes up, however, far exceeds the mean inflation rate. This suggests that when these fees are adjusted upward, they are making up for several years of inflation, or they are raised for additional reasons. As for "real" (consumer price index adjusted) franchise fees, they change frequently, but this is simply because the nominal fees do not keep up with inflation.

One possible explanation for the observed lack of change may be that franchisors change their fees regularly, but every few years rather than yearly. Table 3 shows that there is no such pattern of regular changes every few years in the data either. The table displays, for both the royalty rate and the franchise fee, the proportion of all the sequences of length T in which the firm made a change from year $T-1$ to T but had made no change up to $T-1$. For the royalty rate, these data show that the probability that a firm will make a change in the last period goes down as the number of years without a change goes up. For the franchise fee, this probability also goes down as the number of years without a change goes from one to

TABLE 1

DESCRIPTIVE STATISTICS

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Royalty rate (%)	11,947	6.4	3.5	.0	30
Advertising fee (%)	11,947	1.5	1.8	.0	30
Franchise fee ($1,000s)	11,947	23.3	36.8	.0	1,118.8
Franchise fee less fixed ($1,000s)	11,947	18.6	16.1	.0	450
Number of outlets*	11,947	153.1	493.8	1.0	8,289
Percentage company-owned outlets	11,947	23.7	29.5	.0	100
Canadian franchisor	11,947	.11	.32	.0	1
Capital required (1992 $1,000s)	11,744	174.8	686.7	.0	38,022
Years franchising	11,947	9.4	9.0	1.0	73
Financing provided (dummy)	11,930	.24	.43	.0	1
Number of states with outlets†	6,514	13.7	14.4	.0	50
Initial training (days)	6,204	16.9	14.3	.0	193.5

* McDonald's had a larger number of units (12,643) than the maximum shown here, but it is excluded from the sample because its reported royalty rate sometimes includes rent for the premises and sometimes does not; the division between the two is too blurred to make the data usable.

† This variable equals zero for the few Canadian franchisors in our data with no units in the United States.

TABLE 2

SUMMARY OF CHANGES FROM YEAR TO YEAR

	UP			DOWN				TOTAL		
CHANGES IN	Observations	Mean Change	Mean Percentage Change	Observations	Mean Change	Mean Percentage Change	NO CHANGE: OBSERVATIONS	Observations	Mean Change	Mean Percentage Change
Royalty	969	2.21	40.95	845	−2.32	−43.42	5,897	7,711	.02	.39
Franchise fee	2,075	8.64	33.89	1,015	−11.68	−42.13	4,621	7,711	.79	3.57
Franchise fee (real)	1,778	11.65	35.18	5,807	−3.88	−11.60	126	7,711	−.24	−.62

TABLE 3

CHANGE PROBABILITIES

LENGTH OF SEQUENCE (in Years) (= T)	NUMBER OF SEQUENCES	ROYALTY RATE (with Advertising Fee)		NOMINAL FRANCHISE FEE (including Ongoing Fixed Payments)	
		Sequences of Length T with No Change by $T-1$*	Of These, Percentage with a Change from $T-1$ to T	Sequences of Length T with No Change by $T-1$*	Of These, Percentage with a Change from $T-1$ to T
2	7,711	na	23.52	na	40.07
3	5,159	3,891	17.50	3,051	26.45
4	3,547	2,176	14.02	1,475	23.39
5	2,453	1,272	11.87	745	22.42
6	1,742	776	9.54	382	21.20
7	1,230	491	8.76	201	22.89
8	867	308	7.47	104	27.88
9	614	190	6.84	54	33.33
10	415	117	6.84	26	38.46

* These are sequences of length T in which the value of the royalty rate (franchise fee) has remained constant over all periods to $T-1$.

five. After that, the likelihood that a firm will change its nominal franchise fee goes up with the number of years since the last change occurred. But for either fee, the probability of a change after any given period without a change is never larger than the probability of change after just one year (shown in the first row of table 3). We conclude that the data are not characterized by a systematic pattern of change every few years for all firms.[5]

Table 4 examines whether there are firms in the data that change their fees all the time whereas others rarely do so. It shows the number of firms that have made x changes in their fees. It does so first for the total sample of 11,947 observations and then for the more balanced sample of firms observed at least 10 times or more. The balanced sample results in particular confirm that there is a fair number of firms (30 out of 139) that made no change in their royalty rates even over 10 years. At the other extreme, 22 firms made five or more changes over the same period. Not surprisingly, firms in general change their franchise fees more often than they do their royalty rates, some of them (10 out of 139 in the last three rows) changing them almost every year. Yet we still find 42 out of the same 139 firms changing their franchise fee two times or less over 10 years or more. We conclude that there is significant heterogeneity across firms in the frequency with which they change the terms of their contracts.

For firms that do make changes, we also examined whether these changes within firms were always positive, always negative, or a mix of the two. Though this is not shown in the table, we found that as soon as firms make at least three changes in royalty rates, these changes almost always include both increases and decreases. Even for the franchise fee, the probability that changes were all positive became quite small (below 20 percent in the overall sample) for firms with four or more changes and continued to decrease significantly thereafter. Thus the data continue to show no sign of systematic pattern up or down in fees over time.

We now turn to the effect of franchisor age on the probability that a firm changes its fees up or down. Figures 1 and 2 illustrate what proportion of all firms with given numbers of years of franchising experience either increase or decrease their royalty rates or franchise fees. These figures show no systematic pattern toward either more or fewer increases in fees as firms become more experienced

[5] We further confirmed the lack of alternative periodicity in the data by differencing over intervals longer than one year (i.e., two- or three-year differences) in our regression analyses. The results we obtained were no different from those reported below for one-year first differences.

TABLE 4

NUMBER OF CHANGES PER FIRM

	ROYALTY RATE (with Advertising Fee)				FRANCHISE FEE (with Fixed Payments)			
	Total Sample		Balanced Sample		Total Sample		Balanced Sample	
NUMBER OF CHANGES	Number of Firms	Observations per Firm*	Number of Firms	Observations per Firm*	Number of Firms	Observations per Firm*	Number of Firms	Observations per Firm*
0	1,097	3.34	30	11.73	756	2.94	3	12.33
1	465	3.89	24	12.04	609	3.35	12	11.92
2	177	5.87	21	11.67	232	5.29	27	11.74
3	77	7.64	23	11.78	126	6.88	29	11.72
4	38	9.39	19	11.63	58	7.84	14	12.43
5	16	10.81	11	12.09	47	8.34	16	11.38
6	8	10.88	6	11.83	23	9.87	12	12.08
7	5	12.00	4	13.00	12	9.67	5	12.00
8	1	13.00	1	13.00	4	12.00	4	12.00
9	0		0		7	11.43	7	11.43
10	0		0		6	11.67	6	11.67
11	0		0		1	12.00	1	12.00
12	0		0		3	13.00	3	13.00

NOTE.—There are 1,288 chains in the data with only one record or no consecutive records, making it impossible to calculate a change. Another 453 firms were excluded because their data were not fully consecutive. Results were not sensitive to whether or not these firms were excluded. When we force 10 or more consecutive observations, we discard all data from 3,486 chains.

* Average number of consecutive observations per firm given the number of changes in contract terms.

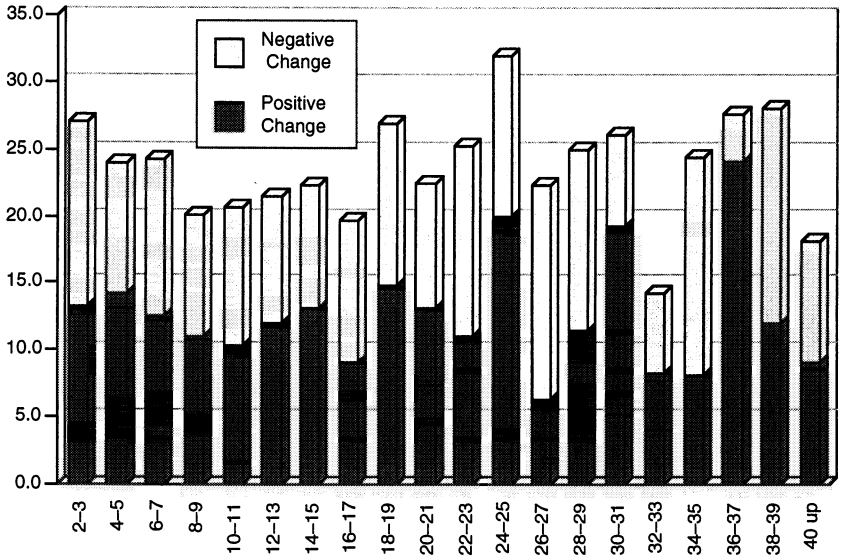

FIG. 1.—Royalty rate: probability of change as a function of years in franchising

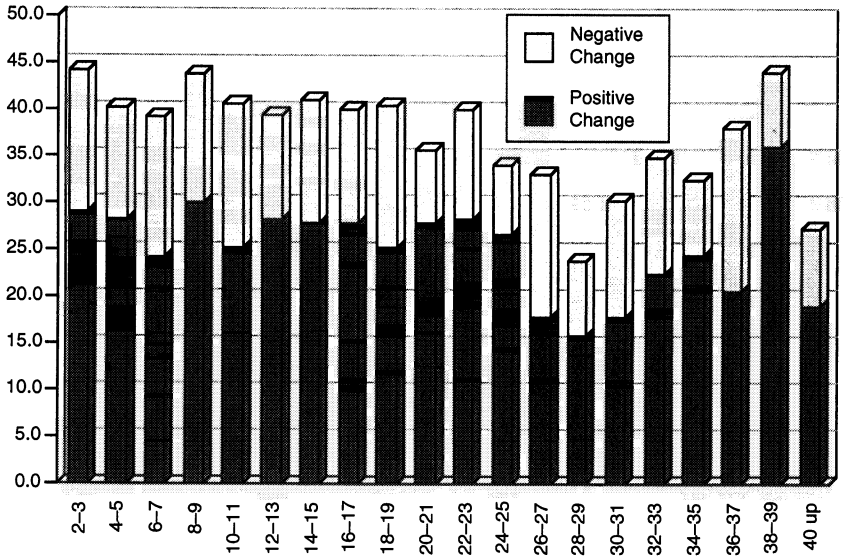

FIG. 2.—Franchise fee: probability of change as a function of years in franchising

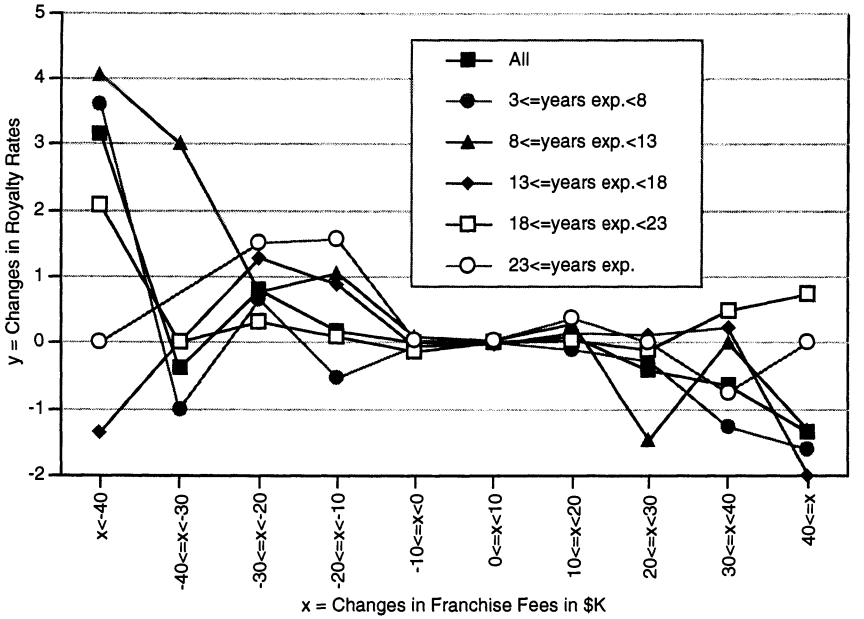

FIG. 3.—Mean changes in royalty rates relative to changes in franchise fees

and no pattern toward more or fewer changes either. Note that at high experience levels, the sample size falls considerably, which explains why there is more volatility. Though the corresponding figures are not shown here, the same lack of systematic effect was found when we examined how fees evolve relative to the number of outlets or, on a yearly basis, relative to inflation rates.

Given the emphasis of the theoretical literature on this relationship, we also want to consider how royalty rates and franchise fees relate to each other. Theory predicts a strong negative correlation between them. The simple correlation between royalty rates and franchise fees, after time effects are taken out, is significant at $-.103$. Since higher-quality firms should charge higher royalties and fixed fees, however, we want to hold quality constant. Thus we turn to the correlation between *changes* in these variables. The simple correlation in changes is $-.158$ (with time effects taken out again). Thus there is a significant negative correlation between the fees in our data.[6]

We explore this further in figure 3, which shows the mean contem-

[6] To test the significance of these correlation coefficients, we assume that the variables are jointly normally distributed, so that under H_0, $\rho = 0$, $r\sqrt{N-2}/\sqrt{1-r^2} \sim t_{N-2}$.

poraneous change in royalty rates by groups of firms categorized on the basis of how they have changed their franchise fee since the last year. The different lines in the figure represent different samples of firms on the basis of their number of years in franchising. Figure 3 illustrates well the negative correlation between the fees, especially among younger firms (less than 18 years of experience). In that sense, the data suggest that younger firms experiment more with their fees. However, the negative relationship that we observe here and the negative correlations reported above are all due to our definition of franchise fee and the presence, in our data, of 700 observations (from 277 franchisors) that sometimes rely on weekly or monthly fixed payments in lieu of sales-based royalties. Among these firms, the negative correlation between total fixed payments and royalty rates is very strong, at $-.43$. Whether we eliminate these firms from our sample (i.e., eliminate all 1,043 observations attached to these firms) or eliminate the 700 observations in which they charge ongoing fixed payments, the relationship between the fees becomes positive (in either case, the correlation is .075 in levels and .04 for changes). This suggests that the emphasis on the potential trade-off between those fees in the theoretical literature may be misplaced. We come back to this issue below, in our econometric analyses.

Finally, some models (e.g., Rubin 1978; Gallini and Lutz 1992; Scott 1995) imply that company ownership is a substitute for royalty payments, suggesting that they should also be negatively correlated in the data. The simple correlation between the two (after time effects are taken out) is .046. The same correlation between changes is .003, which is not significant. Similarly, we found no systematic pattern when we explored this relationship graphically or in our regression analyses, so we do not pursue this issue further below.

Overall, the tables and figures above show not only that franchise contract terms change infrequently, but also that when they are modified, the direction of the change is not systematically up or down. This contradicts those theoretical models (Rubin 1978; Mathewson and Winter 1985; Gallini and Lutz 1992) that predict a systematic pattern over time. Finally, there is a trade-off between royalty rates and franchise fees, but the relationship between the two is much weaker than one would expect from theory and is driven by a small minority of firms that sometimes charge ongoing fixed payments in lieu of variable royalties.

IV. Empirical Methodology and Results

In this section, we examine econometrically how contract terms change as the chain becomes mature and larger and the extent to

which contract terms are characterized by strong firm-specific effects. The analyses of the raw data suggest that firm-specific effects should play a significant role in our regressions because there is a high variance in contract terms across firms yet, within firms, there is little change in contract terms over time. However, econometric analysis could reveal patterns that are not evident in the simple unconditional nonparametric distributions shown above.

A. *OLS and Fixed-Effects Results*

Consider first a simple parametric model relating royalty rates to franchising experience:

$$R_{it} = \beta X_{it} + u_i + \epsilon_{it}, \tag{1}$$

where R_{it} is the royalty rate; X_{it} is the number of years (at time t) since firm i began franchising; u_i is a firm-specific component that could represent the quality of the firm (such as its technology, the market value of its product concept, the quality of its management, and the quality of other aspects of the contract); and ϵ_{it} is a measurement error or other type of stochastic shock. Control variables included in the estimation of equation (1), including nonlinear terms in X_{it}, are omitted for notational simplicity. Also, we concentrate on royalty rates because the effect of franchising experience on franchise fees, according to theory, should be simply the reverse of the effect for royalty rates. Equation (1) focuses on two key questions: Do R_{it}'s change as firms gain experience, and are they explained by fixed effects?

The treatment of the individual effect u_i depends on the assumptions we make about the relationships between u, e, and X. If, for example, u_i captures differences in franchisor quality and if firms that remain in business and see their experience increase are more likely to be high-quality (high-u_i) firms, then there should be a positive correlation between u and X, and ordinary least squares (OLS) coefficients on X would be biased upward. This source of bias can be eliminated by estimating a fixed-effects model in which all variables are taken as differences from their time-series means. On the other hand, the OLS models currently in the literature are consistent if (1) the firm-specific effects in equation (1) are nonexistent, (2) these firm-specific effects are well captured by sectoral dummy variables included in the OLS regressions, or (3) the firm-specific effects are uncorrelated with the regressors.

Tables 5 and 6 show results obtained from estimating (1) using OLS (cols. 1, 2, and 3) and fixed effects (cols. 4, 5, and 6) for the royalty rate and franchise fee, respectively. The F-tests do support

TABLE 5

OLS AND FIXED-EFFECTS RESULTS FOR THE ROYALTY RATE

	OLS			FIXED EFFECTS		
INDEPENDENT VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)
Outlets (100s)	.103***	.103***	.215***	.033	.035*	.056*
	(.016)	(.016)	(.030)	(.020)	(.021)	(.033)
(Outlets)^2 (100s)	−.001***	−.001***	−.003***	−.0006*	−.0006*	−.001
	(.0003)	(.0003)	(.0005)	(.0003)	(.0003)	(.0006)
Years franchising	−.001	−.003	−.016	−.085	−.084	−.178**
	(.009)	(.009)	(.013)	(.060)	(.060)	(.071)
(Years franchising)^2	−.0005***	−.004***	−.0004	.002***	.002***	.001**
	(.0002)	(.0002)	(.0003)	(.0003)	(.0003)	(.0006)
Financing provided		.452***	.355***		.070	−.066
		(.086)	(.123)		(.051)	(.077)
Capital required		.000	−.0001		−.000	.0003
		(.000)	(.0001)		(.000)	(.0002)
Number of states			−.005			.007
			(.005)			(.006)
Canadian franchisor			.891***			
			(.226)			
Canadian × states			−.110***			−.012
			(.023)			(.030)
Training provided			.008**			.007
			(.004)			(.005)
Constant	6.81***	6.63***	6.26***			
	(.161)	(.161)	(.217)			
Sector dummies	yes***	yes***	yes***	na	na	na
Time dummies	yes***	yes***	yes***	yes***	yes***	yes***
Observations	11,947	11,728	5,558	11,947	11,728	5,558
R^2	.072	.074	.105	.022	.023	.028
ρ				.137***	.136***	.150***
				(.009)	(.009)	(.013)

NOTE.—Heteroskedasticity-consistent standard errors are in parentheses (White 1980).
* α = .10 for two-tail t-tests.
** α = .05 for two-tail t-tests.
*** α = .01 for two-tail t-tests.

TABLE 6

OLS AND FIXED-EFFECTS RESULTS FOR THE NOMINAL FRANCHISE FEE

	OLS			FIXED EFFECTS		
INDEPENDENT VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)
Outlets (100s)	.435***	.338***	.155	−.009	.032	−.512
	(.116)	(.120)	(.176)	(.261)	(.262)	(.362)
(Outlets)^2 (100s)	−.007***	−.006***	−.004	−.002	−.003	.005
	(.002)	(.002)	(.003)	(.004)	(.004)	(.006)
Years franchising	.045	.042	.262**	−.292	−.259	1.04
	(.068)	(.067)	(.104)	(.729)	(.733)	(.938)
(Years franchising)^2	−.003**	−.003***	−.006***	−.001	−.005	−.008
	(.001)	(.001)	(.002)	(.004)	(.004)	(.007)
Financing provided		2.13**	2.81***		−1.64***	−2.89***
		(.838)	(.924)		(.623)	(.941)
Capital required		.003***	.005***		.0001	.003
		(.001)	(.002)		(.0004)	(.002)
Number of states			−.027			−.034
			(.042)			(.073)
Canadian franchisor			−5.41***			
			(1.74)			
Canadian × states			1.25***			.793**
			(.229)			(.327)
Training provided			.147***			.008
			(.029)			(.055)
Constant	25.86***	24.91***	20.97***			
	(1.31)	(1.33)	(1.44)			
Sector dummies	yes***	yes***	yes***	na	na	na
Time dummies	yes***	yes***	yes***	yes**	yes*	yes**
Observations	11,947	11,728	5,558	11,947	11,728	5,558
R^2	.051	.051	.084	.046	.040	.033
ρ				.192***	.171***	−.104***
				(.009)	(.009)	(.013)

NOTE.—Heteroskedasticity-consistent standard errors are in parentheses (White 1980).
* α = .10 for two-tail *t*-tests.
** α = .05 for two-tail *t*-tests.
*** α = .01 for two-tail *t*-tests.

the introduction of firm-specific fixed effects, relative to OLS with sectoral dummy variables, in these regressions.[7] Furthermore, in the OLS models shown in tables 5 and 6, both the royalty rate and franchise fee rise at a decreasing rate with the number of outlets; in the fixed-effects models, they do not.[8] Apparently, the unobserved fixed effects are positively correlated with outlets, implying that larger chains set higher royalty rates and franchise fees, but there is little increase in these fees with outlet growth within firms. For years franchising, the coefficients also decline markedly in the franchise fee equation. As for royalty rates, a positive coefficient on the quadratic term arises in fixed effects. In fact, under fixed effects, the four experience and outlet effects are jointly significantly different from zero in the royalty rate regression ($F(4, 11{,}930) = 8.6$), but not in the franchise fee regression ($F(4, 11{,}930) = .19$). However, the four experience variables jointly contribute only .003 to the R^2, and the magnitude of the effects in the royalty regression is very small. In particular, despite the significant positive coefficient on squared years franchising, the total effect of years franchising is negative over all the relevant range of our data (up to 43 years). And even at its peak effect (at 21 years), this variable reduces the royalty rate by only 0.9.

Finally, we note that most of the franchising control variables we introduce in our regressions, which include both sectoral and year dummies[9] and several other variables likely to affect contract terms according to theory, account for some of the differences in contract

[7] Compare cols. 1 and 4 of tables 5 and 6. The F-tests are $F(3{,}624, 8{,}307) = 14.39$ and $F(3{,}624, 8{,}307) = 9.81$ for royalty rates and franchise fees, respectively. The fixed-effects results in tables 5 and 6 are all corrected for within-firm serial correlation since the errors were found to be serially correlated. We constrain ρ to be the same across all firms. There is no serial correlation correction in the OLS regressions in tables 5 and 6 because the estimated ρ would approach "one" and approximate fixed-effects estimation.

[8] Similar large reductions in parameters in moving from cross-sectional to within-firm estimation have been found also in the estimation of production functions (see the review by Griliches and Mairesse [1998]). There are two main explanations for this: (1) The errors in the measurement of the independent variable are greatly exaggerated by the fixed-effects transformation, so the noise to signal ratio becomes very large in fixed effects, leading to very imprecise estimated coefficients. Under this explanation, OLS results are closer to the true coefficients. (2) There are significant firm-specific effects in the data that are correlated with other regressors, such that the OLS coefficients are biased. In this case, the within-firm estimates are closer to the truth. The quality of our data, combined with the descriptive evidence in Sec. III on the lack of within-firm experience effects, leads us to favor the second explanation. (See the Appendix, paragraph 4, for details.)

[9] There is a clear time trend in these data: when time is added to col. 1 of tables 5 and 6, respectively, the coefficients are 0.07 and 0.85, with standard errors of 0.01 and 0.09. But we use time dummies in the remainder of the paper since they are more flexible.

terms across firms in columns 2 and 3 (see App. table A1 for detailed variable definitions). But few of these variables play a significant role in fixed-effects regressions (cols. 5 and 6). In light of the hypotheses pertaining to many of these control variables, however, the fixed effects may be overcontrolling.[10]

In sum, the effects of years franchising and outlets are not important in fixed-effects models of contract terms. As these experience variables also explain very little of the variance in the data, we conclude, consistent with our evidence in Section III, that the maturity of the firm—expressed in terms of either the size of the chain or years of franchising experience—is not a major determinant of the change in contract terms within firms over time. This lack of maturity effect again is inconsistent with predictions from theories that rely on signaling arguments, market saturation effects à la Rubin, or franchisor reputation effects à la Mathewson and Winter.

B. *The Relationship between Royalty Rates and Franchise Fees*

As noted earlier, most models of franchise contracting imply a recursive model for the contract terms in which the royalty rate is chosen first, as a function of incentive and risk issues, and the franchise fee comes second to extract rents left downstream by the royalty rate. Thus the franchise fee is expected to be inversely related to the royalty rate. Alternatively, franchise contracts may be characterized as a set of complementary clauses offered all at once, on a take-it-or-leave-it basis usually, to the franchisee. This implies a simultaneous system, and the regressions presented thus far are all reduced-form equations.

Under either scenario, we need to explore how the two fees are related in the data. Table 7 shows regression coefficients for royalty rates on franchise fees, and vice versa. We also present results obtained when we instrument the "other fee." Unfortunately, when it comes to instrumenting, we do not have good variables to identify separately what causes royalty rates and franchise fees to change. One approach, which we rely on in table 7, is to use own lagged values (along with current and lagged experience and outlets). This approach unfortunately relies on the assumption that the current fee and its lag are not simultaneously determined, a fairly poor as-

[10] The addition of control variables in col. 6 of table 5 produces a reduced sample in which the linear years franchising term has a significant negative effect, but we have verified that this effect is due to the specific odd sample, not to the addition of the control variables.

TABLE 7

RELATIONSHIP BETWEEN ROYALTY RATES AND FRANCHISE FEES

	ROYALTY RATE				FRANCHISE FEE			
	OLS		Fixed Effects		OLS		Fixed Effects	
INDEPENDENT VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Outlets (100s)	.093***	.101***	.033	.035	.478***	.527***	.066	−.023
	(.015)	(.016)	(.020)	(.021)	(.108)	(.124)	(.256)	(.285)
(Outlets)^2 (100s)	−.001***	−.001***	−.001*	−.001*	−.008***	−.008***	−.003	−.002
	(.000)	(.000)	(.000)	(.000)	(.002)	(.002)	(.004)	(.004)
Years franchising	.006	.011	−.086	−.198***	.045	.072	−.474	.301
	(.008)	(.010)	(.060)	(.064)	(.072)	(.102)	(.721)	(.702)
(Years franchising)^2	−.001***	−.001***	.002***	.002***	−.004***	−.005***	.003	.002
	(.000)	(.000)	(.000)	(.000)	(.001)	(.002)	(.004)	(.005)
Franchise fee	−.010***		−.014***					
	(.001)		(.001)					
Instrumented franchise fee		−.008***		−.007***				
		(.002)		(.001)				
Royalty rate					−1.12***		−2.25***	
					(.132)		(.118)	
Instrumented royalty						−1.12***		−.813***
						(.194)		(.151)
Constant	6.78***	6.81***			33.99***	33.88***		
	(.120)	(.143)			(1.61)	(2.19)		
Observations	11,947	7,714	11,947	7,714	11,947	7,714	11,947	7,714
R^2	.025	.021	.051	.036	.021	.015	.074	.145
ρ			.127***	.120***			.182***	.334***
			(.009)	(.011)			(.009)	(.010)

NOTE.—Heteroskedasticity-consistent standard errors are in parentheses (White 1980). Time dummies are included in all regressions.

* α = .10 for two-tail t-tests.

** α = .05 for two-tail t-tests.

*** α = .01 for two-tail t-tests.

sumption given the strong serial correlation found earlier. An alternative approach is to use as instruments variables measuring expected unit sales (such as the number of employees, sectoral dummies, and contract duration). However, given our limited data on these variables (see the Appendix, paragraph 5) and the fact that they change very rarely within firms, these instruments performed poorly in our fixed-effects regressions.

In tables 5 and 6, the correlation coefficients between the error terms of corresponding regressions of royalty rates and franchise fees are all around $-.1$. Consistent with this, in all the regressions in table 7, across and within firms and whether we instrument or not, there is a clear negative relationship between the fees. However, it is also true that the coefficients on other explanatory variables are unaffected by the introduction of the other fee, instrumented or not, among the regressors. Thus simultaneity bias is not really an issue in our data.[11]

In addition, in Section III, we showed that the negative correlations between the two contract terms arise entirely from the inclusion, in what we call the franchise fee, of ongoing fixed payments. This is also true for our regressions. When we exclude from our data the 700 observations with ongoing fixed payments (or the firms with such observations), the correlations between the residuals of the franchise fee and royalty rate regressions become positive, though small (around .04). Furthermore, if we separate the instrumented fixed fee in column 4 of table 7 into two parts, namely instrumented up-front and instrumented ongoing fixed payments, we get a positive but insignificant effect for the up-front fee ($\beta = 0.005$, standard error 0.003) and a very significant and large negative effect for ongoing payments ($\beta = -0.009$, standard error 0.001). Finally, among the set of firms that use ongoing fixed payments, a regression of ongoing fixed payments on royalty rates yields a very significant coefficient on royalty rates of -6.75 (standard error 1.12). This implies that, when one starts from these firms' mean royalty rate (3.73) and mean discounted ongoing fixed payments ($53,000), a one-standard-deviation increase in royalty rate, which here amounts to a 100 percent increase, leads to a $50,000, or a nearly 100 percent, decrease in ongoing fixed payments.

Consistent with what we saw in Section III, we conclude that ongoing fixed payments are a very close substitute for royalties; in fact,

[11] This is true with one exception, which is the case in which we introduce the franchise fee in the royalty rate regression. Here, *if* the fee is instrumented, its inclusion affects the relationship between royalty rates and franchising experience (table 7, col. 4). We believe that this result is spurious since it is sensitive to instrumentation.

firms exchange them almost exactly one for one. This is not completely surprising given how franchisors think about such payments: they arise in the data because some franchisors decide to charge their franchisees a fixed monthly or weekly fee *instead of* charging sales-based royalties or advertising fees. However, given that the vast majority of franchisors (92 percent of the firms in our sample) use only up-front franchise fees, what is more surprising is the lack of a negative relationship, *within firms*, between the royalty rate and *up-front* fixed fees.[12]

Why do we find no negative relationship between royalty rates and the type of up-front fixed fees most firms use when the theories all suggest a strong negative link between the two? One possibility would be that other terms of the contract, such as contract duration, exclusive territories, and input purchase requirements, affect the fees and thereby obscure the cross-sectional patterns. But to the extent that these other terms remain fairly constant over time, they cannot explain the zero correlation between changes in royalty rates and changes in up-front fees within firms. More likely, contract terms are simply not set in a way that systematically extracts all downstream rents in all chains.[13] In particular, franchisors may set their up-front franchise fee mostly to cover the costs they incur in setting up a new franchisee, not to recover future rent. We noted in Section II that the up-front fee averages about 8 percent of the expected value of payments by franchisees to franchisors, so it is really quite small. And in his franchisor directory, Bond (1998) notes that "this amount is considered a franchise fee and is a non-recurring expense to reimburse the franchisor for his costs in locating, selecting, qualifying and training new franchisees. . . . Keep in mind that the franchise fee is usually considered a break-even proposition as far as the franchisor is concerned" (p. 21). In this case, the franchise fee would relate to the amount of services rendered by franchisors up front, not to the royalty rate (see also Dnes [1992], Lafontaine [1992*a*], and Sen [1993] on this).

Having established that the weak negative correlation between our notion of franchise fee and royalties arises from those cases of ongoing fixed payments and having found that this weak relationship does not give rise to simultaneity problems in interpreting experi-

[12] Others have found no correlation across firms between the fees even when including ongoing fixed payments in their notion of franchise fees (Dnes 1992; Lafontaine 1992*a*, 1993; Gagné et al. 1998).

[13] See Kaufmann and Lafontaine (1994) for evidence that McDonald's leaves rents with its franchisees. They argue that these rents are a self-enforcement mechanism, similar to efficiency wages. See also Michael and Moore (1995) for evidence from other chains.

ence effects, in the remainder of this paper, we do not drop the 700 observations with ongoing fixed payments, nor change our definition of the franchise fee to exclude ongoing fixed payments, because we consider that our definition best represents the concept of fixed fee that theory relies on.

C. *Robustness Issues*

The tests for experience effects in tables 5 and 6 impose a quadratic functional form on the experience and outlets variables. Should this functional form be rejected in favor of a more flexible one? We explored this possibility at length and unequivocally rejected it. In the fixed-effects models, we introduced a large number of alternative splines in search of a function that would better fit the data and yet would provide evidence of experience or size effects. We found no such functional form. Moreover, using differences from the firm-specific mean, we used the nonparametric kernel density estimator with alternative bandwidths but still found no evidence of experience effects.

Rather than report these extensive results, we show in figure 4 the mean change in both royalty rates and franchise fees as a function of the years of experience of the franchisor. This figure confirms

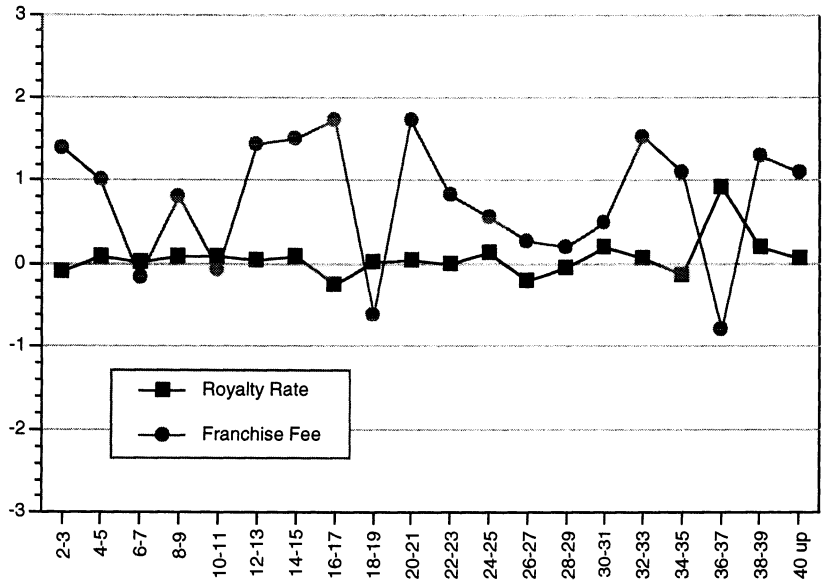

FIG. 4.—Mean changes in contract terms as a function of years in franchising

what we saw earlier in figures 1 and 2, namely, that there is *no systematic age pattern* in the changes in contract terms (though the franchise fee is, on average, adjusted upward to cover inflation).

We also considered the possibility that experience effects on contract terms would be different for important subsamples of the data, namely subsamples based on (1) the type of business the firm is involved in—automotive services, business aids and services, construction, and fast food; (2) the current number of outlets; and (3) the recent growth rate in the number of outlets (negative, zero, or ranges of positive growth). Across all these subsamples, we found no evidence of experience effects.

Two other subsamples are of special interest: franchisors that we observe being successful in franchising over several years and franchisors that will shortly stop franchising. We define the first set as the group of franchised chains for which we have 10 or more years of (not necessarily consecutive) data. This "balanced" subsample is of methodological interest in that it is useful to know how the use of a balanced panel data set might have affected the conclusions reached above. The second subsample, the out-of-business subsample, is the set of firms we know will stop franchising within the next three years (see the Appendix, paragraph 6).

The fixed-effects results from the balanced subsample (in table 8) are not different from those obtained using the whole sample,

TABLE 8

FIXED-EFFECTS SUBSAMPLE RESULTS

INDEPENDENT VARIABLE	ROYALTY RATE		FRANCHISE FEE	
	Balanced Subsample	Out-of-Business Subsample	Balanced Subsample	Out-of-Business Subsample
Outlets (100s)	.007	−.34*	.29	3.00
	(.03)	(.18)	(.42)	(2.46)
(Outlets)^2 (100s)	−.000	.03	−.005	−.35
	(.001)	(.02)	(.006)	(.28)
Years franchising	−.39*	.39**	−.82	−7.12***
	(.23)	(.15)	(2.84)	(2.28)
(Years franchising)^2	.002**	.006***	−.005	.020
	(.001)	(.001)	(.008)	(.014)
Observations	2,498	2,785	2,498	2,785
R^2	.15	.04	.23	.10
ρ	.45***	−.15***	.55***	−.43***
	(.02)	(.02)	(.02)	(.02)

NOTE.—Heteroskedasticity-consistent standard errors are in parentheses (White 1980). Time dummies are included in all regressions.

* α = .10 for two-tail t-tests.

** α = .05 for two-tail t-tests.

*** α = .01 for two-tail t-tests.

confirming again the robustness of the results reported above.[14] But results for the firms that will shortly go out of business are different: they *decrease* their franchise fee and *increase* their royalty rate over time.[15] In other words, when they face a high probability of exit, firms reduce the up-front amount that franchisees must pay to get in (by about $7,000 per year) but load up more on the royalties (by 0.4 percent per year of experience). These are sizable changes given mean franchise fees of $23,300 and an average royalty rate of 6.4 percent in our data (see table 1). The reduction in the franchise fee in particular could be an effort to postpone or obviate failure by making the franchise more attractive to potential franchisees who are wealth constrained.[16] However, the sum of the changes can amount to an increase in the average "total" price of the franchise, since 0.4 percent of discounted future sales (estimated at $5,514,000 in 1992 dollars for the average franchise on the basis of Department of Commerce data) is $22,000, which is much greater than the $7,000 reduction in the franchise fee. This net increase in price goes counter to what one would expect a firm facing failure to do and may explain why firms in fact fail in the end.

Finally, our earlier description of the database highlighted a few different reasons why sample selection may be a problem in our data. Of the 3,625 franchisors that appear in our sample, more than 2,700 firms exit the sample before 1992. Of these, 1,674 have stopped franchising, so their departure is a normal part of the evolution of the population of franchisors. The remaining 1,000 or so firms simply are nonrespondents. We need to consider the effect this might have on our results.

We addressed the possibility of selection bias first by estimating OLS and fixed-effects regressions for two subsamples, namely, those firms that drop out of the sample and those that do not. We found no significant differences between these two sets of firms. Second, we used the standard Heckman (1979) selection correction methodology.[17] Though we have reasonable variables to predict selection,

[14] We do not include the instrumented "other fee" in these regressions since the subsamples are already small, and the need for lagged values in the instruments reduces them much further.

[15] Chow tests confirm that the coefficients for the out-of-business sample are significantly different from those of the full sample: $F(17, 2{,}768) = 19.02$ and $F(17, 2{,}768) = 38.12$ for the royalty rate and franchise fee.

[16] One regularly finds ads in the trade press for "low-cost" franchises, meaning those with low franchise fees and initial investment. Apparently, these franchises are desirable to at least some subset of potential franchisees.

[17] More specifically, we add the inverse Mills ratio—obtained from a regression of the sample selection rule on variables we expect affect the likelihood that franchisors respond to the *Entrepreneur* survey—to our fixed-effects regressions in tables 5 and 6. The variables we used to identify the change in the propensity to respond to the

the selection correction modified none of our conclusions. On the basis of these results and the fact that we reached the same conclusion with our overall sample as with our more balanced sample above, we conclude that our results are not sensitive to selection issues, and we do not pursue alternative semiparametric selection correction methods.

D. *The Importance and Stability of Firm-Specific Effects over Time*

In our analyses, we have shown that firm-specific effects play an important role in our data, that they are significant, and that their introduction in regressions changes the coefficients on other right-hand-side variables. In this subsection, we explore further their explanatory power and stability.

1. The Importance of Fixed Effects

The explanatory power of the firm effects in our data is surprisingly large. For the royalty rate regression (table 5, col. 4), we can calculate a pseudo R^2 that allows us to assess how much firm-specific effects add relative to OLS results for the same regression. The R^2 for the OLS only model is .014. When we add fixed effects, the pseudo R^2 is .864! Similarly, for the franchise fee, the R^2 rises from .038 for OLS to .870 following the introduction of fixed effects (table 6, col. 4). And this very sizable explanatory power of the firm-specific effects is not captured well at all by sectoral differences in contract terms: the increases in R^2 arising from sectoral dummies are only .056 for the royalty rate and .059 for the franchise fee.[18]

2. State Dependence or Firm Effects

The explanatory power of the firm effects described above could reflect one of two very different types of behavior on the part of firms, characterized by the distinction between "unobserved hetero-

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survey are (1) an indicator of whether the franchise chain is seeking new franchisees—firms recruiting new franchisees should want to participate in the survey—and (2) the firm's ranking in the *Entrepreneur* survey—if a firm is given a low rank in its subsector in a given year, it is less likely to participate in the following year. (See App. table A1 and paragraph 7 for details.)

[18] An analysis of variance confirms the importance of the firm-specific effects. Across firms, the standard deviation of the royalty rate is 3.5 (relative to a mean rate of 6.4), and the standard deviation of the nominal franchise fee is $36,800 (relative to a mean of $23,300). In contrast, the average within-firm standard deviations are 0.74 and $5,600, respectively.

geneity" and "state dependence." The firm effect u_i included in equation (1) models unobserved heterogeneity: if there was only u_i on the right-hand side of (1) as our estimates suggest, then firms choose their contract terms when they begin franchising, and these contract terms remain constant over time. But this firm effect may instead be a proxy for state dependence. More specifically, assume that the *optimal* royalty rate of the firm is not fixed over time, but that the costs of adjusting the actual rate cause the observed rate to be relatively fixed over time. These adjustment costs would cause state dependence: the firm's current royalty rate strongly affects its future rate because it is costly to change R even if the desired R^* changes over time because of changes in X's. Patterns of either heterogeneity or state dependence imply that royalty rates are very persistent over time, but the theoretical source of the persistence varies considerably between the two.

Adjustment costs can hinder the process of changing franchise contract terms for many reasons. For example, many state legislatures require that franchisors file new disclosure documents on making "material changes" in the conditions of sales of their franchise (Kaufmann 1992), and such filings can be costly. Also, frequent changes in royalty rates over time lead to higher administrative costs: at any point in time, the franchisor must keep track of the contracts of each of its franchisees, which is harder when there are many different contracts. In a survey, franchisors have argued that these considerations prevent them from modifying their royalty rates frequently (Lafontaine 1992*b*).

Assume that the costs of adjusting the current royalty rate R_{it} to the desired R_{it}^* can be written as

$$C_{it} = a(R_{it} - R_{it}^*)^2 + b(R_{it} - R_{i,t-1})^2. \tag{2}$$

Costs C reflect both the costs to the franchisor of having the actual rate R diverge from the desired rate R^* (the first term in [2]) and the costs of changing the rate (the second term in [2]).[19] The optimal royalty rate minimizes costs C. Solving for this, we get

$$R_{it} - R_{i,t-1} = (1 - \delta)(R_{it}^* - R_{i,t-1}) + \mu_{it}, \tag{3}$$

where $1 - \delta = a/(a + b)$, and μ_{it} is an optimization error. If the desired R^* is given by equation (1) above, after substituting and rearranging, we get

$$R_{it} = (1 - \delta)\beta X_{it} + \delta R_{i,t-1} + (1 - \delta)u_i + \eta_{it}, \tag{4}$$

[19] A more general version of this cost function would include a constant and linear terms. However, this would not affect the econometric model, and so we present the simpler formulation.

where $\eta_{it} = (1 - \delta)\epsilon_{it} + \mu_{it}$. Thus (4) contains a lagged dependent variable whose coefficient is the rate of adjustment of the actual to the desired royalty rate. The relationship between this model and the fixed-effects version is that (4) reduces to the fixed-effects model when the royalty rate is adjusted immediately (when $\delta = 0$).

The fixed-effects regression results with a lagged dependent variable (and the constant term, time dummy variables, and other control variables omitted from eq. [1]) are shown in table 9. Consistent coefficient estimates are obtained here by first-differencing the equation to eliminate the fixed effect and then instrument-

TABLE 9

LAGGED DEPENDENT VARIABLE RESULTS

	ROYALTY RATE		FRANCHISE FEE	
INDEPENDENT VARIABLE	(1)	(2)	(3)	(4)
Lagged dependent variable	.633***	.616***	.533***	.433***
	(.078)	(.126)	(.134)	(.094)
Outlets (100s)	.037	.006	−.171	−.521
	(.171)	(.223)	(1.40)	(1.47)
(Outlets)^2 (100s)	.000	.001	.001	.006
	(.002)	(.003)	(.019)	(1.021)
(Years franchising)^2	.004	−.004	.032	.015
	(.004)	(.006)	(.035)	(.039)
Instrumented franchise fee	−.058	−.047		
	(.064)	(.048)		
Instrumented royalty rate			−.229	−2.58
			(2.69)	(3.07)
Financing provided		.065		−2.66
		(.300)		(2.16)
Capital required		.000		−.001
		(.001)		(.005)
Number of states		−.074		−.064
		(.044)		(.219)
Canadian × states		−.079		3.27
		(.468)		(3.12)
Training provided		.029		.178
		(.021)		(.126)
Time dummies	yes***	yes***	yes***	yes***
Constant	−.073	−.014	−.394	−.184
	(.0956)	(.120)	(1.002)	(1.17)
Observations	5,172	2,387	5,172	2,387
R^2	.020	.009	.020	.003

NOTE.—In this table, we estimate eq. (4) using fixed-effects nonlinear simultaneous equations so that the coefficient on the lagged dependent variable is δ and the coefficients on the other variables are the constrained β. Heteroskedasticity-consistent standard errors are in parentheses (White 1980).

* $\alpha = .10$ for two-tail t-tests.

** $\alpha = .05$ for two-tail t-tests.

*** $\alpha = .01$ for two-tail t-tests.

ing the difference in the lagged dependent variable with a longer lag.[20]

Results imply that, *within firms, the lagged dependent variable has a significant effect* on the current values of royalty rates and franchise fees. The larger the coefficient on the lagged dependent variable, the greater the adjustment costs. The coefficients of about .6 on the lagged royalty rate and .5 on the lagged franchise fee suggest that adjustment costs are relatively high. Looking at the coefficients on the other regressors, we see few significant effects, except that the coefficients on the time dummies (not displayed) are jointly significant.

Finally, given that we found serial correlation in our fixed-effects regressions before a lagged dependent variable was introduced, we test the possibility that the significance of the lagged dependent variable is really reflecting only serial correlation in the residuals. We reject this hypothesis at the 10 percent level.[21] We conclude that while there is serial correlation in the data, the contract terms are also characterized by both heterogeneity and state dependence.

[20] The constructed error term from a regression with both fixed effects and a lagged dependent variable would be correlated with the lagged dependent variable, so that the coefficient on the lagged dependent variable would be biased downward. This bias, which is large when T is small (Hsiao 1986, pp. 74–75), arises because there is a correlation between the difference of the lagged dependent variable from its mean and the difference of the residual from its mean. Thus we instrument the lagged dependent variable with a longer lag. The serial correlation in our data makes our reliance on a longer lag somewhat questionable, but given our data limitations, this remains our best option. Though this is not shown in table 9, results obtained with an instrumented lagged dependent variable are between the OLS and the non-instrumented results, as one would expect given the direction of the biases just described.

[21] The model of serial correlation is $R_{it} = \beta X_{it} + u_i + \epsilon_{it}$, where $\epsilon_{it} = \rho\epsilon_{i,t-1} + e_{it}$. We can rewrite this as

$$R_{it} = \rho R_{i,t-1} + \beta X_{it} - \rho\beta X_{i,t-1} + (1 - \rho)u_i + e_{it}$$

or

$$R_{it} = aR_{i,t-1} + bX_{it} - cX_{i,t-1} + (1 - \rho)u_i + e_{it}.$$

Thus if $a \cdot b - c = 0$, the lagged effect of R is due to serial correlation, not to state dependence or adjustment costs. As is evident from this last equation, this test depends entirely on having good explanatory variables for R. The intuition is as follows: under state dependence, a change in X has a prolonged effect on R because it changes the optimal R^* in the short run and then alters future R's through the current R. In contrast, under serial correlation, changes in R will appear to be random, not explained by changes in X. If the econometrician does not have good explanatory variables, state dependence must be rejected in favor of serial correlation. We found weak evidence of state dependence, evidence that might be stronger if we had more powerful explanatory variables.

3. The Stability of the Firm Effects over Time

In this subsection, we address some final questions on the stability of firm effects over time. We consider two topics: the possibility of firm-specific growth rates in contract terms and the firm-specific patterns of change.

First, we posit that royalty rates are a function of firm-specific growth rates as well as firm-specific effects, that is,

$$R_{it} = \beta X_{it} + u_i + \gamma_i t + e_{it}, \tag{5}$$

where t is time and the γ_i's are firm-specific growth rates. To estimate (5), we begin by first-differencing the equation to eliminate the firm-specific effect,

$$R_{it} - R_{i,t-1} = \beta(X_{it} - X_{i,t-1}) + \gamma_i + (e_{it} - e_{i,t-1}), \tag{6}$$

and then estimate the regression by taking differences from the firm-specific mean growth to eliminate γ_i. The regression results we obtain show that royalty rates and franchise fees are characterized by firm-specific growth rates (γ_i) as well as fixed effects (u_i). The R^2 for the first-differenced royalty rate regression rises from .003 to .395 when firm-specific growth rates are introduced, and for the first-differenced franchise fee regressions, it goes from .003 to .383. If we limit our sample to those firms that made at least one change in the relevant fee (so we eliminate those with $\gamma_i = 0$), the contribution of the γ_i's to the R^2 is reduced to about half of what it is for the full sample (.15 and .20 for the royalty rate and fee regressions, respectively).

The significance of the firm-specific growth rates is somewhat surprising: such growth rates suggest that changes in a given fee within a firm should be mostly all positive or all negative. Yet the evidence in Section III showed that when firms change their royalty rates several times, the changes are rarely all in the same direction (see the discussion around table 4). To address this puzzle, we add $\phi(R_{i,t-1} - R_{i,t-2})$ to (6). We find that the estimated coefficient, $\hat{\phi}$, is very significantly negative: for the subsample of royalty rate changers, $\hat{\phi} = -.75$ with a standard error of 0.02. Also, again for changers, the R^2 rises from the .15 above to .38 with the addition of this variable. For the franchise fee regressions, the equivalent results are $\hat{\phi} = -.58$ (.02) and an increase in R^2 from .20 to .31. We interpret these results as evidence that there is a "reversion to the mean" in the data: an increase in R_{it} or F_{it} in the past is offset by a decline later on. Note that this result could be caused by measurement error in the dependent variable. To address this, we use differences from sectoral means instead of differences from two-period lags and find very sig-

nificant reversion to the sectoral means (see Lafontaine and Shaw [1998*b*] for further discussion). Most likely, these "reversion to sectoral means" results reflect the fact that, because of competitive pressures in the franchisee recruiting process, most firms cannot really diverge from industry standards on contract terms for extended periods of time.

V. Conclusion

The primary goal of this research is to provide the first systematic evidence on how franchisors adjust the key monetary terms of their contracts, namely their royalty rates and franchise fees, as they gain franchising experience. In our empirical analyses, we find that they make very few adjustments, so that contract terms are very persistent. In our sample, 58 percent of the firms observed two consecutive years or more never change their royalty rate and 40 percent never change their franchise fee (see table 4). Further, 23 percent of the firms observed 10 years or more in the sample make no changes in their royalty rate over this period. When changes are made, they tend to be fairly large. However, there is no evidence in the data of systematic movement up or down in royalty rates as firms become more mature.

Overall, we find that firm-specific fixed effects explain a very large proportion of the variance in the data. By themselves, fixed effects account for about 85 percent of the variance in royalty rates and franchise fees, and only a small proportion of this firm-level heterogeneity is related to sectoral differences. We expect that these differences reflect unobserved differences in production and monitoring technologies available to the firms or quality differences in the product, the management, or the contract.

We also find evidence that OLS results currently in the literature suffer from omitted variable bias. In OLS, fees increase with the size of the chain. Our fixed-effects results, however, show no such pattern. It appears that more successful firms, or firms with better contracts, have a larger number of outlets and also charge higher fees. Thus, when firm quality is omitted from the OLS models, contract terms erroneously appear to grow with the number of outlets in the chain.

As a whole, our results are unsupportive of signaling models (Gallini and Lutz 1992), of arguments in which firms adjust their fees as they establish their reputation (Mathewson and Winter 1985), and of arguments in which franchisors adjust their fees when their market becomes saturated (Rubin 1978). Instead, our results are more supportive of models in which optimal contract terms remain rela-

tively constant as a chain becomes more mature or grows (such as those of McAfee and Schwartz [1994] and Bhattacharyya and Lafontaine [1995]) or adjustment cost arguments for relatively constant contract terms. Consistent with prior cross-sectional results on this issue, our results also contradict one of the main data patterns suggested by theoretical models of franchising, namely that up-front franchise fees and royalty rates should be inversely related.

In conclusion, our work suggests that once franchisors set the terms of their contract, they change them very little over time. Thus from both empirical and theoretical perspectives, we need to better understand how firms actually set the monetary terms of their contracts when they begin franchising, and what specific factors might prevent them from changing their contract terms over time. Theoretical models that would systematically address the issues that arise when franchisors deal with multiple franchisees, and over long periods of time, might prove especially useful in explaining these data patterns. Similarly, we expect that work that embeds the choice of monetary contract terms in a richer contracting framework, allowing for a more detailed look at how various contract clauses interact with royalty rates and franchise fees, would provide useful guidance for future research in this area.[22]

Appendix

Sources of Data and Variable Definitions

Table A1 presents definitions of the variables used and their sources. Table A2 presents definitions of the sectors.

Other Information about the Data

1. In 1988, the Department of Commerce canceled the publication of *Franchising in the Economy*, the only source of census-type data on franchising in the United States. As a result, data on the extent and growth of franchising in the United States have been unavailable since.

2. When the advertising fee or royalty payments are given as a fixed amount per time period, they are discounted over the average 15 years of franchise contracts and added to the fixed franchise fee. In reality, fixed up-front fees and ongoing fixed payments are different in that liquidity constraints may limit up-front fees in ways that do not affect ongoing payments. In addition, the obligation to make ongoing payments disappears if the outlet goes out of business during the period of the contract. However,

[22] See, e.g., Athey and Stern (1998) for theoretical arguments, and Bercovitz (1997) and Brickley (1997) for some new work on franchise contracts along these lines.

TABLE A1

VARIABLE DEFINITIONS AND SOURCES

Variable	Definition	Source
Royalty rate	Total percentage of sales paid by franchisee to franchisor, including advertising fees. Observations in which this percentage was above 30 percent were excluded from our data set on the assumption that such rates must represent a proportion of profits rather than sales	E
Advertising fee	Usually a percentage of sales paid by franchisees to franchisors, a component of what we call the royalty rate. Sometimes a fixed ongoing payment	E
Franchise fee (nominal)	Fixed up-front payment made by the franchisee to the franchisor at the beginning of the franchise relationship	E
Franchise fee (real)	As above, but deflated using the consumer price index from the *Economic Report of the President*	E
Fixed payments	Ongoing fixed payments sometimes required by the franchisor in lieu of royalties or sales-based advertising fees. We discount these and add them to the up-front franchise fee to get what we call the franchise fee	E
Franchising experience	Number of years since the franchisor started franchising	E
Number of outlets	Total number of units in the chain	E
Percentage company-owned	Proportion of units in the chain that are company-owned and operated	E
Financing provided	A dummy variable set equal to one if the franchisor provides some amount of financing to the franchisee	E
Capital required	Amount of capital franchisors say is needed to open a unit in their chain	E
Canadian franchisor	Dummy variable set equal to one if the franchisor's headquarters' address is in Canada. This variable is also interacted with the number of states variable because the number of states in which a franchisor operates outlets is not an appropriate measure of geographical dispersion for Canadian firms	E
Rank	Rank of the franchisor within its subsector in the survey. Up to the 1988 survey, all firms were ranked by the magazine and listings were organized, within each subsector, on the basis of these rankings. Since 1988, the magazine ranks about half the firms and lists ranked firms first, by rank, within each subsector, followed by unranked firms in the subsector in alphabetical order	E
Seeking USA	Dummy variable equal to one if the franchisor indicates that it is seeking new franchisees in the United States	E
Seeking non-USA	Dummy variable equal to one if the franchisor indicates that it is seeking new franchisees in Canada or anywhere else outside the United States	E
Initial training provided	Number of days of initial training provided to the franchisee by the franchisor	S, F
Number of states with outlets	Number of states in which the franchisor has established outlets	S, F

SOURCE.—E refers to the *Entrepreneur* surveys, various years; S refers to the *Sourcebook of Franchise Opportunities*; and F refers to the *Franchise Opportunities Handbook*. Data found in the latter two sources were obtained from the *Franchise Opportunities Handbook* for the years 1980–87 and 1990 and in the *Source Book of Franchised Opportunities* for 1988, 1989, 1991, and 1992. Unfortunately, the latter sources do not match the samples in the *Entrepreneur* surveys. These sources typically provided data for about half the franchisors included in the *Entrepreneur* survey of the corresponding year.

TABLE A2

SECTOR DEFINITIONS AND NUMBER OF OBSERVATIONS

Department of Commerce Sector	Number of Observations	Number of Franchisors
Automotive products and services	935	270
Business aids and services:		
Accounting, credit, collection agencies, and general business systems	157	44
Employment services	446	122
Printing and copying services	245	44
Tax preparation services	30	12
Real estate	81	34
Miscellaneous business services	717	260
Construction, home improvement, maintenance, and cleaning services	1,192	357
Convenience stores	108	25
Educational products and services	408	140
Restaurants:		
Chicken	206	59
Hamburgers, franks, roast beef, etc.	301	89
Pizza	579	142
Mexican	223	54
Seafood	83	24
Pancakes, waffles	48	12
Steak, full menu	673	204
Sandwich and other	731	229
Hotels, motels, and campgrounds	205	52
Laundry and drycleaning services	79	27
Recreation, entertainment, and travel	219	82
Rental services (auto, truck)	138	36
Rental services (equipment)	124	50
Retailing (nonfood)	1,798	578
Retailing (food other than convenience stores)	998	284
Miscellaneous	1,223	395
Total	11,947	3,625

ongoing fixed payments are very uncommon (arising in only 700 of our 11,947 observations), and outlet failure rates are also low according to Kostecka (1988). Hence, we decided to disregard these differences. We used a discount rate of 3 percent. Given the very small number of cases in which ongoing fixed payments occur, results are not sensitive to the choice of discount rate. Finally, franchise fees of Canadian franchisors were transformed to U.S. dollars using then-current exchange rates.

3. From our original 14,200 observations, we first eliminated 399 observations because the firms levied no royalties, franchise fees, or advertising fees, so they did not fit the definition of business format franchisors. Another 116 observations were lost because of data inconsistencies that we could not resolve even using other sources of data on individual franchisors. Another 54 observations were excluded from our sample because the royalty rate was above our cutoff value of 30 percent. We imposed this upper limit on royalty rates because we gathered that figures above this cutoff

were cases in which royalties were stated as a percentage of profits rather than sales. We chose 30 percent because we know of firms that ask for 30 percent of sales from franchisees. Finally, we lost another 1,684 observations because of missing data on royalty rates, franchise fees, advertising rates, outlets, or franchise fees. In the majority of cases, 1,336 out of 1,684, the missing data pertained to royalty rates or advertising fees. These observations include cases in which the rates were simply not available in the published data, the company responded "varies" (478 cases for royalty rates, 191 for advertising fees, and 303 for both of these fees), or, even less frequent, the fees were a dollar amount per unit of output (105 for royalties, 13 for advertising fee, and 26 for both). Our final sample of 11,947 observations represents 3,625 franchisors.

In some cases, franchisors gave a range of franchise fees or royalty rates. We used the average value in these cases under the assumption that the average fee is close to what the average outlet in the chain pays. Our results were unaffected when we limited ourselves to samples of firms that did not report any range in their fees.

4. Our data on contract terms and on our main explanatory variables are quite accurate. We used the panel nature of the data to check for consistency across years in all variables. Large discrepancies were then investigated using information from other franchisor directories. Furthermore, for the two independent variables we focus on in this paper, namely the years of franchising experience and the number of outlets in the chain, we were able to do even better. The reported datum for years of experience was the year in which the firm started franchising. Thus we had t different observations for this variable for each firm, and we reconciled them using other data sources when discrepancies arose. Similarly, because each survey contains data on outlets (company-owned and franchised) for the current and two previous years, we were able to check the consistency of data on the size of the chain very thoroughly.

5. Robert Bond's *Source Book of Franchised Opportunities* (Irwin, various editions) gives information on the average number of employees per outlet, the length of the franchise contract, whether or not the franchisee must buy some of its inputs from the franchisor, whether or not passive ownership is allowed by the franchisor, and the square footage of the average outlet. We used these data in some of our work to establish the role that these variables might play in the setting of contract terms. We found very little empirical support for including them in our analyses, and as they were not available for all firms or across many years, their use reduced our sample size too much. As a result, we do not really discuss these data in the body of the paper.

6. The information on the year in which the firm exits franchising was obtained by searching the most extensive franchisor directory (Dixon's *Franchise Annual*) for all years in which the firm did not appear in our sample after an initial appearance. If the firm was found in this directory for any given year, it was considered still franchising, and we concluded that it was a nonrespondent. If the firm was not in our sample or in this other directory, it was considered to have stopped franchising or have gone out

of business in the year in which we no longer could find it in either source. Shane (1996) used a similar procedure to track a small subsample of firms. He then contacted the founders of the companies and found that this procedure was a very accurate way to measure exit. Note that the issue of firms merging or being bought by others is not as big a problem in these data as it is in many other longitudinal firm-level data. The reason is that the unit of observation, the franchised chain, most often does not disappear as a result of a merger, because a large part of what buyers of franchised chains purchase is the right to the trade name and franchise contracts. As a result, the franchised chain continues to operate under its own name and contracts. Consequently, it remains a separate potential observation in our data despite having merged with, or being bought out by, another firm.

7. For the selection equation, we use the seeking non-USA dummy variable described in table A1 (seeking USA is almost constant at one). We also use the rank variable, which corresponds to the order in which the firm appears in the survey. The magazine ranks firms using a particular formula (which combines information on firm growth, size, and other characteristics of the franchised chains included in the survey) and, in each subsector, reports data first for the highest-ranking firm, then the second, and so forth. Up to and including the January 1987 survey, all firms were ranked this way. Since then, some subset of firms providing less information are no longer ranked. In each subsector, these firms now appear in alphabetical order below all the ranked firms, giving them all less "standing."

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