

# Nirvana efficiency: a comparative test of residual claims and routines

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## Abstract

Two widely adopted views of firm efficiency are agency theorists' residual claims and organization theorists' routines. The agency view holds that ownership structures (and their proxies) are the primary source of efficiency differences between firms. The organization theory view holds that organizational routines are the primary source of efficiency differences between firms. We conduct an empirical test that compares the relative value of residual claims and routines in generating firm efficiency, while controlling other factors. We find support for both views, but more importantly find that the average value of routines is roughly an order of magnitude higher than residual claims. © 1999 Elsevier Science B.V. All rights reserved.

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## 1. Introduction

An important tenet of economics is that given full property rights (both the right to govern use and receive benefits), individuals' desires for personal gain can be relied upon as an effective incentive for efficient use of any industrial property (Berle and Means, 1932). This tenet (through the profit maximization condition) is critical for optimal resource allocation in competitive markets (Debreu, 1959). The importance of this tenet is evident in the sizable literature on separation of ownership and control (Veblen, 1923; Berle and Means, 1932; Gordon, 1945; Lewellen, 1969; Jensen and Meckling, 1976). The

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basic premise of the separation of ownership and control literature is that while owner-managers maximize their utility by maximizing the value of the firm, those with less than full ownership maximize utility through a sub-optimal combination of firm value and perquisites. The goal of the separation literature then is to determine the ‘agency costs’ of sub-optimal resource allocation when managers are not sole owners of the firm. Thus agency theorists argue that a substantial source of variation in firm efficiency is differences in ownership structures (*residual claims*). The corresponding prescription for firms seeking maximum efficiency is to design managerial incentive systems approaching that of full ownership.

In a separate field, organization scientists (Barnard, 1938; Simon, 1945; Selznick, 1957; March and Simon, 1958; Cyert and March, 1963; Nelson and Winter, 1982) have stressed intra-firm managerial practices and ‘standard operating procedures,’ that is, organizational *routines* as essential to economic success. “Organizations turn their own experience, as well as the experience and knowledge of others, into rules that are maintained despite turnover in personnel and without necessary comprehension of their bases” (March and Simon, 1958, p.12). Nelson and Winter view *routines* as the source of sustained performance differences between firms: “Organizations with certain *routines* do better than others [in the short term], thus their relative importance in the population is augmented over time [through investment *routines* which are keyed to profitability]” (Nelson and Winter, 1982, p.14). Thus organizational theorists argue that a substantial source of variation in firm efficiency is differences in organizational *routines*. The corresponding prescription for firms seeking maximum efficiency is to hire professional managers, who generate, select and enforce superior *organizational routines*.

We conduct a comparative test of *residual claims*<sup>1</sup> and *routines* to assess their relative importance in achieving firm efficiency. The test is accomplished by comparing the performance of three populations within a single industry: independents, franchisees, and company-owned establishments. Independents are sole residual claimants of their establishments, yet have no access to the superior routine of the franchisor. Company-owned establishments have access to the franchisor’s routine, yet their managers are not residual claimants. Franchisees both have access to the franchisor’s routine, and are sole residual claimants of their establishments.

The use of a franchise setting is motivated by the idea that franchisors have a superior routine that they exchange in a market of entrepreneur-buyers. The assumption that the franchisor routine is superior is based on the franchise demand observation that entrepreneurs pay a premium (in higher up-front cost plus royalties) over independent ownership. The assumption that the routine is superior is also supported by the franchise supply intuition that franchisors have information advantages over independents. There are both static and dynamic components to the information advantages. The static component is a simple sample size story – franchisors receive a more reliable signal than do independents about the merits of any new policy they test, because they can observe the effects of that policy over a large number of establishments. The dynamic component is a learning-by-doing (Arrow, 1962) story – franchisor knowledge accumulates as a

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<sup>1</sup> From here forward, we use the term ‘residual claims’ to represent all incentive advantages stemming from sole ownership. Thus they include both residual claims and full property rights.

function of cumulative system sales (Darr et al., 1995). Thus franchisors learn at a much faster rate than independents, whose learning is based on cumulative establishment sales.

The article proceeds by reviewing the theories of *residual claims* and of organizational *routines*. Next we design an empirical test that compares the power of both in explaining performance differences between establishments, and then discuss the results.

### 1.1. *Residual claims*

Concern over separation and control dates back as far as Adam Smith (1776) who noted that the directors of joint stock companies cannot be expected to be as vigilant watching over others' money as partners in private companies watch over their own. The issue took center stage, however, with Berle and Means (1932), who argued that the world was entering a new era of inefficient economic organization due to the prevalence of public firms with separated ownership and control. Despite the fact that these concerns were not borne out in empirical studies (Gordon, 1945; Lewellen, 1969), interest grew (Baumol, 1962; Marris, 1964; Williamson, 1964; Alchian, 1965) until a formal theory of agency emerged.

Ross (1973) formalized the concerns of separation of ownership and control in the economic theory of agency. In particular, he defined the respective objectives of a principal and an agent as maximizing the expected profits and maximizing the expected fees, and concluded that it is possible to develop a Pareto-optimal fee schedule which maximizes the weighted sum of the utilities. Jensen and Meckling (1976) drew a different conclusion. They held that because the agent can draw utility from sources other than the fee itself, the problem of separation and control cannot be entirely mitigated with an optimal fee structure. In response, Fama (1980) posed the question, "why the prevalence of diffuse ownership and non-owner-managers, if in fact separation of ownership and control is an inefficient form?" He answered that managers rent human capital to firms, and that the discipline from the managerial labor markets resolves the incentive problems from separation of ownership and control. In short, Fama was arguing that separation of ownership is efficient since it is prevalent, and there is little empirical work to challenge that view.

We offer a view that reconciles the Fama observation that public ownership is prevalent, and therefore efficient, with the concerns of earlier scholars that it is inefficient. We agree that separation is inefficient. However, we posit that it is no less efficient than sole ownership – rather, there are information inefficiencies associated with sole ownership that are at least as costly as the agency effects resulting from separated ownership and control. Thus sole owners are not an appropriate standard for 'nirvana efficiency' (Demsetz, 1969). This is not because sole ownership is an "unrealistic ideal norm from a perfect institutional arrangement" (1969, p.1), but rather because sole owners are not necessarily efficient.

### 1.2. *Routines*

We argue that the productive value of professional managers in generating, selecting and enforcing superior organizational *routines* (or production functions) is of greater

value than *residual claims* (or perfect incentive alignment) in defining firm efficiency. This view is decidedly managerial, building on decades of organization theory (Barnard, 1938; Simon, 1945; Selznick, 1957; March, 1965; Litterer, 1969; Katz et al., 1980; Nystrom and Starbuck, 1981). It holds that firms exist because entrepreneurs ‘discover production functions’ or create superior organizational *routines*.

These *routines*, also called rules (Simon, 1945; March and Simon, 1958) and standard operating procedures (SOPs) (Cyert and March, 1963), are the most common form of decision making in organizations – at the opposite end of the problem-solving continuum from formal decision making (Simon, 1945; March and Simon, 1958; Cyert and March, 1963). *Routines* involve the solution of day-to-day problems such as work simplification, personnel selection, morale building, and team organization that are necessary to keep the organization running at efficient levels (Selznick, 1957).

*Routines* play a coordination role in firms – controlling the stimuli of individual decision making such that a sequence of individual decisions can be integrated into a cohesive whole without conscious effort (Simon, 1945; Nelson and Winter). The pattern of these *routines* gives organizations their unique character, or distinctive competence (Selznick). *Routines* change slowly, subject to modification only under duress (Cyert and March), and survive turnover in personnel (March and Simon). This longevity of *routines* gives stability to organizations and direction to their recurring activities (Cyert and March).

Moreover, *routines* play a strategic role. Organizations with superior *routines* achieve higher profits, which allows them to improve their position within their industry (Nelson and Winter, 1982). In this vein, resource-based-view theorists within the strategy field, have adopted *routines* as one of the strategic assets which allows firms to achieve supra-normal profit (Itami, 1987; Rumelt, 1987; Winter, 1987; Ghemawat, 1991).

We hold that *routines* are of sufficient value that public firms with superior *routines*, but diffuse ownership, perform more efficiently than firms with a sole *residual claimant*, even when controlling for likely scale economies in the public firms. In essence, routines overcome the inefficiencies of diffuse ownership. Accordingly, we feel superior *routines* are a more meaningful standard for firm efficiency than are sole *residual claims*. If we are correct, that routines are of greater value than perfect incentives in achieving firm efficiency, we would expect public firms with diffuse ownership, even if wealth constraints and risk aversion assumptions precluding sole ownership were relaxed.

### 1.3. A comparative test of the competing views

We conduct an empirical test that compares the relative value of residual claims and routines in generating firm efficiency. This test is conducted in a franchise setting. Franchising is an ideal setting for the test, because franchisees are hybrids between sole owners and employees. Franchisees are the residual claimants of their respective establishments – they have the right to residual control as well as the right to receive benefits. In addition, franchisees are like employees in that they (1) obtain organizational *routines* from the franchisor, (2) receive managerial assistance from the franchisor in implementing the *routines*, (3) are bound by operational restrictions from the franchisor

which enforce the *routines*, and (4) are monitored by the franchisor to verify that they are operating within the restrictions.

The test is accomplished through a three-way comparison of franchisees, company-owned establishments and independents in a single industry. Company-owned units are units which are like franchisees in all other respects (same brandname, same external features, same routines), except that they are owned by the franchisor rather than by local managers. Thus company-owned establishments share the organizational *routines* of the franchisee, but lack its *residual claims*. Independent establishments are ones created, owned and managed by local entrepreneurs. Thus independents share the *residual claims* of the franchisee, but lack access to its *routines*.

By comparing franchisees with independents (both with *residual claims*), we can isolate the marginal value of access to the franchisor's organizational *routines*. By comparing franchisees with company-owned establishments (both with access to the franchisor's *routines*), we can isolate the marginal value of *residual claims*. The implicit reference in the comparison is to a local establishment with a non-owner manager, who lacks both *residual claims* and access to the franchisor's *routines*. Thus independent performance equals baseline performance plus a *residual claims* premium; company-owned unit performance equals baseline performance plus a *routines* premium; and franchisee performance equals baseline performance plus both *residual claims* and *routines* premiums.

There are a number of other factors which might account for performance differences across the three groups: franchisor scale economies, product differences (Porter, 1974), human capital differences (Williams, 1994), establishment scale economies, brandname (Porter, 1974; Mathewson and Winter, 1985; Brickley and Dark, 1987; Norton, 1988), age of the establishments (Darr et al., 1995) and franchisor choice over which establishments to own versus franchise (see Dant et al., 1992 for a review). We control for many of these differences informally by choice of industry, and augment the informal controls with formal econometric controls.

## 2. Method

### 2.1. Industry

We test the value of organizational *routines* versus *residual claims* in the quick printing industry. The quick printing industry is a segment of graphic arts dealing with small runs (< 1000 copies) from camera-ready originals. The industry was chosen because (1) routines are an important element of the franchise contract, and (2) the industry structure informally controls for many alternative theories of franchise.

*Routines.* The first indication that routines are an important element of the franchise contract, is the fact that the Department of Commerce classifies quick printing as 'business format' franchises rather than 'product/tradename' franchises (U.S. Department of Commerce, 1987). Second, and more importantly, franchise contracts in the industry actually appear to be exchanges of organizational *routines*. Franchisors provide 2–4 weeks training, a complete start-up package (including layout, equipment and supplies),

1–2 weeks on-site opening assistance, and on-going managerial assistance. (U.S. Department of Commerce, 1991). Review of franchisor operations manuals indicates that the *routines* include basic management practices such as forecasting and monitoring demand, operations practices such as how to control work flow, marketing practices regarding the frequency and content of campaigns, as well as human resources practices such as hiring and compensation protocols.

*Industry Structure.* Industry structure approaches perfect competition – 20,000 establishments (14,655 independents, 5204 franchisees and 112 company-owned) remain following a shake-out in the 1980s which reduced the number of establishments from a peak of 30,000 (Michaud, 1993). Thus use of franchising as a temporary solution to resource constraints at the franchisor (Oxenfeldt and Kelly, 1968; Caves and Murphy, 1976), or temporary holding of company-owned units as a performance bond for franchisees (Gallini and Lutz, 1992; Lafontaine, 1992) ought to have settled (Martin, 1996).

*Franchisor scale economies.* The industry is fragmented. The distribution of independents and franchisees suggests that the advantages of each governance form are roughly balanced – a total of 21 franchisors comprise 26.9 percent of the establishments, yet no single franchisor comprises more than 5 percent (Lowery, 1994). Such fragmentation suggests diminishing returns to scale, otherwise the industry ought to be concentrated in a few large producers. Specific evidence that purchasing economies are unimportant is the fact that the difference between materials costs for independents and franchisees is insignificant (NAQP, 1992, 1994).

*Product differences.* Quick printing offers an undifferentiated product. All establishments in the industry use industry standard equipment and materials, leaving little source of variation beyond the service concept (which is part of the routine).

*Brandname.* The importance of franchisor brandname varies with context. Brandname is most important when knowledge of a seller's product quality is low (Norton, 1988), or when establishments cater to non-repeat customers (Brickley and Dark, 1987). Three things point towards the relative unimportance of brandname in the quick printing industry: (1) The quality of the product is readily observed from visual inspection at delivery, (2) the industry has high repeat sales (interviews with franchisees place the rate at 95%), and (3) the Department of Commerce classifies quick printing as being a 'business format' rather than a 'product/tradename' franchise (U.S. Department of Commerce, 1987).

*Franchisor choice of governance form.* Franchisors choose which units to franchise versus hold internally. Early theories of their decision rule were that franchisors preferred company ownership, and that they therefore franchised only to solve monitoring problems (Rubin, 1978) and temporary resource constraints in financing, managerial talent, and local knowledge (Oxenfeldt and Kelly, 1968; Caves and Murphy, 1976). More recent work has tended to reverse prior thinking. The general view seems to be that firms prefer franchising and that they own units to post a performance bond (Gallini and Lutz, 1992), thereby signalling their quality to potential franchisees (Lafontaine, 1992), or to enhance their information about operations (Bradach and Eccles, 1989). Most empiricism has examined differences in ownership patterns across industries, rather than within industry as we do here. Those studies have found that company ownership decreases with

industry growth (Norton, 1988; Thompson, 1992; Martin, 1996). A single industry study avoids this source of variance. Intra-industry sources of variance arising from franchisor choice of governance form are discussed under ‘control variables.’

Thus many of the factors which commonly differentiate performance between franchisees and independents and company-owned establishments are relatively unimportant in the quick printing industry. Accordingly, the industry provides a natural experiment to test the value of routines against that of *residual claims*. Further it is a setting which appears to be biased in favor of *residual claims*. The skills necessary for running an establishment can be taught in less than a month. Thus the differences in *routines* ought to be minor. If *residual claims* are going to dominate *routines* in any setting, it ought to be here, in quick printing.

While the industry controls informally for product differences, brandname, franchisor scale economies, and franchisor choice of governance form, we do not rely on these. The empirical model introduces formal controls for brandname, franchisor scale, franchisor age and franchisor choice of governance form, as well as establishment scale and establishment age.

## 2.2. Sample

The study compares three groups within the industry: franchisees, company-owned establishments and independents. The primary data-gathering instrument was a mail survey distributed to a random sample of 3000 of the 20,000 establishments in the industry. It generated responses from 151 independents and 83 franchisees. As there are only 112 company-owned establishments in the industry, we did not capture any company-owned establishments in our random sample. We therefore obtained company-owned establishment data directly from the franchisor.

There are only four franchisors in the industry with company-owned establishments (excluding two franchisors with a single company-owned establishment each) (Lowery, 1994). Of these four franchisors, only one has a large number (greater than 30) of both company-owned establishments and franchisees. We augmented the mail survey data with a 100 percent sample from that franchisor.

We checked sample bias by comparing mail survey responses and franchisor reports for those establishments that were captured by both techniques. Further, we tested the representativeness of the mail survey data by comparing the sample mean for sales with ‘IRS Corporate Financial Ratios’ (Schonfield and Associates, 1992). There was no significant difference between the sample mean and that for the IRS data (after the IRS data were adjusted to exclude commercial printers). Franchisor data are monitored by the FTC, and therefore their reliability is enforced.

From this total we deleted all establishments which were founded after 1992, and any establishment for which sales, capital or labor was missing. The remaining sample comprised 70 independents, 50 company-owned establishments, and 73 franchisees.

We pooled 2 years of data for each establishment to form a database with 380 observations (193 establishments, two observations: 1993–1994 or 1994–1995, on all but six establishments). Descriptive statistics and a correlation matrix for the data are given in

Table 1  
Summary statistics and data correlation<sup>a</sup>

	Mean	SD	1	2	3	4	5	6	7
1. Independent dummy	0.36	0.48	1.00						
2. Franchisee dummy	0.38	0.49	-0.59	1.00					
3. Company-owned dummy	0.26	0.44	-0.45	-0.46	1.00				
4. Year founded (19_)	82.25	9.05	-0.02	0.09	-0.07	1.00			
5. Equipment (\$1000)	89.09	106.50	0.18	0.06	-0.27	0.02	1.00		
6. Labor (full-time equivalent)	3.84	2.27	-0.03	0.23	-0.22	0.03	0.06	1.00	
7. Sales (\$1000)	412.43	654.55	-0.10	0.23	-0.15	0.00	0.14	-0.02	1.00

<sup>a</sup> $n = 193$ .

Table 1. A more revealing table that compares summary statistics for the three governance forms is given in Table 2.

### 2.3. Variables

*Explanatory variables.* The explanatory variables are dummy variables for organizational *routines* and *residual claims*. These dummies are formed from primary dummies for governance form: company-owned, independent, franchisee. The dummy for organizational *routines* is formed as the sum of the dummies for company-owned and franchisee, since both groups have access to the franchisor routine. The dummy for *residual claims* is the sum of the dummies for franchisee and independent, since both are sole owners and therefore *residual claimants* for their establishments.

*Dependent variable.* The statistical analysis follows a two-stage process which we describe below. In the first stage, we build a production function using sales output (dependent variable). We compare output against factor inputs to produce an efficiency metric for each establishment. We use this efficiency metric as the dependent variable in the second stage.

Table 2  
Summary statistics by governance form<sup>a</sup>

	Independents	Franchisees	Company-owned
Parent firms	n/a	9	1
Sample size	70	73	50
Mean establishments per owner	1.2	1.6	n/a
Age of establishment (mean)	11.0	10.0	12.0
SD	13.0	5.4	6.8
Equipment (\$1000) (mean)	141.0	50.0	41.0
SD	263.0	97.0	28.0
Labor (full-time equivalent) (mean)	5.2	6.2	3.2
SD	4.1	3.9	1.5
1993 Sales (\$1000) (mean)	357.0	514.2	240.1
SD	660.0	321.9	87.6

<sup>a</sup> $n = 193$ .

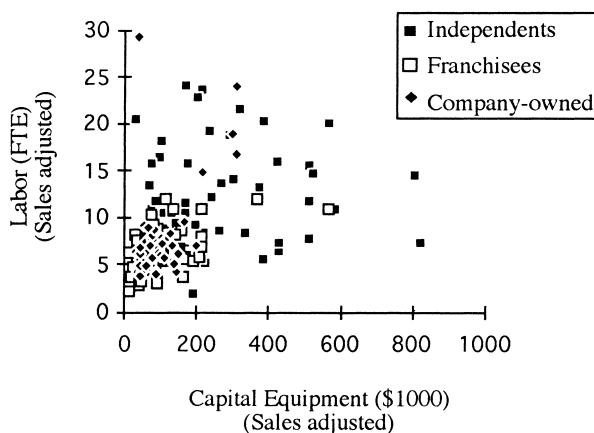


Fig. 1. The efficient frontier is dominated by franchisees. We control for differences in establishment scale in the figure by normalizing capital and labor by mean sales.

We chose ‘efficiency’ as our dependent variable, because we wanted a fundamental measure of establishment performance: how close are establishments to the efficient frontier of their industry? As a practical matter, however, other conventional measures of performance are problematic in this context. Profitability comparisons are difficult across the three governance forms, because independents and franchisees have discretion over whether to take income as profits, salary or perquisites.

*Factor inputs.* We use capital and labor as the factor inputs to determine establishment efficiency in the first stage model. Capital is measured as the resale value of equipment. Labor is measured as the number of full-time-equivalent (FTE) employees. To obtain the FTE we count the total number of full-time employees and add to that the total hours per week of all part-time employees divided by 40 hours. The combination of capital and labor defines the efficient frontier for the industry. A graphical summary of establishment efficiency for our sample is given in Fig. 1. Note that without any formal analysis, it is apparent that independents are the least efficient establishments.

*Controls/classification.* We control for establishment first mover advantages and establishment-specific learning effects using age of the establishment (year founded–year observed). We control for system-wide first mover advantages and system-wide learning using franchisor age. Franchisor age has also been used as a control for brandname (Martin, 1996). We control for alternative theories of franchise advantage (other than organizational *routines*) using franchisor scale. The franchisor scale variable (total system sales) controls directly for scale economies in the chain, and controls indirectly for central investments in operations as well as brandname. For independents, system sales is set equal to establishment sales.<sup>2</sup>

The argument that system sales controls for brandname, stems from two assumptions: first, that advertising expenditures are a proxy for investments in brandname, and second,

<sup>2</sup> We tested models with independents’ system sales set alternatively to 0 or establishment sales. Establishment sales results in greater econometric efficiency.

that advertising intensity is constant across franchisors. Generally, quick printing franchisors require franchisees to pay a national advertising fee of 2 percent of sales, and require that franchisees invest an additional 1 percent of sales in local advertising (Martin, 1993).

We do not control directly for material cost or location. In part this is because some materials and location advantages are part of the organizational *routine* we wish to measure. There are two components to materials and location advantages – structural advantage and information advantage. While we want to control for structural advantage, information advantages that have been translated into franchisees' organizational *routines* should contribute to our *routines* measure.

Structural advantage in the case of materials would be scale economies in purchasing. We control for this using the system sales variable. In contrast, information advantage in the case of materials would be a franchisee policy of ordering inventory monthly rather than just-in-time for each order. This policy is part of the franchisee's routine, which has been prescribed by the franchisor. The franchisor's prescription stems from information advantage in sampling and refining inventory policy using the experience of its large number of establishments.

Structural advantage in the case of location would be local first mover advantages – for example, being first to open a quick printing establishment in downtown Phoenix. We control partially for local first mover advantages using establishment age. In contrast, information advantage in the case of location would be a franchisee policy (handed down from the franchisor) of locating the franchise in an area of downtown Phoenix with the highest density of firms of size \$500,000–\$1,000,000. The franchisor's prescription stems from information advantage in sampling the performance of establishments as a function of their local demographics.

Of franchisor choice factors which vary within industry, empiricism has consistently found that company ownership decreases when monitoring costs are high, as in rural/dispersed locations (Brickley and Dark, 1987; Martin, 1988; Minkler, 1988; Norton, 1988; Brickley et al., 1991; Thompson, 1992; Scott, 1995). Since these location differences correlate well with establishment size, we can control for such differences with establishment scale. Studies have also found that company ownership increases with size of investment, due to a smaller pool of entrepreneurs who can afford the investment (Brickley et al., 1991; Thompson, 1992). In contrast, studies have found that company ownership increases with capital intensity (capital–labor ratio), under the logic that capital cannot shirk, and that the monitoring requirements are eased (Norton, 1988; Scott, 1995). We control for size of investment and capital intensity using the equipment input to the establishment production function (Stage 1 regression). Finally, studies indicate that company ownership decreases with age of the franchise as the need for the performance bond decreases (Martin, 1988; Scott, 1995). We control directly for the age of the franchise.

#### 2.4. Empirical model

Our empirical analysis tests the efficiency effects of organizational *routines* and *residual claims*. To establish these effects we build a two-stage model. In the first stage

we model a stochastic production frontier, from which we derive efficiency metrics for each establishment. These efficiency metrics serve as the dependent variable in a second stage where we examine the contributions of organizational *routines* and *residual claims*.

*First stage.* The first stage uses a fixed effects model of a stochastic production frontier to create an efficiency metric for each establishment. The use of such an approach is driven by an interest in measuring firm performance while taking into account differences in firm production functions. There are two basic approaches to measuring productive efficiency – an econometric approach and a linear programming approach (see Fried et al., 1993 for a comprehensive review). Both approaches construct a production frontier and assess firm distance from that frontier (inefficiency). The linear programming approach (data envelopment analysis – DEA) is non-stochastic and non-parametric, while the econometric approach is both stochastic and parametric. The choice between the two methods is driven by assumptions about which is the lesser of two evils, –attributing all statistical noise to inefficiency (DEA) or attributing specification error to inefficiency (econometrics). In general, DEA “leads to quite considerable distortions” (Greene, 1993, p.105). Choice within the econometric methods is largely driven by the type of data: cross-section versus panel. Since we had 2 years data, we were able to avoid the complications inherent in cross-sectional data of decomposing the residual into statistical noise and technical inefficiency. We were driven to a fixed effects model rather than a random effects model because we only had two observations for each firm.

We use a Cobb–Douglas production function to model output  $Q$  as a function of factor inputs: capital  $K$ , labor  $L$ , year effects  $Y$ , and establishment effects  $\nu$ . The choice of Cobb–Douglas follows Greene. In studies where a translog form has been tested, the Cobb–Douglas restrictions have been upheld (Fried et al., 1993).

$$Q = AK^\alpha L^\beta \exp(Y + \nu + \varepsilon) \quad (1)$$

taking logs, we have:

$$\ln Q = \ln A + \alpha \ln K + \beta \ln L + Y + \nu + \varepsilon \quad (2)$$

where:  $Q$  is output,  $K$  is capital,  $L$  is labor,  $Y$  is year effects,  $\nu$  is establishment effects.

In our case output  $Q$ , is total sales rather than quantity, since there is no meaningful quantity term in printing except number of impressions, which is not archived. Since sales are correlated to  $q$  through price, and since year dummies will control for industry-wide changes in price, we feel sales is a reasonable proxy for quantity. In addition to controlling for price inflation, the year dummies will capture industry growth.

The goal of this stage is to produce efficiency metrics  $\nu_i$  for each establishment for use in the second stage model. While it is not our prime intent, the coefficients on  $K$  and  $L$  will allow us to determine the productivity of capital and labor, as well as the returns to scale. For constant returns to scale, we expect:  $\alpha + \beta = 1$ .

*Second stage.* In the second stage, we test our hypothesis, by modeling establishment efficiency  $\nu_i$ , as a function of *residual claims* and access to organizational *routines*, while controlling for establishment age, franchisor age and franchisor scale (system sales).

$$\begin{aligned} \nu_i = & \gamma_0 + \gamma_1(\text{res claims}) + \gamma_2(\text{routines}) + \gamma_3(\text{estab. age}) + \gamma_4(\text{system age}) \\ & + \gamma_4(\text{system sales}) \end{aligned} \quad (3)$$

We expect to find that both *residual claims* ( $\gamma_1$ ) and organizational *routines* ( $\gamma_2$ ) are significant. However, we further expect to find that organizational *routines* have greater effect than *residual claims*:  $\gamma_2 > \gamma_1$ .

*Single stage validation.* We are driven to the two-stage format by our interest in characterizing establishment efficiency. As a validation of the two-stage, 2-year approach, we also execute a single-stage, single-year model that combines (with some transformation) Eqs. (1) and (2):

$$\ln Q = \ln A + \phi_1 \ln K + \phi_2 \ln L + \phi_3(\text{res claims}) + \phi_4(\text{routines}) + \phi_5(\text{age}) \\ + \phi_6(\text{sys age}) + \phi_7(\text{sys sales}) \quad (4)$$

### 2.5. Prior empiricism

Related empiricism comes from two segments of the franchise literature. The dominant segment examines franchisor choice of governance form (franchise vs. company-owned establishments). Another very recent literature has begun to examine entrepreneur choice of governance form (franchisee vs. independent ownership). The empirical studies in the franchisor choice literature tend to be aggregate studies (one franchisor = one observation) which examine share of company-owned units as the dependent variable. There is little direct work examining the question of relative performance of company-owned establishments versus franchisees. The presumption that because franchisees have higher incentives than managers, their performance will be higher (Shelton, 1967; Wattel, 1968; Rubin, 1978) is not directly tested.

The only tests of relative performance are done in the context of examining whether franchisors ‘cherry-pick’ – buy back their best units. In general these studies tend to show that company-owned establishments are larger (have higher sales) than franchisees (Martin, 1988; Thompson, 1992). However, because these studies use aggregate data, this effect likely reflects industry differences in propensity to franchise, rather than intra-industry differences across governance form; for example, supermarkets, a high revenue industry, are predominantly company-owned.

The recent related literature on entrepreneurial opportunity examines entrepreneur choice of franchisee versus independent ownership. Williams (1994) compares performance of franchisees and independent owners and finds support for his hypothesis that the franchisor offers a market for deficits in entrepreneurs’ human capital. He finds that profits for independent firms are higher than that for franchisees after controlling for human capital differences. However, because his data (the Census of Business Owners) identify sectors, rather than industries, his results, like those in the companion field, likely capture differences in franchising rates across industries rather than differences in performance of franchisees and independents within industries.

Thus the tentative conclusions from the two literatures, while not intending to address our hypotheses, tend to suggest that franchisees will have the lowest performance of the three governance forms. Franchisee sales are lower than those of company-owned establishments; franchisee profits are lower than independents. These results contradict our hypotheses, and conflict with the preliminary indications in Fig. 1. However, the results are problematic because the studies lack controls for inter-industry differences in

propensity to franchise, and lack comparability between the franchisee–company ownership and franchisee–independent methods. We correct these problems by conducting a more direct test that offers a three-way comparison, using a fundamental performance measure in a single industry study.

### 3. Results

The data indicate that *residual claims* and organizational *routines* are both significant in explaining performance differences between establishments. However, the data further indicate that organizational *routines* have far greater value than *residual claims*. To reach that conclusion, we first review the results of the first-stage model, then review the second stage.

#### 3.1. First stage

We modeled establishment sales as a function of factor inputs, establishment effects and year dummies (Eq. (2)). The coefficients for that model are presented in Table 3 (Model 3). The goal of the model was to produce the set of establishment effects which form the dependent variable of the second-stage model. A histogram for the establishment effects ( $\nu_i$ ) is given in Fig. 2. Note that there are three outliers – one of very low efficiency, and two of very high efficiency. We delete these establishments in the second-stage analysis, under the assumption that there are factors outside our model which are driving the performance of these establishments.<sup>3</sup>

An interesting byproduct of the first-stage model was our ability to characterize capital and labor productivity. Both coefficients are significant when we control for year, though labor is more substantial. More interesting, however, is that their sum (0.86–0.91) is significantly less than one ( $t$ -statistic =  $-2.73$ ), implying that there are decreasing returns to scale in this industry. This finding of decreasing returns is consistent with the fragmented structure of the industry. If there are increasing returns to scale, the industry ought to be concentrated in a few large producers. The finding further suggests that franchisor-scale economies may not be important (we, however, test that directly in the next stage).

#### 3.2. Second stage

Next, we model establishment efficiency  $\nu_i$ , as a function of *residual claims* and access to *routines*, while controlling for age of the establishment, age of the system and system scale (Eq. (3)). The coefficients for this model are presented in Table 4 (Model 2). We also include another model that deletes controls (Model 1). We find in both models that *routines* and *residual claims* are both significant in explaining establishment efficiency. The best fit (highest adjusted  $R^2$ ) is actually Model 2 with all control variables. That model indicates that the average value of *routines* is roughly 12 times that for *residual*

<sup>3</sup> The basic results are the same when we include the three outliers; however, the  $R^2$  falls by 0.10.

Table 3  
Stage 1 regression to define firm efficiencies

	1	2	3
Ln (equipment)	0.06 1.23	0.11 <sup>b</sup> 2.43	0.13 <sup>b</sup> 2.53
Ln (labor)	0.81 <sup>a</sup> 11.41	0.80 <sup>a</sup> 11.87	0.73 <sup>a</sup> 9.50
1992	4.24 <sup>a</sup> 27.24	3.76 <sup>a</sup> 22.44	3.78 <sup>a</sup> 19.76
1993		0.29 <sup>a</sup> 3.85	0.27 <sup>a</sup> 3.61
1994	– –	0.57 <sup>a</sup> 6.04	0.54 <sup>a</sup> 5.48
Firm dummies	– –		xxx xxx
$R^2$	0.409	0.462	0.923
Adjusted $R^2$	0.406	0.456	0.564

Dependent variable = Ln (Sales)  $n = 320$  (2 years data on all but 2 firms).

$t$ -statistic listed under coefficients.

<sup>a</sup> $p < 0.001$ .

<sup>b</sup> $p < 0.01$ .

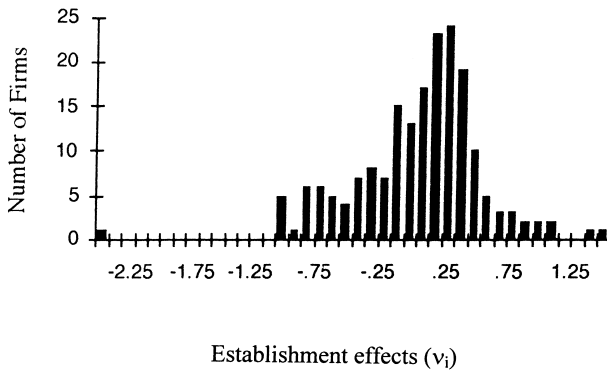


Fig. 2. Distribution of establishment effects.

*claims* (0.84 vs. 0.06). Even in Model 1 without controls, the average value of *routines* is roughly four times the *residual claims*.

Of the control variables, only system scale is significant. The significance of the system scale variable suggests that there may be purchasing economies and brandname advantages associated with franchising. Note, however, that these scale economies do not drive the *routines* effect. The value of *routines* actually increases when we include system scale (coefficient = 0.84 in Model 2 vs. 0.53 in Model 1).

Table 4  
Stage 2 regression

	1	2
Routine	0.53 <sup>a</sup> 7.88	0.84 <sup>a</sup> 4.47
Residual claims	0.13 <sup>b</sup> 1.79	0.06 0.76
Establishment age	– –	0.00 0.61
System age	– –	–0.01 –1.10
Ln (system sales)		<sup>a</sup> 0.13 3.88
Constant	–0.45 <sup>a</sup> –5.04	–1.07 <sup>a</sup> –6.10
$R^2$	0.261	0.326
Adjusted $R^2$	0.253	0.307

Dependent variable = establishment efficiency;  $n = 190$ ; (outliers omitted).

$t$ -statistics listed under coefficients.

<sup>a</sup> $p < 0.001$ .

<sup>b</sup> $p < 0.10$ .

Neither system age nor establishment age is significant. This suggests that there are no important franchisor first-mover advantages, such as locking up prime locations. Further, there appear to be no learning effects which improve establishment efficiency over time (at least after the first year, since we deleted establishments in their first year). This is not a complete surprise. If training takes less than 4 weeks, these are probably skills which are mastered quickly.

### 3.3. Single stage

Finally, as a validation of the econometric efficiency of the 2-year, two-stage approach, we executed a single-year, single-stage model (Eq. (4)). The results (Table 5) are similar to those in the main model. Comparing the most econometrically efficient model in each approach (Model 2 in both Tables 4 and 5), the coefficient on *routines* is 0.84 in the single stage model versus 1.01 in the two-stage model. Similarly the coefficient on *residual claims* is insignificant in both models. The coefficients on capital and labor differ slightly between the two approaches (Table 3 vs. Table 5), because we constrained capital and labor in the first approach to define the efficient frontier. Thus we have some confidence that the two-stage approach is a valid means to compare the performance of establishments in this industry, and to assess the value of *routines* and *residual claims*.

Table 5  
Single-stage single-year regression

	1	2
Routine	0.57 <sup>a</sup> 8.15	1.01 <sup>a</sup> 5.10
Residual claims	0.15 <sup>b</sup> 1.90	0.11 1.27
Establishment age	– –	0.00 0.72
System age	– –	–0.01 –1.64
Ln (system sales)	– –	0.16 <sup>a</sup> 4.47
Ln (equipment)	0.18 <sup>a</sup> 4.16	0.15 <sup>a</sup> 3.618
Ln (labor)	0.68 <sup>a</sup> 10.32	0.63 <sup>a</sup> 9.774
Constant	3.48 <sup>a</sup> 22.77	2.88 <sup>a</sup> 14.75
$R^2$	0.697	0.730
Adjusted $R^2$	0.690	0.720

Dependent variable = Ln (1994) sales);  $n = 190$ ; (outliers omitted).

$t$ -statistics listed under coefficients.

<sup>a</sup> $p < 0.001$ .

<sup>b</sup> $p < 0.10$ .

#### 4. Discussion

This study empirically validated both agency theorists' *residual claims* view of efficiency, and organization theorists' *routines* view of efficiency. Moreover, we conducted a comparative test of the relative power of each view in explaining variance in establishment efficiency. We chose franchising as the setting because it presents a natural test of *residual claims* and *routines*. We further chose the quick printing industry because there were controls for most other sources of variation in establishment performance.

We found support for both the agency theorists' and organization theorists' views. More importantly, we found that the average value of organizational *routines* is substantially higher than that of *residual claims*. In the most econometrically efficient models the average value of *routines* was 12 times that of *residual claims*. Even in a less efficient model with no controls, the average value of *routines* is roughly four times that of *residual claims*. These findings suggest that prescriptions for maximizing efficiency through development of operational *routines* may offer more promise of economic success than prescriptions of incentive alignment.

Cumulatively, these findings offer a possible reconciliation of the observation that publicly owned firms are prevalent despite the inefficiency of their diffuse ownership. Firms that have grown to sufficient size to become public, likely have done so because they were endowed with superior *routines*. These initially superior operational *routines* may support investment in new *routines* that augment the firms' relative importance in their respective populations over time (Nelson and Winter, 1982, p.14). Efficiencies arising from execution of the superior *routines* exceed the inefficiencies arising from the agency problems of diffuse ownership.

There are limitations to generalizing the results. The setting was chosen because it controlled for many factors that explain performance differences between establishments in other industries, such as brand name and product differentiation. We have not yet identified conditions unique to the quick printing industry which govern when *routines* rather than *residual claims* are likely to prevail in firm efficiency. We look to multi-industry studies to aid in the pursuit of those conditions. Second, there was only one firm in the industry with more than a handful of company-owned establishments. In industries where there are more company-owned establishments, results may differ.

The implication of the finding that organizational *routines* have greater value than *residual claims* is that the use of owner-managers as the efficiency standard to which firms must aspire is not universally valid. This is not because it is a 'nirvana efficiency' which public firms can never hope to achieve, but rather because ownership has little effect on performance. Thus the prevalence of public firms may be reconciled with the concerns over separated ownership and control: *residual claims* matter, but not as much as professional management (*routines*).

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