Channel Efficiency: Franchise versus Non-Franchise Systems

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ABSTRACT. This study explores the overall competitiveness of franchises over non-franchises based on the comparison of their operating efficiency at the state level. Operating efficiency is assessed through Data Envelopment Analysis, which is an operations research-based methodology to measure performance efficiency in units characterized by multiple inputs and outputs. The results showed that franchises are more efficient than non-franchises. *[Article copies available for a fee from The Haworth Document Delivery Service: 1-800-342-9678. E-mail address: getinfo@haworthpressinc.com]*

INTRODUCTION

Franchising systems are an important organizational form, which accounts for about one-third of all retail sales in the United States (House Committee on Small Business 1990). Researchers have consistently hypothesized that franchises have competitive superiority over non-franchises in the same industry (see Yoo, Donthu, and Sibley 1997). The superiority of franchises may stem from (1) their easy capital raising ability (Oxenfeldt and Kelly 1968-69); (2) their risk-sharing with franchisors and information advantages as explained by agency theory (Brickley,

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Dark, and Weisbach 1991; Lafontaine 1992; Norton 1988a, 1988b); and (3) their greater capability to respond to environmental changes, an explanation which comes from a population ecology perspective (Pilling, Henson, and Yoo 1995).

This paper examines the overall competitiveness of franchises over non-franchises based on the comparison of the operating efficiency of these two competing organizational forms at the state level. Efficiency requires generation of a given level of output with as minimal input as possible or maximizing output for a given level of input. Effectiveness, on the other hand, requires the successful achievement of marketing goals regardless of inputs used (see Ingene 1984).

The purpose of this paper is to explore whether franchises are the better organizational form than non-franchises from the efficiency perspective. Here, efficiency is assessed through Data Envelopment Analysis (DEA) (Charnes, Cooper, and Rhodes 1981), which is an operations research-based methodology to measure efficiency. DEA has been applied to measure performance efficiency or productivity in various organizations such as banks and hospitals (Vassiloglou 1990; Young 1992), fast food chain stores (Donthu and Yoo 1997), sales functions (Mahajan 1991), sales people (Boles, Donthu, and Lothia 1995), policy programs (Charnes, Cooper, and Rhodes 1981) and market efficiency of brands (Kamakura, Ratchford, and Agrawal 1988). The paper is organized as follows. First, literature on franchising research and performance evaluation is discussed followed by a description of the data and variables of the Pilling, Henson, and Yoo's (1995) study (as the same data base is used here also). Then, the DEA methodology is introduced and used to measure efficiency of franchise firms as well as non-franchises at the state level. Finally, the implications of the study and future research directions are discussed.

FRANCHISING RESEARCH

Theoretical Frameworks: Several theories have been used to explain why franchises exist and under what circumstances franchising is most likely to occur. An early explanation views franchising as a means for the franchisor to raise capital (Oxenfeldt and Kelly 1968-69). Based on organizational life cycle theory, franchisors use franchise locations early in the organization's life to raise funds, identify prime locations, and develop a ready pool of managerial talent. If the organization is successful, the franchisor will develop financial and human resources and franchise locations will no longer be desirable. Eventually successful organizations will have primarily company owned units. This hypothesis is known as the "redirection" hypothesis.

Other researchers (Norton 1988a, 1988b; Brickley and Dark 1987; Lafontaine 1992) have suggested agency theory as an explanation of why franchises exist. Agency problems include the costs of monitoring manager performance in owned units, based on the logic that the manager will not act in the best interest of the unit since his compensation is not tied directly to performance. Other agency problems include free-riding by the franchisee (when repeat business is unlikely leading the franchisee to supply lower-quality products), inefficient risk-bearing on the part of the franchisee (due to lack of diversification in the franchisee's investment, leading to non-ideal investment decisions), and quasi-rent appropriation on the part of the franchisor (possible because of specialized investments by the franchisee). Based on the work of Fama and Jensen (1983a, 1983b), Brickley and Dark (1987) suggest three factors which favor franchising over owning:

1. low investment risk on the part of the franchisee
2. low incentives for free riding by both franchisee and franchisor
3. low investment in firm-specific assets

Another recent perspective (Nygaard 1990; Dant, Kaufmann and Paswan 1992) holds that dual distribution may have synergistic effects on the organization. The franchisor may benefit from maintaining a mix of company-owned and franchisee locations for a variety of reasons, including: maintaining familiarity with the marketplace, as a source for ideas, as a source of experimentation, and as a way to dissuade opportunistic behavior on the part of franchisees who might otherwise perceive the franchisor as vulnerable (Dant, Kaufmann and Paswan 1991).

Bradach and Eccles (1989) support the existence, compatibility and benefits associated with multiple distribution arrangements. Rather than argue that a specific form of distribution excludes other alternatives, it is shown that dual distribution arrangements within the same system (e.g., franchises and company-owned units) may provide significant control advantages for management. They present reasoning to explain both an existing distribution configuration as well as shifts in that configuration.

The population ecology framework has also been applied to the study of franchises (Pilling, Henson, and Yoo 1995). Population ecology examines the effects of competition and environmental conditions on various organizational forms (such as franchises or company-owned outlets) and also examines the suitability of each organizational form to its environment. The focus is on the relative ability of an organizational form (such as franchises or company-owned outlets) to compete for the resources necessary for survival. A key strategic variable, therefore, is the ability of an organization to respond to changes in its environment.

Franchise Performance: Limited empirical work exists on franchise performance. Anderson (1984) investigated performance differences between franchisor and franchisee owned establishments, in order to test the ownership redirection hypothesis. Anderson analyzed aggregate time series data (1969-1980), published in *Franchising in the Economy,* for 17 different business areas. Out of 17 different areas, franchisor owned businesses had higher performance in seven areas. Therefore, it was not concluded that comprehensive performance differentials exist between company owned and franchisee establishments. Anderson also looked for performance differences in mature businesses. Again, however, no systematic performance differences were found.

Bracker and Pearson (1986) examined the relationship between ownership form (independent versus franchise) and financial performance in small, mature firms. They gathered data from owners/operators in 265 dry cleaning businesses. Data analysis did not identify any significant performance difference in revenue growth between the two ownership types. In addition to examining revenue growth, there were no detectable differences in the growth of entrepreneurial compensation or the growth of the labor expense revenue ratio between franchises and independent businesses.

Pilling, Henson, and Yoo (1995) studied the performance of franchises, compared to both company-owned units and independent outlets, in terms of responsiveness to changes in their environment. Responsiveness is a measure of the ability of an organizational form to adapt to changes in its environment, including characteristics such as market demand, population density, and infrastructure conditions. The analysis was conducted at the population level using two data sets, Franchising in the Economy and the Retail Census. The results suggest that franchises (as an organizational form) are more responsive than either company-owned units or independent units. This responsiveness superiority of franchises may be explained by (1) access to the capital necessary for expansion; (2) as a source of ready managerial talent; (3) available knowledge of local market conditions; and (4) reduced agency problems of monitoring managers.

DATA ENVELOPMENT ANALYSIS METHOD

From the last section, it can be concluded that franchises have been shown to be a superior organizational form compared to both company-owned and independent operations, from a *responsiveness* perspective. In this section, Data Envelopment Analysis method (DEA) is introduced and, in next section, efficiency of franchises and non-franchises is evaluated through DEA to test the hypothesis that franchises are also the better organizational form from *efficiency* perspective as well. DEA has been established as an appropriate tool to assess the performance of Decision Making Units (DMUs) from an efficiency perspective, where DMUs are managed entities which can make input and output decisions (see Charnes, Cooper, and Rhodes 1981; Norman and Stocker 1991). Here, DMUs can be any kind of comparable entities such as competitive firms, branches or stores of a firm, individuals, schools, or countries. In a word, DEA is a tool for performance (in particular, efficiency) assessment of DMUs or individual entities whose inputs and outputs can be measured.

In DEA, efficiency is concerned with the allocation of resources among alternative uses and often measures the degree to which the minimum possible input is used to capture a given output or where the maximum possible output is acquired from a given input–the former is called input orientation and the latter output orientation (Parsons 1992). DEA identifies the relationships between inputs and outputs, whether single or multiple, from the perspective of *relative* efficiency. Here, the word *relative* refers to relative ratio of efficiency of a DMU compared to the efficiency of the rest peer DMUs, since efficiency of a DMU is estimated by taking into account the inputs and outputs of all other peer DMUs. Thus, DEA shows how efficiently a DMU operates compared to other DMUs. In this study, DMUs are franchises and non-franchises at the state level. Efficiency can be evaluated not only for each of the DMU members within one organizational form but for comparison between different organizational forms, given input and output measures.

DEA assimilates the concept of *engineering efficiency* of production function in microeconomics–a purely physical concept; that is, it is a technical relationship between the physical quantities of inputs and the physical quantity of output (see Chacholiades 1986). Thus DEA deals with the maximal quantity of outputs for any given amounts of inputs or the minimal quantity of inputs for any given amounts of outputs. The first task of DEA is to ignore all inefficient methods of production and find the most efficient ones, which produces a so-called *efficiency frontier,* analogous to *isoquants* (equal-product curves) of production function of microeconomics. The efficiency frontier is a line connecting the most efficient DMUs, which are determined from a comparison of inputs and outputs of all peer DMUs. Thus DEA produces the *relative* efficiency boundaries, which are called *envelopes* in order to depart from the assumptions of economic theory (Charnes, Cooper, and Rhodes 1981).

The fundamental formulation for efficiency of a DMU is as follows (Charnes, Cooper, and Rhodes 1981):

$$\max h_o = \frac{\sum_{r=1}^{s} u_r y_{ro}}{\sum_{i=1}^{m} v_r x_{io}} \qquad \text{subject to } \frac{\sum_{r=1}^{s} u_r y_{rj}}{\sum_{i=1}^{m} v_r x_{ij}} \leq 1$$

$$j = 1, \ldots, n \qquad u_r, v_i > 0 \qquad r = 1, \ldots, s \qquad i = 1, \ldots, m$$

Here, x and y represent an input variable and an output variable, respectively. It is assumed that there are m x's and s y's; thus DEA makes it possible to use *multiple* input and output measures. The inputs, x's, are the antecedents to produce the outputs, y's. The discrepancies in the outputs which the same amounts of inputs were used to produce are the differences of the efficiencies between DMUs from 1 through n in the above. Analogous to microeconomical production, both inputs and outputs have non-negative values.

The n constraints in the above formula limit the maximum efficiency of each DMU to 1, which is the case of the best relative efficiency, making it easy to interpret the efficiency values. As shown in the objective function, DEA provides one single measure (i.e., h_o) of how efficiently inputs are utilized to attain a level of output, which makes comparisons of performances of DMUs, and resource allocation decisions among DMUs, faster and easier.

DEA APPLICATION

All variables were measured at the state level for all states of the United States for franchises and non-franchises in the refreshment place industry. State level analysis was considered appropriate in evaluating DMUs since each state had exhibited different levels of impact of laws, regulations, and political environment on the processes of competition (Boeker 1991). Data from Census of Retail Trade in 1987, published by U.S. Department of Commerce, Bureau of the Census were used. All dollar variables were converted into 1982 constant dollars. The output measure was:

OUTPUT = Carrying capacity as measured by sales volume ($000). This capacity was assumed as a function of organizational efforts, competition, and environmental factors.

There were five input measures, all of which are assumed to have positive impact on the above output:

INPUT1 = Organizational efforts as measured by the number of establishments. It was predicted that the more firms of an organizational form, the more output.

INPUT2 = Organizational experience as measured by sales volume at the previous time period, that is, 5 years ago ($000). Greater experience would make today's activity easier.

INPUT3 = Competition power index as measured by proportion of an organization among the number of total establishments within an environment, that is, at the state level (unit: %). The higher the index, the more dominant and popular in a given environment the organization form.

INPUT4 = Population density as measured by number of people per firm of total organizations. At the state level, the same density was applied to all the populations since they compete in the same external environment which they cannot control. High density means loose limits in sharing resources.

INPUT5 = Total demand as measured by total U.S. retail sales multiplied by the Buying Power Index (BPI) in 1987 ($000). The U.S. retail sales were provided by the Census of Retail Trade, and the BPI was published by Sales and Marketing Management. A state had the same level of demand as in INPUT4. The prediction was that high demand would bring out high sales.

This database has previously been used by Pilling, Henson and Yoo (1995) to measure environmental responsiveness of franchises. A constant returns-to-scale type of envelopment surface was used. For example, for every one establishment (INPUT1) added, a constant increase in sales (OUTPUT) is assumed. Input orientation was used, so efficiency scores in the results were input efficiency values. After missing data were eliminated, 48 state observations for each population in the refreshment place industry of 1987 were used. Input and output observations are exhibited in Tables 1 and 2. Program IDEAS (1 Consulting 1993) was used for DEA analysis of the data. The results of efficiency evaluation are shown in Table 3.

Results: The findings in Table 3 show that from an efficiency perspective (through DEA analysis), franchises were superior to non-franchises in many ways. First, the mean of relative efficiency scores of franchises (0.87) was higher than that of non-franchises (0.79). Second, in 32 of 48 states, franchises showed higher or identical efficiency scores than non-franchises. Third, efficiency scores ranged from 0.62 (Oklahoma) to 1 for franchises, while from 0.15 (California) to 1 for non-franchises. Finally, in 11 states, franchises operated with perfect efficiency, that is, with efficiency score of 1, while only in 6 states did non-franchises do so.

In the above analysis, an organizational form of each state is evaluated in comparison with the same organizational forms of other states. For example, the franchises of Michigan are compared with the same form (i.e., franchises) in 47 other states in terms of their five different input variables and one output variable. In Table 3, the efficiency score of Alabama franchises is 1.00, that is, perfect efficiency, which can be achieved only when the given inputs are not wasted at all to produce the same amount of output in comparison with other states.

In a second DEA analysis, data from both organizational forms (franchises and non-franchises) were pooled. Once again, as reported in Table 4, the average efficiency for franchises was 0.87 compared to 0.70 for non-franchises. Overall 9 of the franchises had perfect efficiency ($h_o = 1$), while only 5 of the non-franchises had perfect efficiency. In 40 of 48 states, franchises showed higher or identical efficiency scores than non-franchises. Because the non-franchises operate less efficiently than the franchises, their efficiency scores become lower when the non-franchises were evaluated together with the franchises than when they were evaluated by themselves only.

Statistically, DEA provides slack and excess estimates on all variables for each DMU (here an organizational form, franchises or non-franchises, of each state). Slack is the amount of additional output which needs to be produced to make a DMU efficient, while excess is the amount of input which needs to be curtailed from the current level to make a DMU efficient. In this study which used an input orientation perspective, DEA analysis reports excess of each input variable for a DMU. The new value of an input variable is equal to the relative efficiency score multiplied by the current value of the variable minus the excess value for the variable (Mahajan 1991).

TABLE 1. Franchises' Output and Input Data

State	Current Sales OUTPUT	Number of Firms INPUT1	Past Sales INPUT2	% of Firms INPUT3	Population Density INPUT4	Total Demand INPUT5
Alabama	536936	978	271512	44.495	1882.21	19059026
Arizona	300290	668	162921	33.501	1725.72	18497647
Arkansas	250236	548	181340	39.283	1734.76	11364094
California	2568579	4998	1575471	29.894	1671.09	174757422
Colorado	367070	746	274748	37.450	1679.86	19339019
Connecticut	239991	457	141304	28.887	2049.62	23271458
Delaware	71269	124	36205	33.333	1727.15	3866968
Washington, DC	22854	49	27301	12.374	1573.99	3919902
Florida	1114618	2205	805596	31.290	1726.11	71155833
Georgia	641318	1181	354740	29.673	1581.71	33631199
Hawaii	68171	125	62960	17.361	1512.22	6428695
Idaho	100409	243	70741	41.610	1770.38	4826745
Illinois	889193	1738	735325	28.010	1878.74	68273716
Indiana	754981	1580	461796	43.950	1549.60	29860348
Iowa	282167	646	189867	42.472	1880.80	15228276
Kansas	284380	650	241750	38.690	1485.11	13966218
Kentucky	505641	1004	315707	49.047	1842.45	18387600
Louisiana	318722	720	307221	32.698	2051.68	21751695
Maine	76593	161	38106	22.676	1678.59	6815949
Maryland	322443	610	180317	23.256	1739.45	28474313
Michigan	816937	1483	497817	31.493	1967.06	51720697
Minnesota	316849	741	197594	33.898	1963.54	25387425
Mississippi	312746	741	165323	55.756	2013.69	11407277
Missouri	542726	1072	312672	34.282	1654.49	28251433
Montana	78856	260	60534	47.187	1510.16	4151140
Nebraska	151628	420	108260	42.339	1629.83	8817690
Nevada	118129	219	47466	35.096	1645.35	6289395
New Hampshire	81800	109	56565	18.412	1790.70	7176736
New Jersey	460303	659	245633	17.912	2100.73	51547965
New Mexico	174864	405	126975	41.327	1556.12	7338324
North Carolina	807452	1470	437157	38.492	1685.41	33053104
North Dakota	81418	211	66359	53.015	1744.47	3786174
Ohio	1045522	2087	760478	33.001	1713.29	59372446
Oklahoma	276580	881	230203	36.602	1389.44	16729930
Oregon	279604	639	195229	36.535	1565.69	14123627
Pennsylvania	769501	1388	507067	24.385	2103.54	66946187
Rhode Island	67314	110	41427	18.550	1669.47	5853386
South Carolina	400297	720	203726	38.380	1843.49	16617097
South Dakota	76371	195	50706	45.882	1698.58	3684485
Tennessee	621892	1181	329535	41.064	1703.58	24913805
Texas	1383778	3562	1066621	32.736	1552.06	91201103
Utah	178190	390	127685	40.000	1756.30	7784084
Vermont	36675	38	23278	13.058	1891.06	3203900
Virginia	625992	1025	419970	31.922	1850.88	35152355
Washington	351695	811	280433	29.827	1673.00	26131287
West Virginia	206448	468	81986	45.217	1869.17	9074002
Wisconsin	411585	865	219044	36.824	2059.00	26163326
Wyoming	51828	131	54289	42.395	1619.41	2901619

TABLE 2. Non-Franchises' Output and Input Data

State	Current Sales OUTPUT	Number of Firms INPUT1	Past Sales INPUT2	% of Firms INPUT3	Population Density INPUT4	Total Demand INPUT5
Alabama	405519	1220	331426	55.505	1882.21	19059026
Arizona	431728	1326	305694	66.499	1725.72	18497647
Arkansas	179039	847	166061	60.717	1734.76	11364094
California	3766621	11721	2918393	70.106	1671.09	174757422
Colorado	329058	1246	269498	62.550	1679.86	19339019
Connecticut	293047	1125	262683	71.113	2049.62	23271458
Delaware	81128	248	68204	66.667	1727.15	3866968
Washington, DC	145110	347	104817	87.626	1573.99	3919902
Florida	1651195	4842	1084124	68.710	1726.11	71155833
Georgia	1055371	2799	755174	70.327	1581.71	33631199
Hawaii	305416	595	208211	82.639	1512.22	6428695
Idaho	58771	341	54624	58.390	1770.38	4826745
Illinois	1425615	4467	1095300	71.990	1878.74	68273716
Indiana	637278	2015	541521	56.050	1549.60	29860348
Iowa	194014	875	229227	57.528	1880.80	15228276
Kansas	277678	1030	206955	61.310	1485.12	13966218
Kentucky	361378	1043	344077	50.953	1842.45	18387600
Louisiana	482511	1482	423692	67.302	2051.68	21751695
Maine	133593	549	107817	77.324	1678.59	6815949
Maryland	718785	2013	555474	76.744	1739.46	28474313
Michigan	1040327	3226	828031	68.507	1967.06	51720697
Minnesota	446098	1445	328718	66.102	1963.54	25387425
Mississippi	134994	588	147670	44.244	2013.69	11407277
Missouri	659928	2055	530698	65.718	1654.49	28251433
Montana	52246	291	53286	52.813	1510.16	4151140
Nebraska	154460	572	133770	57.661	1629.84	8817690
Nevada	129263	405	117716	64.904	1645.35	6289395
New Hampshire	116088	483	63006	81.588	1790.71	7176736
New Jersey	696142	3020	587999	82.088	2100.73	51547965
New Mexico	133633	575	116081	58.673	1556.12	7338324
North Carolina	810247	2349	654966	61.508	1685.42	33053104
North Dakota	40630	187	28152	46.985	1744.47	3786174
Ohio	1469323	4237	1109270	66.999	1713.30	59372446
Oklahoma	404019	1526	441656	63.398	1389.45	16729930
Oregon	268501	1110	249037	63.465	1565.69	14123627
Pennsylvania	1047376	4304	909960	75.615	2103.55	66946187
Rhode Island	104109	483	69410	81.450	1669.48	5853386
South Carolina	373862	1156	340718	61.620	1843.50	16617097
South Dakota	28609	230	27565	54.118	1698.59	3684485
Tennessee	533077	1695	441248	58.936	1703.58	24913805
Texas	2344878	7319	1933244	67.264	1552.06	91201103
Utah	152504	585	93250	60.000	1756.31	7784084
Vermont	43786	253	31174	86.942	1891.07	3203900
Virginia	727876	2186	528480	68.078	1850.89	35152355
Washington	545745	1908	410287	70.173	1673.00	26131287
West Virginia	159355	567	191097	54.783	1869.18	9074002
Wisconsin	424093	1484	398870	63.176	2059.00	26163326
Wyoming	34892	178	37980	57.605	1619.42	2901619

TABLE 3. Efficiency Scores (Individual Analysis)

State	Franchises	Non-Franchises	Difference
Alabama*	**1.00**	0.84	**0.16**
Arizona	0.90	0.93	−0.03
Arkansas*	0.82	0.69	**0.13**
California*	**1.00**	0.15	**0.85**
Colorado*	0.85	0.79	**0.06**
Connecticut*	0.85	0.73	**0.12**
Delaware*	0.95	0.78	**0.17**
Washington, DC	0.54	0.92	−0.38
Florida	0.94	**1.00**	−0.06
Georgia	0.98	**1.00**	−0.02
Hawaii	0.78	**1.00**	−0.22
Idaho*	0.74	0.62	**0.12**
Illinois	0.91	0.92	−0.01
Indiana*	**1.00**	0.84	**0.16**
Iowa*	0.77	0.56	**0.21**
Kansas	0.78	0.86	−0.08
Kentucky*	0.99	0.85	**0.14**
Louisiana	0.74	0.81	−0.07
Maine*	0.85	0.77	**0.08**
Maryland*	0.92	0.91	**0.01**
Michigan*	0.97	0.88	**0.09**
Minnesota	0.80	0.88	−0.08
Mississippi*	**1.00**	0.60	**0.40**
Missouri*	0.92	0.86	**0.06**
Montana*	0.69	0.59	**0.10**
Nebraska	0.67	0.74	−0.07
Nevada*	**1.00**	0.72	**0.28**
New Hampshire	**1.00**	**1.00**	0.00
New Jersey*	**1.00**	0.77	**0.23**
New Mexico*	0.88	0.73	**0.15**
North Carolina*	**1.00**	0.91	**0.09**
North Dakota	0.72	0.83	−0.11
Ohio	0.96	**1.00**	−0.04
Oklahoma	0.62	0.70	−0.08
Oregon*	0.78	0.71	**0.07**
Pennsylvania*	0.94	0.75	**0.19**
Rhode Island	0.87	0.87	0.00
South Carolina*	0.99	0.78	**0.21**
South Dakota*	0.72	0.56	**0.16**
Tennessee*	0.99	0.83	**0.16**
Texas	0.92	**1.00**	−0.08
Utah	0.82	0.98	−0.16
Vermont*	**1.00**	0.80	**0.20**
Virginia*	**1.00**	0.91	**0.09**
Washington	0.73	0.87	−0.14
West Virginia*	**1.00**	0.61	**0.39**
Wisconsin*	0.94	0.73	**0.21**
Wyoming*	0.69	0.57	**0.12**

* denotes a state where franchises showed superior efficiency.

TABLE 4. Efficiency Scores (Pooled Analysis)

State	Franchises	Non-Franchises	Difference
Alabama*	**1.00**	0.71	**0.29**
Arizona*	0.90	0.79	**0.11**
Arkansas*	0.82	0.55	**0.27**
California*	**1.00**	**1.00**	0.00
Colorado*	0.85	0.63	**0.22**
Connecticut*	0.85	0.56	**0.29**
Delaware*	0.97	0.66	**0.31**
Washington, DC	0.54	0.89	−0.35
Florida	0.94	**1.00**	−0.06
Georgia	0.98	**1.00**	−0.02
Hawaii	0.78	**1.00**	−0.22
Idaho*	0.75	0.48	**0.27**
Illinois*	0.91	0.87	**0.03**
Indiana*	0.97	0.75	**0.21**
Iowa*	0.77	0.44	**0.33**
Kansas*	0.78	0.69	**0.09**
Kentucky*	0.95	0.67	**0.28**
Louisiana*	0.74	0.71	**0.03**
Maine*	0.85	0.65	**0.20**
Maryland*	0.92	0.84	**0.08**
Michigan*	0.97	0.80	**0.17**
Minnesota*	0.80	0.70	**0.10**
Mississippi*	0.96	0.44	**0.52**
Missouri*	0.92	0.80	**0.12**
Montana*	0.66	0.47	**0.19**
Nebraska*	0.67	0.60	**0.07**
Nevada*	**1.00**	0.62	**0.38**
New Hampshire*	**1.00**	0.62	**0.38**
New Jersey*	**1.00**	0.65	**0.35**
New Mexico*	0.79	0.61	**0.18**
North Carolina*	**1.00**	0.84	**0.16**
North Dakota*	0.71	0.57	**0.14**
Ohio	0.95	0.96	−0.01
Oklahoma	0.62	0.71	−0.09
Oregon*	0.78	0.61	**0.17**
Pennsylvania*	0.94	0.70	**0.24**
Rhode Island*	0.88	0.69	**0.19**
South Carolina*	0.99	0.70	**0.29**
South Dakota*	0.75	0.41	**0.34**
Tennessee*	0.99	0.74	**0.25**
Texas	0.87	**1.00**	−0.13
Utah*	0.82	0.76	**0.06**
Vermont*	**1.00**	0.58	**0.42**
Virginia*	**1.00**	0.80	**0.20**
Washington	0.73	0.77	−0.04
West Virginia*	**1.00**	0.52	**0.48**
Wisconsin*	0.94	0.58	**0.36**
Wyoming*	0.68	0.44	**0.23**

* denotes a state where franchises showed superior efficiency.

An efficient DMU does not show any excess because every input is fully and efficiently utilized to produce output in comparison with other DMUs. For example, the California franchises whose efficiency is 1.00 when compared to other franchises do not have excess in any input variable. On the other hand, the California non-franchises whose efficiency is only 0.15, have excess in all input variables except INPUT3 (proportion of non-franchises). INPUT1 (number of firms) shows 627 in excess, while INPUT2 (past sales) 138,250, INPUT4 (population density) 7.8, and INPUT5 12,300,000 (total demand). As an illustration, for the California non-franchises, the number of firms should be reduced to 1,131 (i.e., 0.15 $\times$ 11,721 $-$ 627) from a current level of 11,721 to become efficient. Even though the California non-franchises have the largest sales volume, they do not utilize input resources efficiently, especially, in INPUTs 1, 2, 4, and 5, in comparison with the non-franchises of the other states, and hence their efficiency is only 0.15.

CONCLUSION

This research introduced the Data Envelopment Analysis method to assess the efficiency of franchising systems and confirmed within the diagnosed data sets that franchises operated more efficiently than non-franchises. While there may be other factors that influence efficiency or performance, this paper replicated Pilling, Henson, and Yoo's (1995) study. Similar to their results, franchises, populations of high responsiveness, showed an overall greater efficiency than non-franchises, populations of low responsiveness.

DEA is a mathematical technique for measuring the engineering ratio efficiency of any process or unit that is characterized by multiple inputs and outputs. DEA can be applied to other performance evaluation areas also. In particular, in evaluating performance efficiency, DEA utilizes both inputs (antecedents) and outputs (effects) simultaneously, accommodates multiple inputs and outputs, measures relative (rather than absolute) performance of the peer group, takes into account best (rather than average) performers as standards, and does not require accurate specification of *a priori* functional relationships between inputs and outputs.

The paper can be extended to integrate efficiencies between franchises versus non-franchises longitudinally. Then, we will find out how much franchises are better organizations than non-franchises in terms of ability to adapt to changes in the environment. Future franchising research should also include other potential inputs and outputs. This DEA methodology may also be used in other areas of marketing such as retailing, advertising, sales, etc.

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