

Do Mobility Barriers Affect the Strategy-Performance Relationship? A Study Based on Chinese Listed Pharmaceutical Companies

Xiao Duan
Tsinghua University

Zhan-Ming Jin
Tsinghua University

Literature shows that mobility barriers can maintain existing performance differentials across strategic groups. We propose that mobility barriers also play a moderating role in the strategy-performance relationship. Our sample contains Chinese listed pharmaceutical companies during 2010 to 2011. One of our findings is mobility barriers do not necessarily bring performance differentials. Another finding is the strategic choice between cost leadership and differentiation has opposite effects on firms on the two sides of a mobility barrier, and sales strategy also has different effects on them. Partitioned by mobility barriers, firms ought to consider their relative positions when making strategic decisions.

INTRODUCTION

A fundamental issue in strategic management and relevant fields is to find and explain the heterogeneity within industries. Many business scholars and practitioners have realized that firms in the same industry still vary in key aspects of firm strategy and in performance. But researches have not fully revealed the causes, mechanisms, and influences of the differences up to date. Resource-based view and strategic group are two typical theories aiming to describe and explain the intra-industry heterogeneity. Resource-based view explains the performance variation within industry in terms of firms' idiosyncratic resources. It assumes that resources are distributed heterogeneously across firms and cannot be transferred without cost (Barney, 1991). Resource-based view regards firms' key strategic resources as the source of sustained competitive advantages (Wernerfelt, 1984; Barney, 1991; Peteraf, 1993; Newbert, 2008). For instance, Barney (1991) specified that organizational resources that are valuable, rare, difficult to imitate and non-substitutable can yield sustained competitive advantage. Resource-based view succeeds in providing a structured conceptualization of how achieved competitive advantage can be sustained, but it has rather great difficulty in explaining where competitive advantage stems from (Priem and Butler, 2001). In other words, the value of a resource is exogenous to the resource-based view. Though resource-based view excels in enlightening managers to protect firms' existing advantages, it evades the core issue of why firms in the industry get different performances.

Strategic group theory explains the intra-industry heterogeneity from a perspective different from the resource-based view. Hunt (1972) first used the term "strategic group" to describe a structured industry where firms can be categorized into a small number of groups that differ from each other in some critical decision variables. In literature, strategic group is commonly defined as a cluster of firms carrying out

similar competitive strategies and competing with each other in an industry (Porter, 1980; Cool and Schendel, 1987). Strategic group theory attributes the intra-industry performance variation to the strategies carried out by different groups. Firms in the same strategic group would adopt similar combination of strategies, and deploy their resources in roughly the same way (Cool and Schendel, 1987); thus it is not surprising that they achieve similar profits. In contrast, firms in different strategic groups differ significantly in the combination of key strategic dimensions, such as vertical integration, operational size, scope of product or service, and special knowledge and technologies (Hunt, 1972; Newman, 1978; Thomas and Venkatraman, 1988; Mascarenhas and Aaker, 1989), and therefore their performances vary greatly. This can help to explain why firms implementing a certain pattern of strategy are more profitable than others in an industry. It is reasonable to believe that firms get high profits because they choose the correct strategies to adapt themselves to the changing environment.

Strategic group theory also gives explanation on how competitive advantages can be sustained. An intra-industry force that imposes isolation on strategic groups, namely mobility barrier, is thought to be the source of sustained advantages (Caves and Porter, 1977; Caves and Ghemawat, 1992). Mobility barriers are structural forces preventing firms in the industry from shifting from one strategic group to another (Caves and Porter, 1977; Porter, 1979). Firms from outside a strategic group have to pay much for the entry, whereas members of the group need not (McGee and Thomas, 1986). By keeping most firms staying in their current strategic groups, mobility barriers stabilize the group structure and maintain the performance differentials across strategic groups (Mehra and Floyd, 1998). Mobility barriers may originate from three broad types of factors and their interactions: characteristics of industry, e.g. the supply characteristics; firm-specific features, such as the organizational structure, control systems, management skills, etc; and the nature of firm ownership (McGee and Thomas, 1986). And finally, mobility barriers may take the form of firm-level attributes that reflect relative competitiveness, including production capacity, amount of capital, scope of products or services, leadership in technology, and the preemption of distribution channels (Caves and Porter, 1977; McGee and Thomas, 1986; Mascarenhas and Aaker, 1989). To enter target strategic groups, firms have to accumulate resources and build up competencies to cross over the barriers. Recognizing that mobility barriers widely exist in industries, it is natural to regard the group membership not as free choices by firms but as the result of long-term competitions.

Strategic group does not bear the fundamental defects in resource-based view, such as tautology, static logic, all-inclusive definition of resource, etc (Priem and Butler, 2001). In addition, strategic group theory better suits the cognition habit of managers, for in the real work they tend to categorize competitors into several classes with distinctive characteristics (Reger and Huff, 1993). Instead of seeing each firm as a unique individual, which is implicitly hold by the resource-based view, strategic group theory perceives firms in an industry in terms of clusters. Perceiving firms in terms of groups helps managers to save their time and attention which are scarce resources in the complex environment when making strategic decisions.

Though strategic group theory provides a clear description of the intra-industry heterogeneity, it still has some unclarities in the theoretical foundation. This research will give a thorough analysis on these questions and seek further clarification of some fundamental assertions in strategic group research. And we shall give advice to management practitioners on the basis of findings in this research.

THEORETICAL BACKGROUND AND RESEARCH HYPOTHESES

Performance Differences across Strategic Groups

In strategic group literature, great attention has been paid on the comparisons between strategic groups. Strategic groups are found to be different in the average firm size, vertical integration, scope of products, reputation, advertisings, R&D investment, and mobility rate of group members (hunt, 1972; Newman, 1978; Oster, 1982; Fiegenbaum and Thomas, 1993; Ferguson et al., 2000; Lee et al., 2002). Among those comparisons, the one receiving most concern is performance comparison between groups. Many empirical studies have found significant differences in financial or market performance across

strategic groups (Porter, 1979; Mascarenhas and Aaker, 1989; Fiegenbaum and Thomas, 1990; Mehra, 1996; Nair and Kotha, 2001). However, there are also studies that didn't find such differences (Cool and Schendel, 1987; Mehra, 1996; Guedri, 1998). McNamara et al. (2003) even found that performance differences within groups are larger than between groups, suggesting that some firms developed much stronger competences than others in the same group. From those testing results, we may get an impression that the performance differences across groups appear to be accidentally and unpredictably. Whether significant differences necessarily exist between strategic groups is still unknown.

Moreover, the methodologies used in strategic group researches have some defects. While performance differences are found across strategic groups in some industries, a simple ANOVA test can not reveal the causality between group membership and firm performance, because it cannot offer a clear logic and lacks basic control variables. Perhaps for the same reason, we could not find out why previous testing results of performance comparison are so inconsistent. Actually, it is quite difficult to regard either the studies having found performance differences or those having not as erroneous, as most of them followed similar research designs and were rigorously conducted. Thus, an inference can be preliminarily drawn that a universally correct relationship between group membership and firm performance may not exist. On the other hand, as strategic group theory can contribute to the understanding of industry environment and firms' decision-making, predicting performance difference is not absolutely essential in strategic group theory (Reger and Huff, 1993).

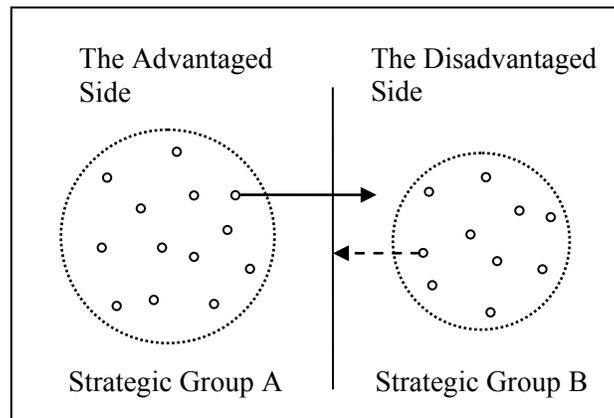
The Separation Effect of Mobility Barriers

As analyzed above, previous studies have obtained inconsistent results in performance comparison between strategic groups. Having noticed that some unprotected strategic groups may be stable only in short terms and their performances are also unstable (Mehra and Floyed, 1998), we should take mobility barriers into consideration to get a clearer picture of that question. Mascarenhas and Aaker (1989) also mentioned that mobility barriers were more closely related with firm performance than some generic strategic variables.

One mobility barrier typically separates all firms in the industry into two groups with asymmetrical positions (Harrigan, 1985). The asymmetry means that firms face differing levels of difficulties when moving across groups in opposite directions. For instance, if firms' operational size is one of the mobility barriers in an industry, moving from the group whose members have a greater size into the group whose members are averagely smaller would be much easier than moving reversely. There might be no incentives for a large firm to move into the small-sized group, as firms usually seek the opportunity of growth. But as far as the difficulty of shifting is concerned, members of the large group face much less serious impediments when shifting to the other side. In this sense, mobility barrier acts as a protection against entry by potential movers for firms on the advantaged side (Caves and Porter, 1977). When more than one kind of mobility barrier is considered, it is more difficult to enter a group protected by higher mobility barriers than to enter a group protected by lower barriers (Hatten and Hatten, 1987). Firms in well protected strategic groups are in dominant positions in the competition, and firms in poorly protected strategic groups are more vulnerable to external entrants.

Figure 1 shows the relative positions of strategic groups separated by a mobility barrier. In this figure, hollow points represent firms in the industry, two circles wherein firms spread stand for the boundary of two strategic groups. The line in the middle denotes any kind of mobility barriers, for instance, the firm size, technologic leadership, special sources of funds, or whatever plays a role of barrier to mobility. Strategic group A is on the advantaged side and its members could shift to the other side of the mobility barrier easily, though they generally lack the incentives to do so. Strategic group B is on the disadvantaged side, and its members need to make much greater effort to move to the other side.

FIGURE 1
SEPARATION EFFECT OF MOBILITY BARRIERS



Mobility Barriers and Firm Performance

As an intra-industry structural force, mobility barriers have been explicitly thought of as the factors associated with sustained profit differentials within industry (Porter, 1979; Caves and Ghemawat, 1992). Porter (1979) noted that the height of mobility barriers protecting a particular strategic group determines the potential profitability of the group. The relationship between mobility barriers and sustained performance differentials is summarized as below.

Firms in an industry may earn different levels of profits due to many reasons. For instance, a crucial reason is they implement different competitive strategies. If mobility barriers do not exist, firms in the high performing groups would be easily imitated by potential entrants, thus the performance differences within the industry cannot last for long. In fact, mobility barriers exist in most industries. Strategic groups protected by mobility barriers are shielded from entry. The higher the mobility barriers protecting a strategic group are, the more completely the entry is deterred, and the less intense the intra-group rivalry will be. Therefore, the high profits are less likely to be competed away in groups that are well protected.

Though this relationship seems quite logical, some questions about mobility barriers and firm performance remain unsettled. Strategic group theory implicitly attributes the initial performance differences to the strategies employed by firms, but it doesn't predict that intra-industry performance differences are certain to occur. In other words, we have not yet known whether mobility barriers play a role in deciding or influencing firm performance. The only thing that is commonly accepted about mobility barriers is they are capable of sustaining competitive advantages and above-average profits. However, sustaining existing advantages is different from producing advantages.

We plan to explore the role of mobility barriers by asking two questions:

Question 1: Do mobility barriers directly determine firm performance? In other words, do firms on advantaged and disadvantaged sides of a mobility barrier necessarily have different levels of profitability?

Question 2: Do mobility barriers influence the relationship between strategies and firm performance? In other words, do the effects of carrying out certain strategies depend partly on the positions where firms stand?

Before testing empirically, we give analyses and propose hypotheses on the basis of previous studies on strategic group.

Mobility Barriers and Performance Difference

For Question 1, we are inclined to think that groups partitioned by a certain mobility barrier do not necessarily differ in performance. A high mobility barrier is able to protect group members from entry by firms from the outside (Caves and Porter, 1977; Harrigan, 1985), thus the high profits of those members are probably to last. But what if a well protected strategic group is enduring a low profit rate? That is possible since mobility barrier is not the guarantee of success. Many other factors could influence firm performance, such as the ability to organize and manage operations, develop creative advertisements, make technological breakthroughs, etc (Porter, 1979). We can further illustrate this in Figure 1. When the average profitability of strategic group A is higher than that of strategic group B, members of group B couldn't easily move into group A, and therefore the high profitability of strategic group A is likely to continue. Nevertheless, when the average profitability of strategic group A is lower than or equals to that of strategic group B, members of group A would probably not move to group B for higher profits. The first reason is that the average profitability of strategic groups may experience periodic fluctuations. Most managers would not impetuously change firm strategies when facing slow growth. Secondly, some irrational factors, for instance, firm owners' ideological persistence, will complicate the strategic decision-making and hinder the strategic transformation. Many firms in well protected strategic group would not shift rashly to other groups when suffering from low profit rates for a short period. Then we propose:

Hypothesis 1: Performance differences do not necessarily exist between the advantaged side and disadvantaged side of a mobility barrier.

Different Effects of the Same Strategy

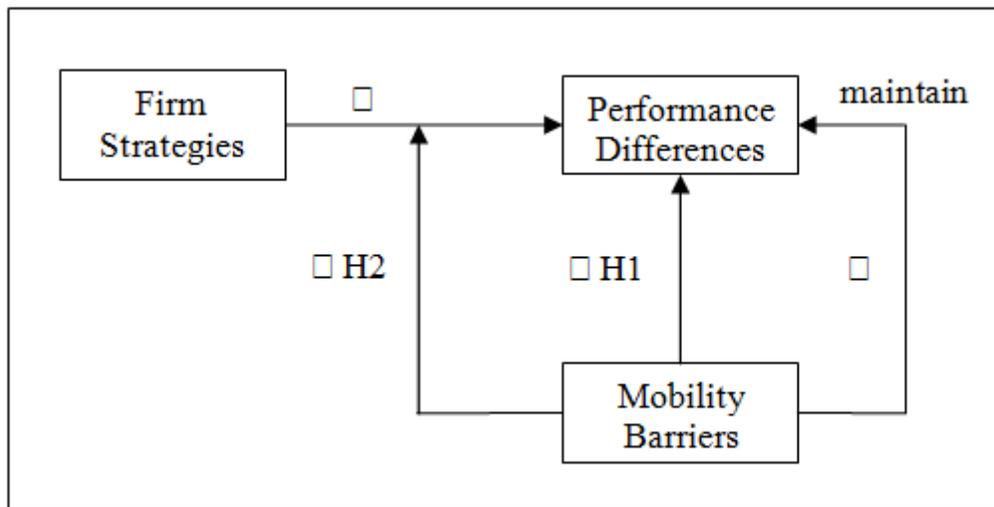
The protection provided by mobility barriers is thought to act as the foundation of maintaining the differentials in firms' relative positions (Porter, 1979). From the perspective of strategic group, the rivalry within an industry can be divided into intra-group and inter-group rivalries. Members of the same strategic group are similar in product scope and resource deployment, so they tend to aim at the same market segments (Caves and Porter, 1977; Cool and Schendel, 1987). But firms do not only participate in intra-group rivalry. They will judge independently where to compete according to specific industry environment. Cool and Diericks (1993) found that the inter-group rivalry played a key role in affecting firm profitability and held an increasing proportion to industrial competitions.

When members of different strategic groups compete for the same market segment, the effects of carrying out a certain strategy by firms may vary. For instance, the outcome of the choice between cost-leadership and differentiation strategies by a firm may be influenced by firms from other groups. In a market where products with high quality and distinctive features sell well, the optimal competitive strategy would be differentiation if there is only one strategic group in the industry. But in most industries, firms are partitioned by mobility barriers into strategic groups with asymmetric competitive positions. Strategic groups vary in capabilities of product design, manufacturing, advertising, and marketing. As a result of competition, only a few advantaged groups could benefit from adopting the differentiation strategy. Other strategic groups may have to choose the cost-leadership strategy, because group members who insist on differentiating products would be beaten in the markets by advantaged groups that adopt differentiation strategy and thus suffer great loss. We can see that whether a certain strategy brings benefit to a firm is practically determined by the strategic choices of advantaged groups. Given that most firms are rational, members of the advantaged groups, which are protected by important mobility barriers, will choose the most favorable strategy. Firms from disadvantaged groups may confront more inter-group rivalry if they also adopt that strategy. Under the partition of mobility barriers, the adoption of a certain strategy could show very dissimilar or even opposite effects on firms from different strategic groups. Hypothesis 2 is proposed based on above analyses:

Hypothesis 2: Under the partition of mobility barriers, the same strategy may show significant different effects on firm performance across strategic groups in the industry.

The relationships between mobility barriers, firm strategy and performance difference are summarized in Figure 2. The four relations mentioned in our study are represented by arrows and marked with numbers in the circle. Relation 1 denotes that the formulation and implementation of strategies cause performance differences. Relation 2 implies that mobility barriers maintain the achieved competitive advantages and hence the differences in performance. Relation 1 and 2 have been commonly recognized by studies on strategic group. Relation 3 and 4 are our research hypotheses. Relation 3 tests whether mobility barriers directly cause performance differences. Relation 4 tests whether the effects of firm strategies on performance is influenced by mobility barriers.

FIGURE 2
RELATIONSHIPS BETWEEN FIRM STRATEGY, MOBILITY BARRIERS AND PERFORMANCE



METHOD

Sample and Data

Our sample contains Chinese listed pharmaceutical companies from 2010 to 2011 (on Shenzhen Stock Exchange and Shanghai Stock Exchange). We do not use the data before 2010, because many pharmaceutical companies were listed in 2009 and they were not included in databases. Companies that focus on veterinary products, which are very different from medicines used for human in many aspects, are not our target firms and hence excluded. The data are mainly acquired from two Chinese financial databases: CSMAR Solution and WIND financial database. Other data are collected by authors from annual reports. We collect the sample from only one industry because mobility barriers might be industry-specific (Mascarenhas and Aaker, 1989; Fiegenbaum and Thomas, 1990; McGee and Thomas, 1986). Though multi-industry studies can provide larger numbers of observations, the meanings and relative importance of critical strategic variables in different industries are unlikely to be identical. Actually, almost all strategic group studies are single-industry based.

Measurement

1. *Cost Leadership or Differentiation (CoDStr)*. This independent variable is measured by the ratio of cost of sales to administrative expense. This measure is not comparable across industries, but in a single-industry context, it reflects the inclination of the firm's choice between cost leadership and differentiation strategy. Generally, a greater value of *CoDStr* indicates that a firm spends more on the material and

manufacturing rather than office management, consultation, and R&D, thus the firm is more likely to be implementing the cost leadership strategy.

2. *Sales strategy (SalStr)*. This is another independent variable in our study. It is measured by the ratio of selling expense to sales revenue of the firm. A greater value of *SalStr* implies that the firm sells its products more aggressively.

3. *Firm performance*. We use return on equity (ROE) as the indicator of firm performance, which is the dependent variable in this study. Return on equity is one of the most commonly used financial indicators in firm studies.

4. *Mobility barriers*. We refer to the literature in strategic group research to identify potential mobility barriers (e.g. Porter, 1979; Cool and Schendel, 1987; Bogner et al., 1996; Leask and Parker, 2007).

(1) *Ownership barrier*. Institutional environment can affect the rules of competition and the formation of strategic groups (Tywoniak et al., 2007). In China, companies' ownership type might have particular influences (Peng et al., 2004). A dummy variable *Own* is set to indicate the ownership type. *Own* equals to 1 when the firm is ultimately controlled by Chinese government or institutions, and equals to 0 when the firm is ultimately controlled by individuals.

(2) *Firm size barrier*. The operating size of firms is thought to be of great importance in many strategic group studies (Porter, 1979; Cool and Schendel, 1987; Guedri, 1998; Leask and Parker, 2007). The natural logarithm of total assets is used as the indicator of firm size. We calculate the average size for each company over the two years. Then the company will be categorized into the *Large_Size* group if its size is larger than the median value of all companies in our sample, and into the *Small_Size* group if its size is smaller than the median value.

(3) *R&D barrier*. Technological capacity is of special importance to pharmaceutical companies. Long-term investment in R&D can improve firms' dynamic capabilities and act as a mobility barrier in the emergence of strategic groups (Lee et al., 2002). The investment in R&D is measured by the ratio of R&D expense to sales revenue over the year. The company will be categorized into the *High_R&D* group if its R&D investment is larger than the median value of all companies in the sample, and into the *Low_R&D* group if its R&D investment is smaller than the median value.

(4) *Foreign sales barrier*. Chinese pharmaceutical companies are making great efforts to expand foreign sales, which reflect the ability of internationalization. But it is not easy for many of them to increase foreign sales due to disadvantages in scientific research, manufacturing technologies, marketing channels, and the number and quality of patents. The barrier of foreign sales is measured by the proportion of sales from foreign markets in total sales of the company. The company will be categorized into the *High_FRS* group if its foreign sales proportion is larger than the median value of all companies in the sample, and into the *Low_FRS* group if its foreign sales proportion is smaller than the median value.

5. *Control variables*. (1) *Time period*. The dummy variable *Year2011* equals to 1 when the data is from the year of 2011, to 0 when the data is from 2010. (2) *Ownership concentration*. *OwnCon* equals to the sum of stocks shares held by ten largest shareholders of the company. A greater value of *OwnCon* means the company's ownership is more concentrated. (3) *Corporate diversification*. The variable *Diver* measures the proportion of sales in industries other than pharmaceutical industry in the total sales. A greater value of *Diver* means the company is more diversified. The natural logarithm of *Diver* will be used in regressions because it is rather right-skewed in our sample. (4) *Debt to assets ratio*. *DAR* is the ratio of amount of debt to the total assets. (5) *Current ratio*. *CR* measures the ratio of current assets to current liabilities. (6) *Inventory turnover*. *ITO* is a ratio of the costs of goods sold to the average inventory of the company, showing how many times a company's inventory is sold and replaced over a year. (7) *Accounts receivable turnover*. *ARTO* is the ratio of net credit sales to the average accounts receivable. (8) *Assets structure*. *NCAP* is the proportion of a firm's noncurrent assets in its total assets.

Models

To test Hypothesis 1, we will conduct two mean-comparison tests: an independent-sample t-test and a nonparametric test. Return on equity (ROE) is the indicator of firm performance. To test Hypothesis 2, we choose the fixed-effect model regression because the sample contains two-year panel data where the

individual-specific effects among firms ought not to be ignored. The F-test also rejects the null hypothesis that all individual-specific effects are insignificant ($P < 0.001$), indicating that pooled OLS should not be used here. Variables relating to mobility barriers are constant during the two years in our research so that their coefficients won't be estimated if they are set in the fixed-effect regressions as dummy variables. Therefore, for each kind of mobility barrier, observations will be divided into two groups and put into the regression respectively to see whether their coefficients are different. Clustered robust standard error is used to get more robust statistical inferences.

Results

Descriptive statistics and correlation coefficients are shown in Table 1.

TABLE 1
DESCRIPTIVE STATISTICS AND CORRELATION COEFFICIENTS (OBS = 182)

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. ROE	0.1334	0.0801	1										
2. Year2011	0.5000	0.5000	-0.1307	1									
3. OwnCon	0.5795	0.1684	0.2052	-0.0644	1								
4. Diver	-3.4311	1.2074	0.0024	0.0410	-0.2229	1							
5. DAR	0.3386	0.1971	0.0478	-0.0457	-0.3685	0.3059	1						
6. CR	4.8870	7.5004	-0.0570	-0.0682	0.3530	-0.1808	-0.5223	1					
7. ITO	3.6630	2.0681	0.0194	-0.0446	0.0094	0.0156	0.3176	-0.0943	1				
8. ARTO	11.949 0	23.245 4	0.0717	-0.0377	0.0736	0.1340	-0.0414	0.0306	0.1640	1			
9. NCAP	0.3915	0.1528	-0.1141	-0.0316	-0.4494	0.1802	0.2642	-0.4184	-0.0068	-0.0226	1		
10. CoDStr	7.6101	6.9213	0.0284	0.0376	-0.0656	0.2814	0.5430	-0.2191	0.4935	0.0910	-0.1484	1	
11. SalStr	0.1832	0.1300	-0.0061	0.0155	0.0933	-0.1900	-0.3766	0.1380	-0.1224	0.0134	-0.2148	-0.4129	1

Table 2 shows the results of performance comparisons between groups on different sides of mobility barriers. As these results indicate, only one out of four kinds of mobility barriers significantly brings performance differential. The average ROE of the *Large_Size* group (0.1483) is significantly higher than that of the *Small_Size* group (0.1183) at $P < 0.05$ in the t-test and at $P < 0.01$ in the Mann-Whitney test. No significant performance difference is found between *Own = 1* and *Own = 0*, *High_R&D* and *Low_R&D*, *High_FRS* and *Low_FRS* groups. Thus, it can be drawn that mobility barriers do not necessarily lead to performance differentials. Hypothesis 1 is supported.

TABLE 2
PERFORMANCE COMPARISON BETWEEN GROUPS

Groups	ROE	Independent- sample T-test	Mann-Whitney Test
Own = 1	0.1237		
Own = 0	0.1407	—	—
Large_Size	0.1483		
Small_Size	0.1183	P < 0.05	P < 0.01
High_R&D	0.1313		
Low_R&D	0.1357	—	—
High_FRS	0.1395		
Low_FRS	0.1272	—	—

Note: “—” indicates that no significant result is found.

Regression results of Hypothesis 2 are listed in Table 3. Competitive strategies show different effects on performance across strategic groups that are partitioned by four mobility barriers. For companies ultimately controlled by government or institution (*Own = 1*), *CoDStr* has a significant negative impact on firm performance (-0.0105), significant at $P < 0.05$. For individual-owned companies (*Own = 0*), *CoDStr* has a significant positive impact (0.0052), significant at $P < 0.05$. The opposite results suggest that companies must consider their ownership types when making strategic decisions. Cost leadership strategy is more beneficial to individual-owned companies, whereas the differentiation strategy is more suitable for government or institution owned companies. For companies controlled by government or institution (*Own = 1*), *SalStr* does not have any significant effect. For individual-owned companies (*Own = 0*), *SalStr* has a negative effect (-0.3751), significant at $P < 0.1$. This indicates that in general individual-owned companies could increase their profitability by cutting down selling expense. But there is no significant effect when government or institution owned companies do so.

For companies in the large-sized group (*Large_Size*), *CoDStr* has a negative effect (-0.0062), significant at $P < 0.1$. For relatively small companies (*Small_Size*), *CoDStr* has a positive effect (0.0067), also significant at $P < 0.1$. The opposite results reveal how firm-size barrier influence the effect of competitive strategies. Firms protected by size barrier should choose differentiation strategy for better performance, while those without this protection had better choose cost leadership strategy. It is clear that firms must consider the positions where they stand when formulating strategies. For companies protected by size barrier (*Large_Size*), *SalStr* has a negative effect (-1.1240), significant at $P < 0.01$. For companies without this protection, the regression coefficient of *SalStr* has a much smaller absolute value (-0.1814) and is insignificant. We can see that companies in the *Large_Size* group could reduce the investment in promotion or advertisings to increase their profitability, whereas companies in the *Small_Size* group cannot improve performance by doing that.

TABLE 3
REGRESSION RESULTS (ROE AS THE INDICATOR OF DEPENDENT VARIABLE)

Groups	Own = 1	Own = 0	Large Size	Small Size	High R&D	Low R&D	High FRS	Low FRS	All
Intercepts	0.5296 [*] (0.2423)	0.1145 (0.1642)	0.6553 [*] (0.3081)	-0.2320 ^{**} (0.0848)	-0.0036 (0.1039)	1.0072 ^{**} (0.3341)	0.6549 [*] (0.2813)	0.0092 (0.1035)	0.0958 (0.0627)
Year2011	-0.0143 (0.0111)	-0.0096 (0.0080)	-0.0367 ^{**} (0.0132)	0.0117 [*] (0.0048)	-0.0105 (0.0070)	-0.0428 [*] (0.0175)	-0.0296 [*] (0.0123)	0.0007 (0.0082)	-0.0071 [†] (0.0038)
OwnCon	-0.2003 (0.1248)	-0.0360 (0.1980)	-0.3586 [†] (0.1880)	0.4019 ^{**} (0.1412)	0.0269 (0.0972)	-0.5903 [*] (0.2922)	-0.6400 [†] (0.3218)	0.1105 (0.0969)	0.0181 (0.0535)
Diver	0.0142 (0.0140)	0.0136 (0.0111)	0.0270 (0.0181)	0.0054 (0.0115)	0.0090 (0.0139)	0.0059 (0.0150)	0.0263 (0.0173)	0.0009 (0.0096)	0.0030 (0.0053)
DAR	0.0708 (0.1925)	0.0156 (0.1075)	0.2101 (0.1639)	0.1659 [*] (0.0793)	0.1196 (0.0986)	-0.0801 (0.1898)	0.0266 (0.1406)	0.1621 (0.1325)	-0.0048 (0.0424)
CR	0.0010 (0.0034)	-0.0014 (0.0010)	0.0038 (0.0057)	0.0012 (0.0009)	0.0018 (0.0020)	-0.0003 (0.0008)	0.0016 (0.0034)	0.0003 (0.0013)	0.0006 (0.0009)
ITO	-0.0149 (0.0173)	0.0213 [*] (0.0098)	0.0070 (0.0181)	-0.0055 (0.0051)	-0.0034 (0.0091)	0.0043 (0.0108)	0.0043 (0.0122)	-0.0107 (0.0086)	0.0007 (0.0033)
ARTO	0.0009 [†] (0.0005)	0.0045 [*] (0.0021)	0.0012 [*] (0.0004)	0.0052 ^{***} (0.0014)	0.0022 (0.0027)	0.0016 ^{***} (0.0004)	0.0022 (0.0030)	0.0014 ^{***} (0.0002)	0.0007 [*] (0.0003)
NCAP	-0.2001 (0.3339)	0.1008 (0.1075)	-0.2798 (0.2691)	0.1343 (0.0916)	0.1501 (0.1029)	-0.6334 [*] (0.2375)	0.0233 (0.1937)	0.1171 (0.1301)	0.1171 [*] (0.0529)
CoDStr	-0.0105 [*] (0.0048)	0.0052 [*] (0.0025)	-0.0062 [†] (0.0035)	0.0067 [†] (0.0035)	0.0102 [†] (0.0058)	-0.0052 (0.0034)	-0.0055 [†] (0.0029)	0.0098 ^{**} (0.0018)	-0.0005 (0.0012)
SalStr	-0.3721 (0.4802)	-0.3751 [†] (0.2150)	-1.1240 ^{**} (0.4237)	-0.1814 (0.1356)	-0.0277 (0.2816)	-1.0283 ^{**} (0.3333)	-0.3657 (0.3884)	-0.3765 [†] (0.1937)	-0.3124 [*] (0.1319)
R ² -within	0.3277	0.5443	0.4391	0.5982	0.4179	0.4157	0.4016	0.4739	0.3202
Obs	78	104	92	90	92	90	92	90	182

Note:

1. Clustered robust standard errors of coefficients are given in parentheses.
2. Significance levels: *** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1.

For companies protected by the R&D barrier (*High_R&D*), *CoDStr* has a positive effect on firm performance (0.0102), significant at P < 0.1. For companies without this protection (*Low_R&D*), the regression coefficient of *CoDStr* is negative (-0.0052) and insignificant. Results suggest that the choice between cost leadership and differentiation strategies should be based on the companies' relative R&D competencies. For companies protected by the R&D barrier (*High_R&D*), *SalStr* shows a rather tiny and insignificant impact. But *SalStr* has a negative effect on performance for companies in the *Low_R&D* group (-1.0283), and the coefficient is significant at P < 0.01. Companies that are weak in technology could improve their performance by cutting down selling expense, whereas companies with high technological ability will not gain from that action.

For companies protected by the internationalization barrier (*High_FRS*), *CoDStr* has a negative effect on firm performance (-0.0055), significant at $P < 0.1$. For companies without this protection (*Low_FRS*), *CoDStr* shows a positive effect (0.0098), significant at $P < 0.001$. Cost leadership and differentiation strategies show opposite effects on the two groups. Companies protected by the internationalization barrier should adopt differentiation strategy, but those with low foreign sales should provide more low-cost products in competition. For companies protected by the internationalization barrier (*High_FRS*), *SalStr* has no significant impact. For companies in the *Low_FRS* group, *SalStr* adversely affects firm performance (-0.3765, $P < 0.1$).

The regression result of all observations by the same model is listed in the last column of Table 3. We can see that *CoDStr* shows almost no influence (-0.0005) on firm performance when all companies of the industry are put in the regression. This result seems to suggest that whether choosing cost leadership or differentiation strategy is irrelevant to firm performance. Actually, the partition of mobility barrier has led to just opposite effects of independent variable *CoDStr*. Besides, the impact of sales strategy is also influenced by mobility barriers. In the last column of Table 3, *SalStr* shows a significant negative effect (-0.3124, $P < 0.05$). However, regressions by group indicate that *SalStr* is not universally effective for all companies. The coefficients of *SalStr* are significant only when companies are in the groups of *Own = 0*, *Large_Size*, *Low_R&D*, and *Low_FRS*. Regressions by group demonstrate that a strategy may bring different or even opposite influences on different strategic groups separated by mobility barriers.

CONCLUSIONS AND DISCUSSION

Findings and Theoretical Implications

Our research provides an in-depth understanding of the functions of mobility barriers. In literature, the most fundamental and widely acknowledged function of mobility barrier is to maintain existing performance differentials between strategic groups in the industry by preventing firms from moving to other groups. But there are still some unclaritys about the effects of mobility barrier in the research on strategic group. This study examined whether mobility barriers necessarily cause performance differences, and whether mobility barriers play a moderating role in the relationship between firm strategies and performance instead of acting only as a stabilizer of performance differentials.

One of our findings is mobility barriers do not necessarily bring performance differences across strategic groups. In the testing results, only one out of four kinds of mobility barriers led to performance difference. Other mobility barriers do not lead to significant differences of firm profitability on the two sides, though they indeed result in asymmetric competitive positions. The average profitability of a strategic group is affected by many factors, such as the market growth rate, the collaboration among group members, and some historical and cultural factors. Recognizing that these factors are largely exogenous to mobility barriers, it is unreasonable to say strategic groups protected by higher barriers are sure to gain better performance. The disadvantage of not being well protected by mobility barriers is the high profits are more likely to be competed away. But that doesn't mean members of these groups will never achieve high profits.

Another finding is mobility barriers play a key moderating role in the relationship between firm strategies and performance. Though mobility barriers do not directly determine firm performance, they significantly influence the outcomes that firms could get when carrying out strategies in the competition. Our study demonstrates that firm performance is determined neither solely by competitive strategies implemented by firms nor by mobility barriers existing in the industry, but by the interaction of strategies and firms' relative competitive positions. Firms in an industry should be viewed as clusters with distinctive characteristics rather than as homogenous units. Strategies that significantly improve the performance of members of a strategic group might be harmful to firms in another strategic group. And a strategy that seems to be universally effective may actually be worthless for a certain category of firms. The four mobility barriers in our empirical tests, namely ownership barrier, firm-size barrier, R&D barrier, and foreign sales barrier, all exert significant influences on the firm strategy-performance

relationship. Future studies on strategic group could take mobility barrier as a moderating variable in the research model.

Practical Implications

Firms in the real business can also learn from our study. Facing fierce intra-industry competition, firms need to understand the key dimensions of the industry environment, and figure out to which strategic groups they belong by searching and identifying possible mobility barriers. They should understand there might be no strategic actions that could benefit all firms in the industry, and conduct detailed and specific analyses when formulating competitive strategies. A strategy that is proved to be helpful to one type of firms might be detrimental to another type. Many management solutions that are claimed to suit all companies, which are usually produced by consulting companies or other professional service institutions, may not be trustworthy. Managers should refuse to blindly follow the so-called best practices without in-depth analysis, thereby avoiding to be misled by inapplicable strategies. When making benchmarking, firms might as well learn from the competitors that are both successful and comparable to themselves rather than simply from the firm with the highest market share or profitability.

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