

BEHAVIORAL ASPECTS OF THE INTRA-INDUSTRY CAPITAL STRUCTURE DECISION

Greg Filbeck^{*}, Raymond F. Gorman^{**} and Dianna C. Preece^{***}

Abstract

The past decade has witnessed numerous challenges to the axioms of the von Neumann-Morgenstern utility maximizing theory of individual behavior. Most of these challenges have come from the field of psychology and have been in the form of experiments on humans which demonstrate frequent violations of these axioms. This cross fertilization between economics and psychology has begun to attract the attention of the finance profession as well.

In this paper we examine two hypotheses, developed from this literature, which may help explain how firms within an industry choose their levels of debt and equity. First, we reexamine the herd migration hypothesis postulated by Patel, Zeckhauser and Hendricks in a 1991 *American Economic Review* paper. Unable to find support for their findings, we next hypothesize that firms may make financing decisions based on following some industry leader. We find only weak support for this hypothesis and conclude that firms act rationally with respect to financing decisions.

INTRODUCTION

Since the seminal work by Modigliani and Miller (MM) (1958), a great deal of the research in finance has been devoted to explaining differences in the capital structures of firms. MM showed that, assuming perfect capital markets, no corporate or personal taxes and the independence of financing and investment decisions, the value of the firm is independent of its capital structure. However, market imperfections do exist. Most models of capital structure are based on the existence of these imperfections. Theories based on agency costs (Jensen and Meckling (1976)), non debt tax shields (DeAngelo and Masulis (1980)), earnings variability (Bradley, Jarrell and Kim (1984)), bankruptcy costs (Haugen and Senbet (1978)), asset redeployment (Williamson (1988)), underinvestment (Myers and Majluf (1984)), and many other factors reviewed by Harris and Raviv (1991) all help explain the differences between the average capital structures between industries.

Because one can observe different levels of debt and equity between industries, many researchers focus on differences between industries (for example regulation, assets in place versus growth opportunities, etc.) to explain the factors that influence the choice between debt and equity. However, much of the previous research does not shed light on how, within an industry, a particular firm chooses its capital structure. In this paper we hope to make a contribution to this end.

We first test the "herd migration" theory proposed in a 1991 *American Economic Review* paper by Patel, Zeckhauser and Hendricks. They find that in 7 out of 10 industries, more than 15 percent of firms move their capital structures with the herd (i.e. the industry). We next test an alternative hypothesis, developed from the behavioral sciences literature (see Kahneman and Tversky (1979), Statman and Caldwell (1987) for example), to explain within industry capital structures. We hypothesize that firms may actually make financing decisions based on the financing decisions of some industry leader. In other words, a certain firm within an industry is a "leader" and the other firms in the industry, termed "followers," will try to emulate the leader's capital structure decisions.

Section II provides a review of the relevant behavioral sciences literature that we can apply to firms' financing

*University of Toledo

**Miami University

***University of Louisville

activities. Section III provides a description of the sample and the methodology employed. In Section IV, we examine the results and finally, Section V provides a brief summary and conclusions.

BEHAVIORAL SCIENCE AND FINANCE

The past decade has witnessed numerous challenges to the axioms of the von Neumann-Morgenstern utility maximizing theory of individual behavior (see for example Kahneman and Tversky (1979) and Tversky and Kahneman (1986)). Most of these challenges have come from the field of psychology and have been in the form of experiments on humans which demonstrate frequent violations of these axioms. This cross fertilization between economics and psychology has begun to attract the attention of the finance profession as well. Financial theory is based on the same set of axioms as economics and consistent violation of these axioms has profound implications for the finance profession.

The study of the role that individual behavior plays in explaining financial phenomena such as dividend policy (Shefrin and Statman (1984)) and capital budgeting (Statman and Caldwell (1987)) is still in the seminal stages of development. Most of it is an application of prospect theory (Kahneman and Tversky (1979)) which shows how the “mental accounting” of individuals leads them to actions different from those predicted by economic theory.

SELF DECEPTION

A specific behavioral phenomenon which may be able to explain certain financial actions is self deception. In a recent article, Quattrone and Tversky (1988) explain how individuals may take an action which is essentially of no consequence, because they have deluded themselves into believing that the action is significant. Quattrone and Tversky apply this idea to explain voting behavior. They claim that most voters are voting under the “illusion” that their vote matters and that this illusion can be attributed to self deception.

Self deception is connected with actions which associate the individual with a related outcome of the action even though the actions do not cause the outcomes. As an extreme example, rich people wear expensive clothing, if I wear expensive clothing, I will become rich. In the terminology of Quattrone and Tversky, there is confusion between diagnostic aspects and causal consequences. In this example, expensive clothing is a diagnostic aspect and being rich is a causal consequence of hard work or superior endowment.

It is possible that certain otherwise difficult to explain financial activities can be better understood in terms of self deceptive behavior. Capital structure policy, dividends policy, merger waves, new equity issues (see Brealey and Myers (1991) for other examples of unsolved problems in finance) are all examples of financial phenomena whose explanation lacks unanimity. Possibly these are instances where investors are engaging in self deceptive behavior--spending time and resources on financial aspects of the firm which are diagnostic rather than causal in determining firm success. For example, if MM are correct and capital structure does not affect firm value (and firm “success”), then any activity that managers engage in to reach an optimal capital structure is futile. In the language of Quattrone and Tversky, these activities would be diagnostic rather than causal to firm success. The activities the firm is engaged in do not affect the desired outcome, that being firm success. Causal factors affecting firm success, which in this case would not be related to capital structure, might include economic efficiency, market power, or government regulation. An empirical test of self deceptive behavior in finance is yet to be formulated.

HERDING BEHAVIOR

Patel, Zeckhauser and Hendricks (1991) use behavioral explanations to explain the buying decisions of people in the mutual fund markets. They call this hypothesis the barn door closing hypothesis. It refers to people taking actions today that would have been profitable if they had been taken yesterday. They also describe behavior, called herd migration behavior, that they postulate may explain the debt-equity ratios of firms. This theory of human behavior is based on the migration activities of birds and trekking wildebeest. They note that animals are aware of the safety of traveling in groups.

According to Patel et. al, “financial players also may migrate in herds, as when firms increase their debt-equity, S&Ls invest in junk bonds, and banks increase their Third-World debt holdings.” (p. 234) Firms must balance the benefits of reaching the optimal capital structure against the cost of “leaving the herd,” that is, of getting too far out of line with the

industry. They argue that there may be a benefit to moving the debt-equity ratio towards its optimum and that this optimum may be firm specific and time-varying. However, the firm may also incur a cost or penalty from the market because it deviates from the herd (i.e. other firms in the industry). For example, bankers often will not lend to borrowers whose debt/equity ratio is higher than the industry average debt/equity ratio.

Patel et. al also note that uncertainty about the true value of this optimal capital structure, combined with the propensity for individuals to free ride on the information of other market participants, provides the potential for overshooting the target. This could also provide the rationale for financial managers developing the impression (albeit probably mistaken) that other firms “know more” about this optimal capital structure than they do and thus induce them to follow the leader.

Patel et. al test the herd migration hypothesis by regressing the firm’s debt-equity ratio on two own lags and one lag of the industry ratio, using data from the *COMPUSTAT* database. They say that a herd migration tendency is indicated if the coefficient on the industry ratio is significant. They consider 182 firms in 10 industries. They find a low level of significance for 3 industries (15 percent or less of the firms exhibiting herd migration tendencies) but a higher proportion of significance in the other 7 industries.

In this paper we test this result using alternative industries. We are unable to find support for their findings. However, they note that “judging ones’s allocations relative to those of others (as in labor market contests) requires less information gathering. This approach may also be dictated by envy. Such relative valuations could lead decision makers to distort their own decisions, say in an “keep up with the Jones” effort, or an attempt to move with the herd as a mechanism for protection.” (p. 233) We use this logic to propose an alternative hypothesis of what Patel et. al see as herding behavior. We conjecture that the herding behavior observed by Patel et. al is a consequence of firms following a leader rather than specifically herding together. Consequently, unlike Patel et. al, we look at the lags of an industry leader’s debt ratios to determine if they influence the debt ratios of “following” firms within that industry.

FOLLOWING THE LEADER

There is evidence that capital structure and dividend decisions affect firm value (see, for example, Masulis (1990) and Litzenberger and Ramaswamy (1979)). Finance theory suggests that the differences in capital structures observed across industries and firms is a result of factors previously mentioned, such as agency costs, bankruptcy costs and underinvestment. These factors have both industry wide and firm specific components. It is the minimization of costs associated with these factors that determines the optimal use of debt and equity. Thus, firm managers should assess these considerations in making their financing decisions. For example, a firm must assess the likelihood and the cost of bankruptcy and incorporate these factors with other elements such as agency costs in the determination of an optimal capital structure. However, for the individual firm, ascertaining how these causal factors affect its choice of debt and equity is a costly and uncertain process. The optimal use of debt and equity is not known by a firm in advance (or perhaps ever).

As an alternative to spending the time and money to find the best mix of debt and equity, the firm may simply follow the lead of another firm in the industry. For example, if the so called industry leader increases their use of debt relative to equity, the follower may do the same. Since the leader is successful it must know what it takes to be successful. This may include knowing how to choose the best mix of debt and equity. This strategy could prove to be satisfactory for the following firm in the sense that it is less costly than determining the optimal capital structure in the way discussed above. The leader’s capital structure, one could argue, may be a good proxy for the follower’s own optimal mix of debt and equity. Nevertheless, what is good for the industry leader may not necessarily be what is best for the other firms in the industry given the firm specific nature of agency costs, bankruptcy costs, etc. In other words, employing this method to choose the capital structure of the firm would be using diagnostic rather than causal factors. Consequently, firms should not, if they are acting rationally, automatically follow industry leaders that change their capital structures.

SAMPLE AND METHOD

Because we eventually test the “follow the leader” hypothesis, we first examine the capital structure of industry leaders. We identify a firm as a leader based on *Fortune’s* annual survey which identifies the most admired firms in 25 industries. Both industry analysts and executives are surveyed. They are asked to rate firms in the industry based on several criteria

such as the quality of management and the quality of a company's products and services. We use *Fortune's* numerical rank of firms in the individual industries as an indicator of industry leadership.

Often there was not a clear-cut leader across time. We study only industries where there is a clearly defined leader across the 1981-1990 sample period. Leaders were selected by examining the rankings from 1983 (the first year of the survey) through 1991. In order to be considered a leader, a firm had to be ranked "most admired" at least six out of the nine years that the survey has been published. We discarded those industries from our sample that did not have a particular firm emerge as a consistent leader throughout the time period 1981 through 1990.

Two sources of information are utilized in determining the makeup of an industry sample (the followers). First, a firm may be included in an industry sample if it appears in *Fortune's* "most admired" list. The list ranks the top 10 firms in each industry. We examined whether the SIC codes of the firms listed in *Fortune* were similar. In some cases an industry, according to *Fortune*, would include firms with very different SIC codes. This is due in large part to conglomerate firms being classified in a single industry. To counter problems with the first procedure we also employ a second. We use the Standard Industrial Classification (SIC) codes to classify firms in various industries (i.e. to identify additional firms not listed in the *Fortune* lists). See Table 1 for a list of the SIC codes included in each industry.

We consider seven industries in this study. The seven were chosen based on the ability to define a clear-cut industry leader as well as the homogeneity of the industry itself. The final sample of industries in this study includes: aerospace, chemicals, pharmaceuticals, soap and cosmetics, forest products, glass, concrete, abrasives and gypsum, and the publishing industry. The industry leaders we identified are Boeing, Dupont, Merck, Proctor and Gamble, Kimberly Clark Corp., Corning Glass Works, and Dow Jones respectively.

Quarterly data from the *COMPUSTAT* database from the third quarter of 1981 through the fourth quarter of 1990 (20 total quarters) were collected for each firm in the industry. Data were collected on the total debt of the firm, the total assets of the firm, the balance sheet value of the equity, the market value of the equity and the long-term debt of the firm. The empirical capital structure literature generally defines capital structure based on the debt-equity (total debt/market value of equity) or leverage ratio (total debt/total assets). The firm's long-term debt is often not an appropriate measure of leverage for smaller firms which do not have access to the capital markets and may thus use shorter-term bank debt to finance assets. Keeping with tradition, we focus on total debt ratios rather than ratios using long-term debt.¹

We have a final sample of 120 firms. As we define the industries (not including the leaders), there are 13 firms in the aerospace industry, 18 in the chemical industry, 17 in the forest products industry, 17 in the soap and fragrances industry, 12 in the publishing industry, 27 in the pharmaceuticals industry, and 16 in the glass, concrete, abrasives, and gypsum industry.

The first regressions we run test the Patel et. al herd migration hypothesis. We regress the firm's debt/equity (total book value of debt to total market value of equity) and debt/total assets ratio on two own lags and one industry lag.

We investigate the leader-follower hypothesis of firm capital structure through the following equations:

Equation 1

$$TDTA = a_0 + a_1Lead + a_2Lead1 + a_3Lead2 + a_4Lead3$$

Equation 2

$$TDTA = a_0 + a_1Lead + a_2Lead1 + a_3Lead2 + a_4Lead3 + a_5Count$$

Equation 3

$$TDTA = a_0 + a_1Lead + a_2Lead1 + a_3Own1 + a_4Own2$$

Equation 4

$$TDTA = a_0 + a_1Own1 + a_2Own2 + a_3Own3$$

Equation 5

$$TDMK = a_0 + a_1Lead + a_2Lead1 + a_3Lead2 + a_4Lead3$$

Equation 6

$$TDMK = a_0 + a_1Lead + a_2Lead1 + a_3Lead2 + a_4Lead3 + a_5Count$$

Equation 7

$$TDMK = a_0 + a_1Lead + a_2Lead1 + a_3Own1 + a_4Own2$$

Equation 8

$$TDMK = a_0 + a_1Own1 + a_2Own2 + a_3Own3$$

where:

<i>TDTA</i>	is the book value of total debt divided by the book value of total assets for a nonleader firm;
<i>TDMK</i>	is the book value of total debt divided by the market value of equity for a nonleader firm;
<i>Lead</i>	is the corresponding leverage value for the leader firm for the same time period;
<i>Lead1</i>	is the corresponding leverage value for the leader firm lagged 1 period;
<i>Lead2</i>	is the corresponding leverage value for the leader firm lagged 2 periods;
<i>Lead3</i>	is the corresponding leverage value for the leader firm lagged 3 periods;
<i>Own1(2)(3)</i>	is the corresponding leverage value for the follower firm lagged for one (two) (three) period(s);
<i>Count</i>	represents the quarters 1-20 from the third quarter of 1981 through the fourth quarter of 1990.

We added the Count variable to see if firms within an industry change together from period to period, even if they do not follow an industry leader. We also do a pooled regression with the total debt/market value of equity of all of the firms in the industry as the dependent variable.

RESULTS

The results of the test of the herd migration hypothesis are in Table 2a and 2b. Part a of the table reveals the number of significant (t-statistic > 2) positive and negative industry coefficients from the individual firm regressions. A distribution of t-statistics is found in part b of Table 2. We find virtually no support for this theory.² Out of the 7 industries we examine, 3 industries have more than 15% of the firms exhibiting herding tendencies based on the *TDTA* ratio. We find only 2 industries which exhibit these tendencies based on the *TDMK* ratio (the ratio used by Patel et. al) We do not find, as Patel et. al finds, significance in the chemical industry. They find 7 out of 24 firms with a t-statistic greater than 2, we find only 2 out of 18 (3 out of 18 for the *TDTA* definition of capital structure). Furthermore, based on the *TDTA* measure, we find 2 industries with greater than 15% of the firms with *negative* significant t-statistics. In fact, Table 2 shows that approximately 75 percent of all t-statistics are less than 1 with approximately 50 percent negative. Thus, we conclude that based on our sample of industries, there is little, if any support for the herding behavior of firms. That is, we do not find evidence that firms choose their capital structures based on industry capital structures.

We next examine the follow the leader hypothesis. These results appear in Table 3. At best we have weak evidence to support the leader/follower hypothesis. In the *TDTA* equations (1 through 4) for each industry, we find nothing with which we can generalize (see Table 3). Equation 3 appears to have the greatest explanatory power of these four, with much higher R-square values in every industry for individual regression runs³. Although the leader variables are more often positive than negative, they are usually insignificant. For example, in Equation 3 the glass sample contains the greatest proportion of significant positive lead variables (net of significant negative lead variables). However, only 4 out of 16 are positive and significant which is hardly convincing of a follow the leader effect.

The variables that are most often positively significant are *Own1* (which is of course to be expected) and *Count*. In equation 3, the forest, publishing and chemical industry samples show all firms with positively significant coefficients relating to the first lag of their own *TDTA* ratios. This confirms that the follower firms' debt ratios are better explained by their most recent capital structures and the passage of time than by the leader's capital structure.

When market leverage value (TD/MK) ratios are used (equations 5 through 8), there tends to be more positive significant leader variables (see Table 3). Within this group of equations, equation 7 appears to have the greatest explanatory power with much higher R^2 's (the average value is around .60) in each industry for individual regressions. In equation 7 for the forest industry, for example, 13 of 17 coefficients of the leader variable are significantly positive, with none negative. In fact, based on equation 7, we find 5 out of 7 industries with 50% or more of the firms with a significant positive coefficient (net of significant negative coefficients) on the lead variable. Thus, we find much stronger support for the follow the leader hypothesis than for the herd migration hypothesis.

The significance of the leader variable (*Lead*) as opposed to the lagged leader variable (*Lead1*) may be due to co-movements in the stock prices of the follower firms with the industry leader. Stock prices of firms in the same industry are likely to move together. This points to a weakness in relying on market based capital structure definitions which are by definition dependent on the price of the company's common stock. Another interesting phenomena is observed with the first lag of the leader variable in Equation 7. An almost offsetting number of the lagged leader market based measures are significantly negative. This offsets the positive significant response to the current $TDMK$ of the leader and thus weakens the conclusions that firms are following the industry leader. We suspect that the unusual results are caused by the close relationships between the variables in the equation.⁴

CONCLUSIONS

We tested the Patel et. al hypothesis that firms have a tendency to keep their capital structures in line with the industry and find (unlike Patel et. al) virtually no support for herding behavior of firms. We next tested the hypothesis that firms base capital structure decisions on following some industry leader. We find stronger, but still weak support for this hypothesis as well.

Based on the above results, we conclude that firms do indeed react rationally, as economic theory would predict, at least with respect to capital structure decisions. Firms do not seem to mistake diagnostic aspects of firm success with causal consequences of firm success. We assume then that firms are making capital structure decisions on firm specific and time varying factors such as agency costs, bankruptcy costs, underinvestment, etc. This is consistent with what managers actually say about their financing decisions. In a survey article by Pinegar and Wilbricht (1989), managers rank "maintaining comparability with other firms in the industry" last out of 7 financial planning principles governing financing procedures of the Fortune 500 list for 1986. Our results are consistent with Pinegar and Wilbricht's findings. Alternatively, there may be other factors accounting for the weak results.

First, there may be some other phenomena occurring in a particular industry. For example, the 1980's was a time of numerous mergers and acquisitions. This would obviously affect firms' capital structures. A second possibility is that the industry, or the industry leader is misspecified. Finally, the model may be misspecified. The R-square values for the industry regressions are quite low, in most cases less than .10. The R-square values for the individual company regressions for the follow the leader hypothesis range from about .10 to .96 with the average being around .60. This indicates that something is clearly missing from the industry equations. It might be these "rational" factors which should affect the debt/equity choice discussed previously. Despite the weak results, we feel that this is a fertile area for future research. It has been shown over and over that individuals do not always act rationally, as economic theory assumes. Applying the concepts of prospect theory and self deception to financial managers' decision making may provide important insights into the way firms make choices. However, this field is in its infancy and much work remains to be done.

TABLE 1
SIC Codes Of Firms By Industry*

SOAP:	2000	AEROSPACE:	3452
	2840		3720
	2842		3721
	2844		
		PUBLISHING:	2643
			2711
CHEMICAL:	2800	PHARMACEUTICALS:	2834
	2810		
FOREST PRODUCTS:	2400	GLASS, CONCRETE	2851
	2421	ABRASIVES and	3220
	2600	GYPSUM:	3221
	2621		3241
			3270
			3272
			3290

*The wide range of SIC codes listed is a result of the *Fortune* list of industry firms. Often they would list a firm in an industry that had a vastly different SIC code than the rest of the industry. Since we considered all of the firms on the *Fortune* lists, the range of SIC codes is broader than in some other papers. Previous research generally uses the first 2 digits of the SIC code to classify firms into particular industries.

TABLE 2a
Herd Migration Regression Results
Number Of Positive And Negative Significant Industry Coefficients Using Quarterly Data
(1981, 3rd Quarter – 1990, 4th Quarter)

Industry		TD/TA		TD/MK	
		+	-	+	-
Aerospace	(n=13)	4	0	2	1
Forest	(n=17)	3	0	2	0
Glass	(n=16)	0	3	4	0
Pharmaceuticals	(n=27)	3	1	1	2
Publish	(n=12)	1	0	1	1
Chemical	(n=18)	3	0	2	0
Soap	(n=17)	1	3	1	3

TABLE 2b
Distribution Of t-Statistics For Herd Migration Regressions

	TD/TA	TD/MK
t-statistics > 2	10%	9%
t-statistics 1-2	14%	17%
t-statistics 0-1	31%	24%
t-statistics < 1	45%	50%

TABLE 3
Number Of Significant Coefficients (10 Percent Level)
In Each Equation Per Industry Using Quarterly Data
(1981, 3rd Quarter – 1990, 4th Quarter)

Equation 1

TDTA		Lead	Lead1	Lead2	Lead3
Aerospace (13)	+	3	0	0	0
	-	0	0	0	4
Forest (17)	+	4	0	0	2
	-	1	0	0	1
Glass (16)	+	4	2	0	0
	-	2	0	1	0
Pharmacy (27)	+	7	2	0	5
	-	1	0	0	3
Publishing (12)	+	1	0	0	0
	-	0	0	0	0
Chemical (18)	+	4	1	1	0
	-	0	0	0	11
Soap (17)	+	6	0	0	1
	-	0	0	1	0

Equation 2

		Lead	Lead1	Lead2	Lead3	Count
Aerospace (13)	+	5	0	0	0	8
	-	1	0	0	5	2
Forest (17)	+	2	0	0	0	8
	-	2	0	0	0	1
Glass (16)	+	5	0	1	0	12
	-	1	0	1	0	3
Pharmacy (27)	+	7	2	0	3	12
	-	1	0	2	2	2
Publishing (12)	+	1	1	0	0	0
	-	0	0	0	0	0
Chemical (18)	+	2	0	0	1	12
	-	0	0	0	3	1
Soap (17)	+	2	0	0	0	4
	-	0	1	1	0	5

TABLE 3
Number Of Significant Coefficients (10 Percent Level)
In Each Equation Per Industry Using Quarterly Data
(1981, 3rd Quarter – 1990, 4th Quarter)

Equation 3

TDTA		Lead	Lead1	Own1	Own2
Aerospace (13)	+	0	0	12	0
	-	0	0	0	0
Forest (17)	+	2	0	17	0
	-	0	0	0	1
Glass (16)	+	4	0	15	1
	-	0	2	0	1
Pharmacy (27)	+	7	4	20	5
	-	2	2	0	4
Publishing (12)	+	3	1	12	1
	-	1	2	0	0
Chemical (18)	+	0	0	18	2
	-	0	0	0	0
Soap (17)	+	1	0	16	1
	-	1	0	0	2

Equation 4

TDTA		Own1	Own2	Own3
Aerospace (13)	+	13	0	1
	-	0	0	1
Forest (17)	+	17	0	1
	-	0	1	0
Glass (16)	+	15	0	2
	-	1	1	0
Pharmacy (27)	+	25	3	2
	-	0	3	1
Publishing (12)	+	12	2	1
	-	0	0	2
Chemical (18)	+	18	1	2
	-	0	1	0
Soap (17)	+	17	1	2
	-	0	2	0

TABLE 3
Number Of Significant Coefficients (10 Percent Level)
In Each Equation Per Industry Using Quarterly Data
(1981, 3rd Quarter – 1990, 4th Quarter)

Equation 5

TDMK		Lead	Lead1	Lead2	Lead3
Aerospace (13)	+	1	0	2	0
	-	0	0	0	2
Forest (17)	+	7	0	0	0
	-	0	0	0	0
Glass (16)	+	3	1	0	0
	-	1	1	0	3
Pharmacy (27)	+	13	0	0	0
	-	1	0	0	11
Publishing (12)	+	2	0	0	2
	-	0	0	0	1
Chemical (18)	+	10	0	0	0
	-	0	0	0	1
Soap (17)	+	3	0	2	1
	-	0	2	0	2

Equation 6

		Lead	Lead1	Lead2	Lead3	Count
Aerospace (13)	+	5	0	2	0	10
	-	1	0	0	2	3
Forest (17)	+	13	0	0	0	9
	-	0	0	0	2	0
Glass (16)	+	6	2	0	2	8
	-	1	0	0	2	3
Pharmacy (27)	+	16	2	0	2	12
	-	1	1	0	12	7
Publishing (12)	+	7	0	0	2	0
	-	0	0	0	0	0
Chemical (18)	+	11	0	0	0	1
	-	0	0	0	3	3
Soap (17)	+	4	0	0	0	6
	-	2	1	0	1	7

TABLE 3
Number Of Significant Coefficients (10 Percent Level)
In Each Equation Per Industry Using Quarterly Data
(1981, 3rd Quarter – 1990, 4th Quarter)

Equation 7

TDTA		Lead	Lead1	Own1	Own2
Aerospace (13)	+	4	0	12	2
	-	3	3	0	0
Forest (17)	+	13	0	15	1
	-	0	12	0	1
Glass (16)	+	10	1	12	2
	-	0	4	0	0
Pharmacy (27)	+	14	0	24	5
	-	0	13	0	2
Publishing (12)	+	8	1	12	0
	-	0	5	0	0
Chemical (18)	+	14	0	17	1
	-	1	13	0	4
Soap (17)	+	6	0	14	2
	-	4	4	0	1

Equation 8

TDTA		Own1	Own2	Own3
Aerospace (13)	+	11	2	0
	-	0	0	1
Forest (17)	+	17	0	0
	-	0	1	0
Glass (16)	+	15	1	2
	-	0	1	0
Pharmacy (27)	+	27	3	0
	-	0	0	2
Publishing (12)	+	12	0	0
	-	0	2	0
Chemical (18)	+	18	0	1
	-	0	2	3
Soap (17)	+	16	1	3
	-	0	3	2

ENDNOTES

1. Regression results are also calculated using long-term debt/total assets. The results are similar to those printed.
2. We have only 1 industry overlap with Patel et al., the chemical industry. They find evidence of herd migration behavior in 7 industries, including: food & tobacco; paper, lumber & printing; oil & gas; chemicals; electrical products & machinery; transportation & communication; and wholesale & retail trade. They do not state their 3 insignificant industries. We may have crossover in these industries.
3. R-square values average approximately 0.60. They are available from the authors.
4. Because of this result, we regress *TDMK* on *Lead*, *Own1* and *Own2*. The R-square values of this specification are lower, and the lead variable is significant only about half as often as in Equation 7. While this provides further evidence that the follow the leader effect is weak, we still have stronger results than our tests of herd migration.

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