INTERNATIONAL JOURNAL OF BUSINESS, 10(2), 2005 ISSN:1083-4346

Regulatory Changes in the Pharmaceutical Industry

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ABSTRACT

In August of 1997, the Food and Drug Administration (FDA) set new less restrictive guidelines for direct-to-consumer (DTC) advertisements by pharmaceutical companies. I examine the common stock price reaction of pharmaceutical companies following the announcement of new FDA guidelines on advertising. Positive announcement effects are found for the pharmaceutical industry following the FDA announcement. Evidence suggests that innovative firms emphasizing research and development (R&D) are more likely to capitalize on DTC advertising and benefit the most from the less restrictive guidelines of the FDA regarding DTC advertisements.

JEL: G18, L50, L65

Keywords: Pharmaceutical; Advertising; R&D; Regulatory changes

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I. INTRODUCTION

In August of 1997, the Food and Drug Administration's (FDA) approved less restrictive guidelines regarding direct-to-consumer (DTC) advertising for pharmaceutical companies. This change in regulation resulted in a flood of pharmaceutical products requiring prescriptions to enter a new era of advertising directly to the consumer. A heated debate continues regarding the impact of the less restrictive advertisements. Physicians and insurance companies criticized the pharmaceutical industry for its increased advertisement expenditures targeted directly to the consumer. Critics are concerned about the level of spending on advertising versus spending on research and development, as well as ethical implications of interfering with the doctor-patient relationship. They raised several questions related to the ethical implications of DTC. Are patients capable of discerning the costs and benefits of new drugs? Would patients seek out the best prescription drug or the best advertised prescription drug? Would patients seek out drugs that are truly necessary or that are only perceived as being beneficial to them? In addition, concerns of rising health care costs continue to draw increased political attention on the pharmaceutical industry.

While the impact of the decreased regulation has generated much attention from physicians, insurance institutions and marketing, it is unclear how the market reacted to the decreased regulation. One issue addressed by politicians is whether or not increasing expenditures on advertising expenses result in rising prescription drug costs and fewer resources being allocated to research and development of potential medical breakthroughs. This study examines the market reaction to the announcement for firms that emphasize advertising and research and development after controlling for the size of the firm.

II. HISTORY OF DTC ADVERTISING

In August of 1997, the FDA set new less restrictive guidelines of DTC advertisements by pharmaceutical companies. Prior to August of 1997, any advertisement promoting a drug's benefits was required to list all of the medicine's side effects. This information was technical and virtually impossible to list on a short television advertisement. To get around this requirement the benefits of a prescription drug could be mentioned or the name of the drug could be mentioned in the advertisement but not both. Therefore, prior to this change in legislation it was very difficult to gain brand recognition.

Calfee (2002) suggests DTC advertising is beneficial citing surveys of consumers conducted by the FDA and others. Survey results suggest DTC advertising benefits consumers by providing valuable information on alternative treatments that can be discussed with their physicians. Lexchin and Mintzes (2002) summarize some of the criticism of DTC advertising. Their major objection to DTC is based on surveys of physicians who feel uncomfortable with prescribing drugs requested by patients. Williams and Hensel (1995) suggest that older individuals are particularly susceptible

to the influences of DTC advertising, because they may seek prescriptions that are unnecessary.

III. PRIOR LITERATURE AND THE DEVELOPMENT OF HYPOTHESES

Prior studies have examined equity value effects of pharmaceutical firms as a result of regulatory changes. Dowdell, Govindaraj, and Jain (1992) found a significant negative effect on common stock prices of the pharmaceutical industry following the new packaging regulation that was implemented as a result of the 1982 Tylenol incident. Bowman, Navissi, and Burgess (2000) found negative announcement effects for pharmaceutical firms after three announcements of regulatory threats in 1992 and 1993. In their paper political vulnerability is proxied by the degree of spending on advertising and research and development. They found firms with higher advertising expenses, suggesting the firms were more vulnerable to political regulation, experienced more negative abnormal returns. While firms with higher research and development expenses, suggesting they were less vulnerable to political regulation, experienced less negative abnormal returns.

Others have examined the equity value effects of regulatory announcements in other industries with various results. A study by Ruback (1982) indicates that price controls caused significant abnormal losses not connected to the actual revenue reduction required. Millon-Cornett and Tehranian (1989) found large commercial banks had positive abnormal returns associated with the initial Depository Institutions Deregulation and Monetary Control Act of 1980 (DIDMC Act) proposal. In addition, small commercial banks and small savings and loans were found to have negative abnormal returns. Szewczyk and Tsetsekos (1992) studied the reaction of firms incorporated in Pennsylvania and other states following the Pennsylvania Senate Bill 1310 which limits the ability of shareholders to challenge management through the proxy process and eliminates the fiduciary obligation of directors to act in the best interest of shareholders. Significant negative abnormal returns were found for 56 Pennsylvania firms. Lastly, Navissi, Bowman and Emanuel (1999) present evidence of negative abnormal returns following price controls and positive abnormal returns following the removal of price controls in the New Zealand market in the early 1970s.

In October of 1981, Merck & Co.'s placed the first direct-to-consumer (DTC) advertisement for Pneumovax. Prior to this there was an increasingly heated debate regarding the financial and ethical effects of DTC advertising. The FDA unsure of how to react to this new form of marketing ordered a moratorium on DTC advertising in February of 1983. In September of 1985, the FDA quietly ended the two-year moratorium on DTC advertising of prescription drugs, but restricted what could be said in the advertisements and required full disclosure of warnings. Pharmaceutical firms focused on advertising their brand name or the advantages of the product. However, they were not allowed to mention the product's name and benefits of the product. The growth in DTC advertising expenditures throughout the 1990s was tremendous. In 1994 the level of DTC advertising expenditures was 160 million dollars. In August of

1997, the FDA relaxed these restrictions and allowed drug manufacturers to describe the benefits of the drugs without providing long, detailed descriptions of possible side effects. Not surprisingly, DTC advertising by pharmaceutical companies increased 50% to 438 million dollars in 1997. By 1998 the DTC advertising business grew to 1 billion dollars. In 2001, the amount of DTC advertising reached 2.8 billion dollars.

The common stock price reaction of pharmaceutical firms following the August 8, 1997 announcement of less restrictive guidelines regarding DTC advertisements are analyzed. In the long run, the entire pharmaceutical industry should benefit from less restrictive DTC guidelines. Prior to DTC advertising, pharmaceutical companies relied entirely on physicians' trade journals to promote and recommend new products and treatments. Over the last two decades the trend is for greater involvement by consumers in health care. For example, Luecke (2000) points out that over the past two decades, the status of over 600 prescription drugs was changed to over-the-counter drugs by the FDA. Several studies indicate that advertising increases the knowledge of consumers regarding information for treatments that they would otherwise fail to receive in a timely manner.[1] Numerous studies discuss the difficulties physicians face in informing consumers, due in part to the aspects of consensus guidelines.[2] These studies suggest consumers are not well informed of new information regarding new medical treatments. In addition, the following articles point out common untreated medical conditions resulting from lack of knowledge by potential patients (e.g. depression by Glick et al. (2001), diabetes by Leape (1995), and osteoporosis by Allen (1999)). Increased consumer awareness of new treatments to illnesses is expected to lead to increased demand for prescription drugs. Therefore, positive abnormal returns are expected for the entire industry.

In addition to examining the overall industry impact, there are two types of pharmaceutical firms that are hypothesized to benefit more from the change in legislation. Firms that have recently used DTC advertising prior to the FDA announcement are expected to benefit from the less restrictive requirements. Firms that emphasize research and development are expected to benefit the most from the less restrictive regulation.

Within the pharmaceutical industry two types of corporate strategies are emphasized. There are a large group of firms that emphasize research and development spending to develop new or improved pharmaceutical drugs. Alternatively, there are many firms that spend considerably less on R&D expenditures and instead market generic substitutes. Studies discussed earlier indicate the inability of physicians to reach potential consumers in a timely manner regarding new treatments prior to DTC advertising. Firms that spend more heavily on research and development expenditures are more likely to benefit the most from DTC advertising. DTC advertising allows firms to reach a broader audience and increase demand for new products in a shorter time frame.

Pharmaceutical firms who emphasize research and development are potentially able to gain new market share more quickly by advertising directly to the consumers regarding the benefits of their patented protected drugs. These firms would be expected

to take advantage of DTC advertising in order to shorten the length of time needed to build their market share. The expiration of patents shortens the life of new projects due to increased competition from generic brands after the patents expire. Creating an early demand for the product is crucial in an industry that has a limited patent protection life from generic competitors. Therefore, firms emphasizing R&D are expected to have an added incentive to gain brand recognition prior to the expiration of the patent and increased competition.

The relative research and development expenditures compared to the size of the firm is used to proxy the degree of emphases on research and development for the firm. There are many smaller firms whose primary mission is research and development. Using an absolute measure of research and development would not capture these firms because of the wide range of size and expenditures on research and development. Pharmaceutical firms who spend a large amount on research and development expenditures relative to total assets of the firm are hypothesized to have the largest positive abnormal returns. The market is expected to react favorably due to expectations of higher future cash flows resulting from increased brand name recognition.

It is hypothesized that the deregulation will immediately allow the large firms who previously engaged in DTC advertising to enhance brand name recognition. Regulation limited the effectiveness due to the lengthy restrictions and inability of firms to identify brand names with medical treatments. Brand name recognition prior to the deregulation was more difficult to obtain. Advertisers could either emphasize their brand name or the medical treatment. However, they could not emphasize both at the same time. Therefore, prior to the deregulation advertisers needed to rely on increasing consumer awareness and hope that physicians would prescribe the product after consumers consulted their physicians. After the deregulation advertisers are not as restricted in creating brand name recognition. Firms with prior DTC advertising are expected to desire brand name recognition the most. Therefore, deregulation is expected to benefit large firms with prior DTC advertisements who have the ability to emphasize brand names more after the deregulation. In addition, these firms are most likely to have current patent protected drugs that will immediately benefit from the deregulation of the DTC advertisements.

Lastly, critics of the deregulation of DTC advertising suggest that corporations have limited funds available for either advertising or R&D expenditures. Critics suggest that R&D expenditures will be reduced and advertising expenditures will be increased with deregulation. Prior to August of 1997, DTC advertising was primarily done by only a select number of very large firms. Examining the results for the DTC advertising and R&D groups provide an indirect test of the political hypothesis. The limitations of this test in this study are discussed with the results.

IV. DATA AND METHODOLOGY

Two-day excess returns are calculated using the market model and standard event study methodology. The announcement date, t = 0, is August 8, 1997, the day the FDA publicly reported the changes in requirements for DTC pharmaceutical advertising. The excess returns are calculated as follows:

$$AR_{iE} = R_{iE} - E(R_{iE}) \tag{1}$$

where RiE = the security return for firm i for days t = -1 and t = 0 around event E; $E(R_i) = \alpha_i + \beta_i R_{mE}$; and R_{mE} = market return (CRSP value-weighted index) for days t = -1 and t = 0 around event E.

The parameters α_i and β_i are estimated using the market model over t = -301 and ends t = -46 around event E. The excess returns of firm j for t = -1 and t = 0, ARjt, are summed to generate the two-day excess returns, which are then averaged over all firms within a particular group to produce a portfolio average of two-day excess returns. Under the null hypothesis of no announcement effect, the average standardized two-day excess return of T announcements is distributed: $N(0, \sqrt{2}/\sqrt{T})$. To obtain the test statistic for the portfolio average of two-day excess returns, the excess returns of firm j for t = -1 and t = 0 are first standardized: SARjt = ARjt/Sjt

$$S_{jt} = \sqrt{V_j^2 \left[1 + \frac{1}{M} + \frac{\left(R_{mt} - \overline{R}_m\right)^2}{\sum_{i=1,M} \left(R_{mi} - \overline{R}_m\right)^2} \right]} \tag{2}$$

where V_j^2 is the residual variance of firm j's market model regression, M is the number of days in the estimation period, Rmt is day t market return, and $\overline{R}_m$ is the mean market return during the estimation period.

The standardized two-day average excess returns are used to test the hypothesis that reduced regulatory restrictions by the FDA have a positive effect on equity values of pharmaceutical firms. Further analysis using the following regression model are used to examine the impact of research and development expenses and advertising expenses in explaining the standardized two-day average excess returns. Total sales are included in the regressions to control for the size of the company. In general all pharmaceutical firms are expected to benefit from deregulation of DTC advertising. Furthermore, it is hypothesized that innovative firms with greater expenditures of R&D as a percentage of total assets, benefit more from the relaxation of DTC requirements than generic firms. It is also hypothesized that firms that incorporated DTC advertising in the prior year benefit more due to an enhanced ability to create brand name recognition after the

relaxed regulation. In addition to examining standardized excess returns for specific sub groups, dummy variables are included in a regression to test these hypotheses.

$$SAR_i = \alpha_i + \beta_{1i}S_i + \beta_{2i}DRD_i + \beta_{3i}ADV_i + \varepsilon_i \quad (3)$$

where S_i = Total Sales for firm i; DRD_i = Dummy variable for firms with highest R&D as a percentage of Total Assets; and ADV_i = Dummy variable for sixteen pharmaceutical firms with the highest amount of advertising expenditures in the prior year.

Observations in the full sample have daily return data available on the Center for Research in Securities Prices (CRSP) and R&D expenditures (item 46) on the Compustat industrial files. The full sample consists of 275 firms in the pharmaceutical industry (NAICS = 325412, 325411, 325414). Sixteen of these firms had DTC expenditures in 1997 based on *Med Ad News*, June 1998.

V. EMPIRICAL RESULTS

Market reaction to the announcement of less restrictive requirements by the FDA is examined. Positive abnormal announcement effects are found for the pharmaceutical industry following the FDA announcement. In addition, the pharmaceutical industry is analyzed with respect to advertising expenditures and the level of research and development expenditures as a percentage of total assets. The findings suggest that less restrictive guidelines by the FDA regarding DTC advertising provides the greatest benefits to pharmaceutical firms that emphasize research and development.

The full sample for Table 1 consists of 275 firms in the pharmaceutical industry. For the full sample the standardized two-day average abnormal return in response to the FDA guideline of DTC pharmaceutical advertising announcement is 1.74%, statistically significant at the 0.01 level. For the full sample of 275 announcements, 59.6% of the standardized average abnormal returns are positive. These results are consistent with the hypotheses that in the long run all pharmaceutical firms benefit from the less restrictive FDA guidelines. Thus, as consumers become more aware of new medical treatments demand and revenues are expected to increase industry wide.

In Panel A of Table 1, the full sample is separated into two groups based on research and development expenditures as a percentage of total assets. The group of 138 firms that spent the most on research and development expenditures as a percentage of total assets has a standardized two-day average abnormal return of 2.76%, significant at the 0.01 level. Conversely, the group of 137 firms that spent the least on research and development expenditures as a percentage of total assets has a standardized two-day average abnormal return of 0.71% that is not statistically significant. These findings are consistent with the hypothesis that pharmaceutical firms who emphasize research and development have the largest positive standardized abnormal returns. Firms with large R&D expenditures are more likely to capitalize on

these expenditures in an environment that is less restrictive in marketing new innovative products directly to the consumer. New products are not reliant on traditional methods of promotion based on physicians' endorsements. Therefore, the results suggest that more timely awareness of innovative products benefits firms emphasizing R&D expenditures. Thus, innovative firms are expected to capitalize more on brand recognition resulting from DTC advertising.

Further analysis of the sample investigates the stock price reaction of sixteen firms that use DTC advertising in 1997.[3] In Panel B of Table 1, sixteen pharmaceutical firms that use DTC advertising are examined. Firms in the sample using DTC advertising have a standardized two-day average abnormal return of –0.71% that is not statistically significant. The results are somewhat surprising and are not consistent with the hypothesis that firms using DTC advertising prior to the deregulation benefit from the deregulation. This suggests that the market did not anticipate additional benefits from the deregulation enhancing the ability of large firms to increase brand name recognition. The results imply that firms who did not use DTC advertising prior to the deregulation benefit more from the deregulation. The deregulation allows consumers to more easily identify a direct relationship between a medical treatment and brand name recognition. The results suggest smaller firms after deregulation are able to enter the market of DTC advertising due to the lower cost-benefit tradeoff in identifying brand name recognition.

Table 1
Tests of stock price reaction of less restrictive FDA requirements

Sample Observation Type	Size	Avg. Std. Abnormal Return(%)	Parametric z-Statistic	Signed Rank z-Statistic	% of Positive Returns
Full Sample	275	1.74	3.90**	4.27**	59.60
Panel A: Based on R&D as a percentage of Total Assets					
Most R&D Emphases	138	2.76	4.59**	5.36**	68.80
Least R&D Emphase	137	0.71	0.95	0.67	50.40
Panel B: 16 firms with highest advertising expenditures in prior year.					
Firms using DTC Adv.	16	-0.48	-1.12	-2.54**	37.5%

Average standardized two-day excess returns, t = -1 and 0, are defined as market model abnormal returns for the sample of 275 pharmaceutical firms (NAICS = 325412, 325411, or 25414) around the event date, t=0 is August 8, 1997, relaxing of FDA requirements for DTC pharmaceutical advertisements. Significance levels are based on one-tail tests.

* Significant at 5% level. ** Significant at 1% level.

The results for the large firms with prior DTC advertising provide an indirect test of the political vulnerability hypothesis.[4] Based on this hypothesis larger firms with greater advertising budgets (more political vulnerable) are hypothesized to be more likely to benefit from the less restrictive guidelines than smaller firms with smaller advertising budgets. In addition, firms that spend more on R&D expenditures are considered less politically vulnerable and are therefore expected to have a smaller reaction (if any) to the regulatory announcement. The results do not support the political vulnerability hypothesis that firms with greater advertising budgets are more likely to benefit from the less restrictive guidelines than smaller firms with smaller advertising budgets. This suggests that positive announcements regarding FDA regulation do not have a significant effect on politically vulnerable firms. This is not necessarily inconsistent with Bowman, Navissi, and Burgess (2000), because in their study negative announcements regarding FDA regulation are found to have significant negative price reactions and it is reasonable that positive announcements may not affect the same types of firms with respect to advertising and R&D expenditures.

Table 2
Descriptive Statistics (in millions)

Panel A: 275 firms in pharmaceutical industry.

	Total Assets	Sales	R&D
Mean	985.5	795.6	104.0
Median	42.4	9.9	12.1
Minimum	0.7	0.0	0.0
Q1	18.2	2.0	4.7
Q3	123.5	51.7	25.6
Maximum	27,381.4	23,636.9	2,140.0

Panel B: 16 firms using DTC advertising.

	Total Assets	Sales	R&D
Mean	12,054.5	10,798.8	1,233.7
Median	12,577.4	11,883.5	1,379.0
Minimum	266.9	132.1	79.2
Maximum	25,811.9	23,636.9	2,140.0

The full sample includes 275 firms in the pharmaceutical industry (NAICS = 325412, 325411, or 325414). Data are taken from Compustat industrial files and are measured as of 1997 fiscal year-end.

Table 3
Descriptive Statistics (in million)

Company	Total Assets	Sales	R&D	DTC '97	DTC '96
Glaxo Wellcome Inc.	13,921.0	13,435.0	1,883.0	126.6	99.8
Bristol Myers Squibb	14,977.0	16,701.0	1,385.0	102.3	47.6
Pfizer Inc.	15,336.0	12,504.0	1,928.0	82.7	59.1
Schering-Plough	6,507.0	6,778.0	847.0	68.5	71.8
Merck & Co.	25,811.9	23,636.9	1,683.7	50.0	89.2
Astra Pharmaceutical	7,841.1	5,653.4	1,101.1	41.9	0.0
Zeneca Pharmaceutical	8,229.9	8,612.7	1,072.7	26.2	1.5
Eli Lilly & Co.	12,577.4	8,517.6	1,382.0	25.6	1.3
American Home Prod.	20,825.1	14,196.0	1,558.0	25.5	46.8
Johnson & Johnson	21,453.0	22,629.0	2,140.0	24.5	73.5
Pharmacia & Upjohn	10,380.0	6,710.0	1,217.0	12.1	12.5
Warner-Lambert Co.	8,030.5	8,179.8	672.2	7.9	0.0
Smithkline Beecham	13,910.0	12,784.0	1,379.0	5.9	15.5
Forest Laboratories	744.3	427.1	79.2	1.7	0.0
Abbott Laboratorie	12,061.1	11,883.5	1,302.4	0.3	8.2
Agouron Pharm. In.	266.9	132.1	108.1	0.2	0.0

DTC '97 and DTC '96 are direct-to-consumer advertising expenditures for 1997 and 1996, respectively. DTC expenditure data are taken from *Med Ad News*, June 1998. Total Asset, Sales and R&D data are taken from Compustat industrial files and are measured as of 1997 fiscal year-end.

The descriptive statistics for the firms in the sample are reported in Table 2. In Panel A of Table 2, total assets for the full sample of pharmaceutical firms range from $700 thousand to $27,381.4 million, with a median of $42.4 million and a mean of $985.5 million. R&D expenditures range from $0 to $2,140.0 million, with a median of $12.1 million and a mean of $104.0 million. Panel B of Table 2 provides descriptive statistics for firms that use DTC advertising. Total assets for firms using DTC advertising range from $266.9 million to $25,811.9 million, with a median of $12,577.4 million and a mean of $12,054.5 million. R&D expenditures range from $79.2 million to $2,140.0 million, with a median of $1,379.0 million and a mean of $1,233.7 million.

Table 3 lists the sixteen firms that use DTC advertising with descriptive statistics. The amount of DTC advertising expenditures ranged from $188.1 thousand to $126.6 million. As illustrated by Table 3, the typical firm that uses DTC advertising is large and has a substantial amount invested in R&D. Only one firm that uses DTC is above the median in terms of relative R&D expenditures as a percentage of total assets. This is not real surprising given the large size of the firms that use DTC. However, the

results in Table 1 and descriptive statistics in Tables 2 and 3 imply that the market does not perceive any additional benefit going towards large firms who previously had DTC advertising prior to the announcement.

Conversely, the market perceives firms that emphasize R&D benefit the most from the less restrictive FDA regulations. These results suggest that the less restrictive DTC advertising regulations benefit firms that emphasize R&D not advertising expenditures. This provides interesting evidence in light of the debate concerning the increased costs of prescription drugs and concerns regarding the amount of spending on advertising and R&D. The results of this study imply that benefits of less restrictive DTC advertising are realized by firms emphasizing R&D and no apparent benefits are immediately realized by firms that currently use DTC advertising.

Table 4
Regression of standardized two-day abnormal returns on sales, and dummy variables for R&D/(Total Assets), and prior DTC advertising

Variable	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)
Intercept	0.008	0.007	0.006
	(1.43)	(1.40)	(1.17)
Sales in Millions	-0.001	- 0.001	
	(-0.35)	(-0.86)	
R&D Emphases	0.022**	0.022**	0.023**
(1 if R&D/TA is high, 0 otherwise)	(2.94)	(2.99)	(3.32)
DTC Advertising	-0.007		
(1 if firm uses DTC advertising, 0 otherwise)	(-0.35)		
F-statistic	3.94**	5.87**	11.00**
Adjusted R-square	0.03	0.06	0.06

Regression tests using standardized two-day abnormal returns as the dependent variable associated with 275 pharmaceutical firms (NAICS = 325412, 325411, or 325414). Significance levels are based on one-tail tests. I hypothesize coefficients will be positive on R&D Emphases and DTC Advertising.
* Significant at 5% level. ** Significant at 1% level.

Table 4 reports the results of regressing standardized abnormal returns around the FDA announcement event on sales, research and development expenditures as a percentage of total assets, and DTC advertising expenditures. The results of the

regression analysis are consistent with the findings discussed in Table 1. Companies that emphasize R&D expenditures benefit the most from the deregulation. The only variable significant at the 0.01 level is R&D emphases in Table 4. The dummy variable is used to identify firms that emphasize R&D expenditures and therefore are more likely to develop new innovative research that is patent protected for a limited amount of time. The findings suggest innovative firms are able to capitalize on patent protected drugs by directly informing consumers of the new product in a timely manner. The increased product awareness allows an increased demand for the new treatments prior to the expiration of the patent. Alternatively, the findings suggest that generic brands do not capitalize on the deregulation because they do not benefit from brand name recognition.

VI. SUMMARY AND CONCLUSIONS

This study examines the impact of relaxing FDA regulation regarding DTC advertising in the pharmaceutical industry. Positive standardized abnormal returns are found for the full sample of firms in the pharmaceutical industry. The full sample is then segmented into two groups based on the level of R&D expenditures. Firms that spend more on R&D are perceived by the market to benefit the most from the less restrictive advertising guidelines. These results suggest that firms who emphasize R&D are expected to capitalize on brand recognition resulting from DTC advertising. Timely product awareness is crucial due to the limited time that products are protected by patents. Innovative firms with high R&D expenditures are more likely to capitalize on DTC advertising that do not rely on traditional more lengthy methods of marketing for new products that were previously dependent upon physicians' endorsements to increase consumer awareness.

Surprisingly, firms that used DTC advertising do not have abnormal returns associated with the FDA announcement. The findings have important implications for the ongoing debate in the medical community regarding the rising costs of prescription drugs and the level of spending on advertising and R&D expenditures. Firms that use DTC advertising do not appear to benefit in the short run from less restrictive FDA regulations regarding DTC advertising. Conversely, firms that emphasize R&D are perceived by the market to have the most potential benefit from the less restrictive regulations. Furthermore, positive announcements of the FDA DTC advertising regulations do not appear to be related to the political vulnerability hypothesis posed by Bowman, Navissi, and Burgess (2000).

ENDNOTES

1. An excellent more detailed discussion of the benefits of advertising can be found in Calfee (2002).

2. For more information on the empirical findings of the inability of physicians to inform consumers in a timely manner see Ayanian et al. (1994), Felch and Scanlon (1997), and Kane and Garrand (1994).
3. The sixteen firms are identified from *Med Ad News*, June 1998.
4. In order to properly test the political hypothesis, advertising and R&D expenditures would need to be examined over time. Changes in these expenditures would provide a more direct test of the hypothesis.

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