Are Food Companies Different? Regulation and the Financial Performance of Canadian Agribusinesses

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Abstract

The interaction between policy and the financial performance of Canada's publicly traded agribusinesses is an under-researched area. Regulations and food safety standards have real economic impacts, so understanding how government actions influence profits and shareholder wealth is important when considering the total costs of current and future food policy. For selected food and non-food agribusinesses, this paper investigates the relationships between regulatory changes, returns on equity and stock market valuations. Several hypotheses are formulated and two empirical approached are employed. An event study demonstrates that official regulatory announcement dates do not generate abnormal returns for publicly traded food companies. Using Mishra et al.'s (2008) DuPont model, mixed evidence is found regarding the effect of regulations on firms' accounting profits. Several future research directions are also discussed.

Keywords: Food Regulation; Agribusiness; Publicly Traded; Event Study; DuPont Identity;

I. Introduction

The interaction between policy and the financial performance of Canada's publicly traded agribusinesses is an under-researched area. Regulations and food safety standards have real economic impacts, so understanding how government actions influence profits and shareholder wealth is important when considering the total costs of current and future food policy. For selected food and non-food agribusinesses, this paper investigates the relationships between regulatory changes, returns on equity and stock market valuations.

In Canada, food regulation is comprised of two pillars. First, the Canadian Food Inspection Agency (CFIA) governs food safety standards. Its aim is to minimize public health risks associated with the food supply and to ensure that legislated standards are followed by all active food processors (CFIA, 2010). As the food safety regulator, the CFIA is an enforcement agency, guaranteeing that companies adhere to existing regulations. Indeed, it is the public face of Canadian food regulation. Another organization is becoming increasingly prominent in discussions regarding regulatory change however. Health Canada, a federal ministry that has a role in many areas of healthcare from drugs to workplace health, controls food regulations related to labelling, chemical residue levels and nutrition and health claims.[1] Specifically, a division of Heath Canada known as the Food Directorate is tasked with two priorities. First it has the role of "establishing policies, setting standards and providing advice and information on the safety and nutritional value of food" (Health Canada, 2010). Second, it administers the Food and Drugs Act on matters related to food, public health, safety and nutrition (Health Canada, 2010).

[1] Under the Canadian constitution, healthcare provision, such as clinics and hospitals, is a mandate of individual provinces.

Many members of the food industry have growing concern over Health Canada's role in the food regulatory process. In particular, perceptions among industry leaders are that Health Canada has promoted regulatory obstacles which stifle innovation. An informal study by Sparling and Laughland (2008) emphasizes these concerns. In a series of semi-structured interviews, they solicited comments from senior managers at a range of Canadian agribusinesses. In general, feedback on Canadian food regulations was negative. For example, one interviewee stated: "There are wholesale changes needed to the entire set of regulations. ... These changes are needed urgently. The regulatory amendment process is broke (sic) and needs to be fixed" (pg.7). Similarly, another participant claimed that: "Those who wish to go into … retail food production become ineligible … [we] simply cannot fit into the rules" (pg.7). Opinions were not universally negative however. Several interviewees did view Canadian food regulation from a neutral perspective: "While no one really likes regulation, current regulation, when used smartly, provides a solid framework for agri-food production." (pg. 6-7).

These statements highlight the budding apprehension over the impacts of food regulation in Canada. There are several reasons why altered standards may adversely affect food companies. These include: 1) resources required to comply with new regulations may generate substantial administration costs; 2) regulations may prevent firms from capitalizing on emerging market opportunities, particularly in the growing functional food sector – i.e., even though consumer demand exists, there are regulatory barriers to new product introduction; 3) new regulations may affect investor perceptions, which in turn influence food manufacturers' stock prices and costs of capital. Yet despite these fears, it is unknown whether recent regulatory changes have had tangible financial effects on Canada's publicly traded food processors.

This paper evaluates two main hypotheses related to the role of regulatory change and relative financial performance of food and non-food agribusinesses. The specific hypotheses are:

Hypothesis I: *Changes in Food Directorate regulations did not adversely affect the stock market valuations for Canadian food manufacturers relative to a comparable group of non-food agribusinesses.*

Hypothesis II: *Changes in Food Directorate regulations did not adversely impact the ex post accounting returns for Canadian food manufacturers relative to a comparable group of non-food agribusinesses.*

The objectives of this study are to assess how food regulations affect the financial performance of Canadian agribusinesses. Several implications will be deduced from the rejection or non-rejection of these hypotheses. Results will be useful in evaluating current food regulations and for guiding future agri-food policy.

To test these hypotheses, two empirical approaches are applied. The first, an event study, is conducted using both food and non-food agribusinesses. Abnormal stock market returns are measured in an event window near "announcement dates" for regulatory changes. These abnormal returns are then statistically tested to identify whether official regulatory announcements influence the stock market valuation of food companies relative to their non-food counterparts. Second, accounting data is employed to examine the *ex post* consequnces of new regulations on firms' returns on equity. An approach developed by Mishra et al. (2008) and Moss et al. (2009), based on the DuPont expansion, is used.

Historically there has been limited research on publicly traded agribusinesses notwithstanding the interaction between these firms and agri-food policy in particular. However interest in the topic appears to be on the rise as several studies have been completed in recent years. For example, Thomsen and McKenzie (2001) and Salin and Hooker (2002) use an event

study to assess how food recalls affect shareholders. Thomsen and McKenzie (2001) find that shareholder losses can be large if the recalls involve serious food-borne contaminants, but find no evidence of abnormal returns when the recalls are less severe. Salin and Hooker (2001) determine that, following a food recall, returns fell immediately for the smallest firm in their study but had a muted effect on the largest companies. The influence of food scares on consumer confidence and share prices is further examined by Garcia-Fuentes et al. (2010). They find a positive relationship between confidence and stock market performance. Tepe et al. (2009) find that U.S. biofuel policy tended to increase the stock returns for seed, fertilizer and machinery companies, while cutting the performance of meat processing firms.

Several papers have examined the impact of legislation and regulation on agribusiness stock prices. These include Detre et al. (2006), Gunderson and Moss (2007), Detre et al. (2008) and Mazzocchi et al. (2009). Applying arbitrage pricing theory, Gunderson and Moss (2007) demonstrate that the 1996 Federal Agricultural Improvement and Reform Act had a positive effect on the share prices for U.S.-based agribusinesses. Detre et al. (2006) and Detre et al. (2008), using an event study, found abnormal returns for certain key dates, specifically when U.S. agricultural legislation emerged from the joint House and Senate committee. They conclude that "stock values of agribusinesses have reacted to … major U.S. farm bills" (Detre et al., 2008, pg. 33). Mazzocchi et al. (2009) also completed an event study examining the impact of food regulations on 30 food companies listed on the London Stock Exchange. Of note for this research, they find little evidence for abnormal returns related to regulatory changes.

A key feature of these studies is that U.S. and European information is used. Research employing Canadian data is sparse. Turvey et al. (2000) and Sparling and Turvey (2002) are exceptions. Both of these papers use the capital asset pricing model to examine the relationship

between the economic value-added metric and stock market performance. Results indicate that high economic value-added is a poor predictor of a company's stock market returns. In Canada, the consequences of regulation on publicly traded agribusinesses have gone unexamined. The contribution of this paper is to initiate an investigation into this topic.

The organization of this paper is as follows. Section two describes how changes to food regulation are announced in Canada. Official announcement dates are used as "event dates" in section three. Section three then presents the empirical methodologies for both event study approach and the DuPont model. Section four describes the data. The results and discussion are presented in section five. Section six concludes.

II. Food Regulation in Canada and Event Date Selection

Canada regulates most aspects of the food system from production to distribution. Food regulations can be categorized under two main headings: food safety and nutrition and health. This study focuses on the latter – i.e., impact of changes to Canada's labelling, nutrition and health regulations on the financial performance of Canadian-based food manufacturers. Food safety regulations will be investigated in future research.

It is useful to review how federal regulations are announced in Canada. The Government of Canada produces a document called the "Canada Gazette", which is the official newspaper of the federal government. By law, all "formal public notices, official appointments, proposed regulations, regulations and public Acts of Parliament" are included in the newspaper (Canada Gazette, 2010). The Canada Gazette contains three parts. Part I is consultative tool for use by Canadians and the government. Proposed regulatory changes coupled with information on the appropriate feedback mechanisms are available in this section. Part III of the Canada Gazette is

restricted to formal Acts of Parliament. Official regulatory announcements are published in Part II of the Canada Gazette. This is the relevant section for this study. All announcements in Part II of the Canada Gazette follow a standardized format consisting of the official language of the regulation followed by an analysis of its motivation and implications. Regulatory changes published in the Canada Gazette also have an official "announcement date." It is these announcement dates that define the event dates for the event study.

In the last decade, Health Canada has published three pertinent regulatory changes in the Canada Gazette. Table 1 presents these announcements. On January 1, 2003, a suite of new labelling restrictions were instituted. This was a major reform that had widespread consequences for Canadian food companies. The second regulatory change is less prominent, affecting only a subset of the firms. Restrictions on the residue levels in final food products from specific veterinary drugs were implemented and announced on December 14, 2005. Finally, on December 26, 2007, several clarifications were made on food health claims. Specifically, natural health products were exempted from restrictions that apply to functional and conventional foods. These three dates, January 1, 2003, December 14, 2005 and December 26, 2007 are the event dates.

Some caution must be exercised with these dates and the ensuing event study interpretation. Event studies are most effective when the event is a surprise. Rarely are new regulations a shock to industry participants. In fact, regulatory changes usually constitute the terminal point of multi-year consultations. Similar to food safety amendments, draft regulations for health and labelling changes are disclosed prior to final implementation (Mazzocchi et al., 2009). This poses a challenge for defining precise event dates. For the regulatory changes

Table 1: Announcement Dates for Food Directorate Regulatory Changes

Change	Announcement Date	Brief Description
Nutrition Labelling and Health Claims	January 1, 2003	Make nutrition labelling mandatory on most food labels, updated requirements for nutrient content claims and permited the use of diet-related health claims on foods. Nutrition labelling became mandatory for most prepackaged foods.
Veterinary Drug Residue Regulations	December 14, 2005	These Regulations establish safe limits for residues of the veterinary drugs ceftiofur, monensin, pirlimycin and teflubenzuron in foods originating from animals treated with these particular drugs. These veterinary drugs are used in the production of healthy animals which are destined for use as food.
Natural Health Product Amendments	December 26, 2007	This regulatory amendment amends the Food and Drug Regulations, the Natural Health Products Regulations, and the Medical Devices Regulations. The amendment (1) revises the list of Schedule A diseases and (2) exempts natural health products and certain drugs from the prohibition of preventative claims listed in Schedule A.

(Source: www.hc-sc.gc.ca/fn-an/legislation/acts-lois/gazette2/index-eng.php)

analyzed in this study, it is not known when or if expectations changed before the official announcement date (Binder, 1985). The problem of ill-defined event dates has received extensive discussion in the literature (see Binder, 1985; MacKinlay, 1997; Mazzocchi et al., 2009). Still, in many ways, Canada's federal regulatory announcement system provides some relief for this issue: it does provide clearly defined dates for which the official changes become known. Ultimately, it is an empirical question as to whether these dates correspond to abnormal stock market returns.

III. Empirical Methodology

Two approaches are employed to determine whether regulatory change adversely influences the financial performance of food companies. First, the event study methodology is discussed (MacKinlay, 1997). This approach is used to assess the effect of regulatory change on share prices near the formal announcement date. Second, accounting data is used in conjunction with DuPont expansion methods similar to Mishra et al. (2008) and Moss et al. (2009). When considered independently both methods have limitations. Yet, used in conjunction they provide a sound starting point for the evaluation of the impact of regulations on firm returns.

Event studies are most effective when the date of event is well-defined. While this study has the advantage of having clearly specified announcement dates, it is not obvious that the market was unaware of the pending changes. Stock prices may have already priced-in the effect of the regulations. The accounting data or DuPont model attempts to measure the *ex post* financial impact of regulation. It avoids the event date problem by taking a longer-term perspective. However, there are drawbacks to this approach as well. Annual data are used. Changes in stock prices are known daily. Annual aggregation of financial information poses challenges for identifying the actual effect of regulatory changes as it can mask intra-period consequences and is subject to other contaminating developments.

Two groups of agribusinesses are used. The first group, non-food agribusinesses, acts as a control. The second or treatment group is comprised of food processors. Many of the same exogenous factors influence the stock market returns of both the non-food and food groups. However, the non-food group is not directly subjected to domestic food regulations. The advantage of using a control and treatment group is that it allows any causal impacts of food regulation on stock prices and financial performance to be better inferred.

Approach 1: Event Study

Event studies are a common approach for evaluating the impact of regulatory changes on the value of a firm (Binder, 1985). The rationale is that an event has a noteworthy impact if it causes a statistically significant change in the stock market value of a firm when compared to its expected return within an event window surrounding the announcement date (Mazzocchi et al., 2009). While the event study methodology is less common in agricultural finance and agricultural economics, there is extensive literature documenting its application. Armitage (1995)

and MacKinlay (1997) are review articles covering many of the more common approaches. Salin and Hooker (2002), Detre et al. (2008) and Mazzocchi et al. (2009) are recent applications of the methodology to agribusinesses. There have been few studies that apply this methodology in a Canadian context however.

Event studies are simply statistical tests on out-of-sample forecast errors from regression models. A complete event study methodology is comprised of five steps (MacKinlay, 1997; Mazzocchi et al., 2009). First, an event date must be determined. The event dates in this study correspond to the publications dates of the Canada Gazette. Next, a model of "normal returns" must be estimated over a period immediately preceding the event window. Third, statistics describing abnormal returns within the event window are calculated. Abnormal returns are the forecast errors from the model estimated in step two. Finally, statistical tests are performed to determine if the event is associated with statistically significant high or low abnormal returns.

In addition to the actual announcement date, this paper considers three event windows for each regulatory change. These are two, five and ten days before and after the announcement. These are denoted as (-2, 2), (-5, 5) and (-10, 10) respectively. The estimation window for this study was 250 days before the first day of the widest event window – i.e., (-261, -11). These event and estimation windows are identical for each announcement date. The "market model" is the most common approach for estimating share returns. As such it is used in this study. This model takes the form:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

where α_i and β_i are firm-specific parameters to be estimated, R_{it} is the return on share i at time t, R_{mt} is the market return at time t and ε_{it} is an error term which is assumed to be independent and identically distributed with a mean of zero and constant variance. The TSX Composite Index

from the Toronto Stock Exchange is used to represent the market return in Eq.(1). Ordinary least squares (OLS) estimation of this model generates consistent and efficient estimates (MacKinlay, 1997). Based on the estimated coefficients from this model, $\hat{\alpha}_i$ and $\hat{\beta}_i$, abnormal returns are calculated. For firm i, this is given by:

(2) $$u_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}$$

where u_{it} is the forecast error over the period covered by event window, which represents an abnormal return.

This paper is interested in the effect of regulatory changes on the share prices of a portfolio of Canadian publicly traded food companies. It is reasonable to assume that the error terms for the different companies will be correlated. Therefore, the so-called "portfolio approach" is used to test for abnormal returns (Armitage, 1995). The following statistics permit testing for abnormal stock market returns associated with announced regulatory changes:

(3) $$\theta_1^j = \frac{\bar{u}^j}{SE(\bar{u}^j)\cdot\lambda} \sim N(0,1), \qquad j = \text{Food, Non - food}$$

(4) $$\theta_2 = \frac{\bar{u}^{Food} - \bar{u}^{Non-food}}{\sqrt{t_2 - t_1}\,SE(\bar{u}_T)\cdot\lambda} \sim N(0,1)$$

where relevant values are calculated as:

$$\bar{u}_t^j = \frac{1}{F}\sum_{i=1}^{F} u_{it},\ j = \text{Food, Non - food}$$

$$\bar{u}^j = \frac{1}{TF}\sum_{i=1}^{F}\sum_{t=t_1}^{t=t_2} u_{it},\ j = \text{Food, Non - food}$$

$$SE(\bar{u}^j) = \sqrt{\left(\frac{1}{T-1}\right)\sum_{t=1}^{T}\left(\bar{u}_t^j - \bar{u}^j\right)}$$

$$SE(\bar{u}_T) = \sqrt{\frac{SE(\bar{u}^{Food})^2}{N^{Food}} + \frac{SE(\bar{u}^{Non-Food})^2}{N^{Non-Food}}}$$

$$\lambda = \sqrt{\frac{1}{T}\left(1 + \frac{(R_{Mt} - \bar{R}_M)^2}{\hat{\sigma}_M^2}\right)}$$

T is the number of days in the estimation window (250), t_1 and t_2 represents the start and end dates for the event window, $\bar{R}_M$ is the average market return over the estimation period and $\hat{\sigma}_M^2$ is the variance of market returns. The expression denoted by λ in Eqs.(3) and (4) adjusts the standard error of abnormal returns by accounting for the sampling error in the estimation of α_i and β_i. This becomes small as T becomes large. For each event, the formal hypotheses tested take the form:

Null: $\theta_k^j = 0$

Alternative:[2] $\theta_k^j \neq 0$

where $k = 1,2$ and $j = Food, Non\text{-}Food$.

A few comments are required on the differences in means statistic, Eq.(4), as it is not as well-established in the event study literature as Eq.(3). This statistic is tantamount to a two sample t-statistic with unequal variances. It compares the abnormal returns of food and non-food agribusinesses, effectively testing whether the stock price of food companies react differently than a comparable group of non-food agribusinesses. This test is included for one key reason. The market model, Eq.(1), uses Canada's primary stock index, the TSX Composite. This metric is based on price movements from the Toronto Stock Exchange. Energy, mining and other

[2] Technically our research hypotheses refer to the adverse implications of regulations on stock prices. This implies that the alternative hypotheses should be formulated as: $H_A : \theta_k^j < 0$. However, plausible explanations for an increase in shareholder value do exist (e.g., regulations lead to greater consumer confidence). As a result, the more general alternative hypotheses is preferred.

resource companies heavily influence this index. Factors such as oil price movements therefore have the potential to act as contaminating events, obscuring the effect of regulation on stock prices. It is assumed that food and non-food firms are sensitive to similar economic factors. However, this may not be true. Some economic conditions may have inverse implications for food processors when compared to other agribusinesses. For example, high commodity prices are positive for input suppliers, while potentially unfavourable food manufacturers. As such, the difference in means test should only be considered in conjunction with the primary abnormal returns statistics.

Approach 2: DuPont Model

The DuPont expansion is a method of decomposing a firm's return on equity (ROE) by means of several alternative financial ratios. ROE is based on companies' annual financial statements – i.e., accounting data. Therefore, it is useful for *ex post* analysis of the consequences of regulations. There are several approaches to evaluating accounting data via the DuPont expansion. This paper follows the method of Mishra et al. (2008) and, for the remainder of the paper, refers to this approach as the DuPont model.

Start by defining four ratios: i) Return on Equity = Net Income / Total Equity (ROE); ii) Profit Margin = Net Income / Sales (PM); iii) Total Asset Turnover = Sales / Assets (TAT) and iv) Equity Multiplier = (1 + Debt / Total Equity) (EM). It is possible to write the return on equity as the product of the other three ratios. This is known as the DuPont Identity:

$$ROE = PM \times TAT \times EM \tag{5}$$

Taking logs, this identity can be written as:

$$\ln ROE = \ln PM + \ln TAT + \ln EM \tag{6}$$

The DuPont identity illustrates that a firm's return on equity is influenced by three factors (Ross et al., 2006):

1. Operating efficiency as captured by the profit margin
2. Asset use efficiency as measured by the total asset turnover
3. Financial leverage via the equity multiplier

A particular regulatory change which has an effect on a firm's ROE must, by definition, influence its components. Intuitively, one would presuppose that regulatory change would sway a firm's operating efficiency while leaving its asset use efficiency and financial leverage unchanged.

Following the approach in Mishra et al. (2008), let the DuPont model refer to a system of three equations where each equation has a component of the DuPont identity as a dependent variable. This system takes the form:

$$
\begin{aligned}
\ln PM_{it} &= \sum_i \upsilon_{1i} + \psi_1 \cdot Year + \sum_j \gamma_{1j} \cdot Food \cdot regulation_j + \sum_k \phi_{1k} Z_k + \varepsilon_1 \\
\ln TAT_{it} &= \sum_i \upsilon_{2i} + \psi_2 \cdot Year + \sum_j \gamma_{2j} \cdot Food \cdot regulation_j + \sum_k \phi_{2k} Z_k + \varepsilon_2 \\
\ln EM_{it} &= \sum_i \upsilon_{3i} + \psi_3 \cdot Year + \sum_j \gamma_{3j} \cdot Food \cdot regulation_j + \sum_k \phi_{3k} Z_k + \varepsilon_3
\end{aligned}
\tag{7}
$$

where the υ_{ki} are firm-specific intercepts and *Z*'s are other control variables such as firm size and primary function (e.g., input supplier or machinery). The parameters of interest are the γ's as they capture the interaction effect of the regulation and food company dummy variables on the three financial ratios.

Panel data methods are used to estimate this system. In this model, identifying the causal effect of regulation requires the counterfactual trend behaviour of the treatment group (food companies) and control group (non-food companies) to be the same (Angrist and Pischke, 2009). This implies that, assuming the causal effect is additive and constant, the only difference

between food companies and non-food firms, conditional on control variables such as firm-specific intercepts and size, should be the effect of food regulation. Assuming that this is a plausible scenario, a series of hypothesis tests can be specified to determine the effect of regulation on the *ex post* financial performance of food companies relative to other agribusinesses. Specifically, two sets of tests can be performed for each event. First, simple single parameter tests for the causal effect in each equation can be formulated – i.e., Null: $\gamma_{kj} = 0$ and Alternative: $\gamma_{kj} \neq 0$ for each *k* (equation) and *j* (regulation change). This test indicates whether the regulation had an effect on that given ratio. Second, an F-test for the causal influence of the regulatory change on the complete system is devised – i.e., Null: $\gamma_{1j} = \gamma_{2j} = \gamma_{3j} = 0$ versus Alternative: $\gamma_{1j} = \gamma_{2j} = \gamma_{3j} \neq 0$. These tests reveal whether the regulation swayed the ROE of the food companies. Together these hypotheses allow inference on whether regulation has an effect on the financial performance of Canada's publicly traded food companies.

IV. Data

Financial and stock market information was collected for a sample of 28 Canadian publicly-traded agribusinesses. Data include complete annual financial statements, daily stock prices and the TSX Composite Index. The data, for the years 1999-2008, were compiled from several sources, notably Thompson ONE Banker, Bloomberg and via firm's annual reports posted on SEDAR. Data on Canadian food regulations were also collected. Information on novel food applications, health-claim approvals, changes in food safety measures and other policy changes was compiled via the websites of Health Canada (2010) and the CFIA (2010).

Appendix A contains a list all companies, their ticker symbol and the years active. There are 28 firms, 13 food manufacturers and 15 non-food agribusinesses. Several comments on the dataset are needed. To be included, firms needed to meet several criteria. First, this study is concerned with Canadian companies which are defined as having their headquarters in Canada. Next, every firm's market capitalization had to be greater than $10 million on average. Moreover, the companies must generate total revenues of greater than $500,000 per year. These two conditions attempt to distinguish businesses that are "going concerns" from those that are in the research stage. The Toronto Venture Stock Exchange includes many food and agricultural biotechnology companies that are in the development stage. Often the shares of these companies are very thinly traded making it challenging to include them in analysis. Finally, retailers, restaurants and brewers are not included as they are subject to different regulatory classes. It should also be noted that not every firm was listed for the entire 1999-2008 period. This implies that for the DuPont model the data comprise an unbalanced panel.

Several cautions should be expressed as well. The dataset may not fully reflect the impacts of regulation on Canada's aggregate food sector. There are several reasons for this. First many Canadian food manufacturers are not publicly traded. For example, McCain Foods and Agropur, Canada's largest and fourth largest food company by revenues (Conference Board of Canada, 2010), are privately-held and a cooperative respectively. To a lesser extent, several of Canada's larger non-food agribusinesses are privately-held as well. Winnipeg-based JR Richardson & Sons is the most prominent example. Next, focusing on publicly-traded firms may introduce selection bias. Often firms that are traded on a stock exchange are more successful than smaller privately-held companies. As a result, these organizations may be able to adapt to regulatory changes more effectively than their non-publicly traded counterparts. Finally,

companies such as Nestle Canada, General Mills Canada and Parmalat Canada are wholly-owned subsidiaries of foreign-based parents. These firms have a large presence in the Canadian food industry, yet, even though the regulatory changes may have major consequences for these firms, they are excluded as their headquarters are in foreign jurisdictions.

V. Results and Discussion

The two main hypotheses of this study involve the role that regulatory changes have in the stock market valuations and accounting profits of Canada's publicly traded food companies. Hypothesis I claims that regulations did not influence stock market values while Hypothesis II states that the same regulations did not impact firms' accounting profits. Results from the two empirical approaches are discussed in turn. The event study is presented first, followed by the DuPont model.

Table 2 displays the results from the three event studies. Columns three through five list the standard Z-statistics derived from Eqs.(3) and (4). Each statistic corresponds to a particular event, presented in column one, and event window, found in column two. The three event dates – January 1, 2003, December 14, 2005 and December 26, 2007 – coincide with distinct regulatory changes. Inspection of the table yields a clear conclusion: official regulatory announcement dates do not generate abnormal stock market returns for Canadian food companies. At a 5% level of significance, there are no statistically significant abnormal returns for either food companies or non-food agribusinesses when considered independently (columns three and four). Examining the difference in means test (Eq.(4)), there is only a single case where the abnormal returns of food and non-food companies diverge by a sufficient margin to be

Table 2: Z-Statistics for Abnormal Returns from Three Event Studies

Event Date	Event Window	Food Companies	Non-Food Companies	Difference in Means
January 1, 2003	Announcement Date	-0.305	0.565	-1.628
	(-2,2)	-1.038	0.109	-0.791
	(-5,5)	-0.927	0.130	-0.792
	(-10,10)	-0.377	-0.088	0.046
December 14, 2005	Announcement Date	-0.099	-0.819	-0.260
	(-2,2)	-0.224	-0.923	-0.683
	(-5,5)	-0.257	-1.360	-0.757
	(-10,10)	-0.369	-0.745	-1.205
December 26, 2007	Announcement Date	-0.725	-0.744	0.601
	(-2,2)	-1.173	-0.413	-1.030
	(-5,5)	-1.517	-0.014	-2.654*
	(-10,10)	0.277	0.665	-1.196

* Statistically significant at a 5% level (two-tailed test)

statistically significantly different from zero. This single instance is for the third event, the announcement related to natural health products, and the (-5, 5) event window. As neither the (-2, 2) nor the (-10, 10) windows show similar abnormal returns, this is not viewed as conclusive evidence of the effect of regulation. Based on the results in Table 2, it is not possible to reject Hypothesis I.

Figures 1 through 3 plot the daily abnormal returns for food and non-food agribusinesses. Visual inspection of these plots supports the conclusions of the statistical analysis. The stock prices of food companies experienced no dramatic deviations during the period under investigation. In fact, for the first and second events, food companies appear distinctly less volatile than non-food agribusinesses, while the returns of the two groups appear correlated for the third event.

Official regulatory announcements do not generate statistically significant changes in the stock market valuations of Canadian food companies. More importantly, the consequences for food company shareholders are not appreciably different than those who own non-food agribusiness equities. These results have several implications. First, it is possible that share prices had already incorporated all relevant regulatory information prior to the announcement

date. The fact that regulatory changes are seldom surprises has been discussed and our results are similar to those of Binder (1985) and Mazzocchi et al. (2009). As Binder (1985, pg. 181) states: "it is extremely difficult to find announcements in the regulatory process that are unanticipated by the market … the formal regulatory announcements that receive attention in newspapers and histories of regulation and that are examined in this article are likely to be anticipated". Quite simply, trouble with event date definitions may explain the lack of significant statistics. Second, it may be that the regulations are not perceived as burdensome, despite the claims of Sparling and Laughland's (2008) interviewees. Large food companies have staff dedicated to managing regulations. In reality, it may have been straightforward to accommodate these new standards. This conclusion has some support from the *ex post* analysis which is discussed next. Moreover, it should be noted that publicly-traded firms are generally larger and have more experience with regulatory procedures. Smaller and newly established

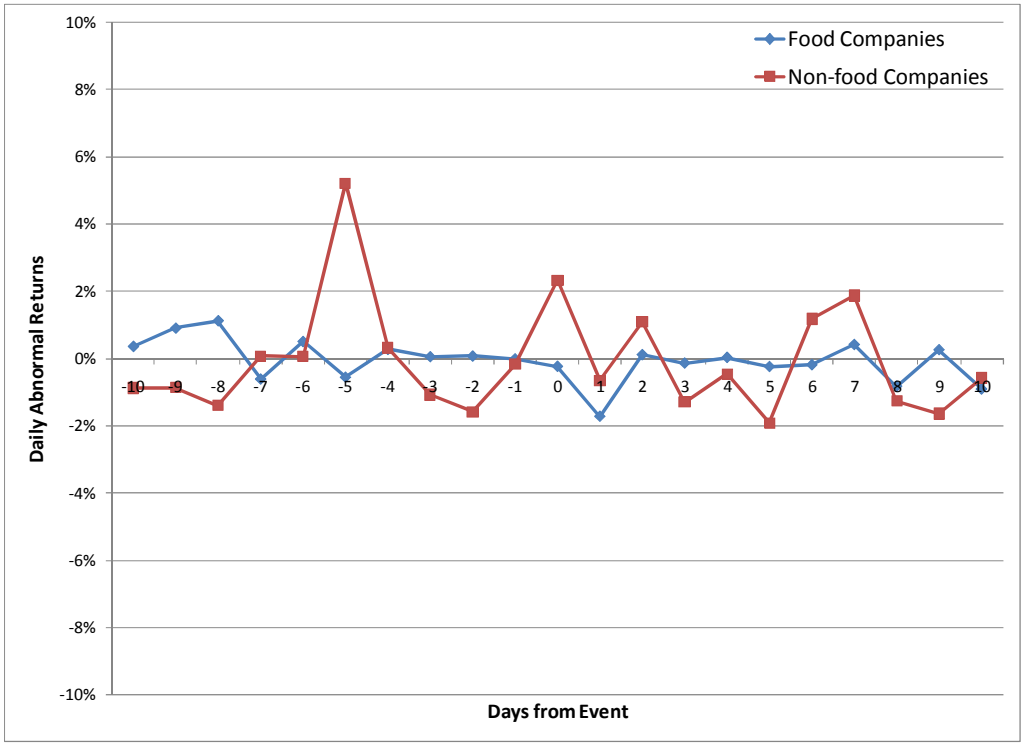

Figure 1: Abnormal Returns for the Days Surrounding the Regulatory Announcement Date – January 1, 2003

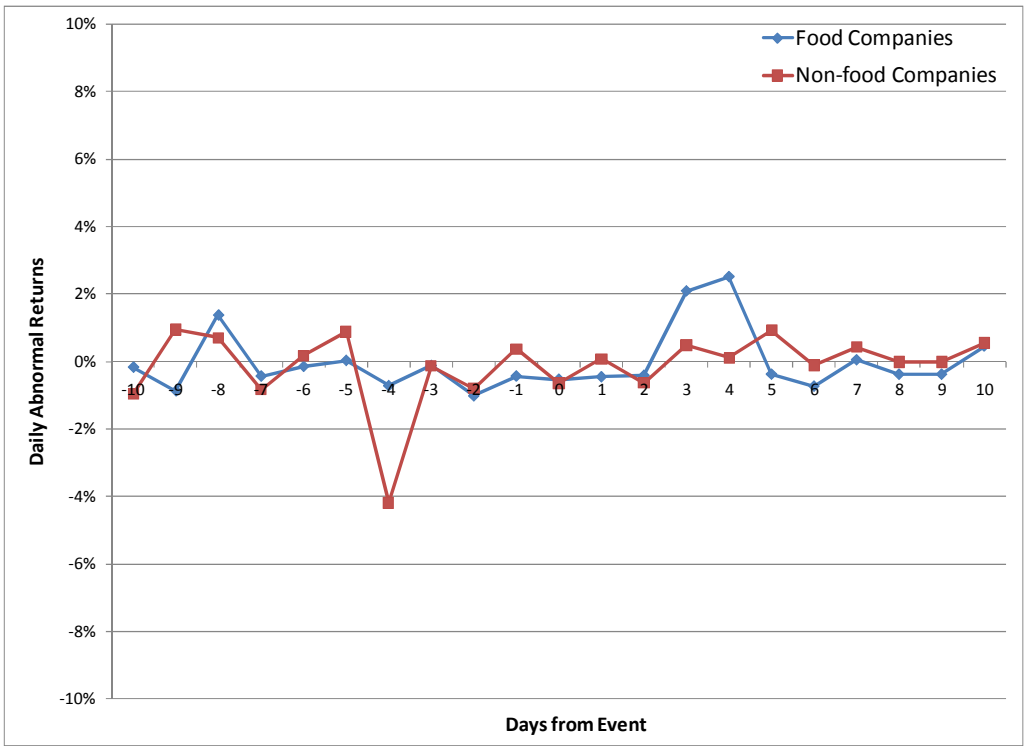

Figure 2: Abnormal Returns for the Days Surrounding the Regulatory Announcement Date – December 14, 2005

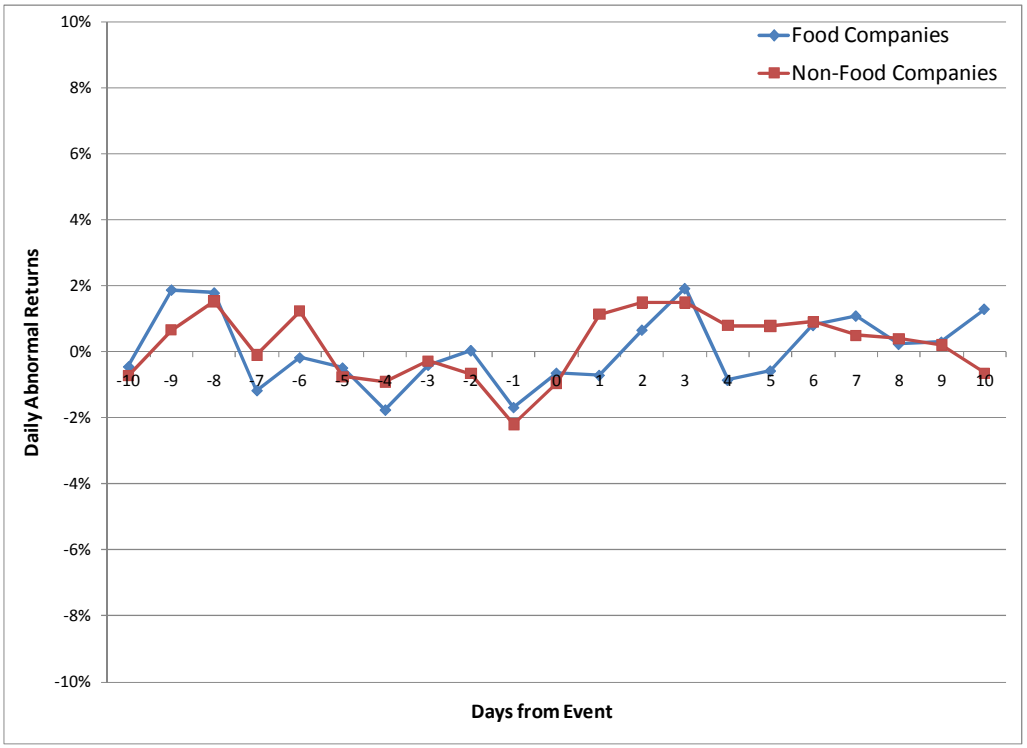

Figure 3: Abnormal Returns for the Days Surrounding the Regulatory Announcement Date – December 14, 2005

firms could face larger obstacles. Finally, some regulations may actually have a positive impact on one firm but a negative impact on a competitor. This is particularly true for the regulations related to natural health product definitions.

The event study demonstrated that regulation announcement dates do not correspond with abnormal returns for food companies. Yet, a decline in ROE or accounting profits as a result of regulations is a possibility. Table 3 presents the results from the DuPont model which is based on accounting data. The DuPont model results do hint that regulations may have had some effect on accounting performance. Normally, a key complaint regarding regulations is that they generate significant administration costs. These costs materialize in the profit margin but should not affect sales or leverage. Therefore, one would expect to see statistically significant effects for the profit margin equations and not for total asset turnover or the equity multiplier. To some degree, the DuPont model results support this notion.

In section three, two statistical hypotheses were described. First, tests are performed on individual parameters to indicate whether a given regulatory change affected a particular ratio. Table 2 shows that for both the second and third regulatory changes, the profit margin equation had a statistically significant effect. The restrictions on veterinary drug residues had negative implications for profit margins whereas the natural health product regulation improves profit margins. The second statistical hypothesis relates to the overall impact on ROE. It involves a joint test of all three equations. If relevant variables are significantly different from zero then the regulation can be said to influence ROE. Only one causal effect, as measured by the F-statistic, is statistically different from zero at a 5% level. This is the natural health products amendments. So while the veterinary drug residue restrictions did influence food companies' profit margins, the change does not appear in ROE.

Table 3: Effect of Regulation within the DuPont Model[a]

	Profit Margin	Asset Turnover Ratio	Equity Multiplier
Food Dummy*Event 1	-0.095	-483.56	-0.055
	(-0.250)	(-0.281)	(-0.583)
Food Dummy*Event 2	-0.822*	-359.17	-0.087
	(-2.134)	(-0.205)	(0.910)
Food Dummy*Event 3	1.604*	-214.93	0.044
	(3.439)	(-0.101)	(0.381)
Trend	0.058	145.72	0.028
	(1.124)	(0.625)	(-0.565)
	Firm specific intercepts and firm size controls included in models		
R^2	0.39	0.33	0.27
N	223		
Regulation 1 - F(3,223)	0.126		
Regulation 2 - F(3,223)	2.129		
Regulation 3 - F(3,223)	4.493*		

a - t-ratios in parentheses

* - statistically significant at a 5% level

Initially it may seem counterintuitive that regulations improved the financial performance of food companies as is the case with the natural health product standards. Yet, there is a reasonable explanation for this result. Regulations can have both positive and negative implications. Often focus is place on the down-side of regulatory amendments because of the real or perceived burden of administration and paper work costs. However, occasionally regulations clarify confusion that existed with respect to out-dated and incomplete standards. Resolving uncertainty enables some firms to pursue new products, while others may choose to abandon money-losing projects. The implication is that expediency throughout the regulatory process – i.e., ensuring that regulatory changes proceed rapidly – could lead to positive effects for firms. Moreover, it may be that it is not regulations themselves, but a prolonged regulatory consultation process, that generates adverse implications for firms. While this conjecture is untested, one conclusion is apparent. These results do not overwhelmingly support Hypothesis II, so it is not possible to reject it.

VI. Conclusions

The decisions of publicly traded agribusinesses impact consumers, suppliers, farmers, processors and rural communities (Manfredo et al., 2008). Understanding the factors that motivate and influence these decisions is important, particularly with respect to the ability to raise capital for future projects. The Canadian government has played a large role in the food processing sector. Food regulations, in the form of health and nutrient claims as well as food safety standards, have the potential to impact not only the products that Canadians consume, but also the stock market performance of firms that produce food.

This paper examined two primary hypotheses:

Hypothesis I: *Changes in Food Directorate regulations did not adversely affect the stock market valuations for Canadian food manufacturers relative to a comparable group of non-food agribusinesses.*

Hypothesis II: *Changes in Food Directorate regulations did not adversely impact the ex post accounting returns for Canadian food manufacturers relative to a comparable group of non-food agribusinesses.*

While some mixed evidence did emerge, overall it appears that the regulatory changes considered in this study did not have major consequences for the stock market valuations or accounting profits of firms. This means that neither of these hypotheses could be conclusively rejected. There is a key point to remember regarding these results however. This research focused on changes to the regulatory system that occurred over the 1999-2008 period. Many longstanding standards may impose constraints on firm development. The methodologies used in this study are unable to capture these factors.

In general, little is known about the effect of regulation on Canadian food companies. This study contributed to this topic by providing some insight into firms' stock prices and ROE.

Additional research is needed however. Three areas require attention in particular. First, food safety regulation must be examined in conjunction with labelling and nutrition standards. Food safety standards comprise a much larger set of rules compared to nutrition and health. Second, the regulatory requirements of Canadian food companies should be compared to international standards. A multi-jurisdictional analysis permits comparisons between the relative stringency o Canadian regulations when compared with its foreign partners. Finally, the impact of regulatory changes on smaller, privately-held firms should also be investigated. It is likely that these companies bear a disproportional burden in Canada.

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Appendix A: Companies included in the dataset

Table A.1: Companies included in the dataset

Name	Ticker Symbol	Years in Data
Food Companies		
Beaumont Select Corporations Inc.	BMN.A-V	1999-2008
Canada Bread Company, Limited	CBY-T	1999-2008
GLG Life Tech Corporation	GLG-T	2005-2008
High Liner Foods Incorporated	HLF-T	1999-2008
Lassonde Industries Inc.	LAS.A-T	1999-2008
Maple Leaf Foods Inc.	MFI-T	1999-2008
MRRM Inc.	MRR-V	1999-2008
Premium Brands Holdings Corporation	PBH-T	1999-2008
Rogers Sugar Income Fund	RSI.UN-T	1999-2008
Saputo Inc.	SAP-T	1999-2008
SunOpta Inc.	SOY-T	2002-2008
Sun-Rype Products Ltd.	SRF-T	1999-2008
Swiss Water Decaffeinated Coffee Income Fund	SWS.UN-T	2002-2008
Non-food Companies		
AgGrowth International	AFN-T	2005-2008
Alliance Grain Traders	AGT-T	2004-2008
Agrium Inc.	AGU-T	1999-2008
Asia Bio-Chem Group Corp.	ABC-V	2006-2008
Atrium Innovations Inc.	ATB-T	2005-2008
Hanfeng Evergreen Inc.	HF-T	2000-2008
Menu Foods Income Fund	MEW.UN-T	2002-2008
Potash Corporation of Saskatchewan Inc.	POT-T	1999-2008
Ridley Inc.	RCL-T	1999-2008
Sun Gro Horticulture Income Fund	GRO.UN-T	2002-2008
Village Farms Income Fund	VFF.UN-T	2003-2008
Viterra Inc.	VT-T	1999-2008
Cott Corp.	BCB-T	1999-2008
Migao Corporation	MGO-T	2006-2008
Buhler Industries	BUI-T	1999-2008