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The financial impact of retail store closure announcements

Jaideep Chowdhury
Department of Finance and Business Law, James Madison University, Harrisonburg, Virginia, USA, and
Sourish Sarkar
Sam and Irene Black School of Business, Penn State Erie, The Behrend College, Erie, Pennsylvania, USA

Abstract

Purpose – While store closure announcements frequently appear in newspapers, little is known about the financial impact of store closure decisions on the retailer's market value. The purpose of this paper is to investigate the stock market reaction to the announcements of retail store closure decisions.

Design/methodology/approach – The authors collect data from news articles on store closure announcements in the USA during 1995-2016. Using the four-factor model in an event study, the authors compute the abnormal stock returns for the retail firms due to these announcements.

Findings – Based on the authors' analysis for sample and matching control firms, the abnormal stock returns for store closure announcements are found to be positive overall. The authors find evidence that the positive effects of the announcements are stronger, particularly for the firms which have positive sales growth at the time of the announcements. The authors also report that industry competition acts as a negative moderator in the relationship between announcements and financial impacts.

Practical implications – The authors' analysis implies the investors' positive sentiment of store closure announcements as a viable cost-cutting strategy, especially when it is done proactively by better performing retailers. The findings should be useful to the supply chain managers of retail industries in making store closure decisions.

Originality/value – This paper is believed to be the first to address the impact of retail store closure announcements on the stock market. The authors' approach of categorizing the firms based on their sales growth seems to be the first in the event study literature on corporate restructuring.

Keywords Empirical research, Event study, Stock market return, Retail channel

Paper type Research paper

Introduction

Newspapers often report on retail store closures. For instance, *The Wall Street Journal* reported on August 11, 2016 that Macy's decided to close 15 percent of all stores in North America because of declining sales (Beilfuss, 2016). CNNMoney lists some of the retailers closing stores in early 2017 (Garcia, 2016). In another instance, in January 2010, Foot Locker's announcement to close more than 100 stores nationwide was reported in the news (Stynes, 2010). Deciding on the number of retail outlets in a specific geographic area is a key element of distribution channel management (Frazier, 1999), which is shown to have a significant effect on a firm's revenue (Bucklin *et al.*, 2008). However, very few past studies have investigated the influence of distribution channel decisions on the shareholder value (Gielens and Geyskens, 2012). Our paper bridges this gap in the literature.

As the key point of interaction with the end consumers, retail stores are at the forefront of the retail supply chain. Retail stores are the integral part of the distribution network, which acts as a key driver of the overall profitability of the firm (Chopra, 2003). A dense network of retail stores can make the stores more accessible and less crowded. However, total supply chain cost of maintaining a large network is significantly high due to an increase in the inventory, transportation and facility costs at the store locations.

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Therefore, determination of the optimal retail network is essential for a retailer to stay ahead of the competition.

Managing inventory is a crucial task in retail operations. In 2011, retailers had an average of 21 percent of their total assets invested in inventory (Gaur *et al.*, 2014). As the number of store locations increases, total inventory holding also increases and the corresponding inventory-turn deteriorates (Chopra, 2003). A retailer's inventory-turn may deteriorate with time due to increasing competition (that may result in reduced market share) or poor industry outlook (i.e. declining overall demand) – either of these may prompt the retailer to take measures toward more efficient inventory management. For any store in the retail network, the amount of inventory is linked with sales, service level and merchandise variety (Dubelaar *et al.*, 2001). Reducing inventory within a store has an adverse effect on retail on-shelf availability (Moussaoui *et al.*, 2016). A retailer would rather prefer to close some stores in an effort to reduce the cost.

A comprehensive overview of facility location problems is discussed in the vast literature of supply chain management (e.g. Drezner and Hamacher, 2004; Melo *et al.*, 2009). Analytical framework is presented for both strategic- and tactical-level decision making in supply chain network design (e.g. Daskin, 2013; Farahani *et al.*, 2014). While gravity models and neural networks can aid in strategic-level decisions, multiple regression and discriminant analysis are useful at the tactical level. A retail supply chain's various sources of risks and performance measures are interconnected, and most risks ultimately affect the inventory-turns and sales growth (Srivastava *et al.*, 2015). Modeling the impact of uncertainties in global logistics system design (i.e. determination of the number and location of the facilities, supplier and channel selection, design of material flow through the supply chain, etc.) has been addressed in the literature (Vidal and Goetschalckx, 2000). Some recent studies focus on the application of robust optimization in facility location problems (Baron *et al.*, 2011; Gülpinar *et al.*, 2013).

Various analytical models are available for identifying the optimal set of store locations in a retail supply chain. However, the retail location selection problem is interdisciplinary in nature. A suitable decision-making model should consider a variety of components, such as, the external environment (e.g. economic, political, social and technological factors), the internal environment (e.g. organizational structure, culture, risk-taking attitude), location positioning (suitable fit between location and product, proximity to customers), location strategy (degree of saturation in the market, operational cost of retail network), etc. (Clarke *et al.*, 1997). With the advancement of information technology, the location selection decisions are becoming more data-centric and analytic-driven. Nevertheless, intuition and experience of the executives can play a role, making the store location selection process both art and science (Hernández and Bennison, 2000). Most location models focus on opening new locations for retail expansion; very few models (e.g. ReVelle *et al.*, 2007) address the issue of facility closures. A retailer may decide to shut down a number of stores in response to declining sales or due to a proactive "strategic rethinking and rebuilding of core competencies to ensure a future growth" (Lee, 1997). The consequences of these two different intents of store closures could be an interesting study. While a handful of analytical models on facility closures are still available, there is no empirical study available on retail store closures.

Estimating the overall change in future income due to the store closure is not an easy task. To estimate the change in income, it is imperative to know the impact of the store closure on both the overall revenue and the overall cost incurred by the retailer. The retailer's distribution decision can affect the overall cost and revenue in several ways, depending on both demand-side and supply-side mechanisms. For example, once some stores are closed, the previous customers of those stores may have three alternatives to choose from: they could decide not to buy the goods anymore, they could switch to a nearby store of the same retailer, or they could turn to a competitor's store. Uncertainty of the customers' intentions makes it hard to predict the retailer's revenue change post store closure (Haans and Gijsbrechts, 2010; Pancras *et al.*, 2012). Again, store closures may have a hard-to-measure impact on the supply side due to a change in the physical distribution costs (Gielens and Geyskens, 2012).

For the reasons mentioned above, it is hard to predict the effective change in the retailer's future revenue and operating costs due to the store closure decision. However, it is still possible to perform an event study analysis and find the stock price changes (i.e. abnormal returns). Based on the efficient market hypothesis, it can be concluded that the abnormal return reflects the change in the net present value of all future incomes owing to the store closure decision. This claim of stock market reflection of operational decisions is also supported in the supply chain literature. One such example is Hendricks and Singhal (2009) estimated two-day period stock market reaction of excess inventory announcements.

In this study, we first investigate whether there is an immediate financial impact of retail store closure announcements by determining the abnormal return of the retailer's stock during the announcement period. Our event study analysis is based on newspaper articles on retail store closure announcements in the USA during 1995-2016. We repeat the analysis after segregating the retailers based on their performances (i.e. sales growth), and show evidence that the store closure announcements are seen by the investors as signals of the retailer's future performance. To our knowledge, this is perhaps the first study that exclusively focuses on store closure announcements and their impact on the stock market.

The remainder of this paper is organized as follows: a theoretical framework is presented next, followed by the hypotheses. We then present our data and research methodologies, which are followed up with corresponding results. We conclude with a discussion of the implications of our findings.

Theoretical framework

Event study analysis is based on the efficient market hypothesis, which is one of the important paradigms in financial economics. An efficient market is one in which stock prices fully reflect available information. If stock prices reflect all past information, then the market is said to be weakly efficient. However, if stock prices reflect all past and current information the market is then said to be semi-strongly efficient. If stock prices quickly reflect all past, current and private information, then the market is said to be strongly efficient. There is evidence of market imperfection in various settings (see Lo and Mackinlay, 1988). However, there also exists some evidence in the literature that is in support of weak form market efficiency (see Keown and Pinkerton, 1981; Busse and Clifton Green, 2002).

Event studies on supply chain incidents have recently been getting wider attention, which perhaps started with the works of Hendricks and Singhal (2003), Papadakis (2003) and Geyskens *et al.* (2002). Using a two-day event period, Hendricks and Singhal (2003) found a mean abnormal return of 10.28 percent because of supply chain glitches causing production or shipment delays. Follow-up event studies on supply chain disruptions are Hendricks and Singhal (2005), Kumar *et al.* (2015), Zsidisin *et al.* (2016), Filbeck *et al.* (2016), etc. Deitz *et al.* (2009) examined the effect of the announcement of a retailer's RFID mandate (in 2003) on suppliers' stock returns. However, very little research is done on linking the retail distribution decisions to the shareholder value (Srinivasan and Hanssens, 2009; Gielens and Geyskens, 2012), which is the purpose of this paper.

It should be noted that most event studies in supply chain literature focus on announcements of events rather than the actual events *per se*. This is because the stock market reaction does not wait for the actual event to occur. An efficient market reacts immediately when the news becomes publicly available via the announcement. Most studies also estimated the market reaction over a short time period (e.g. two-day interval in Hendricks and Singhal, 2003). As the market is efficient, the impact of an event can be quickly reflected in stock prices. An event study over a short duration therefore provides an unbiased estimate of the stock market's assessment of the event's value (Hendricks and Singhal, 2003).

Drawing on the event study literature on market reaction to layoffs, restructuring and divestiture announcements (e.g. Palmon *et al.*, 1997), we propose that the market reaction to the store closure announcement is influenced by both a firm's performance and the industry's competitiveness. Figure 1 provides a graphical representation of our conceptual framework. Development of our hypotheses is built upon this framework.

Hypotheses

When a retailer decides to close some of the stores in its network, the sales being generated from those stores will be lost. However, the operational cost incurred for these stores can be saved. The retailer typically decides to close a particular store when the operating cost outweighs the sales generated from the store. Closures of underperforming stores may help the retailer to optimally allocate inventory across the supply chain (Vidal and Goetschalckx, 2000). Investors should acknowledge and welcome a retailer's effort of operational improvement. Therefore, we expect to see an improvement in the financial condition of the retailer after store closures; the stock price after the announcement should reflect that improvement. However, management literature found negative reaction for layoff announcements (e.g. Worrell *et al.*, 1991). While we believe that the relative benefit of closing underperforming stores should be more than that for layoffs, it is interesting to test the following hypothesis:

H1. The retailers announcing store closures experience a positive abnormal return on stock price.

Store closure is a restructuring initiative taken by the retailer for future cost-cutting. Love and Nohria (2005) segregated organizational downsizing into reactive (i.e. the firm initiated downsizing in response to performance decline) and proactive (i.e. downsizing in absence of performance decline). Proactive downsizing is shown to perform better than reactive downsizing. While proactive measures help the firms to retain a competitive advantage, reactive measures aim to reduce the gap between the shareholders' expectations and achieved performance (Datta *et al.*, 2010). As noted in Hamel and Prahalad (1994),

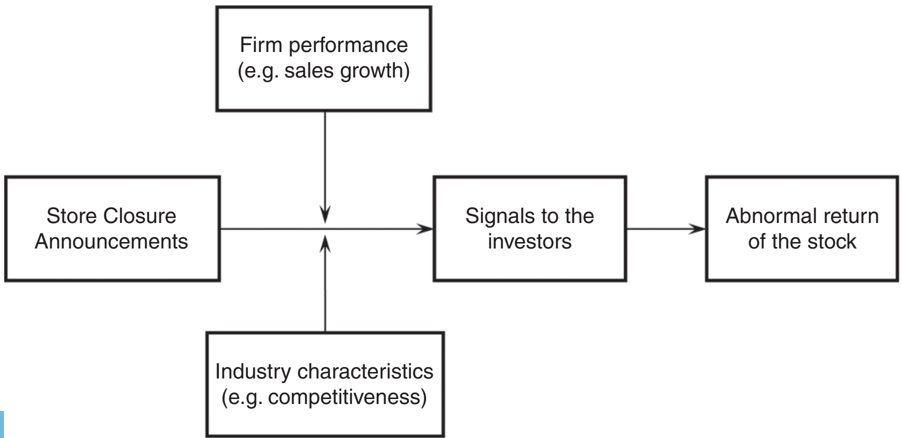

Figure 1.
Theoretical framework

"[…] getting smaller is not enough. Downsizing, the equivalent of corporate anorexia, can make a company thinner; it doesn't necessarily make it healthier," therefore it is important to categorize the store closure decisions accordingly.

Growth is an outcome of a firm's entrepreneurial and managerial knowledge capabilities (Penrose, 2009). Retailers typically make store closure decisions when the industry outlook is not promising. In such slow-growth settings, a firm can have sales growth only by taking the sales of a competitor (McDougall *et al.*, 1994). Competency of the management team is also found to be linked with the sales growth (Kor, 2003). Strategic management literature considers the growth in sales a measure of economic performance of the firm while positive sales growth indicates successful expansion of the firm's "product-market scope" (Ansoff, 2007). Finance literature also considers negative sales growth as the "most direct measure of customer-driven losses in sales," which is the primary yardstick of measuring firm performances (Opler and Titman, 2009). Therefore, we can consider sales growth as a distinguishing factor in store closure decisions. We also find support of this view in supply chain literature. Gaur *et al.* (2014) found that sales growth can affect the retailer's valuation significantly. Market performance of the firm is therefore measured by its sales growth (Petersen *et al.*, 2005; Kim *et al.*, 2006). In our case, we can expect to see a positive stock market reaction for financially healthy retailers, and a negative reaction for the retailers with declining financial conditions. Therefore, we may expect to see a difference in market reaction depending on whether the retailer has positive growth in sales or a negative growth in sales. Accordingly, we test the following set of hypotheses:

H2a. The retailers with positive sales growth in recent past experience positive abnormal return on stock prices after store closure announcements.

H2b. The retailers with negative sales growth in recent past experience negative abnormal return on stock prices after store closure announcements.

For competitive industries, a large number of firms vie for a finite number of customers. In such industries, it is difficult to increase profit, as well as the firm's value, through store closures. Recent literature in marketing shows the moderating role of competitive intensity for the effect of various marketing strategies on the firm's financial performance. For example, Lee *et al.* (2014) found that the positive effect of the customer-centric organizational structure on financial performance is moderated by a competitive environment. Josephson *et al.* (2015) reported on the moderating role of industry competitiveness for the effect of strategic marketing ambidexterity on financial performance. Homburg *et al.* (2014) found that increasing channel distribution intensity creates less firm value for highly competitive markets than for less competitive markets. In a similar vein, we expect that the positive market reaction of the store closure announcement to be positive if the market is competitive. In competitive industries, the positive signaling effect of store closure announcements are somewhat mitigated due to the fact that the firm will lose customers to its competitors. We test the following hypothesis for store closures (i.e. a reduction in channel's distribution intensity):

H3. Industry competition negatively moderates the abnormal return on stock prices after store closure announcements.

Data and methodology

We employ the standard event study methodology to measure the financial impacts of store closure announcements. Following the seminal works of Fama *et al.* (1969), Brown and Warner (1980) and Brown and Warner (1985), event study methodology is widely being used in the business literature for corporate event analysis. For an overview of the related studies published recently in premier journals see Sorescu *et al.* (2017).

In our analysis, the announcement dates (i.e. event days) are set as Day 0. The previous trading day before the event day is denoted as Day –1. The trading day next to the event day is Day +1, and then the following trading day is Day +2. Event windows (−1, 0), (0, 1), (−1, 1), (−2, 0), (0, 2), (−2, 2), (−3, 0), (0, 3) and (−3, 3) are considered in this study. Previous literature sometimes considers long-horizon event study, where the time window lasts over several months or years (e.g. Liu *et al.*, 2014). However, potential confounding effects in the present context (e.g. additional store closures, resignation of CEO and impending bankruptcy in upcoming months) make the long-horizon event study more challenging. Treatment of confounding effects is essential in any event study; however, this practice is not often adopted in long-horizon studies (Sorescu *et al.*, 2017). Our approach of using a short-term time window eliminates the effect of confounding events. The span of the time window is consistent with some recent event studies in supply chain management (e.g. Modi *et al.*, 2015; Kumar *et al.*, 2015).

Data collection

We collect samples of firms that experienced store closures during the period of 1995-2016. News articles from *The Wall Street Journal Eastern Edition* (in ABI/INFORM database) were searched using keywords "store/outlet" in conjunction with "close/closure/shut" that appeared in the news headlines. We carefully read each article in its entirety and eliminated the following types of news from our collection to avoid confounding effects: news where layoff announcements were explicitly mentioned besides store closures; news where store closure plans were announced together with other forms of financial disclosures, such as declaring financial results. After this round of elimination, we searched for any news within the event time window (–3 days, +3 days) about each retail firm in our data set: a firm is further eliminated from the data set when any other news except store closure is also present (e.g. bankruptcy declaration) within the time window for the particular firm. Firms not listed in the US stock market are also eliminated. After the final round of elimination, we have our final data set of 173 remaining announcements[1].

For each firm in our final data set, accounting data (such as sales, total asset, book value of equity, market value of equity) are collected from the quarterly Compustat database. Daily stock price information and all other stock information such as share code, momentum, SIC code and number of shares outstanding are obtained from Center for Research in Security Prices (CRSP). Once we collect all the data, we segregate the firms based on the most recent sales growth: positive (negative) sales growth firms are firms with positive (negative or zero) sales growth in the previous quarter. We use Fama-French 10 industry classification scheme (Fama and French, 1997) for industry fixed effect. Following Tuli *et al.* (2010) and Homburg *et al.* (2014), and we measure industry competition as the inverse of the Herfindahl-Hirschman index at the four-digit SIC code level.

Event study methodology

For each stock, we have an event and an estimation period. We define an estimation period as a period where we estimate the parameters of the four-factor model in Equation (1). The four-factor model (Carhart, 1997) is a standard approach for event study analysis, which has been adopted in recent supply chain management research (e.g. Jacobs and Singhal, 2014; Shin and You, 2017). The minimum (maximum) estimation period is 15 (60) days. The estimation period ends at least seven days before the event date in order to ensure that there is no spillover effect from the estimation to the event period. Stock prices are supposed to absorb all relevant information indicating the present worth of all expected future cash flows. Therefore, measuring the cumulative abnormal return (CAR) of stock prices should reflect the true value of the retailers' announcements. An overview of the methodology is provided as follows.

In the first step, we estimate the following four-factor model during the estimation period for each stock:

$$R_{it} = \alpha_{it} + \beta_{it}^{m}(R_{mt} - Rf_t) + \beta_{it}^{smb} SMB_t + \beta_{it}^{HML} HML_t + \beta_{it}^{mom} MOM_t + \varepsilon_{ijt} \tag{1}$$

where R_{it} refers to the total return for the firm i over the Day t. R_{mt} is the market return, SMB_t is the small-minus-big factor, HML_t is the high-minus-low factor, MOM_t is the momentum factor. *SMB* factor is the difference in returns between the small market capitalization firms and large market capitalization firms, *HML* is the difference in return between the high book-to-market firms and low book-to-market firms. Book-to-market is the ratio of book value of equity to the market value of equity. This ratio indicates the growth potential of the firm. The momentum factor is a proxy for prior performance of the firm. These factors are considered to be important predictors of stock returns.

In the second step, we define the event period, where Day 0 is the event date. Our event date is the day when the firm announces store closure. Our event periods are windows (−1, 0), (0, 1), (−1, 1), (−2, 0), (0, 2), (−2, 2), (−3, 0), (0, 3) and (−3, 3). We use the estimated coefficients of the four-factor model obtained in the previous step to compute the expected return of each stock for each day in the event period:

$$E(R_{it}) = \hat{\alpha}_{it} + \hat{\beta}_{it}^{m}(R_{mt} - Rf_t) + \hat{\beta}_{it}^{smb} SMB_t + \hat{\beta}_{it}^{HML} HML_t + \hat{\beta}_{it}^{mom} MOM_t \tag{2}$$

In the third step, we compute the abnormal return of stock i on Day t of the event period. The abnormal return of stock i in Day t is obtained by subtracting the expected return of a stock, $E(r_{it})$, from the actual return on that same day. Expected return is the return expected by the investors in the absence of any announcement(s). Hence the following abnormal return represents the change in stock returns that can be attributed to the announcement:

$$AR_{it} = R_{it} - E(R_{it}) \tag{3}$$

The average abnormal return for Day t for all firms in the sample is given by:

$$AAR_t = \frac{1}{N} \sum_i AR_{it} \tag{4}$$

We also estimate the CAR between periods t_1 and t_2 for firm i, which is defined as follow:

$$CAR_{it} = \sum_{t=t_1}^{t_2} AR_{it} \tag{5}$$

The average cumulative return for our sample of N firms at time t is given by:

$$ACAR_t(t_1, t_2) = \frac{1}{N} \sum_{i=1}^{N} CAR_i(t_1, t_2) \tag{6}$$

The standardized arithmetic returns (SARs) are given by:

$$SCAR_{it} = \frac{AR_{it}}{\sqrt{VAR(\varepsilon_{AR_{it}})}} \tag{7}$$

The standardized cumulative arithmetic returns (SCARs) are given by:

$$SCAR_{it} = \frac{CAR_{it}}{\sqrt{N \times VAR(\varepsilon_{AR_{it}})}} \tag{8}$$

where $\varepsilon_{AR_{it}}$ is the residual from the risk model estimation for stock i and N is the estimation window length.

Buy and Hold Return (BHAR) is given by:

$$BHAR_{it} = \prod_{t=T_1}^{T_2} (1+R_{it}) - \prod_{t=T_1}^{T_2} (1+E(R_{it})) \tag{9}$$

One of the widely used statistics is the Patell's Z which standardizes event window CARs by the standard deviation of the estimation period's abnormal returns. This test assumes cross-sectional independence in abnormal returns, as well as that there is no event-induced change in the variance of the event period abnormal returns:

$$t_{\text{Patell}} = \frac{\sum_{i=1}^{M} SCAR_{it}}{\sqrt{\sum_{i=1}^{M} (k_i - 2/k_i - 4)}} \tag{10}$$

where M is the number of stocks in the portfolio, K_i is the number of non-missing return observations in stock i's estimation period and $SCAR_{it}$ is the standardized abnormal return of i-stock.

Analysis and results

Descriptive statistics for the sample firm's characteristics and industry characteristics are reported in Table I. Store closures may be industry-specific events. In regression analysis, we need a control for the industry fixed effect. If we use either three- or four-digit SIC code for industry fixed effect, we may have a problem with the degrees of freedom. For industry classification, we chose the Fama-French 10 industry scheme, which has been widely used in past studies (e.g. Yu and Yu, 2012). The grouping of our sample firms based on this

	Mean	Median	SD	n
Sales growth	0.070	0.022	0.355	173
Mtb	1.400	1.700	6.376	173
Log(at)	7.632	7.525	1.848	173
Debt to equity	1.177	0.398	2.509	173
ROA	0.010	0.012	0.034	173
Market share	0.686	0.190	0.435	173
Industry competition	1.777	1.931	1.390	173
Industry growth	−0.057	0.000	0.530	173
Industry turbulence	−0.39309	0.02206	2.5738	173

Notes: The sample is a sample of firms which experienced store closures from 1995 to 2016. All the accounting data are from the quarterly Compustat database. Sales growth is the growth in sales/revenue in one quarter with sale being the variable saleq. Operating profit growth is the growth in operating profit in one quarter, with the variable taken from the quarterly Compustat database. Mtb is market-to-book ratio. Market is the market value of equity which is the product of the number of shares outstanding (variable cshprq) and the price at the end of fiscal year (prccq). Book is the book value of equity. Book equity is the sum of variables ceqq and txditcq minus pstq. Debt to equity is the ratio of the book value of debt to the market value of equity. Market share is the ratio of the quarterly sales of the firm to total industry sales, with industry defined by the four-digit SIC code. ROA is the ratio of the firm's earnings before extraordinary items to total assets. Industry competition is the inverse of the Herfindahl-Hirchman index. Industry growth is the quarterly sales growth of the industry over the past one-year period with the industry being measured by the four-digit SIC code. Industry turbulence is the ratio of the standard deviation of quarterly sales to the average quarterly sales growth within the industry over the previous one-year period

Table I.
Descriptive statistics

classification is provided in Table II. The details of the Fama-French 10 industry classification scheme are provided in the Appendix.

One may argue that the market reactions of our sample firms are due to some industry-specific event or some economy-wide event like a financial crisis, and cannot be attributed to a firm specific event. In order to address this issue, we created a group of control firms. If we can report that there are market reactions for the sample firms and no corresponding market reactions for the control firms, we can conclude that the market reactions of the sample firms can be attributed to store closure news and not attributable to any industry-wide or economy-wide phenomenon. Barber and Lyon (1996, 1997) recommended a method for determining the abnormal returns that involves matching sample firms to the control firms – this approach of matching sample and control firms provides well-specified test statistics, and has been widely used in recent empirical studies. Following this method, we match each sample firm with a control firm based on the following three factors: book-to-market ratio, market value of equity (a measure of size) and industry. We form deciles of the sample firms based on the values of book to market and market value of equity variables as of the quarter prior to the event's quarter. All firms in our sample are grouped into 100 portfolios based on all possible combinations of book to market (ten portfolios) and market value of equity (ten portfolios), which is a standard approach in the literature (e.g. Chowdhury *et al.*, 2016). Each firm in the sample is assigned to one of these 100 portfolios based on the cutoffs of book to market and market value of equity as of the quarter prior to the event's quarter. Control firms are all firms excluding the sample firms, whose data are available in CRSP and Compustat for the same time period as the sample firms, and who belong to the sample industry, industry being defined by the Fama-French 10 industry classification code. All control firms are assigned to one of the 100 portfolios. For every sample firm there may be one or more potential control firms. We select the control firm that has the lowest standardized distance from the sample firm based on book to market, market value of equity and which belongs to the same industry as the sample firm. So, for every sample firm, we have one control firm which is closest to the sample firm in terms of book to market and market value of equity and belong to the same industry.

Similar to the sample firms, there are also estimation and event periods for the control firms. We again use a four-factor model for the control firms in the estimation period, with the estimation and event period separated by at least seven days. We compare the sample and control firms to test if the sample and control firms are similar in terms of the matching criteria used.

There are three matching criteria, book to market, market value of equity and industry. In Table III, we compare the sample firms with the control firms. In panel A, we report the mean and median book to market and market value of equity of the sample and control firms.

	Number of firms		
Fama-French 10 industry classification code	All firms	Negative sales growth firms	Positive sales growth firms
1	4	3	1
4	1	0	1
5	2	2	0
7	166	21	145
Total	173	26	147

Notes: The sample is a sample of firms which experienced store closures from 1995 to 2016. All the accounting data are from the quarterly Compustat database. Sales growth is the growth in sales/revenue in one quarter with sale being the variable saleq. Positive (negative) sales growth firms are firms with positive or zero (negative) sales growth in the previous quarter. Industry classification is based on the Fama-French 10 industry

Table II.
Number of firms and industry classification

	Sample		Control		Difference (sample – control)	
	Mean	Median	Mean	Median	Mean	Median
Panel A: all firms						
Book to market	0.824	0.638	0.832	0.703	−0.010	−0.066
(p-value)					(0.5570)	(0.778)
Size	10,194.66	1,793.430	3,360.96	619.574	5,744.050	1,153.856
(p-value)					(0.124)	(0.349)
n	173	173	173	173	173	173
Panel B: negative sales growth firms						
Book to market	0.868	0.679	0.889	0.743	−0.066	−0.064
(p-value)					(0.616)	(0.352)
Size	10,559.38	1,848.130	3,672.779	603.656	6,387.000	1,214.474
(p-value)					(0.10)	(0.410)
n	26	26	26	26	26	26
Panel C: positive sales growth firms						
Book to market	0.779	0.656	0.804	0.656	−0.147	0.000
(p-value)					(0.331)	(0.923)
Size	7,920.110	1,557.662	3,296.053	580.040	3,815.086	927.622
(p-value)					(0.253)	(0.365)

Notes: The sample is a sample of firms which experienced store closures from 1995 to 2016. All of the accounting data are from the quarterly Compustat database. Market is the market value of equity which is the product of number of shares outstanding (variable cshprq) and price at the end of fiscal year (prccq). Book is the book value of equity. Book equity is the sum of variables ceqq and txditcq minus pstq. Size is the market value of equity. Book to market is the ratio of book value of equity to market value of equity. The p value of the difference in mean is the p value of two-sample t-tests. p value of the difference in median is the p value of the Wilcoxon sign rank test

Table III. Comparison of sample and control firms

We also report the difference between the sample and control firms in terms of mean and median. For the difference in mean, we report the p-value of the two-sample t-tests and for the median, we report the p-value of the Wilcoxon Sign rank test. We find that there is no difference between sample and control firms in terms of mean and median. In panel B of the table, we report the mean and the median of the sample, and the control and difference in the sample and control firms for only those sample firms with positive sales growth. There is no difference in sample and control firms in terms of book to market and market value of equity. In panel C, we repeat the analysis with sample firms with negative sales growth. Our results show that there is no difference between sample and control firms in terms of book to market and market value of equity for the sample firms with negative sales growth also. Overall, the results in Table III suggest that we have a good match between the sample and control firms.

We examine the market reaction of our sample firms and report the results in Table IV. We estimate the CARs and BHARs for the sample firms and the corresponding Patell's Z-test for the following windows: (−1, 0), (0, 1), (−1, 1), (−2, 0), (0, 2), (−2, 2), (−3, 0), (0, 3) and (−3, 3). First, we report the market reaction considering all firms. For the windows (−1, 0), (−2, 0) and (−3, 0), neither the CARs nor BHARs are statistically significant, as evidenced by Patell's Z-test. This indicates that there is no confounding event before the store closure. Further, the store closure news has not been leaked or anticipated by the market before the store closure event is announced. The CARs and BHARs are positive and significant for the windows (0, 1) and (0, 2) indicating the stock market welcomes the news of store closure. This is expected if the store closure is supposed to improve the economic viability of the firm. The CARs and BHARs are positive, but loses significance in the window (0,3), suggesting that the news of store closure gets dissipated in the market within two days of the announcement of store closure. The CARs and BHARs are

Types of firms	Statistics	Time window (−1, 0)	(0, 1)	(−1, 1)	(−2, 0)	(0, 2)	(−2, 2)	(−3, 0)	(0, 3)	(−3, 3)
All firms	CAR	0.59%	2.46%	2.73%	0.90%	5.41%	6.08%	0.89%	4.92%	5.55%
	BHAR	1.02%	2.61%	3.59%	−0.03%	7.16%	5.09%	−0.06%	5.29%	3.63%
	Patell *Z*	−0.7	2.32**	2.47**	−0.49	2.92***	2.04**	0.9	1.90	1.54
Positive sales growth firms	CAR	0.92%	3.02%	3.57%	1.97%	7.73%	9.46%	1.33%	6.73%	7.65%
	BHAR	1.45%	3.16%	4.56%	0.54%	10.60%	8.11%	−0.003%	7.44%	5.01%
	Patell *Z*	0.84	2.82***	3.8***	0.45	3.32***	2.74***	0.29	2.10**	1.61
Negative sales growth firms	CAR	0.79%	2.96%	3.44%	0.14%	0.36%	0.44%	0.17%	0.33%	0.28%
	BHAR	1.35%	3.11%	4.48%	0.19%	0.37%	0.68%	−0.56%	0.22%	0.30%
	Patell *Z*	0.57	1.64	1.49	−0.38	0.35	0.40	−1.01	0.12	−1.41

Notes: The sample is a sample of firms which experienced store closures from 1995 to 2016. All the accounting data are from the quarterly Compustat database. Sales growth is the growth in sales/revenue in one quarter with sale being the variable saleq. Positive (negative) sales growth firms are those firms with positive or zero (negative) sales growth in the previous quarter. CAR is the cumulative abnormal return based on the four-factor model. BHAR is the Buy and Hold return based on four-factor model. Day 0 is the day of store closure. **$p < 0.05$; ***$p < 0.01$

Table IV.
Market reaction to store closures for the sample firms

significant for the windows (−1, 1) and (−2, 2), but insignificant for the window (−3, 3) indicating that there is no more abnormal return after two days of the store closure. The results are in support of *H1*.

Positive aggregate abnormal returns are driven by the positive sales growth firms. CARs and BHARs for the windows (0, 1), (0, 2) and (0, 3) are all positive and statistically significant as indicated by the Patell *Z*-test. We report that the CARs and BHARs for the windows (−1, 0), (−2, 0) and (−3, 0) are statistically insignificant. These results indicate that the news of store closure was not anticipated by the market before the event day. The CARs and BHARs for the window (−3, 3) are statistically insignificant, which suggests that the news of the store closure announcement is fully absorbed by the market within two days of the event. These results are in support of *H2a*.

We examine the market reactions of the negative sales growth firms. These firms experience positive CARs and BHARs, but none of these are statistically significant. Our results offer no evidence in support of *H2b*.

Industry-specific or economy-wide events (e.g. economic recession) may affect the market reaction of the sample firms, which may lead one to believe that our results are attributed to that industry-specific or economy-wide event, and not due to store closure announcements. In order to address this possibility, we estimate the market reactions for the group of control firms. For each sample firm, we have a control firm. Similar to the event study methodology of the sample firms, CARs and BHARs for the control firms and the corresponding Patell *Z*-statistics are calculated for the following windows: (−1, 0), (0, 1), (−1, 1), (−2, 0), (0, 2), (−2, 2), (−3, 0), (0, 3) and (−3, 3). We report the results in Table V. We find no market reaction for the control firms, in any of the event windows. This also holds true when we examine the market reaction of the control firms for sample firms of positive/negative sales growth. The results are reported in Table V.

There are no abnormal returns for the control firms, whereas the sample firms reflect abnormal returns during the event period, suggesting that the abnormal returns of the sample firms can be attributed to events surrounding the sample firms. The comparison with the control firms suggests that our results for the sample firms are driven by store closure events and not attributable to any industry-specific or economy-wide event, since we do not observe any similar pattern of market reaction for the control firms.

The explanatory roles of sales growth and industry competition in cumulative market reaction for three different event windows (0, 1), (0, 2) and (0, 3) are estimated by regression

Table V. Market reaction to store closure for control firms

Types of firms	Statistics	Time window (−1, 0)	(0, 1)	(−1, 1)	(−2, 0)	(0, 2)	(−2, 2)	(−3, 0)	(0, 3)	(−3, 3)
All firms	CAR	0.91%	0.31%	0.36%	0.20%	0.79%	0.97%	1.06%	0.69%	0.75%
	BHAR	1.46%	032%	0.46%	0.54%	0.11%	0.83%	−0.30%	0.76%	0.48%
	Patell *Z*	0.74	0.76	0.69	0.41	0.33	0.27	−0.32	1.20	1.06
Positive sales growth firms	CAR	−0.95%	0.30%	0.13%	−0.39%	0.79%	1.26%	0.55%	1.25%	1.72%
	BHAR	−0.93%	0.20%	0.007%	−0.28%	0.70%	1.21%	0.36%	1.12%	1.41%
	Patell *Z*	−0.35	0.60	0.41	0.59	1.30	1.58	0.30	1.54	1.34
Negative sales growth firms	CAR	0.08%	0.04%	0.04%	0.94%	0.98%	0.74%	0.68%	0.68%	0.72%
	BHAR	0.10%	0.06%	0.07%	0.44%	0.10%	0.33%	−0.69%	0.76%	0.45%
	Patell *Z*	−0.25	0.64	1.17	0.26	0.44	0.27	−0.86	1.09	0.74

Notes: The sample of firms experienced store closures from 1995 to 2016. All the accounting data are from the quarterly Compustat database. Each sample firm has a control firm. Each sample firm is matched with a control firm based on book-to-market ratio, market value of equity and industry. Sales growth is the growth in sales/revenue in one quarter with sale being the variable saleq. Positive (negative) sales growth firms are those firms with positive or zero (negative) sales growth in the previous quarter. CAR is the cumulative abnormal return based on the four-factor model. BHAR is the Buy and Hold return based on four-factor model. Day 0 is the day of store closure. $^{**}p < 0.05$; $^{***}p < 0.01$

analysis. The lag values of variables (such as market-to-book, size and debt equity) indicate the values of those variables in the previous quarter. Following Homburg *et al.* (2014), we include industry growth, industry turbulence, etc. as independent variables. Industry fixed effect is included with the industry classified as the Fama-French 10 industry classification. We include dummy sales growth that was equal to 1 if the sales growth in the previous quarter is non-negative and 0 otherwise. The *t* statistics are calculated based on standard errors which are robust and heteroscedasticity adjusted. We report the results in Table VI.

The coefficient on dummy sales growth is positive and significant indicating that the firms with positive sales growth experience positive CAR, compared to the firms with negative sales growth. This is in line with what we reported in Table IV. We also report that coefficient of industry competition is −0.026 and −0.027 for the windows (0, 1) and (0, 2), respectively, and both are statistically significant. This suggests that the positive cumulative returns of the store closure announcements are reduced for those firms which belong to the competitive industries. Hence, we find support for *H3* in that industry competition has an adverse effect on the CAR. This result is in line with the intuition that the firms belonging to competitive industries risk potential loss of clients with store closure announcements which may mitigate some of the positive signals store closure announcements convey.

Discussion and conclusions

Collective results from our analysis indicate immediate financial impact of retail store closure announcements is positive overall. The positive impact is stronger for the retailers that experienced positive growth in sales in the previous quarter. On the other hand, no significant stock price reaction can be identified for the retailers with negative growth in sales in the previous quarter. Industry competition acts as a negative moderator for the relationship between the announcements and the abnormal returns.

Our findings are supported by the signaling theory (Spence, 2002; Connelly *et al.*, 2011) that explains the role of signals to reduce the information asymmetry between two parties. For example, both price and advertising may be used as signals to the users for product quality of durable goods (Milgrom and Roberts, 1986); alternate strategies for innovation (such as make, buy or ally) may act as signals to the investors (Borah and Tellis, 2014).

Table VI.
Regression of cumulative abnormal return on sales growth, market share, return on asset, industry growth, industry competition and industry turbulence

	Model 1: CAR (0, 1)		Model 2: CAR (0, 2)		Model 3: CAR (0, 3)	
	Coefficient	*t*-stat	Coefficient	*t*-stat	Coefficient	*t*-stat
Dummy for sales growth	0.042	2.340**	0.041	2.340**	0.035	1.940
Firm level variables						
ROA	0.173	0.400	−0.066	−0.140	−0.054	−0.120
Market share	−0.035	−0.960	−0.050	−1.310	−0.034	−0.920
Lag Mtb	−0.001	−0.230	−0.001	−0.240	0.000	−0.020
Lag log(at)	−0.007	−2.030**	−0.006	−1.530	−0.005	−1.300
Lag debt equity	0.017	2.090**	0.013	1.230	0.015	1.840
Industry level variables						
Industry competition	−0.026	−2.650***	−0.027	−2.080**	−0.016	−1.700
Industry growth	−0.018	−1.210	−0.004	−0.410	−0.011	−0.950
Industry turbulence	0.000	−0.220	0.000	−0.050	0.001	0.550
Intercept?	0.098	2.120**	0.104	1.970**	0.073	1.720
Industry fixed effect	Yes		Yes		Yes	
n	173		173		173	
Adjusted R^2	0.340		0.278		0.282	

Notes: The sample of firms experienced store closures from 1995 to 2016. All the accounting data are from the quarterly Compustat database. Sales growth is the growth in sales/revenue in one quarter with sale being the variable saleq. Mtb is market-to-book ratio. Market is the market value of equity which is the product of the number of shares outstanding (variable cshprq) and price at the end of fiscal year (prccq). Book is the book value of equity. Book equity is the sum of the variables ceqq and txditcq minus pstq. Debt to equity is the ratio of the book value of debt to the market value of equity. Sales growth is the quarterly sales growth over the previous quarter. Median analyst recommendation is the median analyst recommendation over the previous quarter. Market share is the ratio of the quarterly sales of the firm to total industry sales, with industry defined by the four-digit SIC code. ROA is the ratio of the firm's earnings before extraordinary items to total assets. Industry competition is the inverse of the Herfindahl-Hirchman index. Industry growth is the quarterly sales growth of the industry over the past one-year period with the industry being measured by the four-digit SIC code. Industry turbulence is the ratio of the standard deviation of quarterly sales to the average quarterly sales growth within the industry over the previous one-year period. The dependent variable is the cumulative abnormal return which is calculated based on the four-factor model. The standard errors are robust and heteroskedasticity adjusted. Industry fixed effect is based on the Fama-French 10 industry classification code. The first entry is the coefficient and the second entry, which is in parenthesis, is the corresponding t statistics. **$p < 0.05$; ***$p < 0.01$

In the context of store closure announcements, expected improvement after store closing is private information to the investors. In the absence of that information, investors rely more on the firm's performance. One such measure of performance is recent sales growth, which is considered to be one of the most effective measures of a firm's performance (Deeds *et al.*, 1998; Florin *et al.*, 2003). When the sales growth is positive, the investors may consider the store closure announcements as proactive measures taken by the retailers to further increase the firm's value. The proactive measure may be seen as a positive signal, and the investors react more favorably for the proactive store closures. This finding is in support of prior research on organizational downsizing (Love and Nohria, 2005, *H3*): proactive downsizing results in superior performance outcomes compared to reactive downsizing.

In our data set, the number of retailers with positive sales growth is considerably larger than the number of retailers with negative sales growth. This might be an explanation of overall positive market reaction in our study. Therefore, we analyzed the positive and negative sales growth retailers separately. Our sample of retailers with stagnant or negative growth in sales is relatively small. This is largely due to the elimination of announcements from our data set where the retailers were declaring layoffs or bankruptcy within the event study time window. This elimination process is important to avoid the confounding effect (as we cannot differentiate between the market reactions due to layoffs/bankruptcy and store closure announcements). Though the data set is small and the market reaction is not significant for negative-sales-growth firms, we still find this outcome interesting. Perhaps market reaction is not significant during the event study time window because the investors anticipated such cost-cutting measures beforehand. It is possible that these retailers had histories of previous store closures or taking other cost-cutting initiatives. Alternatively, the investors might have anticipated it from declining sales. Store closure announcements by a well-performing retailer (with increasing sales) come as a surprise to the investors, and the market reacts accordingly within the short time window. However, such announcements by a retailer with bleak financial outlook and negative sales growth are not surprising to the investors. Therefore, the market reaction is not significant within the time window (i.e. perhaps the market already reacted before the announcement). We found some support of this explanation from the literature: Lin and Rozeff (1993) could not find any stock market reaction of permanent operations closing announcements, and justified the finding as due to investor's anticipation of such announcements.

Managerial implications

Store closure is an important decision in distribution channel management. Our current study is important in the following ways. This study is, perhaps, the first to examine the stock market impact of retail store closure announcements. The findings show that the store closure announcements affect the stock market in a completely different way than the effect of other restructuring initiatives (such as layoff announcements or plant closures). The market reaction is found to be positive for well-performing retailers, whereas the literature generally portrays a negative impact of restructuring initiatives (Worrell *et al.*, 1991; Chen *et al.*, 2001; Blackwell *et al.*, 1990). When the sales growth is already positive, an ambitious restructuring plan for increasing the future profit seems to be well-accepted by the investors. This study differentiates between retailers with positive and negative sales growth. The market reaction for positive sales growth firms is found to be highly significant, whereas negative sales growth firms do not generate significant market reaction. This approach of differentiating the firms based on sales growth is novel, to our knowledge, in the literature on event studies for any kind of corporate restructuring. Our findings should be useful to the investors in retail industries as the study presented for the first time a positive investor sentiment for store closure announcements. In absence of any prior empirical study, the managers might be intuitively thinking of an adverse reaction, as the firm's overall revenue decreases due to the store closures. Keeping in mind investors' sentiments, the managers could have felt hesitant to consider store closures. Our study shows that well-performing firms need not be worried about the market reaction, which is actually positive for store closure announcements. Even for the firms with negative sales growth, the reaction is not negative as the investors often anticipate such measures before they are announced.

This research regarding the link between the management of retail supply chains and the firm's valuation can be extended in following ways. For event studies on various types of corporate restructuring announcements, the role of the current financial performance on the investor sentiment can be investigated. We consider closures of retail stores that are located at the downstream end of the supply chain. It may be an interesting study to examine the effect of facility closures at other locations of a retail supply chain (e.g. closure of a supplier's facility or distribution centers), and then compare the impacts of facility closures at various echelons. We consider a seven-day time period for our event study analysis. Future research can also examine the long-term impact of the store closure decisions by overcoming the challenges of long-horizon event studies (which has been discussed earlier). Omni-channel distributions are becoming more popular nowadays

(Hübner *et al.*, 2016). A retailer may decide to close several stores and focus more on omni-channel distribution (Ishfaq *et al.*, 2016). For example, Forbes recently reported on H&M's new strategy of the quick closure of unproductive stores and the strengthening of their online presence (Loeb, 2017). However, the current study does not consider a retailer's specific strategy for omni-channel distribution. Future study can consider the moderating effect of omni-channel and other expansion strategies along with store closure announcements.

Note

1. Data set used in this study is available upon request.

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Appendix. Fama-French 10 industry classification

(1) NoDur Consumer NonDurables – Food, Tobacco, Textiles, Apparel, Leather, Toys:

- 0100-0999;
- 2000-2399;
- 2700-2749;
- 2770-2799;
- 3100-3199; and
- 3940-3989.

(2) Durbl Consumer Durables – Cars, TV's, Furniture, Household Appliances:

- 2500-2519;
- 2590-2599;
- 3630-3659;
- 3710-3711;
- 3714-3714;
- 3716-3716;
- 3750-3751;
- 3792-3792;
- 3900-3939; and
- 3990-3999.

(3) Manuf Manufacturing – Machinery, Trucks, Planes, Chemicals, Off Furn, Paper, Com Printing:

- 2520-2589;
- 2600-2699;
- 2750-2769;
- 2800-2829;
- 2840-2899;
- 3000-3099;

- 3200-3569;
- 3580-3621;
- 3623-3629;
- 3700-3709;
- 3712-3713;
- 3715-3715;
- 3717-3749;
- 3752-3791;
- 3793-3799; and
- 3860-3899.

(4) Enrgy Oil, Gas, and Coal Extraction and Products:

- 1200-1399; and
- 2900-2999.

(5) HiTec Business Equipment – Computers, Software, and Electronic Equipment:

- 3570-3579;
- 3622-3622 Industrial controls;
- 3660-3692;
- 3694-3699;
- 3810-3839;
- 7370-7372 Services – computer programming and data processing;
- 7373-7373 Computer integrated systems design;
- 7374-7374 Services – computer processing, data prep;
- 7375-7375 Services – information retrieval services;
- 7376-7376 Services – computer facilities management service;
- 7377-7377 Services – computer rental and leasing;
- 7378-7378 Services – computer maintenance and repair;
- 7379-7379 Services – computer related services;
- 7391-7391 Services – R&D labs; and
- 8730-8734 Services – research, development, testing labs.

(6) Telcm Telephone and Television Transmission:

- 4800-4899.

(7) Shops Wholesale, Retail, and Some Services (Laundries, Repair Shops):

- 5000-5999;
- 7200-7299; and
- 7600-7699.

(8) Hlth Healthcare, Medical Equipment, and Drugs:
- 2830-2839;
- 3693-3693;
- 3840-3859; and
- 8000-8099.

(9) Utils Utilities:
- 4900-4949.

(10) Other – Mines, Constr, BldMt, Trans, Hotels, Bus Serv, Entertainment, Finance.

Corresponding author
Jaideep Chowdhury can be contacted at: chowdhjx@jmu.edu