



The effect of supply chain glitches on shareholder wealth

Kevin B. Hendricks^{a,1}, Vinod R. Singhal^{b,*}

^a *Richard Ivey School of Business, The University of Western Ontario, London, Ont., Canada N6A-3K7*

^b *DuPree College of Management, Georgia Institute of Technology, Atlanta, GA 30332, USA*

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Abstract

This paper estimates the shareholder wealth affects of supply chain glitches that resulted in production or shipment delays. The results are based on a sample of 519 glitches announcements made during 1989–2000. Shareholder wealth affects are estimated by computing the abnormal stock returns (actual returns adjusted for industry and market-wide influences) around the date when information about glitches is publicly announced. Supply chain glitch announcements are associated with an abnormal decrease in shareholder value of 10.28%. Regression analysis is used to identify factors that influence the direction and magnitude of the change in the stock market's reaction to glitches. We find that larger firms experience a less negative market reaction, and firms with higher growth prospects experience a more negative reaction. There is no difference between the stock market's reaction to pre-1995 and post-1995 glitches, suggesting that the market has always viewed glitches unfavorably. Capital structure (debt–equity ratio) has little impact on the stock market's reaction to glitches. We also provide descriptive results on how sources of responsibility and reasons for glitches affect shareholder wealth.

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1. Introduction

In recent years, supply chain management (SCM) has been heralded as the next source of building, sustaining, and winning competitive advantage. Many have alluded to the compelling bottom-line benefits and tremendous payoff that accrue to firms from developing effective supply chains while others have talked about the strong correlation between excellence in SCM and shareholder value (Edward et al., 1996; Raman, 1998; Tyndall et al., 1998; Quinn, 1999;

Chopra and Meindl, 2001; Mentzer, 2001).² Yet, hard evidence to support these claims seems to be limited. Much of the evidence that we have come across is anecdotal and case study oriented, and often based on non-financial metrics. Little evidence exists that

² There is no dearth of references on the link between SCM, profitability, and shareholder value. The practitioner literature is full of such references (see, for example, articles in publications such as Supply Chain Management Review, Purchasing, Logistics Management and Distribution Report, and Inside Supply Management). Other sources of reference are the websites of solution providers such as SAP, Inc., Oracle, i2 Technologies, Manugistics, and numerous other small and large providers. Of interest here are the various white papers that are available from these websites as well as the literature that describe their solutions. The link between SCM, profitability, and shareholder value is also stressed in academic journals such as Management Science, Journal of Operations Management, and Decision Sciences.

* Corresponding author. Tel.: +1-404-894-4908; fax: +1-404-894-6030.

E-mail addresses: khendricks@ivey.uwo.ca (K.B. Hendricks), vinod.singhal@mgt.gatech.edu (V.R. Singhal).

¹ Tel.: +1-519-661-3874; fax: +1-519-661-3959.

systematically links effective SCM to shareholder value creation. This assertion is based on our review of recent SCM books; websites of supply chain solution providers such as SAP, Inc., Oracle, i2 Technologies, and Manugistics; popular practitioner publications such as *Supply Chain Management Review* and *Inside Supply Management*; as well as articles on SCM in academic journals.³

This paper is concerned with empirically estimating the shareholder value creation potential of effective SCM. Supply chains create value by being reliable and responsive in matching demand and supply. Reliability is delivering the right product in right quantity at the right time to the right place at the lowest cost. Responsiveness is the ability to respond quickly to changing market conditions. One approach to estimating the value creation potential of supply chains is to identify a set of firms that have improved the reliability and responsiveness of their supply chains, and compare their stock price performance against a set of firms that have not improved the reliability and responsiveness of their supply chains. The difference in stock price performance, appropriately adjusted for industry and market performance, provides an estimate of the value creation potential of reliable and responsiveness supply chains. Although intuitively appealing, this approach is hard to implement because of the difficulty in measuring the reliability and responsiveness of supply chains from publicly available data. One could resort to samples based on anecdotes or case studies that appear in press. However, this is not the most objective method.

An alternative approach is to estimate the shareholder value lost, if any, when supply chains are unre-

liable and unresponsive. Unreliable and unresponsive supply chains are more likely to suffer from glitches in matching supply and demand. Glitches could be due to many reasons including inaccurate forecast, poor planning, part shortages, quality problems, production problems, equipment breakdowns, capacity shortfall, and operational constraints (Fisher and Raman, 1996; Fisher, 1997; Raman, 1997). Glitches could be due to suppliers, customers, or internal sources. Glitches do affect a firm's short- and long-term profitability, which in turn affects shareholder value. By calculating how much shareholder value is lost due to glitches, one can estimate the value creation potential of more reliable and responsive supply chains. The rationale is that if supply chains were more reliable and responsive they would not have experienced the glitches, and hence, would not have experienced the loss in shareholder value.

This paper measures the effect of supply chain glitches on shareholder wealth. Our focus is on glitches that resulted in production or shipment delays. Examples of such glitches include Sony's inability to deliver Playstation 2s for the 2000 Holiday Season due to part shortages; Nike's inability in 2001 to match demand with supply due to complications in implementing a supply chain management systems; and disruption in Ericsson's ability to meet the demand for mobile phones in 2000 due to internal and supplier production problems. Our results are based on a sample of 519 such supply chain glitches that were publicly announced during 1989–2000.

To estimate the shareholder wealth affects, event study methodology is used to compute abnormal returns around the date when information about glitches is publicly announced. Abnormal returns are the difference between the actual change in stock prices and a benchmark to adjust for the overall industry and market-wide influences. Thus, abnormal returns are normal stock returns purged for industry and market-wide influences. We examine how factors such as size, growth prospects, capital structure (debt–equity ratio), and the timing of the glitches influence the magnitude of shareholder wealth affects. We also provide descriptive results on how sources of responsibility and reasons for glitches affect shareholder wealth.

Section 2 discusses the hypothesis examined in this paper. Section 3 describes the collection of the sample.

³ See, for example, recent textbooks on SCM by Gattorna (1998), Tyndall et al. (1998), Handfield and Nichols (1999), Simchi-Levi et al. (2000), Chopra and Meindl (2001), and Shapiro (2001). Recent academic research has focused on developing analytical models of supply chain issues to understand how alternate ways of managing supply chains affects performance (Cachon and Fisher, 2000; Lee et al., 2000; Aviv, 2001; Barnes-Schuster et al., 2002; Milner and Kouvelis, 2002; Taylor, 2002). Others have attempted to empirically establish the relationship between supply chain practices and performance (Narasimhan and Jayaram, 1998; Narasimhan and Das, 1999; Krause et al., 2000; Shin et al., 2000; Frohlich and Westbrook, 2001). However, most of the currently available evidence is based on hypothetical or self-reported data. Hence, it is not clear how well the evidence correlates to actual performance, and in particular to shareholder value.

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