

THE IMPACT OF LOGISTICS AND MANUFACTURING OUTSOURCING ON
SHAREHOLDER VALUE

By

Pedro Tapia de Miguel

Thesis

Submitted to the faculty of the
Graduate School of Vanderbilt University
in partial fulfillment of the requirements

for the degree of

MASTER OF SCIENCE

in

Management of Technology

December, 2005

Nashville, Tennessee

Approved:

David M. Dilts

Robert W. Blanning

ACKNOWLEDGEMENTS

This work would not have been possible without the financial support of Vanderbilt University and the Management of Technology Program. I am especially indebted to Dr. David Dilts, Professor and Director of the Management of Technology program for his guidance and patience.

I am grateful to everyone that helped me during these last two years. I would especially like to thank Dr. Vinod Singhal from Georgia Tech for his time and advice when we were learning to use the event study methodology. I would also like to thank Dr. Robert Blanning, professor of the Owen Graduate School of Management, for his invaluable advice while writing my thesis and my parents whose support has been invaluable. In addition, I am indebted to all the people in the Management of Technology program in particular to Mary Jane Buchanan and Flo Fottrell, thank you for all your help.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS.....	ii
LIST OF TABLES.....	iv
LIST OF FIGURES.....	v
Chapter	
I. INTRODUCTION.....	1
II. HYPOTHESIS AND ISSUES.....	5
III. SAMPLE SELECTION.....	12
IV. METHODOLOGY.....	16
V. EMPIRICAL RESULTS: EVENT STUDY RESULTS.....	21
Sensitivity Analysis.....	23
Post-announcement stock price performance.....	24
Some descriptive results.....	26
VI. RESULTS FROM REGRESSION ANALYSIS.....	30
Sensitivity Analysis of regression.....	35
VII. IMPLICATIONS FOR MANAGERS IN DEALING LOGISTICS AND MANUFACTURING OUTSOURCING.....	38
Make sure you follow the right strategy while publishing an outsourcing deal.....	38
VIII. SUMMARY.....	40
REFERENCES.....	57

LIST OF TABLES

Table	Page
1a. Descriptive statistics of manufacturing and logistics outsourcing firms.....	44
1b. Industry break down for manufacturing and logistics outsourcing firms.....	44
2. Countries receiving outsourcing contracts.....	45
3a. Event study results (manufacturing).....	48
3b. Event study results (logistics).....	48
4. Event study results for the market and mean adjusted models.....	49
5a. Descriptive statistics (manufacturing).....	54
5b. Descriptive statistics (logistics).....	55
6. Regression results.....	56

LIST OF FIGURES

Figure	Page
1. Linking supply chain performance with sourcing strategy.....	43
2a1. Manufacturing outsourcing histograms by month.....	46
2a2. Manufacturing outsourcing histograms by year.....	46
2b1. Logistics outsourcing histograms by month.....	47
2b2. Logistics outsourcing histograms by year.....	47
3a. Range of abnormal returns for Days (-0, 1) for manufacturing outsourcing.....	50
3b. Range of abnormal returns for Day 0 for logistics outsourcing.....	51
4a. Mean cumulative abnormal return.....	52
4b. Median cumulative abnormal return.....	53

CHAPTER I

INTRODUCTION

Many companies have revisited their operations strategies because of the global nature of markets and competition (Gunasekaran & Ngai, 2005). Enterprises have transformed themselves from centralized to decentralized institutions to be closer to their markets and to take advantage of available resources. In today's dynamic environment, strategic relationships with suppliers are a key ingredient to the success of a supply chain (Talluri & Narasimhan, 2004). Several studies have investigated sourcing strategies and their impact on the supply chain (Gunasekaran & Ngai, 2004; Miegheem, 1999; Waterson *et al.*, 1999; Novak & Eppinger, 2001; Talluri & Narasimhan, 2004) but, little work has been completed on the direct impact of sourcing strategies on external financial metrics. Our research fills this gap by focusing on strategic sourcing and its impact on shareholder value.

Carter *et al.* (1990) described strategic sourcing as an initiative to build competitive advantage through early supplier involvement in product engineering, sharing of supplier technology, and supplier assistance in developing product and process improvements. Strategic sourcing is a way to obtain capabilities without capital investments and the principal objectives are to reduce uncertainty and improve flexibilities (Miliken, 1987; Johnson & Johnson, 1991). In this study the terms sourcing, strategic sourcing and outsourcing are synonyms regardless of the location and nationality of the vendor or contracting firm.

Strategic sourcing can help companies improve the flexibility of their supply chains (Narasimhan & Das, 1999). Fundamental changes have occurred in the competitive market environment such as rapid technological shifts, higher risk levels, increased globalization, and greater customization pressures (Narasimhan & Das, 1999). Therefore, agility (flexibility and responsiveness) has become a competitive weapon for capturing market share in a global market (Gunasekaran & Ngai, 2005).

Strategic sourcing, or outsourcing, also may open new business opportunities. The business process outsourcing market in the US is a \$543 billion industry (Brown & Wilson, 2004), with manufacturing accounting for 44%, about \$239 billion, and logistics for \$81 billion or about 15% of the market. On the other hand, finance and accounting, administration, customer care, transaction processing and human resources represent the other 41% of the business process outsourcing market (Brown & Wilson, 2004). Therefore, researchers should pay special attention to two segments manufacturing and logistics.

Little attention has been paid to the effects of business process outsourcing on shareholder wealth. To our knowledge there have only been three such analyses. Hayes *et al.* (2000) studied the effects of information technology outsourcing on the stock market value of a firm for the period between 1990- 1997 with a sample size of 76 announcements¹. They found that there is a positive and significant market value gains when comparing smaller vs. larger firms and service vs. non-service industry firms. Kroes & Singhal (2004) found that there is a statistical significant positive reaction of the market to business process outsourcing. Their research was based on 75 public announcements between 1999 and 2003.

¹ This study makes normality assumptions that might not be strong for the sample size.

Logica CMG (2005) found that there is a 1.7% increase in stock price when performing outsourcing. They surveyed 7 different industries of stocks traded in the FTSE.²

Our study differs from previous empirical efforts in that it examines manufacturing and logistics outsourcing announcements. As mentioned before, previous research has focused on the effect on shareholder value of IT outsourcing (Kroes & Singhal, 1994; Hayes et. Al, 2000) and outsourcing in general (Logica CMG, 2005). We are analyzing the impact of outsourcing in shareholder value in two specific sectors: logistics and manufacturing. We applied Hendricks & Singhal (2003) event study method and theory to a different sector of the outsourcing industry.³

This paper measures the relationship between outsourcing announcements and shareholder wealth. The results presented are based on outsourcing announcements released between 1992 and 2003. Examples of such announcements are Motorola re-entering the TV market with products carrying its brand but built by a partner in Hong Kong (Ramstad, 2003); FedEx outsourcing three 747 cargo airplanes to Atlas Air in 1998 as part of FedEx strategy to restructure operations to reduce reliance on its own pilots (McCartney, 1998); and Dell's unusually sweeping outsourcing agreement in 1995, when they handed all responsibility for all its shipping to Roadway Logistics Systems (McCartney, 1995).

²The statistical significance of this paper is difficult to measure since they never mention the sample size.

³ We used Hendricks & Singhal paper (2003) because it is considered one of the most complete and technically strict event ever studies published.

We use event study methodology to determine the impact of outsourcing on shareholder value. This methodology measures the abnormal return of a stock when an outsourcing deal is publicly announced. Abnormal returns are the difference between the return of the stock, on the day of the announcement, and a benchmark (Hendricks & Singhal, 1996, 1997, 2001, 2003). The benchmark is used to control for market wide influences. In addition, we used variables such as size, growth prospects, capital structure (debt-equity ratio), and the timing of the outsourcing announcements to understand the way in which abnormal returns behave. Finally, we categorized our sample by type of outsourcing (logistics or manufacturing), time of the announcement (recent or old), and location (onshore or offshore) to gain a perspective on outsourcing.

This manuscript has 8 sections. Section 2 presents theory that relates outsourcing and shareholder value and the hypothesis tested. In Section 3 the sample selection process is described. Section 4 explains event study methodology. Section 5 presents the empirical results. In Section 6 several variables are used to explain the abnormal returns. Section 7 discusses the implication of outsourcing announcements for supply chain managers. Section 8 is a summary. In sections 4, 5 and 6 the results will be presented in the same order. The order is: when applicable combined results would come first, by combined we mean manufacturing and logistics together, followed by manufacturing results and finally logistics results would be presented.

CHAPTER II

HYPOTHESIS AND ISSUES

We present a framework that portrays the link between an outsourcing strategy and shareholder value. It is similar to previous models (Hendricks & Singhal, 2003; Evans & Danks, 1998; Tyndall *et al.*, 1998; Chopra & Meindl, 2001) but it includes outsourcing decisions as part of the supply chain strategy (See Figure 1).

The first link of the model depicts the relationship between operational metrics and supply chain (SC) strategy. SC strategy includes elements such as network design, integration strategies (Forlich & Westbrook, 2001), supplier development and sourcing strategies (Narasimhan & Das, 1999). The choice and implementation of these strategies directly impact operational metrics. Supply chain performance can be related to operational measures in areas such as forecasting and planning accuracy, supplier performance, delivery performance, lead time, inventory, capacity and quality (Handfield & Nichols, 1999; Simchi- Levi *et al.*, 2000). Although each company will tailor operational measures to their best interests, the performance of the firm will determine the efficiency, reliability and responsiveness of its supply chain (Tyndall *et al.*, 1998; Simchi- Levi *et al.*, 2000; Chopra and Meindl, 2001). Efficiency, reliability and responsiveness affect cash flow, earnings, company's reputation and credibility (Hendricks & Singhal, 2003). As a result, shareholder value is affected. Shareholders value superior management and execution capabilities and allocate a premium for it (Francis, 2002).

This framework suggests that the short and long-term cash flows are affected by sourcing strategies. On the cost side, being one main reason companies consider this strategy (Deloitte, 2005), outsourcing has deep impact on the income statement since paying the contractor is generally cheaper than owning and running assets or paying wages for in-house services (Boston Consulting Group, 2004). Also, productivity is enhanced given that attention shifts from running day- to- day operations to managing core competencies. In addition, outsourcing has an impact on customer service because a firm receives the same level of quality while paying less money for it (McKinsey, 2003). Higher customer satisfaction leads to higher loyalty and comfort levels among customers and good word of mouth publicity (Hendricks & Singhal, 2003).

With the framework presented in Figure 1, one can argue that there are a number of strategic implications when outsourcing. Fine and Whitney (1999) suggest the strategy of outsourcing capacity instead of knowledge to acquire or retain a core competency. When contracting third parties to perform an in-house process, a company develops dependency. This dependency might lead to a trap if the contract awarding firm company lacks the knowledge to do the process in-house. This is defined as knowledge outsourcing which, in the long term, enable suppliers to in source those activities (Fine and Whitney, 1999). On the other hand, outsourcing capacity opens a number of opportunities to the company, for example some of the benefits are transferring risk to vendors, integrating best practices, keeping up with technological innovation, taking advantages of economies of scale and being more flexible (Boston Consulting Group, 2004). As a result, investors may see the future optimistically and might value it with a premium when compared to similar firms. In

addition, raising capital will be easier and future cash flows will be more certain (Hendricks & Singhal, 2003). Outsourcing capacity may be a strategically sound decision for managers.

Firms must evaluate the potential benefits and associated risks when choosing to outsource logistics or manufacturing processes. We predict that investors will feel that the potential cost savings and performance improvements of outsourcing will outweigh the political and operational risks. In addition, research has demonstrated that there is a positive reaction in the stock market price when an information technology outsourcing announcement is made (Kroes & Singhal, 2004). Our main hypothesis is:

H1a: *Logistics outsourcing announcements have a positive effect in the stock market price of the contract granting firm*

H1b: *Manufacturing outsourcing announcements have a positive effect in the stock market price of the contract granting firm.*

Hypothesis 2 relates firm size and shareholder's reaction to announcements. There are three reasons for this. First, Kuper (2002) states that smaller companies are highly focused, and their profitability is critically dependent on the flawless execution of the supply chain for their limited set of products. When outsourcing capacity they become more flexible (Narasimham & Das, 1999) thus, meeting their objectives is more certain. Second, small firms are less tracked by investors and analysts. The aggregate demand for, and supply of, analyst services is an increasing function of firm size (Bushman, 1989). It is easier to predict stock price performance of a large company since there are so many people following it. Third, information of smaller firms is not as well anticipated when compared to larger firms (Brown, et. al, 1987). Finally, Banz (1981) found that stock returns do not follow a linear relationship when compared against firm size. Smaller firms are more likely to show larger returns than large firms. Therefore, an outsourcing announcement might be more of a

surprise and of a larger magnitude coming from a small firm than from a large firm. This leads to our second hypothesis:

H2a: The stock market's reaction to logistics outsourcing announcements will be more positive for smaller firms than larger firms.

H2b: The stock market's reaction to manufacturing outsourcing announcements will be more positive for smaller firms than larger firms.

Outsourcing announcements will have a larger positive impact in companies with high growth potential than for firms with low growth prospects. Growth prospects depend on the product, market and industry where the product is introduced; some products have shorter life cycles, higher contribution margins, and require shorter delivery times when compared to low growth prospects (Hendricks & Singhal, 2003). Companies with high growth potential products depend on reliable and responsive supply chains to be successful (Fisher, 1997). The economic impact of outsourcing is likely to be more positive on high growth firms than for low growth firms.

There is an indirect positive impact of outsourcing on high growth products (Fisher, 1997). When dealing with high growth products there are a number of competitors entering the market. It is likely that customers change suppliers if there are delays in product delivery. Demand can be unpredictable and change rapidly. In addition, high growth product markets are characterized by more competition. Thus, unreliable and unresponsive supply chains could cause existing customers to migrate to competitors, leading to loss of market share (Hendricks and Singhal, 2003). These issues might be less of a concern in low growth products as the products are standard, margins are low, and the basis on competition is more on cost. This leads to the next hypothesis:

H3a: Logistics Outsourcing announcements by high growth prospects firms will have more positive stock market reaction than low growth prospects firms.

H3b: Manufacturing Outsourcing announcements by high growth prospects firms will have more positive stock market reaction than low growth prospects firms

Our next hypothesis states that the debt to equity ratio moderates the market reaction to outsourcing announcements. We assume that the outsourcing announcements increase the market value of the firm and decrease its risk. Our proposition is that the lower the debt-to-equity ratio is of the firm, the more positive will be the abnormal returns experienced by its shareholders. We have mentioned before that outsourcing decreases the operating expenses of the firm, which increases the value of the firm. Furthermore, a change from fixed cost to variable cost decreases the operating leverage of the firm, which decreases the risk of the firm (Lev, 1974; Gahlon and Gentry, 1982; Lederer and Singhal, 1988).

There are theoretical and empirical evidence that the market value and risk affect of a firm the market value of debt and equity (Jensen & Meckling, 1976; Galai & Masulis, 1976; Smith and Warner, 1979; Masulis, 1980). Two conclusions, drawn from the previously mentioned papers, are interesting for our analysis. First, any action that affects the market value of the firm, also impacts the value of debt and equity. An increase (decrease) in the market value of the firm will increase (decrease) the market values of debt and equity. In addition, the debt to equity ratio determines the extent of change in the market value of debt and equity; for example, the higher the debt-to-equity ratio the greater the impact will be borne by the shareholder. The second interesting result is that a change in the risk of the firm will impact the value of debt and equity (Galai & Masulius, 1976, Smith and Warner, 1979). Particularly, if the risk of a firm increase there are two results, on the one hand the value of debt will decrease, on the other hand, the value of equity will increase. This

relationship is also a function of the debt-to-equity ratio, the higher the ratio, the higher the increase (decrease) in equity (in debt). We hypothesized that logistics and manufacturing outsourcing deals are likely to increase the market value of the firm and decrease the risk of the firm. Specifically:

H4a: *The higher the debt-to-equity, the less positive will be the stock market's reaction to logistics outsourcing announcements.*

H4b: *The higher the debt-to-equity, the less positive will be the stock market's reaction to manufacturing outsourcing announcements.*

We anticipate that recent outsourcing announcements (in calendar time) will have a larger positive abnormal return when compared to older deals. This argument follows the idea, based on recent supply chain management literature, that effectiveness is a key to remain competitive in the fast changing supply chain environment (Lee, 2001; Selen and Soliman, 2002; Heikkila, 2002). Global competition, product life cycles, technological changes, demanding customers, higher customer service levels, are increasing firm's attention in SC (Narasimhan & Das, 1999; Cachon & Fisher, 2000; Frohlich & Westbrook, 2001; Milner & Kouvelis, 2002; Swafford, *et al.*, 2003). Competitive market conditions have increased (Handfield & Nichols, 1999; Simchi-Levi *et al.*, 2000), therefore, the implications of new strategy adoption are expected to be more severe today than in the past. Our hypothesis is:

H5a: *Recent logistics outsourcing announcements will be valued more by shareholders than earlier outsourcing announcements.*

H5b: *Recent manufacturing outsourcing announcements will be valued more by shareholders than earlier outsourcing announcements.*

In order to better understand shareholder's reaction to logistics and manufacturing outsourcing we categorized our sample and measured their abnormal returns. We provide information on type of outsourcing deal (manufacturing or logistics), location of the deal

(onshore or offshore), and by calendar time (recent vs. old). In addition, descriptive statistics, for all the categories mentioned above, are included.

CHAPTER III

SAMPLE SELECTION

We searched the Wall Street Journal (WSJ), the Dow Jones News Service (DJNS), the Business Wire (BW) and PR Newswire (PR) for logistics and manufacturing outsourcing announcements between 1992- 2003. We used keywords and phrases such as “outsourcing” in the same paragraph as “manufacturing” and “logistics”, “capacity outsourcing”, “transportation outsourcing”, “third party manufacturing”, “contract manufacturing”, “third party logistics”, “warehouse”, “storing”, “moving” and “shipping”. We identified 400 relevant announcements. Based on a careful review of this sample we discarded 219 of them due to the following reasons:

- 46 announcements that included additional business information.⁴ Most of them earnings/ loss announcements.
- 64 announcements of firms not publicly traded on the New York Stock Exchange, the American Stock exchange or the NASDAQ exchange.
- 19 announcements for which sufficient daily stock price information in the Center for Research in Security Prices (CRSP) database was incomplete for our estimation period.
- 27 announcements that repeated previous information.

⁴ Confounding effects can modify the abnormal return measurement. This includes declaration of dividends, announcement of impending merger, filing for a large damage suit, earning announcements etc. Any of these events might have an impact on the share price during the event window and should be removed (McWilliams & Siegel, 1997).

- 33 announcements that discuss only using a contractor or third party provider for extra capacity during high demand periods, supply chain management consulting services and mergers or acquisitions of manufacturing outsourcing companies.
- 30 announcements to new product introduction, sales of equipment and manufacturing operations centralization.

Examples of manufacturing and logistics announcements are provided below:

<u>Manufacturing Announcement</u> Source: The Wall Street Journal Date: 2/4/2003	Solectron Corp. signed a manufacturing and supply agreement with Hewlett-Packard Co. valued at \$1.4 billion over five years.
<u>Logistics Announcement</u> Source: PR Newswire Date: 8/7/1996	Case Corporation, one of the world's largest farm and construction equipment companies, has awarded GATX Logistics, Inc. responsibility for warehousing services as part of a five-year agreement.

The remaining 181 announcements are sorted and analyzed. There are 123 manufacturing announcements of which 43 are onshore, 50 offshore, and 30 did not provide information on the location. In addition, there are 58 logistics outsourcing announcements; 49 are onshore, 5 offshore, and 2 with no location specified. Table 1a presents descriptive statistics about each sample. The mean asset value of the manufacturing firms is \$17.9 million with a median of \$1.9 million. Their sales accounted for \$14.8 million with a median of \$1.6 million. The sample of logistics outsourcing firms has an asset mean of \$18 million and a median of \$5.4 million. Their mean registered sales are \$15.8 million with a median of \$5 million.

Table 1b presents the SIC code for each of the announcements. The most prevalent SIC code for outsourcing is Computers, Electronics, and Communication with 84 (48%) announcements followed by Food, Furniture, Paper and Chemicals with 21 (12%). Information was obtained from Compustat database and refers to the industry classification code for the holding company. For example, Microsoft Corporation SIC code is 7370 or business services.⁵

Table 2 presents the countries receiving the outsourcing contracts. We were surprised when noticing the large number of companies outsourcing inshore. The US is the leading outsourcing destination with 43 (35%) announcements, followed by announces where there was no information available with 32 (26%). Global destination (global destination means that the outsourcing vendor operates in at least three different countries) ranked third with 12 (9%).

Financial information was retrieved from CompuStat on the year previous to the announcement.⁶ Additionally, the value of the manufacturing outsourcing deals, when mentioned, sums to a total of \$15.7 billion. Logistics announcements total value is \$292 million. The total of people fired, mentioned in the announcements, is 12,390 of whom 9,020 were rehired or relocated in other jobs.

⁵ At first glance this information does not seem logical. After analyzing the third and fourth numbers of the SIC codes we learn that it stands for computer programming and data processing. This is an example of a service firm which outsourced the manufacturing of a game console which relates to abnormal return measurement.

⁶ Compustat is a yearly data base, so the closest information to the announcement date not affected by the abnormal return is from the previous year.

There is no clustering of announcements in months or years (see Figure 2a and 2b).

Without clustering type I and type II errors are decreased (Chan, *et al.*, 2002). Overall, the months with the largest number of announcements are January and November with 21 announcements each. The year with the most announcements is 2003 with 32.

Manufacturing outsourcing announcements behave similarly where January and November are the highest activity months with 15 and 13 each and 2002 and 2003 the highest activity years with 25 and 27 announcements respectively. For logistics August and November are the highest activity months with 10 and 8 announcements each, while the most active year is 2001 with 11 announcements.

CHAPTER IV

METHODOLOGY

We use the event study methodology to estimate the impact of manufacturing and logistics outsourcing announcements (Hendricks, et. Al., 1995; Klassen & McLaughlin, 1996; Hendricks & Singhal, 1997, 2003). This methodology measures the impact of stock price variance when an outsourcing announcement is made, while controlling for market and industry wide influences (see Brown and Warner 1980, 1985 and MacKinlay, 1997 for a detailed description of this methodology, and Hendricks & Singhal, 1997, 2003 for applications of the methodology). The measurements are made using the percentage change of the stock or return, including dividends, and are known as abnormal returns. Event study methodology assumes that the market is efficient and rational, thus the impact of an outsourcing announcement can be calculated in short period of time.

We use the market model methodology to estimate the abnormal returns (Brown & Warner, 1980, 1985; Hendricks & Singhal, 1996, 1997, 2001, 2003; MacKinlay, 1997). This model relates the price of the stock within a portfolio in a linear way while controlling for systematic risk. We used daily stock returns for a given period. The relationship is:

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

where r_{it} is the return of stock i on day t , r_{mt} is the return of the portfolio on day t . In our study an equally weighted index of the Nasdaq, NYSE and AMEX securities, α_i is the intercept of the stock i , β_i is the slope created by market wide movements and the error

term ε_{it} which measures the movement of the stock price that is not related to market movements.

We estimate $\hat{\alpha}_i$, $\hat{\beta}_i$, and $\hat{S}_{\varepsilon_i}^2$ (the variance of the error term, ε_{it}) for each firm in the sample using ordinary least square (OLS) regression. Using procedures other than OLS for estimating the market model convey no clear cut benefit in detecting abnormal return (Brown & Warner, 1984).

Our data cover an estimation period of 100 trading days and firms that do not fulfill this parameter were rejected immediately (Brown & Warner, 1980). With this selection procedure, the probability of being included in our sample depends on the amount of data available for a security. This is known as the survivability bias. Brown & Warner (1980) suggest that this bias is not important for event studies. There is an estimation period buffer of two weeks or 11 days between the abnormal return measure and the regression. Since we are measuring abnormal returns, the estimation period should not be included while calculating the betas. Beaver (1968) showed that the market response to the earnings announcements was almost entirely captured by the two week period surrounding the earning announcement dates and Klassen & McLaughlin (1996) argue that using a 10 day period before the event date will limit any contamination of the estimation period by “insider trading”. Therefore, the estimation period starts from -110 days from the event date and finishes on Day -11.

The abnormal return is calculated by subtracting the expected return of the stock on day i to the real return of the stock. The term is denoted by A_{it} .

$$A_{it} = r_{it} - (\hat{\alpha}_i + \hat{\beta}_i r_{mt}) \quad (2)$$

\bar{A}_t denotes the average daily abnormal return is calculated by

$$\bar{A}_t = \sum_{i=1}^N \frac{A_{it}}{N} \quad (3)$$

where N is the number of firms in the sample. The cumulative abnormal return (CAR) is sum of all the measures on a given period and is expressed as:

$$CAR(t_1, t_2) = \sum_{i=t_1}^{t=t_2} \bar{A}_t \quad (4)$$

To test the statistical significance of the abnormal return we need the standardized abnormal return of each sample firm. It is calculated by dividing the daily abnormal return by the estimated standard deviation of the error term:

$$A_{it}^S = \frac{A_{it}}{\hat{S}_{\varepsilon_i}} \quad (5)$$

We then assume that under the null hypothesis abnormal returns are independent across firms with a mean 0 and a variance $\hat{S}_{\varepsilon_i}^2$. Therefore, the sum of N standardized abnormal returns is normally distributed with mean 0 and variance N . Hence, it is calculated as

$$TS_t = \sum_{i=1}^N \frac{A_{it}^S}{\sqrt{N}} \quad TS_t \text{ is } N(0,1) \quad (6)$$

To obtain the test statistic for multiple days we assume that abnormal returns are independent and identically distributed across time (Hendricks & Singhal, 1997, 2003). The multiple day test statistic is

$$TS_c = \frac{1}{\sqrt{N}} \sum_{i=1}^N \frac{\sum_{t=t_1}^{t=t_2} A_{it}}{\sqrt{\sum_{t=t_1}^{t=t_2} \hat{S}_{ei}^2}} \quad (7)$$

Non-parametric tests are used as confirmations of the t-tests to prevent outliers from driving the results (Dyckman, *et al.*, 1984; MacKinlay, 1997). We applied the Wilcoxon Signed Ranked test to determine if the median abnormal return is different from 0 and the Binomial Signed test to determine if the proportion of abnormal returns less than zero is significantly different from 50 percent (Hollander & Wolfe, 1973; Lehmann, 1975).

Calendar time is transformed to event time following this procedure. The day of the outsourcing announcement is Day 0. That is, when a company announces, manufacturing or logistics, an outsourcing deal is regarded as Day 0. The trading day before that is -1 and the next trading day after that is 1. The subsequent day is 2 and so on. Weekends, holidays and days where the market is closed are ignored. For the WSJ the day of the publication of the event is Day 0. If the first public announcement published in PR, DJNS, and Businesswire was made before the stock market closed (4p.m. Eastern time), then the event day was the same calendar date as the announcement date. If the announcement was made after the stock market closed, the event date was chosen to be the next trading day after the calendar date of the announcement (Hendricks & Singhal, 1996).

Our event study used a three day event period to test the hypotheses. This includes Days -1, 0 and 1 to capture the price effect of announcements which occur before and after the stock market closes on the event date (MacKinley, 1997). As a result, early public announcements of outsourcing deals or late market response to deals will not affect our measurements.

We controlled for partial anticipation by eliminating early announcements that only mentioned the intent to outsource. Malatesta & Thompson (1985) suggest a series of methods to control for partial anticipation on event studies. However, the information needed for such methods is rarely available. We controlled for partial anticipation by eliminating announcements from the sample that discuss the intent to outsource or that repeated the information in other publications. As mentioned earlier, in the sample selection section, 27 announcements repeated information on outsourcing deals. There is no data registering the number of announces that mentioned intent to outsource since they were removed during the initial screening for announcements.

CHAPTER V

EMPIRICAL RESULTS: EVENT STUDY RESULTS

Table 3a and 3b presents information that rejects the null hypotheses 1a and 1b. The information is based on the daily abnormal returns of 166 of the 181 outsourcing announcements. Abnormal returns for 15 announcements were not used in the analysis because they are outliers, that is, if the abnormal return was outside the upper (lower limit) of two and half times the standard deviation of the mean ($\mu \pm 2.5\sigma$) they are considered outliers (Draper & Smith, 1981). The mean abnormal return for logistics outsourcing announcements on Day 0 is -0.8% (t-static of 2.84, $P=.003$). The mean abnormal return for manufacturing outsourcing announcements on event Day (0, 1) is 0.82% (t-statistic of 2.35, $P=.01$). The evidence clear shows that on average, announcements of manufacturing outsourcing are associated with a positive stock price increase on event period (0, 1) and logistics outsourcing announcements are associated with a negative stock price decrease on the day of the announcement.

Several statistical indicators confirm this. For logistics outsourcing the median abnormal return is negative and significant with a value of -0.6% (Wilcoxon Z of -2.61, $P=.004$). For manufacturing outsourcing the median abnormal return is positive and highly with a value of 0.4% (Wilcoxon Z of 1.71, $P=.04$).

The distribution of the Day 0 logistics and event period (0, 1) manufacturing announcements also show similar findings. For logistics, the distribution is negatively

skewed with 38% of the announcements being positive. For manufacturing the distribution is positively skewed with 80% of the announcements being positive. The portion of the negative abnormal returns for the logistics outsourcing confirms that the sign of the median abnormal return is negative and statistically significant with negative percentage of 62% (Binomial Sign test of -1.66, $P=.05$).

There is anecdotal evidence that will give us an insight on why logistics outsourcing is perceived negatively by shareholders. Stalk, Evans and Shulman (1992) mentioned that Wal-Mart outperformed K-Mart in the 1990's because of Wal-Mart's strategic investment in a variety of interlocking support systems which include a private satellite communication system, 2,000 company owned trucks and 19 distribution centers. As a result Wal-Mart's logistics network is more fast and responsive (Stalk, Evans and Shulman, 1992). In addition, Kaipia and Tanskanen (2003) suggest that outsourcing is an appropriate strategy if own capabilities are developed and maintained in core functions and operations. Another reason for perceiving logistics outsourcing negatively is that organizations believe there would be loss of control over third party providers (Bardi and Tracy, 1991; Bowman, 1995; Byrne, 1993; Cooke, 1994; Lynch Et Al., 1994; Richardson, 1993). Also, Bradley (1995) suggests losing touch with important information, failure to select or manage providers properly, unreliable promises of providers, suppliers inability to respond to changes in requirements, their lack of understanding of the buyer's business goals as reasons why logistics outsourcing is penalize by shareholders. Additionally, Cooke (1988) and Muller (1991) attribute the poor performance of logistics deals to the difficulty of assessing the savings to be gained through outsourcing. Empirical evidence suggests that practitioners do not value logistics outsourcing strategies.

We calculated the mean dollar change in the shareholder value for the sample firms. For each firm, the Day 0 dollar change in value is the product of the market value of its equity on Day 0 and its abnormal return on that same day. The equity value on any trading day is the number of common shares outstanding times the share price at the end of that trading day. For ease of comparison, the dollar changes in value are converted to 2003 dollars using the S&P 500 index. In using the S&P index as a basis of comparison, we are assuming that the dollar change due to the outsourcing announcement is invested in the S&P 500 after the announcement and held till the end of 2003. The mean (median) dollar change in the shareholder value for manufacturing announcements is US \$30.5 million (-\$1.3 million) in 2003 dollars. The mean (median) change in shareholder value for logistics announcements is US -\$163.7 million (-\$1 million). In addition, 42% (52%) of companies that announced manufacturing outsourcing earned (lost) a cumulative total of US \$23 billion (-\$19.3 billion) in 2003 dollars with 7 (5%) companies not registering changes due to 0 return on Day 0. For logistics companies 16% (31%) earned (lost) a cumulative total of US \$6.1 billion (-\$15.3 billion) in 2003 dollars with 9 (16%) companies not registering changes due to 0 return on Day 0. Our results suggest that outsourcing deals can create large stock returns as well as large losses since there is high variance in the abnormal returns.

Sensitivity Analysis

We used the market adjusted and mean adjusted models to verify that the final results are unbiased (Brown & Warner, 1985). The market adjusted and mean adjusted models provide two benchmarks to compare against the findings of the market model (Hendricks & Singhal,

2003). The market adjusted model uses the market return as the standard and is calculated as:

$$A_{it} = r_{it} - r_{mt} \quad (8)$$

In this model, it is assumed that each firm in the sample is similar to the overall market ($\alpha_i = 0$ and $\beta_i = 1$).

The mean adjusted model uses as point of reference the stock's daily average return over the estimation period. The abnormal return is computed as:

$$A_{it} = r_{it} - \bar{r}_i \quad (9)$$

$$\bar{r}_i = \left(\frac{1}{D_{est}} \right) \sum_{t \in EstP} r_{it} \quad (10)$$

where \bar{r}_i is the mean of stock i daily return and D_{est} is the number of days in the estimation period.

The results of these two models are very similar to the market model. For manufacturing outsourcing, on Days (0, 1) the median abnormal return (AR) is -.001 with a P=.24 for market adjusted model and .0001 with a P=.4 for the mean adjusted model. For logistics outsourcing the median AR for Day 0 is -.004 with a P=.01 for the market adjusted model and -.006 with P=.01 for the mean adjusted model. The results shows that the magnitude of abnormal returns associated with outsourcing announcements are very similar across the different models.

Hendricks & Singhal (2003) used three additional models to control for variances while measuring the abnormal returns and obtained similar results with all of them. In addition, Brown & Warner (1985) and Dyckman, *et al.* (1984) have shown that the choice between the ordinary least squares regression and the Scholes and Williams (1977) procedure that controls for nonsynchronous data has no significant impact on the calculated abnormal returns. Since the results of the different models and previous research suggest that there is no distinction between the methods used, the rest of the results reported in this paper are those obtained from the market model.

Post-announcement stock price performance

Since the stock market reaction involves a three day interval (-1, 0, 1), it might appear that only the short term impact of the abnormal return is measured. Theoretically, since we assumed an efficient market, where the effect of an event will be rapidly reflected on the stock price, this is not possible. Therefore, measuring the abnormal return in a three day event period will give an unbiased estimate of the market reaction to outsourcing announcements. Nonetheless, some studies have documented statistically significant abnormal returns during a post-announcement period (Hendricks & Singhal, 2003). To test whether this behavior is present we estimated a 60 day trading period, roughly similar to a quarter in calendar time, subsequent to the outsourcing announcement.

Figure 4a and 4b illustrate the cumulative abnormal return for the logistics and manufacturing announcements. The graph includes Day -1, 0 and 60 days after the announcement. Figure 4a uses the mean cumulative abnormal returns and Figure 4b uses the median cumulative abnormal returns. The mean (median) CAR over the 60 day post announcement period for the entire sample of announcements is -0.11%, with a (-2.22%).

Both CARs are insignificantly different from 0 with t- test (Wilcoxon Z) value of 0.056, $p=.48$ (-0.99, $p=.16$). Logistics mean (median) CAR is 2.34% (-0.98%) with a t-test (Wilcoxon Z) value of 0.725, with a $p=.236$ (0.18, $p=.43$) which are insignificantly different from 0. Manufacturing mean (median) CAR is -1.25% (-3.52%) with a t- test (Wilcoxon Z) value of 0.48, $p=.32$ (-1.35, $p=.09$). In manufacturing the median CAR is insignificantly different from 0 during the 60 day period as well as for logistics. These results show that the manufacturing and logistics outsourcing announcements impact is wholly contained on the event period with no effect afterwards. Also, this graph confirms our assumption that the market is efficient.

Descriptive results

To provide additional insights into the stock market reaction associated with outsourcing, we categorized the announcements and estimated their abnormal returns. Table 5 presents these results. Keeping the original split between manufacturing and logistics outsourcing, we then divided the sample in two different ways. First, we analyzed abnormal returns by location of the outsourcing deal (onshore vs. offshore) and second, we analyzed the sample by calendar time (recent announcements vs. old announcements). The stock market reaction to manufacturing outsourcing is positive and statistically significant for offshore announcements with a mean of .7% and $P=.05$. On the other hand, logistics outsourcing announcements are statistically different for onshore announcements with a median of -.5% and $P=.02$ and mean -.7% and $P=.01$ for Day 0. Also logistics outsourcing announcements are statistically significant median of -.9% with $P=.01$ and mean -1% with $P=.01$ on Day 0.

Our findings are based on the Wilcoxon Z a non-parametric statistics because of the sample size⁷ and the T statistic.

The primary driver of the move to low cost location sourcing remains the large and sustainable cost advantage that companies can achieve (Deloitte, 2005). The cost advantage derives from several sources: lower labor cost, lower capital investment costs, lower domestic sourcing costs, larger economies of scale and government incentives. For example, accounting employees earn \$26 to \$30 per hour in the US, \$10 to \$12 in India and \$15 to \$18 per hour in Eastern Europe (Boston Consulting Group, 2004). In addition, the number of offshore workers with advanced degrees has grown substantially. For example, China's universities graduate almost as many scientists and engineers as their U.S. counterparts do. In addition, India enrolls more than 6 million people in 200 universities and 5,000 colleges (Robinson & Kalakota, 2004). By employing highly skilled work forces, offshore outsourcing vendors can often provide better quality services in a shorter time and at a lower cost compared to onshore vendors (Palvia, 2003). This information led us to believe that the median abnormal return of offshore announcements (both relating to manufacturing and outsourcing) will be significantly different from zero.

Abnormal returns are statistically significant for onshore logistics outsourcing announcements and offshore manufacturing announcements. The onshore logistics median abnormal returns, with N=44, for Day 0 is -.5% with a Wilcoxon Z -2.12 ($p=.02$). In addition, the mean abnormal return for onshore logistics announcements is -.7% with a t-

⁷ As mentioned before, MacKinlay (1997) suggests that the power of the t-statistic decreases when used with a sample smaller than 200.

statistic of 2.25 ($p=.01$). Offshore manufacturing abnormal returns mean, with $N=47$, for event Day (0, 1) is .7%. The t-statistic is 1.69 ($p=.05$). On the other hand, onshore manufacturing outsourcing does not have any statistically significant results as well as onshore logistics outsourcing announcements. These results suggest that stock holders appreciate manufacturing offshore deals and penalize for logistics onshore deals.

Kroes and Singhal (2004) found that recent outsourcing announcements have less positive effect on firm's stock market price. On the other hand, experts from the Boston Consulting Group (2004) state that the cost gap, the main reason to outsource (Deloitte, 2005), is unlikely to close within the next 20 years. In addition, countries like India will face fierce competition which will increase competitiveness in their sector. For example, India is likely to lose market share in offshore business process outsourcing (BPO), from its current 80 percent to about 55 percent by 2007 (Ribeiro, 2004). Based on the previous information we analyzed our data and measured the median abnormal returns on recent vs. old outsourcing announcements.

Recent outsourcing announcements logistics are statistically significant. "Old" announcements are denoted as announcements made before January 1st, 1998 after that date all announcements are referred as "recent". We choose this date because it approximately the middle point of the time period of the analysis. Recent logistics announcements median abnormal return is -.09% with a Wilcoxon Z of -2.37 ($p=.01$) for Day 0 with an $N= 33$. The median abnormal return for recent manufacturing outsourcing announcements is -.3% with a Wilcoxon Z of -1.48 ($p= .07$) with an $N=78$. There is no statistically significant evidence that "recent" or "old" manufacturing outsourcing announcements are different. Data

suggests that there is difference in the date for the measure of abnormal returns for logistics outsourcing deals.

CHAPTER VI

RESULTS FROM REGRESSION ANALYSIS

This section discusses results that test our hypotheses of size, growth prospect, debt-equity ratio, and earlier outsourcing announcements on the direction and magnitude of abnormal returns during the event period. This is the model we used:

$$Abret_i = \beta_0 + \beta_1 Size_i + \beta_2 Market-to-book_i + \beta_3 Debt-to-equity_i + \beta_4 Time_i + \varepsilon_i$$

where $Abret_i$ is the event period abnormal return for firm i . $Size_i$ is measured as the natural logarithm of sales in the most recent fiscal year ending prior to the announcement date.⁸

The sign is predicted to be positive for manufacturing (negative for logistics). Growth potential is calculated by the variable Market-to-book _{i} ratio.⁹ It is computed by the market value of equity, 10 days before the announcement date, with the book value of equity reported in the most recent fiscal year ending prior to the announcement date. Predicted sign of the coefficient is positive for manufacturing (negative for logistics). Debt-to-equity _{i} is measured by the ratio of the book value of debt to the sum of the book value of debt and the market value of equity. To measure all debt, we use total liabilities as reported in the most recent fiscal year ending prior to the announcement date. Predicted sign of the coefficient is negative for manufacturing (positive for logistics). Time _{i} measures the calendar date when the announcement was made. It takes a value of zero if the

⁸ We use the logarithmic transformation of sales to remove the skew in the distribution (Hendricks & Singhal, 2003).

⁹ Hendricks & Singhal (2003) suggest that this is the most commonly used ratio to measure growth potential.

announcement was made before January 1st, 1998 one otherwise. Predicted sign is positive for manufacturing (negative for logistics). ε_i is the random error.

Some announcements were removed from the sample because of missing information and outliers. In models 1a and 2a for manufacturing we dropped 5 samples because there was missing data in Compustat and 6 samples that were outliers.¹⁰ Regression 1a and 2a are based on a 103 announcement. In models 1b and 2b, for logistics, we dropped 8 announcements (3 incomplete, 5 outliers)). Regressions 1b and 2b are based on a 44 announcement sample.

Models 1a and 1b in Table 6 present the regression results for Day 1 and for event Day (0, 1) and dependent variables log-size, debt-to-equity, market-to-book ratio and calendar time. It is important to note that we use Event date (0, 1) for manufacturing and Day 9 for logistics as the independent variables in the regression because they were the only statistically significant results in the previous abnormal return analysis. The results suggest that none of the hypotheses are statistically significant. For manufacturing, Size is positive and not statistically different from zero with a $p=.3$ for logistics the variable is positive and not statistically significant with a $p=.52$. Therefore, there is no difference when large or small firms announce logistics or manufacturing outsourcing. We had predicted a positive coefficient for the market-to-book ratio for manufacturing and negative for logistics. The estimated coefficient for the growth prospect is negative for manufacturing and not statistically different with $p=.93$ for logistics it is also negative but not statistically

¹⁰ Hendricks & Singhal (2003) controlled for outliers systematically trimming the dependent variable (abnormal returns) at the 2.5% level on both tails and compared the results with the untrimmed sample. The conclusions from both regressions are similar. We trimmed in a similar manner.

significant with a $p=.61$. This indicates that the growth potential of a company, whether high or low, is not important for share holders when they outsource logistics or manufacturing operations. We had predicted a negative relation between debt-equity ratio and abnormal returns for manufacturing and negative for logistics. Both models present a negative sign with the results being not statistically significant with a $p=.94$ for manufacturing and $p=.5$ for logistics. Hence, there is no support for the relation between debt-equity ratio and abnormal returns associated with outsourcing announcements.

The estimated coefficient of time, which segments the sample in pre and post January 1st, 1998 announcements, is not significantly different from zero with a $p=.43$ for event date (0, 1) and $p=.96$ for Day 0. The evidence does not support our hypothesis that early outsourcing announcements enjoy more appreciation by stock holders than recent outsourcing announcements.

Overall the model is not significant with an F value of .18 Day 0 and .41 event date (0, 1). R^2 and adjusted R^2 values are .018 and -.083 for Day 0 and .016 and -.024 for event date (0, 1). These results are common when using cross-sectional data and are typical on cross-sectional regression models that attempt to explain abnormal return behavior (Hendricks & Singhal, 2003).

Empirical results differ from theory when dealing with logistics or manufacturing outsourcing announcements. Our hypothesis was that outsourcing announcements would have a positive impact on share holder wealth. Empirical evidence suggests that share holders neither value nor penalize companies that outsource logistics or manufacturing

when controlling for size, market to book ratio, debt to equity ratio and time of the outsourcing deal. While the current focus on improving the reliability and responsiveness of supply chains is timely and relevant, it is important to establish variables of importance for shareholders when determining their reaction to supply chain manufacturing or logistics outsourcing deals.

We completed exploratory analysis on other potential impact factors. The first is by type of industry. The specific industry groupings and SIC ranges, based on Hendricks & Singhal (2003) are:

- Industry 1 = 1 if the SIC code is between 0001 and 1999 (agriculture, natural resources), 0 otherwise.
- Industry 2 = 1 if the SIC code is between 2000 and 2999 (food, tobacco, textiles, lumber, wood, furniture, paper and chemicals), 0 otherwise.
- Industry 3 = 1 if the SIC code is between 3000 and 3569 or 3580 and 3659 or 3800 and 3999 (rubber, leather, stone, metals, machinery, equipment, other), 0 otherwise.
- Industry 4 = 1 if the SIC code is between 3570 and 3579 or 3660 and 3699 or 3760 and 3789 (computers, electronics, communications, defense), 0 otherwise.
- Industry 5 = 1 if the SIC code is between 3700 and 3759 or 3790 and 3799 (automobile, airlines, transportation), 0 otherwise.
- Industry 6 = 1 if the SIC code is between 4000 and 4999 (logistics, supply), 0 otherwise.
- Industry 7 = 1 if the SIC code is between 5000 and 5999 (wholesaling, retailing), 0 otherwise.
- Industry 8 = 1 if the SIC code is between 6000 and 9999 (services, financial services, government), 0 otherwise.

Using these industry variables, we estimate the following regression:

$$\begin{aligned}
Abret_i = & \alpha_1 Industry_1 + \alpha_2 Industry_2 \\
& + \alpha_3 Industry_3 + \alpha_4 Industry_4 \\
& + \alpha_5 Industry_5 + \alpha_6 Industry_6 \\
& + \alpha_7 Industry_7 + \alpha_8 Industry_8 + \beta_1 Size_i \\
& + \beta_2 Market_to_book_i + \beta_3 Debt_equity_i \\
& + \beta_4 Time_i + \varepsilon_i
\end{aligned}$$

Models 2a and 2b in Table 6 give the regressions results with the industry variables and four predictor variables.¹¹ As with our previous regression we used event Day (0, 1) for manufacturing and Day 0 for logistics as our independent variable due to the fact that they are the only statistically significant results when measuring abnormal returns. All the coefficients for size, market-to-book, debt-equity ratio, and time are positive and not statistically significant. The industry coefficients are negative and not statistically significant with one exception. That exception is industry 7 for model 2a with a t-statistic of -2.63 and $p=.01$. This industry is wholesaling and retailing. It seems that for shareholders, retail companies experience a smaller positive return when they announce a manufacturing outsourcing deal, the coefficient of the variable is -.05. An example of this type of diminishing abnormal return is the snowmobile company Redline which in 2003 announced the outsourcing of certain line of engine to a Canadian firm, the market perceived this sign as negative. The R^2 and adjusted R^2 of the model for Day 0 are .17 and -.10 and for event date (0, 1) R^2 is .16 and adjusted R^2 is .06. Shareholders do not value or penalize the outsourcing deals based on the industry where the contract-granting firm operates, with one exception: the retail industry is penalized in their stock returns if they outsource their manufacturing.

¹¹ Industry 8 is not included in Table 6 because there were no outsourcing announcements in our sample from that industry.

Sensitivity analysis of regression results

Hendricks and Singhal (2003) suggest using the following criteria to test the robustness of the regression results:

- *Multiple outsourcing announcement indicator*: a binary variable with a value of 1 if the outsourcing firm had a previous announcement, 0 otherwise. The regression using this model had a sample size of 83 for manufacturing and 30 for logistics. (See models 3a and 3b)
- *Capital intensity*: The ratio of property, plant and equipment to number of employees in the year prior to announcement. This ratio was not available for 35 firms in for event date (-1, 0) and Day 0. The regression using this model had a sample size of 83 for manufacturing and 30 for logistics. (See models 3a and 3b)
- *Research development and intensity*: the ratio of the research and development expense to the sales in the year prior to the announcement. This information is not available for 4 firms in both event dates. The regression using this model had a sample size of 80 for manufacturing and 29 for logistics. (See models 4a and 4b)
- *Industry competitiveness*: We use the Herfindahl-Hershman index (HHI) as a proxy for the degree of competition. While this index is traditionally a measure of concentration, it has been widely used as a proxy for competitiveness because the degree of concentration and the degree of competition are generally inversely related (Zeghal, 1983; Lang & Schulz, 1992). For each firm in our sample, we computed the HHI using sales of all firms in the Compustat database with three digit SIC groupings when available or two when there was little information as

that of the firm announcing the outsourcing deal.¹² HHI for an industry is defined as the sum of the squared fraction of industry sales by firm, based on reported sales in the most recent fiscal year completed before the outsourcing announcement. The regression using this model had a sample size of 66 for manufacturing and 23 for logistics. (See models 5a and 5b)

Table 6 presents the results with the control variables. Models 3a and 3b include variables capital intensity and multiple outsourcing indicators as dependent variables and manufacturing event Day (0, 1) and logistics Day 0 as independent variables since they are the only significant abnormal returns. They have the largest sample size, 83 for manufacturing and 30 for logistics, and none of the results are significant. For manufacturing outsourcing announcements the *p* values for size, market-to-book, debt-to-equity, time, multiple outsourcing indicator and capital intensity are the following .13, .77, .80, .23, .86, and .88 for logistics they are .86, .14, .93, .99, .06, and .18. Stockholders reaction to outsourcing announcements is not related to investment in property plant and equipment or if the company announces several outsourcing deals.

Models 4a and 4b include the variable research and development intensity. Sample size for manufacturing is 80 and for logistics is 29. Again the results are not significant and similar to previous models. The *p* values are for manufacturing .89 and .70 for logistics .18 and .49. Adding the research and development variable does not increase the explicative potential

¹² We followed Hendricks & Singhal (2003) paper and used the Compustat database to compute the Herfindahl-Hershman index.

of the regression. This evidence suggests share holders are not interested on the R&D spending when valuating firms that perform outsourcing deals.

Models 5a and 5b use the Herfindahl-Hershman index. This variable is used to measured competition in sample firm's industries. Sample size for manufacturing is 66 and for logistics is 23. None of the results are statistically significant. For manufacturing the p value is .53 and for logistics .16. Hence, stock holders do not value or penalize companies depending on the competitiveness of their industry.

CHAPTER VII

IMPLICATIONS FOR MANAGERS IN DEALING WITH LOGISTICS AND MANUFACTURING OUTSOURCING

The analysis of the shareholder value created by logistics and manufacturing outsourcing provides firms with an insight of the economic impact of outsourcing. The analysis clearly indicates that logistics outsourcing is perceived negatively by shareholders and that manufacturing outsourcing is perceived positively by shareholder but the effect is a transient one. This means that the positive or negative effect on the stock price will dilute a soon after the announcement. Thus, one of the main assumptions of our research, that the market is efficient, is strengthen as well. On the other hand, there is evidence that suggest that outsourcing has created as many successful firms as unsuccessful firms (Talluri & Narasimhan, 2004; Gunasekaran & Ngai, 2004; Novak & Eppinger, 2001). An obvious question for managers is: How can I make the most out of an outsourcing deal? In our view the following strategies can help managers to make the most out of their outsourcing deals.

Make sure you follow the right strategy while publishing outsourcing deals
Managers should develop strategies for releasing shareholder wealth information. Our research suggests that logistics and manufacturing outsourcing deals have statistically significant impact on shareholder wealth. Specifically, stock holders value manufacturing outsourcing deals while logistics shareholders do not. Based on these findings we recommend two strategies. First, companies completing manufacturing outsourcing deals should publish the contract in as many places as possible. This will inform shareholders of the cost containment measures the company is taking and will take advantage of the

positive impact that manufacturing outsourcing has on shareholder wealth. On the other hand, companies outsourcing their logistics operations should include this announcement when releasing other types of information. For example, logistics outsourcing deal information should be released with quarterly earnings announcements or with several other measures of cost control. This will decrease the harmful effects of the logistics outsourcing announcements on the shareholder value of a firm.

CHAPTER VIII

SUMMARY

This paper has examined the abnormal stock market reaction around the dates of a logistics or manufacturing outsourcing announcement. Based on sample of 181 announcements made during 1992-2003, we find that logistics outsourcing announcements have negative impact on shareholder value and that manufacturing outsourcing announcements have a positive impact. However, the firm's size, growth prospect, debt-to-equity ratio, and date of the deal do not influence the direction or magnitude of the abnormal return on either type of outsourcing. We also conducted a sensitivity analysis to strengthen our results using the variables: industry type, capital intensity, research and development intensity, industry competitiveness, time of the announcement and a multiple outsourcing indicator as explanatory variables. The results are not statistically significant and very similar to the first set of results with the exception of the retail industry which logistics outsourcing announcements are not as negative as for other industries. As a result, there are no significant patterns in the sample. We also segmented the sample according to the place of the outsourcing, the type of outsourcing, and outsourcing announcement timing. Again, no statistically significant patterns or results are present. Finally, we conclude that shareholders value manufacturing outsourcing deals and punish logistics outsourcing deals.

The logistics, and to a certain extent manufacturing, sample size pose a limitation to this research. Manufacturing outsourcing announcements are more common place than logistics. In addition, there is information missing from the Compustat database for many firms. As a

result, the sample size for logistics started small and decrease when including other variables. Small sample size limits the power of the parametric and non parametric statistics (McKinlay, 1997) used in this paper. In some cases the reliability of the Wilcoxon Z test will decrease well below 95% when analyzing a sample size of 100 or less. Therefore, confidence in logistics conclusions is not as robust as we had hoped. Another factor affecting the results would be the difference in yearly patterns of manufacturing outsourcing announcements when compared to the logistics outsourcing announcements.

There are a number of directions in which future research could prove useful. The first is estimating the impact of outsourcing in the capital structure of the firm in the long term. Our analysis focused more on the immediate impact in shareholder value of outsourcing. Further research is needed to determine if outsourcing is a long-term value generating strategy. Thus, identifying immediate and long-term effect will give managers a more comprehensive understanding of outsourcing strategies. Another direction would be to compare different outsourcing implementation strategies and their impact in the capital structure of the firm. Outsourcing experts and professionals have different ways to implement outsourcing. Thus, sourcing strategies have different impacts in different firms. Comparing different strategies and their impact to the capital structure of the firm may reveal best practices and increase in the implementation success rate. It would be interesting to study the impact of firm's outsourcing announcements in its competitors. Arguments can be made that predict an increase as well as a decrease in the competitors' stock prices. In addition, it would be of interest to study the impact of logistics and manufacturing outsourcing announcements on accounting based performance measurements and the magnitude of revisions in earnings forecasts by analysts. This would

shed light on how permanent are the benefits or negative consequences of logistics and manufacturing outsourcing.

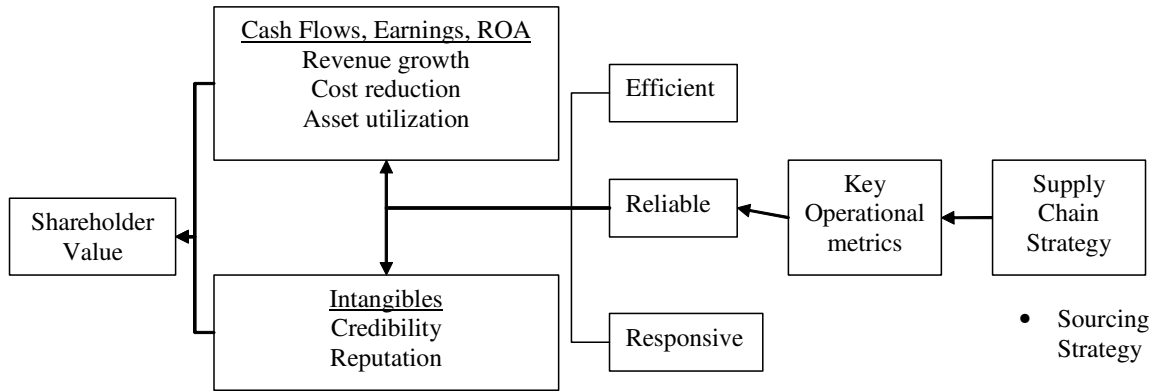


Figure 1. Linking supply chain performance with sourcing strategy

Table 1a. Descriptive statistics of manufacturing and logistics outsourcing firms

Manufacturing *

	Assets	Sales (Net)	Employees	Net Income	Liabilities total
Mean	\$ 17,857	\$ 14,861	\$ 57	\$ 159	\$ 12,221
Standard Deviation	\$ 36,845	\$ 27,969	\$ 103	\$ 2,406	\$ 29,878
Median	\$ 1,984	\$ 1,673	\$ 6	\$ 15	\$ 702

Logistics

	Assets	Sales (Net)	Employees	Net Income	Liabilities total
Mean	\$ 18,035	\$ 15,810	\$ 70	\$ 767	\$ 12,871
Standard Deviation	\$ 38,073	\$ 25,646	\$ 125	\$ 1,794	\$ 32,967
Median	\$ 5,378	\$ 4,965	\$ 19	\$ 188	\$ 3,217

* all numbers are in millions except for employees which is in thousands.

Table 1b. Industry break down for manufacturing and logistics outsourcing firms

Industry break down		SIC	All	%	Manufact.	%	Logisitcs	%
A	Agriculture, Forestry, & Fishing	0110-0971	0	0.00%	0	0.00%	0	0.00%
B	Mining	1010-1499	1	0.57%	1	0.81%	0	0.00%
C	Construction	1520-1799	0	0.00%	0	0.00%	0	0.00%
D	Manufacturing							
	Food, Furniture, Paper, and Chemicals	2010-2999	21	12.00%	17	13.82%	6	10.34%
	Rubber, Leather, Stone and Machinery	3010-3569	11	6.29%	8	6.50%	3	5.17%
	Computers, Electronics, and Communication	3570-3699	84	48.00%	67	54.47%	18	31.03%
	Transportation Equipment	3710-3799	9	5.14%	7	5.69%	4	6.90%
	Instrumentation and Medical Dev.	3810-3999	7	4.00%	6	4.88%	1	1.72%
E	Transportation, Communications, Electric, Gas,	4011-4971	11	6.29%	5	4.07%	6	10.34%
F	Wholesale Trade	5012-5199	3	1.71%	1	0.81%	2	3.45%
G	Retail Trade	5211-5999	9	5.14%	4	3.25%	5	8.62%
H	Finance, Insurance, & Real Estate	6011-6799	3	1.71%	2	1.63%	2	3.45%
I	Services	7011-8999	16	9.14%	5	4.07%	11	18.97%
J	Public Administration	9111-9999	0	0.00%	0	0.00%	0	0.00%

Table 2. Countries receiving outsourcing contracts

Manufacturing		
Countries		%
China	5	4.13%
Mexico	5	4.13%
Singapore	4	3.31%
Malaysia	2	1.65%
Canada	8	6.61%
France	2	1.65%
Ireland	1	0.83%
Taiwan	0	0.00%
Global	12	9.92%
US	43	35.54%
Scotland	3	2.48%
Italy	1	0.83%
Japan	1	0.83%
Korea	1	0.83%
Hong Kong	1	0.83%
N/A	32	26.45%

Logistics		
Countries		%
US	43	74.14%
Global	8	13.79%
N/A	7	12.07%

Global stand for outsourcing solutions delivered in more than three countries.

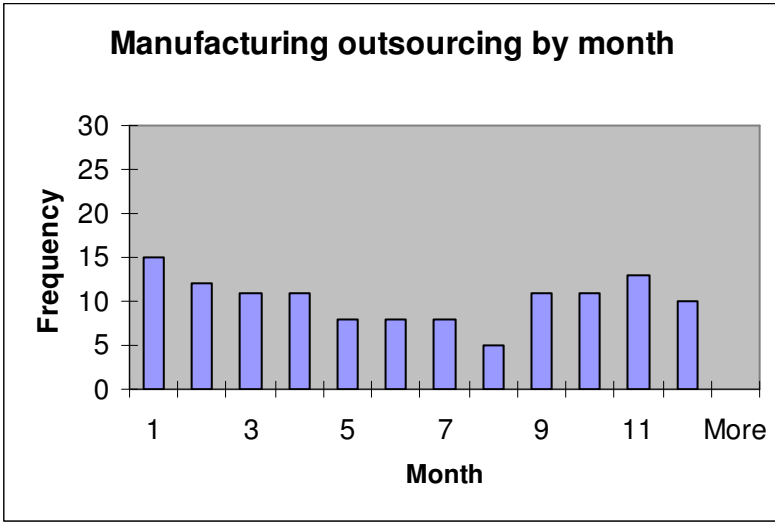


Figure 2a1. Manufacturing outsourcing histograms by month

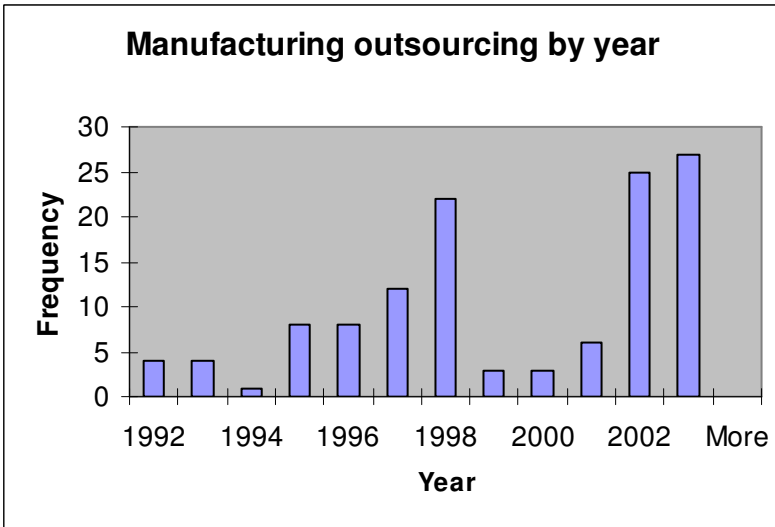


Figure 2a2. Manufacturing outsourcing histograms by year

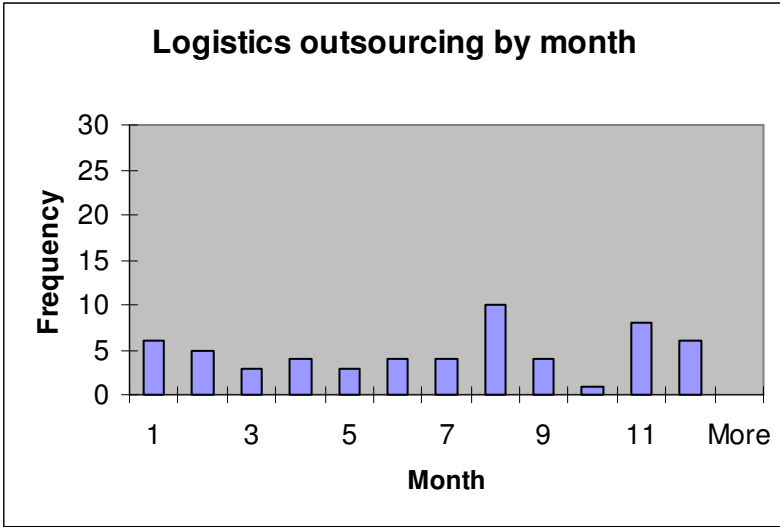


Figure 2b1. Logistics outsourcing histograms by month

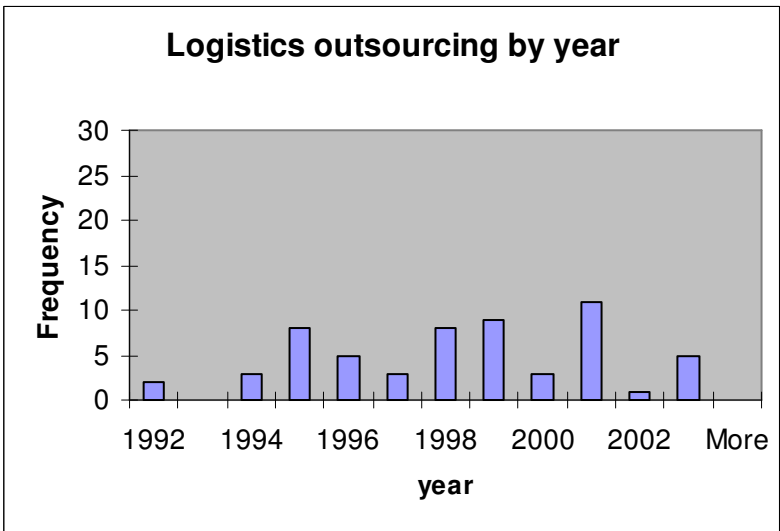


Figure 2b2. Logistics outsourcing histograms by year

Table 3a. Event Study Results

Manufacturing	-1	0	1	(-1, 0)	(0, 1)
Median	0.003	0.001	0.000	0.001	0.004
Mann- W.	-0.04	0.38	0.82	0.34	1.71
P value	0.48	0.35	0.21	0.37	0.04
Mean	-0.001	0.004	0.004	0.003	0.008
T.statistic	0.35	1.31	1.47	0.62	2.35
P value	0.36	0.10	0.07	0.27	0.01
% Positive	0.561	0.509	0.500	0.518	0.553
Binomial	1.31	0.19	0.00	0.37	1.12
P value	0.09	0.43	0.50	0.35	0.13

Table 3b. Event Study Results

Logistics	-1	0	1	(-1, 0)	(0, 1)
Median	0.001	-0.006	-0.001	-0.009	-0.005
Mann- W.	0.18	-2.61	-0.25	-1.48	-1.58
P value	0.43	0.00	0.40	0.07	0.06
Mean	0.001	-0.008	0.001	-0.007	-0.007
T.statistic	0.27	2.84	0.19	1.55	1.67
P value	0.39	0.00	0.43	0.06	0.05
% Positive	0.519	0.385	0.462	0.346	0.481
Binomial	0.28	-1.66	-0.55	-2.22	-0.28
P value	0.39	0.05	0.29	0.01	0.39

Bold numbers represent significance at the .05 level.

Table 4.

Event Study Results
Market and Mean Adjusted Models

Manufacturing					
Market Adjusted Model	-1	0	1	(-1, 0)	(0, 1)
Median	0.001	-0.003	-0.001	0.000	-0.001
Mann- W.	-0.03	-0.56	0.13	0.11	0.69
P value	0.49	0.29	0.45	0.46	0.24
Mean	0.000	0.002	0.002	0.002	0.004
T.statistic	0.01	0.63	0.77	0.42	1.19
P value	0.50	0.26	0.22	0.34	0.12
% Positive	0.544	0.439	0.482	0.500	0.482
Binomial	0.94	-1.31	-0.37	0.00	-0.37
P value	0.17	0.09	0.35	0.50	0.35
Mean Adjusted Model					
	-1	0	1	(-1, 0)	(0, 1)
Median	0.001	-0.004	-0.003	-0.003	0.000
Mann- W.	0.26	-1.41	-0.61	-0.19	-0.26
P value	0.40	0.08	0.27	0.43	0.40
Mean	0.003	0.000	0.001	0.002	0.000
T.statistic	0.69	0.14	0.19	0.41	0.03
P value	0.25	0.45	0.42	0.34	0.49
% Positive	0.513	0.407	0.442	0.451	0.504
Binomial	0.28	-1.98	-1.22	-1.03	0.09
P value	0.39	0.02	0.11	0.15	0.46
Logistics					
Market Adjusted Model	-1	0	1	(-1, 0)	(0, 1)
Median	-0.001	-0.004	0.000	-0.011	-0.003
Mann- W.	-0.15	-2.48	-0.26	-1.35	-1.34
P value	0.44	0.01	0.40	0.09	0.09
Mean	0.000	-0.007	0.001	-0.007	-0.007
T.statistic	0.04	2.42	0.15	1.48	1.40
P value	0.48	0.01	0.44	0.07	0.08
% Positive	0.481	0.327	0.500	0.404	0.442
Binomial	-0.28	-2.50	0.00	-1.39	-0.83
P value	0.39	0.01	0.50	0.08	0.20
Mean Adjusted Model					
	-1	0	1	(-1, 0)	(0, 1)
Median	0.002	-0.006	0.000	-0.004	-0.006
Mann- W.	0.25	-2.40	-0.11	-0.76	-1.23
P value	0.40	0.01	0.46	0.22	0.11
Mean	0.001	-0.006	0.001	-0.004	-0.005
T.statistic	0.49	1.68	0.29	0.92	0.77
P value	0.31	0.05	0.39	0.18	0.22
% Positive	0.519	0.327	0.500	0.481	0.423
Binomial	0.28	-2.50	0.00	-0.28	-1.11
P value	0.39	0.01	0.50	0.39	0.13

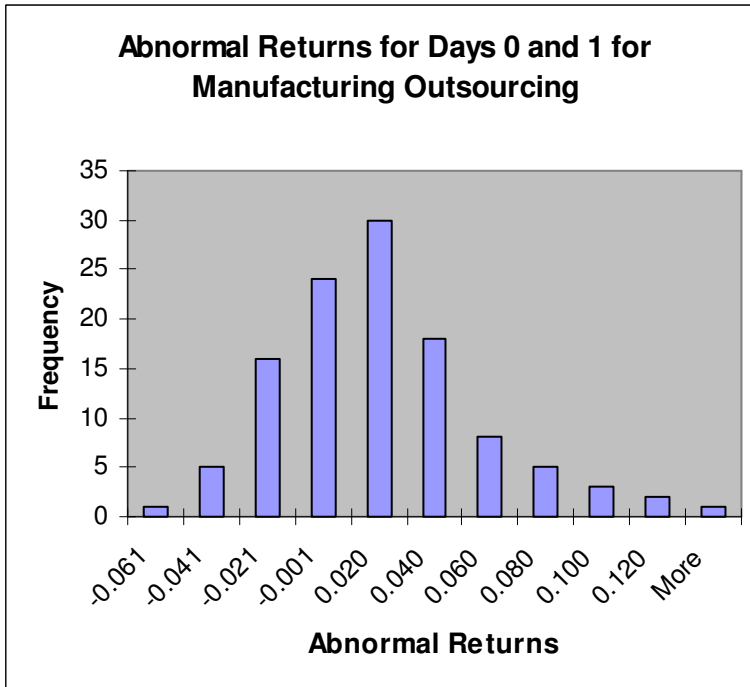


Figure 3a. Range of abnormal returns for Days (0, 1) for manufacturing outsourcing

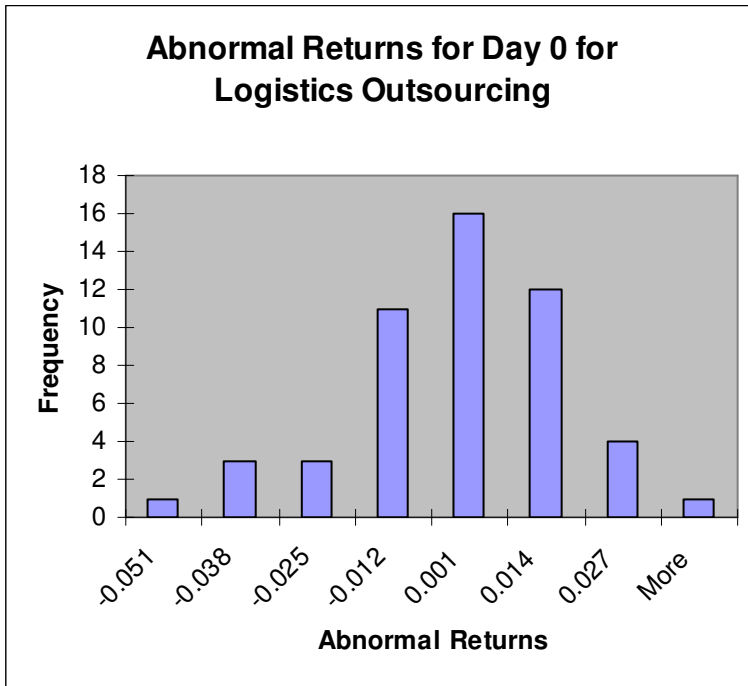


Figure 3b. Range of abnormal returns for Day 0 for logistics outsourcing

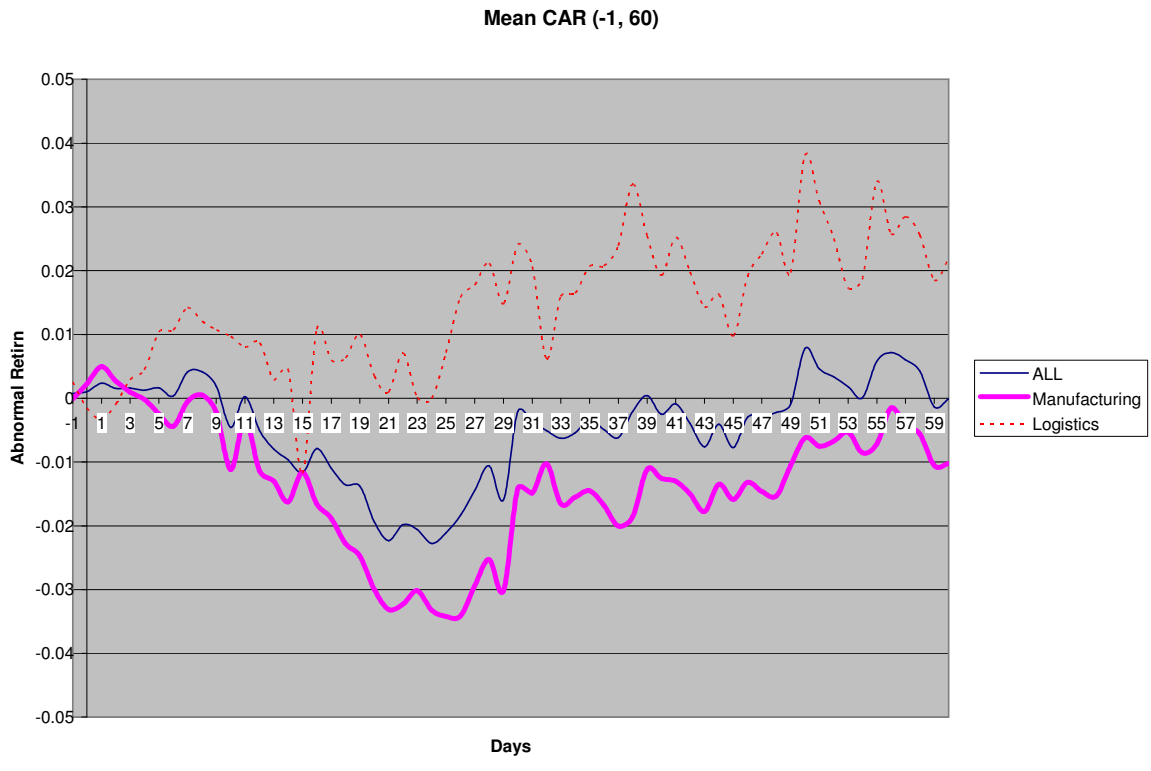


Figure 4a. Mean cumulative abnormal return

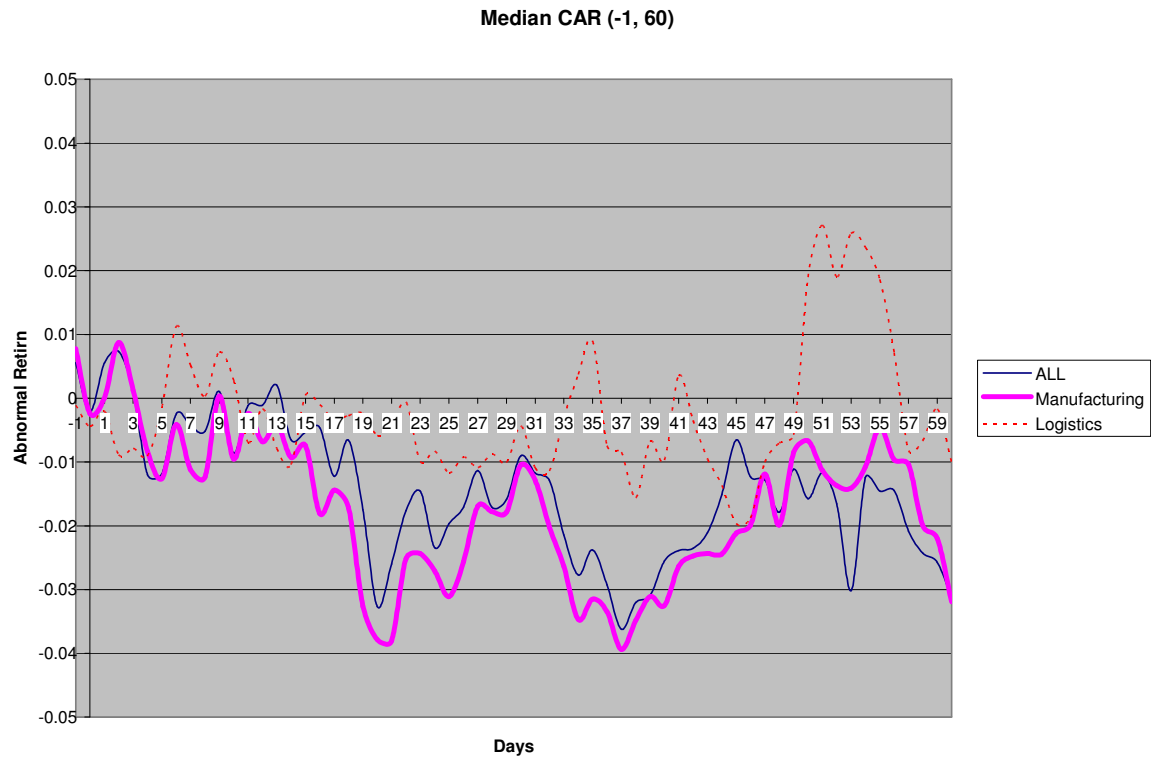


Figure 4b. Median cumulative abnormal return

Table 5a. Descriptive statistics

Manufacturing

		Onshore				
N 40		-1	0	1	(-1, 0)	(0, 1)
Median		0.001	-0.002	-0.001	0.001	0.002
Mann- W.		-0.07	0.09	-0.28	0.44	0.71
P value		0.47	0.46	0.39	0.33	0.24
Mean		0.002	0.007	0.002	0.009	0.009
T.statistic		0.22	1.15	0.42	0.99	1.27
P value		0.41	0.13	0.34	0.16	0.10
% Positive		0.525	0.450	0.500	0.525	0.525
Binomial		0.32	-0.63	0.00	0.32	0.32
P value		0.38	0.26	0.50	0.38	0.38
		Offshore				
N 47		-1	0	1	(-1, 0)	(0, 1)
Median		0.004	-0.004	0.005	-0.004	0.000
Mann- W.		0.47	-1.15	1.46	-0.68	0.26
P value		0.32	0.12	0.07	0.25	0.40
Mean		-0.002	-0.004	0.007	-0.006	0.004
T.statistic		0.46	0.92	1.69	0.79	0.85
P value		0.32	0.18	0.05	0.22	0.20
% Positive		0.638	0.468	0.511	0.489	0.468
Binomial		1.90	-0.44	0.15	-0.15	-0.44
P value		0.03	0.33	0.44	0.44	0.33
		Recent				
N 78		-1	0	1	(-1, 0)	(0, 1)
Median		0.002	0.000	-0.003	0.001	-0.004
Mann- W.		-0.33	0.79	-1.48	0.52	-0.09
P value		0.37	0.21	0.07	0.30	0.46
Mean		-0.001	0.005	-0.004	0.004	0.001
T.statistic		0.27	1.27	1.43	0.57	0.28
P value		0.39	0.10	0.08	0.28	0.39
% Positive		0.538	0.500	0.397	0.513	0.449
Binomial		0.68	0.00	-1.81	0.23	-0.91
P value		0.25	0.50	0.04	0.41	0.18
		Old				
N 36		-1	0	1	(-1, 0)	(0, 1)
Median		0.003	0.001	-0.002	0.001	0.000
Mann- W.		0.71	-0.39	-0.68	0.00	-0.22
P value		0.24	0.35	0.25	0.50	0.41
Mean		-0.001	0.002	-0.001	0.001	0.001
T.statistic		0.33	0.44	0.23	0.22	0.23
P value		0.37	0.33	0.41	0.41	0.41
% Positive		0.611	0.528	0.444	0.528	0.472
Binomial		1.33	0.33	-0.67	0.33	-0.33
P value		0.09	0.37	0.25	0.37	0.37

Table 5b. Descriptive statistics

Logistics

		N 44 Onshore				
		-1	0	1	(-1, 0)	(0, 1)
Median		0.001	-0.005	-0.001	-0.007	-0.005
Mann- W.		0.13	-2.12	-0.29	-1.19	-1.30
P value		0.45	0.02	0.39	0.12	0.10
Mean		0.001	-0.007	0.001	-0.006	-0.006
T.statistic		0.21	2.25	0.21	1.20	1.28
P value		0.42	0.01	0.42	0.12	0.10
% Positive		0.523	0.386	0.432	0.341	0.477
Binomial		0.30	-1.51	-0.90	-2.11	-0.30
P value		0.38	0.07	0.18	0.02	0.38

		N 5 Offshore				
		-1	0	1	(-1, 0)	(0, 1)
Median		0.001	-0.021	0.005	-0.021	-0.013
Mann- W.		0.67	-1.21	0.13	-1.21	-0.94
P value		0.25	0.11	0.45	0.11	0.17
Mean		0.004	-0.017	-0.001	-0.013	-0.017
T.statistic		0.76	1.52	0.08	0.85	0.96
P value		0.24	0.09	0.47	0.22	0.19
% Positive		0.600	0.400	0.600	0.400	0.400
Binomial		0.45	-0.45	0.45	-0.45	-0.45
P value		0.33	0.33	0.33	0.33	0.33

		N 33 Recent				
		-1	0	1	(-1, 0)	(0, 1)
Median		-0.005	-0.009	0.003	-0.010	0.000
Mann- W.		-0.56	-2.37	0.78	-2.05	-0.74
P value		0.29	0.01	0.22	0.02	0.23
Mean		-0.002	-0.010	0.005	-0.012	-0.005
T.statistic		0.44	2.73	1.11	1.95	0.85
P value		0.33	0.01	0.14	0.03	0.20
% Positive		0.424	0.333	0.515	0.242	0.515
Binomial		-0.87	-1.91	0.17	-2.96	0.17
P value		0.19	0.03	0.43	0.00	0.43

		N 19 Old				
		-1	0	1	(-1, 0)	(0, 1)
Median		0.008	-0.002	-0.006	0.000	-0.011
Mann- W.		1.45	-1.09	-1.57	0.32	-1.61
P value		0.07	0.14	0.06	0.37	0.05
Mean		0.006	-0.004	-0.007	0.001	-0.012
T.statistic		1.75	1.02	1.60	0.22	1.76
P value		0.05	0.16	0.06	0.41	0.05
% Positive		0.684	0.474	0.368	0.526	0.421
Binomial		1.61	-0.23	-1.15	0.23	-0.69
P value		0.05	0.41	0.13	0.41	0.25

Table 6. Regression results

Table 5. Regression Results*

Manufacturing					Logistics				
Model 1a (0, 1)					Model 1b Day 0				
	Predicted sign	Coefficients	t Stat	P-value	PS	Coefficients	t Stat	P-value	
Intercept	?	-0.0097	-0.769	0.44	?	-0.0070	-0.464	0.65	
Size	-	0.0013	1.033	0.30	+	0.0010	0.645	0.52	
Market to book	+	-0.0001	-0.082	0.93	-	-0.0004	-0.510	0.61	
Debt- equity	-	-0.0010	-0.073	0.94	+	-0.0096	-0.678	0.50	
Time	+	0.0053	0.799	0.43	-	-0.0003	-0.046	0.96	
R Square		0.016				0.018			
Adjusted R Square		-0.024				-0.083			
Observations		103				44			
F		0.41		0.80		0.18		0.95	

Model 2a (0, 1)					Model 2b Day 0				
	Predicted sign	Coefficients	t Stat	P-value	PS	Coefficients	t Stat	P-value	
Size	-	0.0010	0.751	0.45	+	0.0016	0.999	0.33	
Market to book	+	0.0009	0.779	0.44	-	0.0000	0.004	1.00	
Debt- equity	-	0.0096	0.660	0.51	+	0.0023	0.144	0.89	
Time	+	0.0086	1.268	0.21	-	0.0034	0.483	0.63	
Industry 1	?	-0.0134	-1.007	0.32	?	-0.0208	-0.914	0.37	
Industry 2	?	-0.0233	-1.433	0.16	?	-0.0007	-0.034	0.97	
Industry 3	?	-0.0134	-0.994	0.32	?	-0.0194	-1.111	0.27	
Industry 4	?	-0.0254	-1.421	0.16	?	-0.0313	-1.450	0.16	
Industry 5	?	-0.0272	-1.577	0.12	?	0.0088	0.373	0.71	
Industry 6	?	0.0315	1.543	0.13	?	-0.0325	-1.5429	0.13	
Industry 7	?	-0.0510	-2.635	0.01	?	-0.0230	-1.315	0.20	
R Square		0.165				0.173			
Adjusted R Square		0.064				-0.107			
Observations		103				44			
F		1.66		0.10		0.63		0.79	

* **Bold values are significant at the .05 level.**

Model 3a (0, 1)					Model 3b Day 0				
	Predicted sign	Coefficients	t Stat	P-value	PS	Coefficients	t Stat	P-value	
Intercept	?	-0.0254	-1.804	0.08	?	-0.1957	0.847	0.85	
Size	-	0.0023	1.523	0.13	+	-0.1821	0.857	0.86	
Market to book	+	0.0003	0.288	0.77	-	1.5131	0.144	0.14	
Debt- equity	-	0.0037	0.249	0.80	+	0.0856	0.933	0.93	
Time	+	0.0085	1.206	0.23	-	-0.0088	0.993	0.99	
Multiple Outsourcing Indicator	?	-0.0014	-0.176	0.86	?	-1.9891	0.059	0.06	
Capital Intensity	?	0.0000	0.146	0.88	?	-1.3670	0.185	0.18	
R Square		0.055				0.296			
Adjusted R Square		-0.020				0.11			
Observations		83				30			
F		0.74		0.62		1.61		0.19	

* **Bold values are significant at the .05 level.**

Table 6. Continued

		Model 4a (0, 1)			Model 4b day 0			
	<i>Predicted sign</i>	<i>Coefficients</i>	<i>t Stat</i>	<i>P-value</i>	<i>PS</i>	<i>Coefficients</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	?	-0.0235	-1.562	0.12	?	-0.0001	-0.003	1.00
Size	-	0.0020	1.079	0.28	+	-0.0011	-0.476	0.64
Market to book	+	0.0003	0.210	0.83	-	0.0034	1.543	0.14
Debt- equity	-	0.0028	0.180	0.86	+	0.0006	0.036	0.97
Time	+	0.0096	1.247	0.22	-	0.0012	0.157	0.88
Multiple Outsourcing Indicator	?	-0.0018	-0.204	0.84	?	-0.0221	-1.980	0.06
Capital Intensity	?	0.0000	0.134	0.89	?	0.0000	-1.392	0.18
Research and Development	?	0.0000	0.334	0.74	?	0.0000	0.704	0.49
R Square		0.056				0.314		
Adjusted R Square		-0.036				0.085		
Observations		80				29		
F		0.61		0.75		1.37		0.27

* **Bold values are significant at the .05 level.**

		Model 5a (0, 1)			Model 5b Day 0			
	<i>Predicted sign</i>	<i>Coefficients</i>	<i>t Stat</i>	<i>P-value</i>	<i>PS</i>	<i>Coefficients</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	?	-0.0336	-1.497	0.14	?	-0.0185	-0.687	0.50
Size	-	0.0025	1.206	0.23	+	-0.0023	-0.885	0.39
Market to book	+	-0.0012	-0.601	0.55	-	0.0033	1.203	0.25
Debt- equity	+	0.0128	0.641	0.52	-	0.0019	0.091	0.93
Time	+	0.0114	1.275	0.21	-	0.0041	0.389	0.70
Multiple Outsourcing Indicator	?	-0.0034	-0.358	0.72	?	-0.0263	-1.802	0.09
Capital Intensity	?	0.0000	-0.322	0.75	?	0.0000	0.581	0.57
Research and Development	?	0.0000	-0.079	0.94	?	0.0000	1.347	0.20
Industry Competitiveness	?	0.0000	0.631	0.53	?	0.0000	1.492	0.16
R Square		0.103				0.403		
Adjusted R Square		-0.023				0.062		
Observations		66				23		
F		0.82		0.59		1.18		0.37

* **Bold values are significant at the .05 level.**

REFERENCES

- Bardi, E.J., and Tracey, M., 1991. Transportation outsourcing: a survey of US practices. *International Journal of Physical Distribution & Logistics Management*, 21(3), 15-21.
- Banz, R.W., 1981. The relationship between return and the market value of common stocks. *Journal of Financial Economics* 9, 3-18.
- Beaver, W., 1968. The information content of annual earnings announcements. *Journal of Accounting Research* 6(3), 67- 92.
- Boston Consulting Group. 2004. Capturing global advantage: How leading industrial companies are transforming their industries by sourcing and selling in China, India and other low cost countries. In BCG Report (Ed.). Retrieved on April 15, 2005 from .bcg.com.
- Bowman, R.J., 1995. A high wire act. *Distribution*. December 36-39.
- Bradley, P., 1995. Third party gain slow, cautious support. *Purchasing*, 18 May, 51-52.
- Brown, L., Hagerman, R., Griffin, P., Zmijewski, M., 1987. An evaluation of alternative proxies for the market's assessment of unexpected earning. *Journal of Accounting and Economics* 9, 159-193.
- Brown, S.J., Warner, J.B., 1980. Measuring Security Price Performance. *Journal of Financial Economics* 8(3), 205-258.
- Brown, S.J., Warner, J.B., 1985. Using Daily Stock Returns: The Case of Event Studies. *Journal of Financial Economics* 14(1), 3-31.
- Brown, D., Wilson, S., 2004. The black book of outsourcing. John Wiley & Sons, Hoboken, New Jersey.
- Bhushan, R., 1989. Firm characteristics and analyst following. *Journal of Accounting and Economics* 11, 255-274.
- Byrne, P.M., 1993. A new roadmap for contract logistics. *Transportation and Distribution*, April, 58-62.
- Cachon, G., Fisher M., Supply chain inventory management and the value of shared information. *Management Science* 46, (8) 1032-1048.
- Carter, J., Narasimhan, R., 1990. Purchasing in the international marketplace: Implications for operations. *Journal of Purchasing and Materials Management* 26, (3) 2-11.

- Chan, K., Cheung, J., Wong, H., 2002. A comparison of event study methods for foreign firms listed on the US stock exchanges, *Journal of International Accounting Research* 1, 75- 90.
- Chopra, S., Meindl, P., 2001. Supply chain management: strategy planning and operations. Prentice Hall, Upper Saddle River, New Jersey.
- Clark, K., 1989. Project scope and project performance: The effect of parts strategy and supplier involvement in product development. *Management Science* 35, (10) 1247-1263.
- Clark, K., Fujimoto, T., 1991. Product development performance, strategy organization, and management in the world auto industry. Harvard Business School Press. Boston, MA.
- Cooke, J.A., 1988. Outsourcing: who will do your job. *Traffic Management*, May 38-43.
- Cooke, J.A., 1994. Third party logistics: has its time come? *Traffic Management*, October 71-73.
- Deloitte Consulting, 2005 April. Calling a change in the outsourcing market: The realities for the world's largest organizations. White paper, Deloitte Touche Tohmatsu, New York, NY.
- Draper, N., Smith, H., 1981, Applied Regression Analysis. John Wiley & Sons, Indianapolis, IN.
- Dyckman, T., Philbrick, D., and Jens, J.S., 1984, A comparison of event study methodologies using daily stock returns: a simulation approach, *Journal of Accounting Research* 22(Supplement), 1-30.
- Evans, R., Danks, A., 1998. Strategic supply chain management : creating shareholder value by aligning supply chain strategy with business strategy. In: Gattorna, J. (Ed.), Strategic supply chain alignment. Gower, Aldershot, pp. 18- 37.
- Fine, C., Whitney, D., 1999. Is the make-buy decision process a core competence? In Moreno Muffatto and Kulwant Pawar (eds.) *Logistics in the information age*, (1st ed., pp. 31- 63). Padova, Italy: Servizi Grafici Editoriali.
- Fisher, M., 1997. What is the right supply chain for your product? *Harvard Business Review*, Vol. 75, March-April, 105-116.
- Francis, S., 2002. The view of supply chain from Wall Street. In: Proceedings of the presentation made at the first annual supply network conference. San Jose, California, 18 September.

- Frohlich, M.T., Westbrook, R., 2001. Arcs of integration: an international study of supply chain strategies. *Journal of Operations Management* 19, 185- 200.
- Galai, D., Masulis, R., 1976. The option pricing model and the risk factor of stock. *Journal of Financial Economics* 3, 18-37.
- Ghalon, J., Gentry, J., 1982. On the relationship between systematic risk and the degree of operating and financial leverage. *Financial Management* 11, 15-23.
- Gunasekaran, A., Ngai, E., 2005. Build-to-order supply chain management: a literature review and framework for development. *Journal of Operations Management*. 23, 423-451.
- Hanflied, R.B., Nichols, E.L., 1999. Introduction to supply chain management. Prentice Hall, Upper Saddle River, New Jersey.
- Hayes, D.C., Hunton, J.E., Reck, J.L., 2000. Information systems outsourcing announcements: Investigating the impact on market value of contract-granting firms. *Journal of Information Systems* 14(2), 109-125.
- Heikkilä, J., 2002. From supply to demand chain management: efficiency and customer satisfaction. *Journal of Operations Management* 20, 747-767.
- Hendricks, K.B. and Singhal, V.R., 1996, Quality awards and the market value of a firm: an empirical investigation, *Management Science* 42, 415-436.
- Hendricks, K., Singhal, V., 1997. Delays in new product introductions and the market value of the firm: the consequences of being late to the market. *Management Science* 43, 422-436.
- Hendricks, K., Singhal, V., 2001. Firm characteristics, total quality management, and financial performance. *Journal of Operations Management* 19, 269-285.
- Hendricks, K., Singhal, V., 2003. The effect of supply chain glitches on shareholder wealth, *Journal of Operations Management* 21, 501-522.
- Hendricks, K., Singhal, V., Wiedman, C., 1995. The impact of capacity expansion on the market value of the firm. *Journal of Operations Management* 12, 259-272.
- Hollander, M. and Wolfe, D.A., 1973, Nonparametric statistical methods John Wiley & Sons, New York.
- Jensen, M., Meckling, W., 1976. Theory of the firm: managerial behavior, agency cost, and ownership structure. *Journal of Financial Economics* 3, 305-360.
- Johnson, D., Johnson N., 1991. Bottom line and beyond. *Industrial Management and Data Systems* 91, (7) 12-13.

- Kaipia, R., Tanskanen, K., 2003. Vendor managed category management-an outsourcing solution in retailing. *Journal of Purchasing & Supply Management* 9, 165-175.
- Klassen, R., McLaughlin, C., 1996, The impact of environmental management on firm performance. *Management Science* 42, (8) 1199-1214.
- Kroes, J., Singhal, V., 2004. The effect of offshore business services outsourcing announcements on the market value of the firm. [Working paper] College of Management Georgia Institute of Technology
- Kuper, A., 2002. Hardening Vulnerable links in the supply chain. *TOTALSupplychain*, February 2002, 1-4.
- Lang, L., Stulz, R., 1992. Contagion and competitive intra-industry effects of bankruptcy announcements: an empirical analysis. *Journal of Financial Economics* 32, 45-60.
- Lederer, P., Singhal, V., 1988. The effect of cost structure and demand risk in the justification of new technologies. *Journal of Manufacturing and Operations Management* 1, 339-371.
- Lee, H., 2001. Introduction to focus issue: the use of information in managing supply chains. *Manufacturing & Service Operations Management* 3, 51-52.
- Lev, B., 1974. On the association between operating leverage and risk. *Journal of Financial and Quantitative Analysis* 9, 627-642.
- LogicaCMG. 2005. Outsourcing for corporate value: Accelerating growth through outsourcing. White paper, LogicaCMG, London, UK
- Lehmann, E.L., 1975, Nonparametrics: Statistical methods based on ranks. Holden-Day, San Francisco.
- Lynch, M.E., Imada, S., Bookbinder, J., 1994. The future of logistics in Canada: A Delphi based forecast. *Logistics and Transportation Review*. 30(1), 95-112.
- Masulius, R., 1980. The effects of capital structure changes on security prices: a studying exchange offers. *Journal of Financial Economics* 8, 139-177.
- McCartney, S., 1995, February 15. Dell to outsource all it shipping to Roadway unit. *The Wall Street Journal*. Retrieved April 15, 2005, from Factiva.
- McCartney, S., 1998, November 12. Atlas Air to Unveil Agreement to Fly Planes for FedEx. *The Wall Street Journal*. Retrieved April 15, 2005 from Factiva.
- MacKinlay, A.C., 1997. Event studies in economics and finance. *Journal of Economic Literature* 35, 13-39.

- McKinsey Global Institute. 2003. Offshoring: Is it a win-win game? In MG Institute (Ed.)
- McWilliams, A. and Seigel, D., 1997, Event studies in management research: theoretical and empirical issues, *Academy of Management Journal* 40, 626-657.
- Milner, J., Kouvelis, P., 2002. On the complementary value of accurate demand information and production and supplier flexibility. *Manufacturing & Service Operations Management* 4, (2) Spring 2002, 99-113.
- Muller, E.J., 1991. How to profit using third parties. *Distribution* May, 31-38.
- Narasimhan, R., Das, A., 1999. An empirical investigation of the contribution of strategic sourcing to manufacturing flexibilities and performance. *Decision Sciences* 30, 683-718.
- Novak, S., Eppinger, S., 2001. Sourcing by design: Product complexity and the supply chain. *Management Science* 47 (1), 189-204.
- Palvia, S.C.J., 2003. Global outsourcing of IT and IT enabled services: Impact on US and global economy. *Journal of Information Technology Cases and Applications* 5(3), 1-11.
- Ramstad, E., 2003, October 15. Motorola Returns To the TV Business In 21st Century Way --- Products Carrying Its Brand To Be Built by a Partner Based in Hong Kong. The Wall Street Journal. Retrieved April 15, 2005, from Factiva.
- Ribeiro, J., 2003, August 30. India's BPO market likely to loose market share. Infoworld. Retrieved July 20, 2005, from http://www.infoworld.com/article/04/08/30/HNindiabpo_1.html
- Richardson, H.L., 1993. Why use third parties. *Transportation and Distribution*. January, 29-21.
- Robinson, M., Kalakota, R. 2004. Offshore Outsourcing. Mivar Press, Alpharetta, Georgia.
- Scholes, M., J. Williams, 1977. Estimating betas from nonsynchronous data. *Journal of Financial Economics* 5, 309-328.
- Selen, W., Soliman, F., 2002. Operations in today's demand chain management framework. *Journal of Operations Management* 20, 667-673.
- Simchi-Levi, D., Kaminsky, P., Simchi-Levi, E., 2000. Designing and managing the supply chain. McGraw Hill, New York, NY.
- Smith, C., Warner, J., 1979. On financial contracting: an analysis of bond covenants. *Journal of Financial Economics* 7, 117-161.

- Stalk, G., Evans, P., Shulman, L., 1992. Competing on capabilities: the new rules of corporate strategy. *Harvard Business Review* March-April, 57-69.
- Swafford, P., Ghosh, S., Murthy, N., 2003. The antecedents of supply chain agility: scale development and model testing. Working paper. Dupree College of Management, Atlanta.
- Talluri, S., Narasimhan, R., 2004. A methodology for strategic sourcing. *European Journal of Operational Research* 154 (1), 236-250.
- Tyndall, G., Gopal, C., Partsch, W., Kamauff, J., 1998. Supercharging supply chains: new ways to increase value by through global operational excellence. Wiley, New York, NY.
- Waterson, P., Clegg, C., Bolden, R., Pepper, K., Warr, P., Wall, T., 1999. The use and effectiveness of modern manufacturing practices: a survey of UK industry. *International Journal of Production Research* 37 (10), 2271-2292.
- Winkler, R., Hays, W., 1970. *Statistics: probability, inference, and decision*. Holt, Rinehart, and Winston.
- Zeghal, D., Industry, market structure, and the informational content of financial statements. *Journal of Accounting and Public Policy* 2, 115-131.