The Short and Long-Run Financial Impact of Corporate Outsourcing Transactions

by

Ning Gao

B.A. in Accounting, Ren Min University, 1998

M.A. in Economics, Florida State University, 2001

Submitted to the Graduate Faculty of

Joseph M. Katz Graduate School of Business in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

University of Pittsburgh

2006

UNIVERSITY OF PITTSBURGH

Joseph M. Katz Graduate School of Business

This dissertation was presented

by

Ning Gao

It was defended on

July 25, 2006

and approved by

Steven Husted, PhD, Professor

Frederik Schlingemann, PhD, Associate Professor

Shawn Thomas, PhD, Associate Professor

Chad Zutter, PhD, Assistant Professor

Dissertation Advisor: Kuldeep Shastri, PhD, Professor

The Short and Long-Run Financial Impact of Corporate Outsourcing Transactions

Ning Gao, PhD

University of Pittsburgh, 2006

This dissertation investigates the financial impact of a large sample of outsourcing contracts signed by corporations listed on the US markets from 1990 through 2003. We construct a data set that identifies the outsourcing client and vendor firms and use this data set to examine (a) the announcement effects of outsourcing contracts on firm value, (b) the impact of outsourcing contracts on long-run stock and accounting performance and (c) the impact of outsourcing contracts on the relation between client and vendor firms.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

Outsourcing defined as the delegation of non-core operations from internal production within a firm (client firm) to an external entity that specializes in that operation (vendor firm) became a popular buzzword in business in the mid 1990s. Although outsourcing has been a management practice for over 200 years it has received more attention in the recent past since the volume of international outsourcing has grown rapidly.[1] Proponents of outsourcing argue that this activity helps client firms by providing them with the ability to (i) purchase intellectual capital that may otherwise not be available to them, (ii) focus more on core competencies, (iii) better anticipate future costs and (iv) lower costs. This implies that outsourcing helps US firms become more profitable, thereby benefiting shareholders.[2] Opponents of international outsourcing argue that this activity hurts the economy of the United States of America, reduces the quality of service provided and jeopardizes security. For example, in the 2004 presidential campaign, Democratic candidate John Kerry claimed that international outsourcing was a major cause of unemployment in the US and blasted companies and Chief Executive Officers (CEOs) that outsource calling them "Benedict Arnold Corporations and CEOs" and argued for intervention by the US government. This view seems to be shared by the American public since a Zoghy International poll in 2004 reported that 71 percent of those polled believed that outsourcing jobs overseas hurts the US economy and 62 percent think that the government should impose legislative restrictions on outsourcing. In contrast, a *Wall Street Journal* poll of economists reports that only 16 percent of those surveyed saw outsourcing as having a significant impact on jobs. As a matter of fact, many suggested that outsourced jobs are replaced by better paying jobs in another

[1] For example, there was not much publicity when Eastman Kodak Company contracted away the management of its data centers to IBM Corporation in 1989 or when American Express set up its back-office operation in India more than a decade ago.

[2] For example, on December 9, 2002 when Anthem Inc. signed an information technology (IT) outsourcing contract with Affiliated Computer Services, Inc., the stock of Anthem Inc, displayed a market-adjusted abnormal return of 1.14 percent.

area/industry and that outsourcing is just a new way of doing international trade. For example, Drezner (2004) reports that although 70,000 computer programmers lost their jobs between 1999 and 2003, 115,000 computer software engineers found higher paying jobs within the same period. In addition, the McKinsey Global Institute has estimated that for every dollar spent on outsourcing to India, the US reaps between $1.12 and $1.14 in benefits.

As stated previously, outsourcing has been part of business practice for many years but has garnered much more attention recently because of both the historical and forecasted growth in the number and volume of these transactions. Figures 1 and 2 provide a historical perspective on the annual number and total value of outsourcing transactions signed by firms with stocks listed in the US over the period starting in January 1990 and ending in December 2003. As can be seen from these figures, the number of outsourcing deals per year has grown from 7 in 1990 to 216 in 2003 with a peak of 241 in 2002. The corresponding figures for the total value of outsourcing deals signed per year (in 2000 dollars) are $226.25 million, $27.78 billion and $61.98 billion (in 2002), respectively.[3] Deavers (1997) argues that this increase in outsourcing activities is a result of rapid technological change, increased risk and the search for flexibility, greater emphasis on core competencies and globalization.

In terms of future growth, the McKinsey Global Institute estimates that the size of this market is going to grow at a rate between 30 and 40 percent per year for the next five years. In addition, a recent report by the business consultant company INPUT states that outsourcing expenditures on the Information Technology (IT) sector alone is expected to grow from $10 billion in fiscal year 2005 to approximately $18 billion in fiscal year 2010.

Given the magnitude of the market for these transactions and the controversy surrounding offshore outsourcing, a natural question that arises is as follows: what is the magnitude of the benefits of outsourcing to the client and vendor firms and what are its determinants? The purpose of this paper is to examine the short and long-run financial impact of outsourcing transactions on client and vendor firms over the 1990 to 2003 period. Specifically, we first analyze the impact of announcements of outsourcing contracts on the stock prices of the client and vendor firms and provide an examination of the cross-sectional determinants of the announcement effect. Second, we study the impact of outsourcing contracts on the long-run

[3] The numbers reported in Figures 1 and 2 are based on the outsourcing sample used in this study. See Section 5 for more details on our sample.

accounting and stock performance of the client firms. Third, we analyze the impact of outsourcing contracts on the relation between the long-run accounting and stock performance of the client and vendor firms.

Our results indicate that the average abnormal return for client firms on the announcement day of outsourcing contracts (day 0) is an insignificant 0.145 percent. On the other hand, multivariate tests indicate that the announcement is associated with positive day 0 abnormal returns. Specifically, we find that the abnormal return decrease with client firm size and client firm flexibility while they increase with the relative size of the vendor firm to the client firm and client firm opacity. Based on these results, we conclude that the short-run of outsourcing transactions can be partially attributed information asymmetry. In addition, our results are consistent with the hypothesis that outsourcing is undertaken to take advantage of economies of scale, to have the ability to focus more on core competencies and to provide more operating flexibility.

We also find that the rivals of the client firms experience a negative day 0 abnormal return. This suggests that in the eyes of the market, signing the outsourcing contract provides the client firm with competitive advantages vis-à-vis the rest of the industry.

With respect to vendor firms we find that they gain 1.303 percent on the announcement day. This gain decreases with vendor size and increases with the size of the deal. We also find those deals that are renewals of previously signed deals have a smaller impact on day 0 stock prices. Overall this suggests support for hypothesis that the short-term effect of the announcements of outsourcing transactions on vendor firms are partially driven by information asymmetry. In addition, the results also indicate support for the hypotheses that the sources of gains to vendor firms from outsourcing are economies of scale and the amount the contract enhances the vendor's revenue stream.

We also find that the rivals of vendor firms experience a positive abnormal return on day 0. This result is consistent with the good news associated with the announcement having a contagion effect in the industry.

Given that vendors experience a positive abnormal return when it is learned that they have been awarded an outsourcing contract, one would expect the opposite on an announcement of a contract being cancelled by the client firm or when the client firm announces that the vendor was not chosen to be the partner in a particular transaction. Our results are consistent with this

hypothesis. Specifically, we find that vendors experience a negative day 0 abnormal return around such announcements.

In the case of client firms, long-run stock and accounting performance is consistent with the results reported above for short-run stock performance. Specifically, we find that the buy-and-hold returns (BHARs) for client firm stocks in the 3-year period prior to the outsourcing transaction are not significantly different from the BHARs for a control group of firms. On the other hand, BHARs for client firms in the post-outsourcing period are significantly larger than that for the control group. The same result hold for measures of accounting performance including sales per employee, income per employee, gross profit margin, net profit margin, and asset turnover.

Finally our results are consistent with the view that outsourcing transactions create a strategic partnership between client and vendor firms. Specifically we find that client and vendor firm stock returns are not correlated prior to outsourcing transactions but the correlation becomes significantly positive in the post-outsourcing period. The same result holds true for changes in accounting performance when accounting performance is measured by return on assets and asset turnover.

The remainder of this dissertation is organized as follows. Section 2 reviews the literature of the financial impact of outsourcing. Section 3 identifies the specific hypotheses that are tested here. Section 4 describes the methodology used in the tests of the hypotheses, while Section 5 contains a description of the sample and data. The empirical results and the interpretation of the results are contained in Section 6 and Section 7 concludes.

2.0 A REVIEW OF THE LITERATURE

The early outsourcing literature employs the "economics of transaction cost" model of the firm as the primary theoretical lens to examine outsourcing arrangements.[4] According to Coase (1937), the limits of the firm are determined by the relative production costs inside the firm as compared with the costs of using the market (outsourcing). Williamson (1985) attributes transactions costs to supplier hold-ups after customers have already invested in relationship specific assets. Thus, when hold-up problems are very costly, internal hierarchies are more advantageous to external relationships (outsourcing).

Grossman and Helpman (2002) theoretically examine a firm's decision to produce in-house or outsource. They model the "make or buy" decision as a trade-off between diseconomies of scope and the transaction costs that stem from search frictions and incomplete contracts. They find that where the cost advantage of specialized component producers is large and their bargaining power *vis-à-vis* specialized final producers is great, outsourcing is more likely to emerge in a stable equilibrium the greater is the substitutability between varieties of final goods.

The transaction cost theory of the firm suggests that as firms evolve and compare the costs of an internal versus external hierarchy, they will engage in outsourcing as they start to recognize that the production costs of managing their own internal operations may be reduced by outsourcing due to the effect of considerable economies of scale.[5] Specifically, by outsourcing, client firms can benefit from economies of scale when there are large specialist vendor firms that can provide the services at lower average cost..

Another possible reason for firms recognizing the value of outsourcing could be a result of an external shock to their operating environment. For example, Sharpe (1997) suggests that

[4] For more details on the theory of the firm based on the economics of transactions costs, see Coase (1937) and Williamson (1979).
[5] For example, see Abraham and Taylor (1996), Sharpe (1997), Deavers (1997) and McCarthy and Anagnostou (2004).

deregulation of telecommunications companies in the 1980s and public utility companies in the 1990s caused a change in the operating environment of these companies resulting in their embracing outsourcing as a more efficient way of doing business. Specifically, Sharpe states that "outsourcing did not emerge as the consequence of a sudden technical breakthrough, nor did it grow out of a best selling book by a well-known management guru. Rather, it was the result of market forces that emerged in response to demands for more efficient ways to address organizational competitiveness."

Quinn and Hilmer (1994) make a core competency argument for the use of outsourcing. Specifically, they suggest that the potential gains offered by outsourcing are optimized when outsourcing enhances a "core competency" business strategy. Thus, when correctly or optimally combined, core competency and extensive outsourcing strategies provide more flexibility, greater efficiency and better responsiveness to customer needs at lower costs. Most importantly, they suggest that strategic outsourcing provides organizations with a competitive edge in the long run.

There is anecdotal evidence that corporate decision makers act in a way consistent with this strategic outsourcing theory. For example, at the time of signing a five-year outsourcing contract worth $2.1 billion in July 1991 by LaBarge Inc. and McDonnell Douglas Co., William Maender, LaBarge's vice president, said that "it is an effort to improve operating efficiency, control costs, standardize practices among plants and comply with the demanding government reporting requirements of manufacturing for the defense market." In another example when Affiliated Computer Services Inc. (ACS) announced the renewal of a comprehensive IT outsourcing agreement with Affiliated Health Services of Mt. Vernon, Washington in January 2000, Tom Litaker, CFO of Affiliated Health Services said that "ACS has the experience and expertise to integrate technology with our business and help us reach our goals in the future. We expect ACS' broad range of services and industry knowledge to bring us efficiency and cost effectiveness in operations as we focus on providing the best possible care to our constituents."

In summary, the rationale for firms to outsource is that this activity helps organizations increase operating efficiency, reduce operating costs, while achieving an increased focus on core competencies. This would suggest that client and vendor firms should benefit in the short-run and long-run from signing these outsourcing contracts.

There are a few studies that have examined the short-run stock price impact of outsourcing transactions. One of the earliest papers is one by Hayes, Hunton and Reck (2000) in which they analyze the effect of the announcement to outsource all or a portion of a firm's information systems (IS) functions on the market value of the client firm. The first hypothesis they test is that IS outsourcing announcements will have a greater positive impact on the market value of smaller firms as compared to the market value of larger firms, because there tends to be more information asymmetry about smaller firms. Specifically, announcements made by small firms are expected to yield a greater market response because of the bigger surprise they generate. Second, they hypothesize that the impact of IS outsourcing announcements would have a greater positive impact on the market values of service firms as compared to the market values of non-service firms. This hypothesis is based on the argument that there is more information asymmetry about service firms since standard financial-reporting systems do not capture many factors (such as intellectual capital and other "soft" assets) important to service industries and that service firms allocate a higher proportion of their resources to information technology as compared to non-service firms. This implies that the reaction to the announcement should be more positive because it is more of a surprise and is more meaningful to the firm.

Using a sample of client firms that announce IS outsourcing arrangements from 1990 through 1997, they find no statistically significant stock price change for a two-day event window for their complete sample of client firms.[6] For their sub-sample of small firms, they report weakly significant positive abnormal stock returns for the two-day event window. For a one-day window (the day after the announcement day), they report significant positive abnormal stock returns for both small firms and service firms. Finally, they find support for both their hypotheses in a multivariate regression analysis.

There are several other papers that follow Hayes et. al. (2000) and employ the event study methodology to examine the short-run impact of the announcement of outsourcing transactions. For example, Farag and Krishnan (2003) examine IT outsourcing deals announced between January 1994 and August 2001 and find that there are positive announcement effects for outsourcing decisions by firms in the IT and service industries. They also find that the stock price react positively to the announcement of strategic sourcing projects but not to cost cutting projects. Gellrich and Gewald (2005) examine outsourcing decisions by firms in the financial

[6] The two-day event window consists of the announcement day and the day after the announcement day.

services industry and find that there are positive announcement effects associated with large deals, deals that involve experienced vendors and those that involve the IT function.

There is a paucity of empirical evidence on the long-run effects of outsourcing transactions. One exception is Gilma and Görg (2004) who examine the impact of outsourcing decisions by UK manufacturing firms on the labor productivity. They find that outsourcing is associated with improved labor productivity in the long-run.

A majority of the empirical literature on outsourcing focused on only one party in the contract, that is, either the client or vendor firm. In contrast, on the theoretical level the literature recognized outsourcing transactions as a project assigned by the client firm (the principal) to the vendor firm (the agent). This could lead to potential agency problems since the two parties do not have perfectly matched goal.[7] These agency issues can be mitigated by developing contracts between the two parties that specify the relationship between the two parties and define the performance metrics that can be used by the principal to monitor the agent.[8] More recently, it has been argued in the literature that rather than viewing outsourcing transactions as simple transactional contracts, they should be viewed as strategic alliances/partnerships between the client and vendor firms.[9] For example, Natovich (2003) uses a case study of a project failure to argue that a contract-driven approach to mitigate vendor risk in outsourcing transactions may not be as effective as a partnership approach to sharing risk.[10]

This strategic alliance view of outsourcing transactions has significant implications for the future relation between the accounting and stock price performance of the client and vendor firms. Specifically, one would expect the performance metrics for the two firms to become more correlated with each other after the signing of the outsourcing transaction.

This dissertation extends the extant finance and IS literature on outsourcing in a number of ways. First, it provides a more complete picture of the impact of the announcement of the signing of outsourcing transaction by looking at both the client and vendor firms. Second, it

---

[7] For example, see Banker and Kemerer (1992)
[8] For example, see Chaudhury, Nam and Rao (1995).
[9] For example, see Gallivan and Oh (1999).
[10] The case study in Natovich (2003) is that of an outsourcing contract between a telecommunications company, Bezeq (the client) and a software company, AMS (the vendor) to develop the code for a new billing system that was signed in September 1997. Bezeq cancelled the contract in August 1999 and terminated the project before even a single line of code was delivered.

analyzes the long-run impact of outsourcing transactions on client firms, an area not explored previously. Finally, it provides a direct test of the “strategic alliance” hypothesis.

3.0 THE TESTABLE HYPOTHESES

3.1 THE SHORT-RUN FINANCIAL IMPACT OF THE ANNOUNCEMENT OF OUTSOURCING TRANSACTIONS

The argument presented in the previous section would suggest that the announcement of outsourcing transactions should be associated with an increase in the client and vendor firms' stock prices. Again, the previous literature suggests that the magnitude of the stock price increase should vary across firms based on a number of factors that include firm size, economies of scale involved, the degree of focus on core competencies, flexibility provided by the outsourcing, the size of the contract and the location of the vendor firm.

3.1.1 Information Asymmetry

It is well recognized in the literature that the amount of publicly available information is not equal for firms of different sizes. Since large firms are more closely followed by media and analysts than small firms one would expect less information asymmetry to be associated with large firms. This would imply that announcements by smaller firms should be associated with a larger announcement-day movement in stock price. This suggests that **t**he market reaction of the client (vendor) firm's stock to corporate outsourcing announcements will be a decreasing function of the size of the client (vendor) firm.

3.1.2 Economies of scale

It was argued earlier that outsourcing takes advantage of the economies of scale available through the vendor firm by saving overall production costs and improving operating efficiency

for the client firm. It has also been suggested that larger firms enjoy better economies of scale than their smaller counterparts.[11] Thus, one would expect **t**he market reaction of the client firm's stock to corporate outsourcing announcements to be the smallest for contracts between large clients and small vendors and the largest for contracts between small clients and large vendors.

3.1.3 Focus on core competency

It was argued earlier that by focusing on its core competencies and strategically outsourcing other activities, a firm can create unique value for their customers and that, in turn, can help the firm maintain its competitive edge in the long run. Therefore, this increase focus in core competencies should translate into higher stock values for the client firm.

We use opacity as a measure of the degree to which a firm has focused on core competencies. Specifically, opacity measures whether a firm's earnings are more dependent on the realization of future growth opportunities than on assets already in place. The specific measure of opacity used here is net plant, property and equipment (PPE) divided by total assets (PPE/TA) with firms having high values of PPE/TA being considered more transparent and being more focused on core competencies. This suggests that the market reaction of the client firm's stock to corporate outsourcing announcements will be a decreasing function of opacity (PPE/TA).[12]

3.1.4 Flexibility

Outsourcing can also help provide greater flexibility, especially in the purchase of rapidly developing new technologies, fashion goods, or the myriad components of complex systems.[13] It

[11] For example, see Sharpe (1997).
[12] One possible problem with this conclusion is that our measure of opacity may just be a proxy for firms in the business service industry since such firms tend to have a low PPE to total assets ration. To ensure that are results are not driven by this factor, we examine firms that do not belong to the business service industry separately. Our results indicate that firms with low opacity in this group experience a day 0 abnormal return of 1.455 percent with an associated significance level of 10 percent. This suggests that the argument that client firms outsource to focus on core competencies is not driven by firms in the business service industry.
[13] For example, see Carlson (1989) and Domberger (1998).

allows companies to incorporate the latest technology and respond to changes in business environment more quickly and at a lower cost than vertically integrated organizations. Flexibility is measured here by two liquidity ratios - the current ratio and the quick ratio. Specifically, the higher a firm's liquidity ratio, the better able they are to meet short-term obligations and the greater their financial flexibility. Since client firms with low liquidity ratios have less financial flexibility, we would expect them to benefit more from outsourcing. Therefore, the market reaction of the client firm's stock to corporate outsourcing announcements will be decreasing function of firm liquidity.

3.1.5 Contract Size

It can be argued that a larger contract size represents potentially larger cost savings for the client firm and a potentially larger revenue stream for the vendor firm. This would suggest that the market reaction of both the client firm's and vendor firm's stocks to outsourcing contract announcements increases with the size of the contract.

3.1.6 Country of origin

A number of groups have suggested that international outsourcing is not good for the US economy because it results in a firm substituting higher paying jobs in the US for lower paying jobs in another country. This would imply that the announcement of international outsourcing contracts should be associated with a larger market reaction in the client firm's stock price as compared to the announcement of domestic outsourcing contracts. On the other hand, it has been argued that outsourcing of any sort is a response by firms facing a complex change in its cost boundaries and the choice between domestic and international vendor firms is solely dependent on which firm provides the best strategic fit.[14] In this scenario, the market reaction of both the client firm's stock to outsourcing contract announcements should not be dependent on the country of origin of the vendor.

[14] For example, see Deavers (1997)

3.2 THE LONG-RUN FINANCIAL IMPACT OF THE SIGNING OF OUTSOURCING TRANSACTIONS

As stated previously, the second objective of this dissertation is to examine the impact of outsourcing transactions on the long-run performance of the client firms. In the previous section we argued that the announcement of outsourcing transactions should be associated with an increase in the client firm's stock price. This hypothesized increase in stock price results from an expectation in the market that the client firm will be operating more efficiently in the future. Thus one would expect that client firms would exhibit abnormally positive long-run accounting and stock price performance. In addition, since the impact of outsourcing is hypothesized to be more positive for smaller, more opaque and less flexible client firms, we would expect the same to be true with long-run abnormal performance.

3.3 OUTSOURCING TRANSACTIONS AS STRATEGIC ALLIANCES/PARTNERSHIPS

As stated earlier, it has been argued in the literature that rather than viewing outsourcing transactions as simple transactional contracts, they should be viewed as strategic alliances/partnerships between the client and vendor firms. This strategic alliance view of outsourcing transactions has significant implications for the future relation between the accounting and stock price performance of the client and vendor firms. Specifically, one would expect the performance metrics for the two firms to become more correlated with each other after the signing of the outsourcing transaction.

4.0 THE METHODOLOGY

4.1 ESTIMATING THE SHORT-RUN IMPACT OF THE ANNOUNCEMENT OF OUTSOURCING TRANSACTIONS

4.1.1 Estimating Abnormal Returns and Test Statistics

We estimate the short-run impact of the announcement of outsourcing transactions using the methodology outlined in Brown and Warner (1985) to calculate abnormal returns on stocks around a day of interest. Specifically, for all the outsourcing deals in our sample, we define the contract announcement day as event day zero.[15] A trading date that is t days before the announcement day is denoted as day –t, while a trading day t days after the announcement is denoted as day +t. The analysis is based on stock returns over a period starting at day -250 and ending at day +10 (-250, +10). The first 240 days in this period (-250, -11) are designated as the "estimation period", and the following 21 days (-10, +10) are designated as the "announcement period". The "market model" is used to adjust for market-wide risk factors. Specifically, for any security j, the abnormal or excess return over each of the t=-10, ...,10 days around the time of the contract announcement is defined as,

$$A_{jt} = R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j R_{mt}) \tag{1}$$

where A_{jt} is the abnormal return for security j at event day t, R_{jt} is return on security j at event day t and R_{mt} is return on Center for Research in Security Price (CRSP) value-weighted index at event day t. The coefficients $\hat{\alpha}_j$ and $\hat{\beta}_j$ are Ordinary Least Squares (OLS) estimates

[15] A description of our sample and the methods used to identify the announcement date are provided in Section 5.

from the regression of the return on security j on the CRSP value-weighted index over the estimation period.

The statistical significance of the abnormal returns is assessed in two ways depending on whether the returns under consideration are one event day or multiple event days in the announcement period. For a single event day, the t statistic is calculated as the ratio of that event day's mean excess return to its estimated standard deviation. Specifically, let N_t represent the number of sample securities whose excess returns are available on event day t. Then we can express the test statistic for any single event day t as,

$$\bar{A}_t / \hat{S}(\bar{A}_t) \tag{2}$$

where

$$\bar{A}_t = \frac{1}{N_t} \sum_{j=1}^{N_t} A_{jt} \tag{3}$$

$$\hat{S}(\bar{A}_t) = \sqrt{(\sum_{t=-250}^{-11} (\bar{A}_t - \bar{\bar{A}})^2) / 239} \tag{4}$$

and

$$\bar{\bar{A}} = \frac{1}{240} \sum_{t=-250}^{-11} \bar{A}_t \tag{5}$$

The test statistic has a Student-t distribution.

For tests over multi-day intervals, our test statistic is calculated as follows. The measure of abnormal performance of any security j between any two days d_1 and d_2 in the announcement period is given by the cumulative abnormal returns,

$$CAR_j = \sum_{t=d_1}^{d_2} A_{jt} \tag{6}$$

The mean cumulative abnormal return between days d_1 and d_2 for the N securities in the sample is given by,

$$\overline{CAR} = \frac{1}{N} \sum_{j=1}^{N} CAR_j \tag{7}$$

The test statistic is defined as the ratio of the mean cumulative abnormal return to its estimated standard deviation, which is expressed as,

$$\overline{CAR} \Big/ \sqrt{\sum_{t=d_1}^{d_2} \hat{S}^2(\overline{A}_t)} \tag{8}$$

where $\hat{S}(\overline{A}_t)$ in the denominator is defined as in equation (4). This test statistic is also distributed as a Student-t.

4.1.2 Cross-Sectional Tests

Cross-sectional tests are conducted to ascertain what firm and contract characteristics have an impact on the stock price reaction to announcements of outsourcing transactions. Specifically, we regress the client (vendor) firms' day 0 abnormal returns on measures of firm and contract characteristics. The regression for client firms is of the form:

$$\begin{aligned} A_j = {} & \alpha + \beta CSize_j + \chi CSizevsVSize_j + \delta C\,\mathrm{Re}lativeDealSize_j + \phi Opacity_j \\ & + \varphi Liquidity_j + \eta\,\mathrm{Re}newal_j + \gamma ForeignV_j + \theta Early_j + \pi Interactive_j + \varepsilon_j \end{aligned} \tag{9}$$

where A_j is the client j's day 0 abnormal return, $CSize_j$ is either the log of client firm sales or market value of equity (MVE), $CSizevsVSize_j$ is the log of vendor size divided by client firm size, $C\,\mathrm{Re}lativeDealSize_j$ is the log of contract value per year divided either by client firm's costs of goods sold or by MVE, $Opacity_j$ is the log of client firm's ratio of property plant and equipment (PPE) to total assets, $Liquidity_j$ is the log of client firm's current or quick ratio, $\mathrm{Re}newal_j$ is a dummy variable that equals 1 when the contract is a renewal of a existing contract, $ForeignV_j$ is a dummy variable that takes on a value of 1 if the vendor firm of the contract is a foreign firm, $Early_j$ is a dummy variable tthat takes on a value of 1 if the deal occurs before 1998 and $Interactive_j$ is the interaction of the time dummy with other independent variables. [16]

[16] All variables based on accounting data are measured at the end of the year preceding the contract announcement year.

Based on arguments presented previously, we would expect the coefficients of client size (β), relative client to vendor size (χ), opacity (ϕ), flexibility (φ) and the renewal dummy (η) to be negative, while that of deal size (δ) to be positive.[17] The coefficient of the foreign vendor dummy (γ) is an empirical question.

The regression for the vendor firms is of the form:

$$A_j = \kappa + \iota VSize_j + \lambda V\,\mathrm{Re}\,lativeDealSize_j + \nu\,\mathrm{Re}\,newal_j + oGov_j + \vartheta Early_j + \rho Interactive_j + \varpi_j \quad (10)$$

where A_j is the vendor j's day 0 abnormal return, $VSize_j$ is the log of vendor firm sales or MVE and Gov_j is a dummy variable that equals 1 when vendor signs a contract with a governmental entity, $Early_j$ is a dummy variable that takes on the value of 1 when the deal occurs before 1998 and $Interactive_j$ is the interaction of the time dummy with other independent variables.[18] Based on arguments presented previously, we would expect the coefficients of vendor size (τ), the renewal dummy (ν) and the government dummy (o) to be negative, while that of deal size (λ) to be positive.[19]

4.2 ESTIMATING THE LONG-RUN IMPACT OF THE SIGNING OF OUTSOURCING TRANSACTIONS

We use three techniques to analyze the long-run financial impact of the signing of outsourcing transactions. First, we examine buy-and hold returns for the client stock from the effective day of the contract to the three-year anniversary of the effective date.[20] Second, we compute changes in accounting performance measures from one year before to three years after the effective date of

[17] The predicted negative sign for the renewal dummy is based on the argument that announcement of renewals should have a smaller market impact than the announcement of new contracts.
[18] All variables based on accounting data are measured at the end of the year preceding the contract announcement year.
[19] The predicted negative sign for the government dummy is based on the argument that an outsourcing transaction with the government does not represent a strategic alliance.
[20] If the firm gets delisted prior to the three-year anniversary, we use the delisting date as the ending date for the buy-and-hold period.

the contract. The specific accounting performance measures used are sales efficiency, income efficiency, gross profit margin, net profit margin, asset turnover and return on assets. Finally, we use the Fama and French (1993) three-factor model to determine the 3-year abnormal return on portfolios on client firms. This approach is similar to analyzing buy-and-hold returns but is considered superior since it eliminates the problem of cross-sectional dependence among sample firms and yields more robust test statistics. Each one the three set of tests are described in more details in the following sections.

4.2.1 Calculating long-run buy-and-hold stock returns

For the purposes of calculating buy-and-hold returns for the client firm stocks, we define the contract effective day as event day zero. A trading date t days before the effective day is denoted as day –t and that t days after day 0 is denoted as day +t. We follow each client (vendor) firm from day zero until the earlier of its delisting date or the date of the contract's third anniversary. We define a year as twelve 21-trading day intervals (252 days). A three-year window of 756 trading days is used in order to facilitate comparisons with other studies. The percentage buy-and-hold return for firm j is defined as:

$$R_{jT} = [\prod_{t=1}^{T}(1+r_{jt}) - 1] \tag{11}$$

where T is the earlier of the delisting date or the end of the three-year window, and r_{jt} is the return for firm j on date t.

For each firm in the sample, we choose a matching control firm using a variation of the matching procedure suggested by Barber and Lyon (1996). They suggest that if the tests of interest are designed to detect abnormal performance following an event, sample firms should be matched with control firms based on pre-event performance as of year prior to the event year. Barber and Lyon (1997) provide evidence that the procedure of matching sample firms to control firms of similar sizes and book-to-market ratios gives well-specified test statistics and yields more powerful, and unbiased test statistics than other matching procedures. As suggested by Barber and Lyon, our matching procedure attempts to match client (vendor) firms with control firms on the basis of size and book-to-market effects.

Specifically, size-matched firms are selected from all public companies (excluding the sample firms) at the end of the year prior to the contract effective year. The size matched firm is the firm closest in market capitalization to the client (vendor) firm. When matching on size and book-to-market ratios, we select the subset of firms that have market equity values within 30% of the market equity value of the sample firm. This subset is then ranked again according to book-to-market ratios. The size and book-to-market matched firm is the firm with the book-to-market ratio, measured at the end of the year prior to the contract effective year, which is closest to the client (vendor) firm's ratio. Matched firms are included for each sample firm for the full 3-year holding period or until the date of delisting. If a matching firm is delisted before the ending date for its corresponding sample firm, a second matching firm is spliced in after the delisting date of the first matching firm. The replacement firm is the non-sample firm with size (size and book-to-market) at the original ranking immediately next to the original matching firm. This matching methodology helps reduce any bias from survivorship.

Buy-and-hold abnormal returns are defined as the average of equally weighted paired differences between buy-and-hold returns for the sample firms and those for the matching control firms. That average equals 0 if the sample firms do not have a better long-run stock performance compared to their control firms. The average T-year abnormal buy-and-hold return is measured as,

$$R_{\tau} = \frac{1}{N}\sum_{j=1}^{N}(R_{jT} - R_{mT}) \tag{12}$$

where R_{jT} is the percentage buy-and-hold return on firm j for holding period T, R_{mT} is the percentage buy-and-hold return on firm i's matching firm for the same holding period T, and N is the number of firms in the sample.

Based on our previous discussion, we would expect this abnormal buy-and hold return to be positive and significant for our sample of client firms. In addition, we regress the abnormal buy-and hold return on the same set of independent variables used in the multivariate analysis in Section 4.1.2 to determine what firms and contract characteristics contribute to the correlation change.

4.2.2 Measuring changes in accounting performance

From both academic and anecdotal evidence, the often cited motivation for outsourcing is to increase the focus on the core operation of the client firms, thus improving their operating efficiency. To examine whether operating efficiency improves after outsourcing transactions, we examine changes in accounting performance/efficiency measures around the signing of outsourcing transactions. Specifically, operating efficiency is proxied by six measures: sales efficiency (SALEFF) defined as sales divided by the number of employees, income efficiency (IEFF) defined as operating income divided by the number of employees,[21] gross profit margin (GRSMRGN) defined as one minus the ratio of costs of goods sold to sales, net profit margin (NETMRGN) defined as the ratio of net income to sales, asset turnover (TURNOVER) defined as the ratio of sales to total assets and return on assets (ROA) defined as the ratio of operating income to total assets.

Again, if we define the year the contract is effective as year zero, we calculate these six ratios for our sample firms and their matching firms one year prior to the contract effective year (year -1) and three years after (year 3). For each year, we define the adjusted performance measure as the sample firm's ratio minus the benchmark ratio. Because of skewness and the potential influence of outliers when using accounting ratios, we follow Loughran and Ritter (1997) and focus on median values.

Two groups of benchmarks are used in the analysis. To control for industry effects, the operating efficiency measures are adjusted by subtracting the median value of the corresponding measures for all firms in the primary two-digit SIC industry in which the firm was active one year before the event. A two-digit industry definition is used because Clarke (1989) has shown that the two-digit definition captures similarities among firms as effectively as industry definitions based on three- or four- digit SIC groupings.

A matching-firm approach is used to facilitate comparisons of industry-adjusted operating efficiency. The specific matching algorithm follows the matching method of Fee and Thomas (2004). In the case of each efficiency proxy, we first identify all firms that are not in our sample with the same first two-digit SIC code as our sample firm, asset size at the end of year -1

[21] SALEFF and IEFF are deflated by normalizing year -1 numbers to unity. This implies that the values in other year are expressed as a fraction of the value in the base year.

between 25% and 200% of the sample firm, and the efficiency proxy between 90% and 110% of the sample firm. From these firms we choose as the matching firm the company with the efficiency proxy closest to that of our sample firm. If no firm meets these criteria, then we relax the efficiency proxy screen to between 70% and 130% of the sample firm. If no matching firm is available this time, we relax the industry screen to require only a one-digit SIC code match, and then relax the efficiency proxy requirement accordingly. If there is still no match, we eliminate the industry matching requirement and match on size and the efficiency proxy. Finally, if no match is available after eliminating the industry matching requirement, we eliminate the size requirement and match purely on the efficiency proxy. In all but 4 percent of the cases, client firms have matches at the two-digit SIC level. The corresponding figures based on matching on one-digit SIC codes, matching on size and the efficiency proxy and matching on the efficiency proxy alone are 1.9, 2 and 0.1 percent, respectively.

Based on our previous discussion, we would expect the client firms to show improvements in operating efficiency from the pre-outsourcing period to the post-outsourcing period. Specifically, we would expect income efficiency, sales efficiency, gross profit margin, net profit margin, asset turnover and return on assets to increase from year -1 to year +3. Finally, we regress the changes in accounting performance on the same set of independent variables used in the multivariate analysis in Section 4.1.2 to determine what firms and contract characteristics contribute to the change in operating efficiency.

4.2.3 Measuring Abnormal Returns in Calendar Time

In this section we discuss a calendar-time approach to calculating abnormal returns after the signing of the outsourcing transaction for a portfolio of client firms. As opposed to an event-time approach such as calculating buy-and-hold returns, the calendar-time approach offers some advantages. First, this approach eliminates the problem of cross-sectional dependence among sample firms because the returns on sample firms are aggregated into a single portfolio. Second, the calendar-time portfolio methods yield more robust test.

We use the three-factor model developed by Fama and French (1993). The calendar-time period considered in the analysis represents a 36-month post-event window. For each calendar month, we calculate the return on a portfolio composed of firms that has an event within our

calendar window. The calendar-time return on this portfolio is used to estimate the following regression:

$$R_{pt} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + \varepsilon_{it} \quad (13)$$

where R_{pt} is the simple monthly return on the calendar-time portfolio, R_{ft} is the monthly return on three-month Treasury bills, R_{mt} is the return on the CRSP value-weighted market index, SMB_t is the difference in the returns of value-weighted portfolios of small stocks and big stocks, and HML_t is the difference in the returns of value-weighted portfolios of high book-to-market stocks and low book-to-market stocks.

The estimate of the intercept term α_i provides an estimate of the abnormal return on a portfolio of client firms. Based on our previous discussion we would expect this abnormal return to be positive and significant for the portfolio of client firms.

4.3 MEASURING THE IMPACT OF OUTSOURCING TRANSACTIONS WHEN VIEWED AS STRATEGIC ALLIANCES/PARTNERSHIPS

In this section we discuss the methodology used to analyze the evolution of the relation between client and vendor firms from a time period in the pre-contract signing period to a time period in the post-contract signing period to determine if the signing of the outsourcing contract results in a closer link between the performances of the two parties involved in the contract.

4.3.1 Measuring the Relation between Client and Vendor Stock Prices

One implication of viewing an outsourcing transaction as a strategic alliance between the client and vendor firms is that the correlation between the stock returns for the firms should increase from the pre-effective to the post-effective period.[22] For purposes of implementation, the exact specification of the pre-effective and post-effective periods depends on whether the vendor

[22] The effective date of a contract is the start date of the contract.

appears once (single contract vendors) or multiple times (serial contract vendors) in 3-year (756 trading day) windows within our sample period. For single contract vendors, the pre-period (post-period) is defined as the 378 trading days before (after) the contract effective date (day 0). For the serial contract vendors, the pre-period is defined as the 756 trading days before day 0 while the post-period is the day after the contract effective day (day +1) to one day before the same vendor takes another contract.

Cross-autocorrelation coefficients are calculated using the Pearson product-moment correlation method applied to daily stock returns for the client and vendor firms. In order to minimize the effect of non-synchronous trading on cross-autocorrelation, returns for both client and vendor firm stocks on a particular trading day are excluded from the computation of correlation if either the client or vendor stocks did not trade on that date.

The cross-autocorrelation coefficient for each pair of client and vendor firm stocks in the pre-effective period is denoted by $\rho_{PRE}(r_c, r_v;)$ while that in the post-effective period is denoted by $\rho_{POST}(r_c, r_v;)$ where r_c (r_v) is the return on the client (vendor) firm stock. If the outsourcing transaction does create a strategic alliance between the client and vendor firms, one would expect the change in cross-autocorrelation to be positive. We also regress the changes in cross-autocorrelations on the same set of independent variables used in Section 4.1.2 to determine what firms and contract characteristics contribute to the correlation change.

Another implication of the strategic alliance hypothesis is that the outsourcing transaction can result in a lead-lag relation between the client and vendor firm stocks in the post-effective period where none existed in the pre-effective period. We use a vector autoregression (VAR) approach with a lead-lag of one day to test whether there is a lead-lag relation between client and vendor stock returns.[23] The specific equations estimated are given as:

$$r_{V_i,t} = \alpha_{i,0} + a_{i,1} r_{V_i,t-1} + a_{i,2} r_{C_i,t-1} + \nu_{i,t} \tag{14a}$$

$$r_{C_i,t} = \beta_{i,0} + b_{i,1} r_{V_i,t-1} + b_{i,2} r_{C_i,t-1} + \mu_{i,t} \tag{14b}$$

where $r_{V_i,t}$ ($r_{C_i,t}$) represents the returns on the vendor (client) firm associated with contract i. If the daily stock returns of the client firms lead those of the vendor firms, one would expect

[23] The order of the VAR model is determined by using both the Akaike information criterion (AIC) and the Bayes information criterion (BIC). Both criteria suggest a lead-lag of one day.

$a_{i,2} > 0$ and $a_{i,2} - b_{i,1} > 0$. On the other hand, if the daily stock returns of the vendor firms lead those of the client firm, one would expect $b_{i,1} > 0$ and $b_{i,1} - a_{i,2} > 0$. We estimate a separate VAR regression for each contract in the pre-effective and post-effective periods and compute cross-section averages across all contracts.

In order to control for the size effect documented in the literature, we stratify our client (vendor) firms into 5 different size quartiles using the Fama and French market value of equity (ME) breakpoints.[24,25] We group client and vendor pairs into three categories: (1) clients that are bigger than vendors, (2) clients and vendors that belong to the same size quartiles and (3) clients that are smaller than the vendors. The VAR regression is also estimated separately for these groups to determine if the lead-lag relation changes with relative size.

Finally, following the methodology outlined in section 4.2.1, we estimate buy and hold returns for the client and vendor firm stocks for the pre-effective and post-effective period. We compute the cross-correlations between each pair of client and vendor stocks in the pre-effective and post-effective periods. Again, the strategic alliance hypothesis would suggest that the change in this cross-correlation difference from the pre-effective to post-effective periods would be positive.

4.3.2 Measuring Correlations in Accounting Performance

To examine whether the post-effective operating performance of the client and vendor firms are more closely correlated as compared to their value in the pre-effective period, we analyze four proxies for operating performance: gross profit margin (GRSMRGN), net profit margin (NETMRGN), asset turnover (TURNOVER) and return on assets (ROA), where all variables have been defined previously in Section 4.2.2.

As in Section 4.3.1., our tests are based on correlations between changes in the performance measures for the client and corresponding vendor firms. Specifically we compute the correlation of the change in the performance measures in the pre-effective period (year – 3, -

[24] For example, Lo and MacKinlay (1990) show that returns of large stocks lead those of smaller stocks.
[25] Fama and French compute ME breakpoints on a monthly basis. ME is defined as the price per share multiplied by shares outstanding (divided by 1000) at month end. .See French's website for more details (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).

2 and -1 to year 0) and that in the post-effective period (year 0 to year +1, +2 and +3). Again, as in the case of stock returns, correlations are computed using the Pearson product-moment correlation method.

To control for industry effects, the raw operating performance measures are adjusted by subtracting the median value of the corresponding measures for all firms in the primary two-digit SIC industry in every event year and the tests described above are repeated using the industry-adjusted measures. Again, the rationale for the use of two-digit codes is that they have been shown to capture similarities among firms as effectively as industry definitions based on three- or four- digit SIC groupings.[26]

If the outsourcing transaction does create a strategic alliance between the client and vendor firms, one would expect the correlations to increase in the post-effective period relative to the pre-effective period.

[26] See Clarke (1979).

5.0 THE SAMPLE AND DATA

5.1 THE SAMPLE

Outsourcing contracts signed by organizations for the period 1990-2003 were obtained from Factiva using a variety of keywords including the terms outsourcing, contract, agreement, deal and transaction. This initial search provided us with information on 1,118 outsourcing contracts. Further analysis of the information obtained from Factiva helped us classify these 1,118 observations into two categories – 1071 observations that had announcements of finalized contracts and 47 announcements in which either contracts were cancelled or lost to a competitor.

The initial sample is filtered based on a number of criteria. First we require that the client and vendor firms be listed on the American Stock Exchange (AMEX), the New York Stock Exchange (NYSE) or Nasdaq with stock returns available on the Center for Research in Security Prices (CRSP) database. Second, we require the firms to be listed in Compustat on a consolidated basis so that we can obtain financial accounting data on these firms. Finally, we require there should be no other financial events announced by the firm around the outsourcing contract announcement days as reported in Factiva or in the firms 10K filings. This criterion ensures that the results reported in the next section can be identified with the outsourcing announcement and are not contaminated by other events.

Our final sample of signed contracts consists of 482 contracts signed by 341 client firms and 936 contracts signed by 239 vendor firms. For canceled deals, there are 22 cancelled contracts on the client firm side and 43 cancelled and lost contracts on the vendor firm side.

5.2 A DESCRIPTION OF THE DATA

Summary statistics of signed deals and the firms involved in these deals are presented in Table 1. Panel C of the table indicates that the average (median) deal has a duration of 6 (5) years and has an annual average (median) value of $77 (13) million. Panel D indicates that 13.73 percent of the deals are renewals, 12.14 percent involve a governmental entity as the client firm and 5.71 percent outsource to foreign vendors.[27]

The results in Panel A and B indicate that client firms are larger than vendor firms in terms of sales and market value of equity. Specifically the mean (median) value of sales for the client firms is $16.5 (6.3) billion while the corresponding figures for the vendors are $12.7 ($1.8) billion. In terms of market value of equity the mean (median) for clients is $21.8 ($4.9) billion while that for vendors is $19.6 (2.6) billion. The relative deal size measured by contract size per year divided the market value of equity averages 6 and 9 percent for the client and vendor firms, respectively.[28] The corresponding median value is 2 percent for both clients and vendors. The clients have an average (median) current ratio of 1.50 (1.25) while the corresponding number for the quick ratio is 1.17 (0.97).[29] The mean (median) opacity for the clients is 0.27 (0.19) implying that on average 27 percent of the assets of the client firm is in property plant and equipment.

Panel C of Table 1 indicates that the median ratio of vendor size to client size is 55 (60) percent in terms of sales (market value of equity) indicating that the vendors in our sample are in general smaller than the client.

Finally, Panel E and Panel F of Table 1 report the top 4 major industry groups outsourcing or providing outsourcing services. Interestingly enough, the top three outsourcing industries are also the top three industries providing outsourcing services, only in a slightly different order, that is, business services (SIC code 73), electronic and other electrical equipment and components except computer equipment (36) and industrial and commercial machinery and computer equipment (35).

---

[27] This foreign outsourcing number is relative small because we require the vendor to be listed on AMEX, NYSE or Nasdaq.

[28] The minimum cutoff point for the relative deal size is 0.01. This is to ensure that the contracts have at least some impact on client firms' cash outflows.

[29] The current ratio is the ratio of current assets to current liabilities. The quick ratio is the ratio of current assets less inventory to current liabilities.

Table 2 reports the characteristic of the cancelled deals and the firms involved in these deals. As with signed deals, vendors are, on average, relatively smaller in size as compared to client firms. Finally, Panel D the industries in which the major cancellations occur. The results in this panel indicate that a large fraction of the cancelled deals involve vendors in the business services industry (SIC code 73).

6.0 EMPIRICAL RESULTS

6.1 SHORT-RUN IMPACT OF THE ANNOUNCEMENT OF OUTSOURCING TRANSACTIONS

6.1.1 Univariate results

Table 3 presents abnormal returns for client firms for various windows around the announcement of outsourcing contracts. As can be seen from the table, for the complete sample of outsourcing announcements the client firms experience an abnormal return of 0.145 percent. The t-statistic associated with this return implies that it is not different from 0 at conventional levels of significance. This is consistent with results reported previously in Hayes et. al. (2000) and Farag and Krishnan (2003).

Columns labeled 2 through 24 in Table 3 present announcement period abnormal returns for sub-samples of client firms stratified by client size, relative size of vendor to client, deal size, opacity, flexibility and whether the contract was announced prior to or after 1988.[30] As can be seen from the table, small firms realize a positive and significant announcement day abnormal returns while that for large firms is not significantly different from 0. Specifically, when size is measured as sales, small firms experience an abnormal return of 0.531 percent with an associated significance level of 5 percent while the abnormal return for large firms is an insignificant -0.303 percent. When size is measured by market value of equity, the corresponding figures are 0.459 percent (significance level of 10 percent) and an insignificant -0.149 percent, respectively. This result is consistent with the information asymmetry hypothesis that suggests that small clients will react more to the announcement of outsourcing transactions.

[30] In each case the stratification is based on the sample median for the variable under consideration except for the current and quick ratios, where the stratification is based on the value of one..

We had argued earlier that due to economies of scale, the announcement day reaction should be more positive for deals with larger ratios of vendor size to client size. The results presented in columns labeled 8, 9, 10 and 11 provide some evidence on this hypothesis. Specifically, the results in columns 8 and 9 suggest the announcement day abnormal return for deals that involve firms with a value of the ratio of vendor sales to client sales above one is 0.526 percent with a significance level of 10 percent while that for deals with the ratio below one is an insignificant -0.378 percent.[31] Similar results obtain when the stratification is based on size defined as the market value of equity.

Columns labeled 12, 13, 14 and 15 contain results with the sample stratified by relative contract size. Earlier we had hypothesized that larger contracts should be associated with larger savings and, therefore, result in a larger abnormal return. The results in these columns do not support this hypothesis since the day 0 abnormal returns for both the small and large contract sub-samples are not significantly different from zero.

In the hypothesis section we argued that outsourcing was a way for companies to focus more on their core competencies and since more opaque companies are less focused on core competencies, we would expect such companies to gain more from outsourcing. Columns 16 and 17 present abnormal returns for the sample stratified by firm opacity (defined as net property, plant and equipment divided by total assets). As can be seen from these columns the abnormal return for more opaque firms is 0.974 percent with an associated significance level of 10 percent while that for more transparent firms is an insignificant -0.087 percent.

Columns 18, 19, 20 and 21 present results for sub-samples stratified by flexibility where flexibility is proxied by the current ratio and quick ratio. It was argued that firms with less flexibility have more to gain from outsourcing since it improves the degrees of freedom available to them. The results in these columns support this hypothesis. Specifically, firms with less flexibility in terms of the current ratio have a day 0 abnormal return of 0.596 percent with a significance level of 10 percent while the corresponding number for clients that are more flexible is an insignificant 0.001 percent. Similar results are obtained when flexibility is measured by the quick ratio.

[31] The results are even stronger for a (0, +1) event window where the abnormal return for large group is 0.933 percent with a significance level of 5 percent while that for the small group is an insignificant -0.257 percent.

Column 22 provides the results for the sub-sample of contracts that were renewals. We expect renewal to be associated with a smaller announcement day abnormal return than the overall sample if there is less surprise associated with a renewal. On the other hand, if the announcement of a renewal is viewed by the market as an announcement of a strategic alliance between the client and the vendor, one could argue that these announcements would be greeted with a larger abnormal return than the overall sample. Our results are consistent with the latter argument. Specifically, we find that announcements of renewal are associated with a day 0 abnormal return of 0.781 percent with a significance level of 10 percent.

We argued earlier that the outcry associated with foreign outsourcing would imply that clients that outsource to foreign vendors should realize more cost savings than those that outsource to US vendors. Columns 23 and 24 provide results for sub-samples stratified on the domicile of the vendor firm. Our results are not consistent with this argument. As a matter of fact, we find that the day zero abnormal return for clients that outsource to non-US vendors is –1.102 percent with a significance level of 10 percent while that for clients who outsource to US vendors is an insignificant 0.03 percent.

Columns 25 to 27 in Table 3 report abnormal returns for the rivals of the client firms involved in the outsourcing contracts.[32] Based on the literature on market reaction of rival firms to corporate announcements, one could argue for either negative or positive abnormal returns. For example, if one argues that increasing efficiency by using outsourcing puts the client firm at a competitive edge relative to its rivals, it would be reasonable to expect rivals to react negatively. On the other hand, if the adoption of outsourcing by a client signals that its rivals are likely to take that same course of action in the futures, the rivals could react positively in anticipation of a future gain in efficiency. Our results are consistent with the competitive edge argument. Specifically, we find that the rivals of the client firms involved in the outsourcing experience a day 0 abnormal return of -0.48%, with a significant level of 10 percent. With the negative abnormal return being primarily driven by those rivals that do not announce an outsourcing transaction during our sample period.[33]

[32] A rival is defined as firm with the same 2 digit SIC code as the client and market value of equity closest to the client in year -1.

[33] As a robustness test, we group the rival firms for each contract announcement into a portfolio and estimate the abnormal returns for these rival portfolios. The results are similar to those reported in Table 3 for individuals rivals.

Column 28 reports abnormal returns for client firms when they cancel an outsourcing contract. The results suggest that these cancelled contracts have outlived their usefulness to the clients since the day 0 abnormal return is an insignificant -1.03 percent.

Table 4 presents abnormal returns for vendor firms for various windows around the announcement of outsourcing contracts. As can be seen from the table, for the complete sample of outsourcing announcements the vendor firms experience a day 0 abnormal return of 1.303 percent with an associated significance level of 1 percent.

Columns 2 through 13 of Table 4 provide abnormal returns for various sub-samples based on above-sample median and below sample-median values of vendor size (measured by sales and market value of equity) and relative contract size (measured in terms of market value of equity and sales) and whether the contract was announced prior to or after 1988. The information symmetry hypothesis implies that smaller vendors should gain more at the announcement date of the contract. Our results are consistent with this argument. Specifically, we find that small vendors (as measured by sales) experience a day 0 abnormal return of 2.062 percent with a significance level of 1 percent wile larger vendors gain a much smaller 0.489 percent with the same significance level. Results are similar if size is measured by market value of equity. Finally, we find that contracts announced after 1988 are associated with a larger abnormal return as compares to those announced prior to 1988.

We also argued that since larger contracts may be associated with larger revenue gains, vendors receiving larger contracts should have a more positive stock price reaction. Columns 8, 9, 10 and 11 confirm this hypothesis. Specifically, vendors receiving large contracts (defined relative to their market value of equity) experience a day 0 abnormal return of 2.303 percent with a significance level of 1 percent while that for vendors receiving small contracts is an insignificant 0.087 percent.

The results in column 12 indicate that renewal deals are less valuable than other deals since they are associated with an insignificant day 0 abnormal return of – 0.272 percent. Deals where the client firm is a governmental entity are as valuable as deals with private entities since the day 0 abnormal returns associated with such announcements is 1.484 percent with a significance level of 1 percent (see column 13).

Columns 14 to 16 report results for rivals of the vendor firms involved in the outsourcing transactions.[34] The results indicate that the rivals of vendors experience a day 0 abnormal return of 1.584 percent with a significance level of 1 percent with the positive abnormal returns being driven by the group of vendors that receive contracts later in our sample period. This is consistent with the argument that there are contagion effects when a member of an industry receives a contract that is perceived as having positive value to the contract recipient.

Since receiving a contract adds value to a vendor's stock, cancelled contracts should have the opposite impact. This is confirmed from the results for cancelled contracts reported in Column 17. Specifically, the day 0 abnormal return for a vendor stock on the announcement of a cancellation of an outsourcing transaction is -1.89 percent with a significance level of 5 percent. The majority of the cancelled contracts are when the contracts are won by vendors' rivals. ISpecifically, when we focus on this group of vendors who lose the contract to a rival, they experience an significantly negative announcement day abnormal return of -2.91 percent announcement.

6.1.2 Multivariate results

Table 5 reports the results of the estimation of equation (9). Specifically, we estimate a regression of the client firm's day zero abnormal return on firm size (either sales or market value of equity), the ratio of vendor size to client size, relative deal size (relative to market value of equity or cost of goods sold), opacity (ratio of net property, plant and equipment to total assets), flexibility (current ratio or quick ratio), a dummy variable that takes on a value of 1 for renewals, a dummy variable that takes on a value of 1 if the vendor is not based in the US, a dummy variable that takes on a value of 1 if the deal is before 1998 and a set of interactive variables. Based on our previous discussion, we expect the coefficients of client size, opacity, liquidity and the renewal dummy to be negative while that for relative vendor to client size, relative contract size and the foreign vendor dummy to be positive.

[34] A rival of a vendor firm is a firm in the same 2 digit SIC code as the vendor and is closest in market value of equity to the vendor in year -1.

Our results are consistent with the predictions for client size, relative vendor to client size, opacity and liquidity coefficients. On the other hand, the coefficients of relative contract size and the two dummy variables are not significantly different from zero.

Overall this suggests support for hypothesis that the short-term effect of the announcements of outsourcing transactions on client firms are partially driven by information asymmetry. In addition, the results also indicate support for the hypotheses that the sources of gains to client firms from outsourcing are economies of scale, the renewed focus on core competencies and increased flexibility.

Table 6 presents results from the estimation of equation (10). Specifically, we estimate a regression of the vendor firm's day zero abnormal return on firm size (either sales or market value of equity), relative deal size (relative to market value of equity or sales), a dummy variable that takes on a value of 1 for renewals, a dummy variable that takes on a value of 1 if the client is a governmental entity, a dummy variable that takes on a value of 1 if deal is before 1998, and a set of interactive variables. Based on our previous discussion, we expect the coefficients of vendor size, the renewal dummy. the government dummy and the time dummy to be negative while that for relative contract size to be positive.

Our results are consistent with our prediction for the coefficients of size and relative deal size. On the other hand, the coefficients of the two dummies are not significantly different from zero.

Overall this suggests support for hypothesis that the short-term effect of the announcements of outsourcing transactions on vendor firms are partially driven by information asymmetry. In addition, the results also indicate support for the hypotheses that the sources of gains to vendor firms from outsourcing are economies of scale and the amount the contract enhances the vendor's revenue stream.

6.2 THE LONG-RUN IMPACT OF THE SIGNING OF OUTSOURCING TRANSACTIONS

In this section we report the results of an analysis of stocks returns and changes in operating performance for client and vendor firms after the effective date of outsourcing transactions.[35] As described in Section 4.2, the analysis of stock returns is based on buy-and-hold returns (BHARs) and calendar-time based abnormal returns. Operating performance is proxied by sales efficiency (SALEFF), income efficiency (IEFF), Gross profit margin (GRSMRGN), net profit margin (NETMRGN), asset turnover (TURNOVER) and return on assets (ROA).

6.2.1 Long-Run Stock Returns for Client Firms after the Signing of Outsourcing Transactions

Table 7 reports the results of the analysis of BHARs for client firm stocks for the period starting the day after the effective date of the outsourcing transaction and ending the earlier of the delisting date of the stock or three years (756 trading days) after the effective date. The third column of the table reports the average BHAR client firm stocks, column 4 contains the corresponding figure for the matching control firms, and the difference in the two BHARs is in column 5 with column 6 containing the test statistic for the difference in BHARs. Panel A of the table presents the results for the entire sample of client firms. The remaining panels present results for sub-samples stratified on client firm size (either sales or market value of equity), size of vendor relative to client, contract size, opacity, current ratio, quick ratio and whether the vendor firm is based in the US or not.

As can be seen for Panel A, when matched by size alone, client firms have an abnormal BHAR of 21.66 percent with an associated significance level of 5 percent. For matching based on size and the market value of equity, the corresponding figures are 27.84 and 1 percent. This suggests that firms that use outsourcing perform significantly better than a control group suggesting that outsourcing improves the efficiency of client firms.

[35] The effective date of the outsourcing transaction is the start date of the contract.

Panels B, C, D and E indicate some mixed results when the sample is stratified by client firm size. Small client firms perform better in the long run when compared to a size-matched control firm as compared to large client firms regardless of how client firm size is measured. The same holds true when client firm size is measured by market value of equity and the control firms are matched based on size and the ratio of book to market. On the other hand, when client firm size is measured by sales and the control firm is based on size and the ratio of book to market, small and large client firms perform equally well in the long-run. The remaining panels also show that opaque client firms perform well in the long-run.

The above results are in contrast to those presented in Table 8 for BHARs in the period starting three years (756 trading) days and ending one day before the effective date of the outsourcing contract. As can be seen from this table, for average client firm either underperformed or performed equally as well as the control firms in the pre-effective period. This suggests that the improvement in performance exhibited by the client firms can be attributed to the signing of the outsourcing contract.

The results reported in Table 7 are robust to the method used to calculate long-run abnormal returns. Table 9 reports results for abnormal returns calculated using the calendar-time portfolio method of Fama and French (1993). Column 2 of this table presents abnormal returns for a portfolio of client firms with portfolio formation periods of 12, 24 and 36 months. As can be seen from the table, client firms exhibit abnormal returns of 12.33 (significance level of 5 percent), 21.6 (significance level of 1 percent) and 28.1 percent (significance level of 1 percent) for 12, 24 and 36 month portfolio formation periods, respectively. This implies that our result that the client firms have positive abnormal long-run stock returns after signing outsourcing contracts is robust to the specification of abnormal returns.

Table 10 presents the results of the estimation of the following regression with client's 3-year *ex-post* BHAR as the dependent variable:

$$BHAR_i = e_0 + e_1 CSize_i + e_2 CSizevsVSize_i + e_3 C\,\mathrm{Re}lativeDealSize_i + e_4 Opacity_i + e_5 Liquidity_i + e_6 ForeignV_i + \varepsilon_i \quad (15)$$

where $BHAR_i$ is the client firm's 3-year buy-and-hold abnormal return, $CSize_i$ is the log of the client firm's sales or market value of equity at year -1, $CSizevsVSize_i$ is the log of vendor size divided by client size, $C\,\mathrm{Re}lativeDealSize_i$ is the log of contract value per year divided either by the client firm's costs of goods sold or market value of equity, $Opacity_i$ is the log of client firm's

ratio of net property, plant and equipment to total sales, $Liquidity_i$ is the log of client firm's current or quick ratio, and $ForeignV_{l,i}$ is a dummy variable, which equals 1 when a client firm signs a contract with a non-US vendor. For each firm, all the accounting variables are taken from Compustat for the year-end before the contract effective year. As can be seen from the results of this multivariate estimation, smaller firms and more opaque firms show a marginally better improvement in long-run stock return performance.

Finally, Table 11 presents results for the analysis of the long-run BHARs after the signing of outsourcing contracts for vendor firms. As can be seen from this table, there is no significant difference between the BHARs for vendor firms and their controls. This suggests that vendor firms do not have any significant improvement in long-run performance that is not already impounded into stock prices at the announcement date.

6.2.2 Long-Run Accounting Performance of Client Firms after the Signing of Outsourcing Transactions

Table 12 presents the results of the analysis of changes in accounting performance measured from one year before to three years after the effective dates of the outsourcing transactions.[36] The results are presented for raw (unadjusted) change in performance and two versions of adjusted changes, one adjusted by the industry median and the other adjusted by the median for control firms that are industry and prior accounting performance matched. The second column presents the results for the complete sample, while the remaining panels present results for sub-samples stratified by size (either sales or market value of equity), size of vendor relative to client, contract size, opacity, current ratio, quick ratio and whether the contract was awarded to a US-based or a non-US based vendor. Panel A, B, C, D, E and F present the results for SALEFF, IEFF, GRSMRGN, NETMRGN, TURNOVER and ROA, respectively.

As can bee seen from column 2, client firms show improvements, on average, in all six efficiency measures. For expositional purposes we focus on control firm-adjusted changes. The results indicate that sales efficiency improves by \$0.083 per employee, income efficiency improves by \$0.055 per employee, net profit margin improves by 0.90 percent and asset turnover

[36] The results are qualitatively similar for time windows of year -1 to year +1 and year -1 to year +2.

improves by 0.0054 with all being statistically significant at a level of 10 percent or below.[37] By and large, the same conclusions can be drawn from the various sub-samples. Overall, these results suggest that client firms experience a significant improvement in operating performance after signing an outsourcing contract.

The above results are in contrast to those presented in Table 13 for changes in measures of operating performance in the period starting three years and ending one year before the effective date of the outsourcing contract. As can be seen from the third and fourth columns of this table, the average client firm performed equally as well as the industry or the control firms in the pre-effective period. This suggests that the improvement in performance exhibited by the client firms can be attributed to the signing of the outsourcing contract.

Table 14 presents the results of the estimation of the following regression with client's 3-year *ex-post* change in operating efficiency as the dependent variable, with operating efficiency being proxied by the six variables mentioned earlier:

$$\Delta EFFICIENCY_i = e_7 + e_8 CSize_i + e_9 CSizevsVSize_i + e_{10} C\,\mathrm{Re}lativeDealSize_i + e_{11} Opacity_i + e_{12} Liquidity_i + e_{13} ForeignV_{l,i} + \upsilon_i \quad (16)$$

where $\Delta EFFICIENCY_i$ is the accounting performance change from year -1 to year +3, $CSize_i$ is the log of client firm sales or market value of equity at year -1, $CSizevsVSize_i$ is the log of vendor size divided by client firm size, $C\,\mathrm{Re}lativeDealSize_i$ is the log of contract value per year divided either by client firm's costs of goods sold or by market value of equity, $Opacity_i$ is the log of client firm's opacity level, $Liquidity_i$ is the log of client firm's current or quick ratio, $ForeignV_{l,i}$ is a dummy variable, which equals 1 when US client firm signs a contract with a non-US vendor and the efficient measures used have been defined previously. For each firm, all the accounting variables are taken from Compustat for the year-end before the contract effective year. As can be seen from columns 2 through 7 of this table the results from this multivariate estimation indicate that smaller firms and more opaque firms have a marginally better improvement in operating performance. The results here are consistent with those reported for long-run stock return performance.

Next, Table 15 presents results for the analysis of the long-run operating performance after the signing of outsourcing contracts for vendor firms. Again focusing on control firm-

[37] The results are qualitatively similar for the unadjusted and industry adjusted measures.

adjusted changes, as can be seen from this table, there is, in general, no significant difference between the operating performance for vendor firms and their controls. This suggests that vendor firms do not have any significant improvement in long-run performance that is not already impounded into stock prices at the announcement date, a result that is consistent with that for long-run stock returns.

Finally, Table 16 presents the results of the estimation of the following regressions with vendor's 3-year *ex-post* change in BHAR and operating efficiency as the dependent variables,

$$BHAR_i = e_{14} + e_{15}VSize_i + e_{16}V\,\mathrm{Re}lativeDealSize_i + e_{17}Gov_i + \varpi_i \qquad (17)$$

$$\Delta EFFICIENCY_i = e_{18} + e_{19}VSize_i + e_{20}V\,\mathrm{Re}lativeDealSize_i + e_{21}Gov_i + \zeta_i \qquad (18)$$

where $BHAR_i$ is vendor firms' 3-year buy-and-hold abnormal return as defined in table 11, $\Delta EFFICIENCY_i$ is the accounting performance changes from year -1 to year +3. $VSize_i$ is the log of vendor's size. $V\,\mathrm{Re}lativeDealSize_i$ is the log of contract value per year divided by vendor's size. Gov_i is a dummy variable representing that vendor sign a contract with a governmental entity and the efficiency measures used have been defined previously. The results are consistent with the univariate results for vendors.

6.3 THE LONG-RUN INTEGRATION OF THE CLIENT AND VENDOR FIRMS

In this section we present results on the long-run relation between post-signing stock returns for client and vendor firms. We also analyze the impact of outsourcing transactions on the long-run relation between measures of operating performance for the two firms. We had argued earlier that the correlations of these various measures for client and vendor firms should increase in the post-signing period if outsourcing transactions are viewed as strategic alliances between the two firms. We would also expect the result to be stronger for vendor firms that appear once in our sample versus those that appear more than once. This follows from the argument that for the "strategic alliance" hypothesis to be valid, the vendor firm should be establishing a strong relation with a particular client firm and this would not be true for vendors who link up with many client clients, a feature more likely for "serial" vendors.

6.3.1 The Relation between Client and Vendor Stock Returns in the Pre and Post-Signing Period

Table 17 reports the change in the Pearson correlation from the pre-signing to the post-signing period for vendors that appear once in our sample (Panel A) and for those that appear more than once in our sample (Panel B). For single contract vendors we consider three specifications of the pre and post-signing periods: three years (756 trading days), two years (504 trading days) and 1 year (252 trading days).[38] For three-year periods, the correlation coefficient for clients and vendor stock returns increases by 0.0296 with a significance level of 1 percent for vendors that appear once in our sample. The corresponding figures for the two year and three year periods are 0.0420 and 0.026, respectively with both being significant at the 1 percent level. As predicted the change in correlation is not significant for vendors that appear more than once in our sample.

Table 18 provides the results of an estimation of a regression of the change in correlation on a number of dependent variables that were defined in section 6.1. The estimated regression is:

$$\begin{aligned}&\rho(r_{C_i,t}, r_{V_i,t}) - \rho(r_{C_i,-t}, r_{V_i,-t}) = \alpha_i + \beta CSize_i + \chi VSize_i + \delta CSizevsVSize_i \\ &+ \varepsilon C\,\mathrm{Re}lativeDealSize_i + \phi V\,\mathrm{Re}lativeDealSize_i + \varphi Opacity_i + \gamma Liquidity_i \\ &+ \eta ForeignV_i + \iota Number_i + \sigma_i\end{aligned} \tag{19}$$

where ρ is the stock cross-correlation coefficient, $r_{C_i,t}$ ($r_{C_i,-t}$) is the daily stock return of the client firm for contract i during the post-effective (pre-effective) period, r_{V,t_i} ($r_{V_i,-t}$) is the daily stock return of the vendor for the same contract i during the post-effective (pre-effective) period, $CSize_i$ is the log of client firm sales or MVE, $VSize_i$ is the log of vendor firm sales or MVE, $CSizevsVSize_i$ is the log of vendor size divided by client firm size, $C\,\mathrm{Re}lativeDealSize_i$ is the log of contract value per year divided either by client firm's costs of goods sold or by MVE, $V\,\mathrm{Re}lativeDealSize_i$ is the log of contract value per year divided either by vendor's sales or by MVE, $Opacity_i$ is the log of client firm's opacity level, $Liquidity_i$ is the log of client firm's current or quick ratio, $ForeignV_i$ is a dummy variable representing that vendor firm is a foreign firm listed on US markets and $Number_i$ is the log of number of contract that vendor is awared

[38] We cannot do this for multiple contract vendors since we are not guaranteed the length of the post-signing period after a particular contract since the vendor may sign with another contract with another client that period.

within the 7-year time frame of our sample. As can be seen from this table there are no systematic factors that explain the increase in correlation.

Table 19 presents correlation changes based on buy-and-hold returns. The results in this table are consistent with those presented earlier. Specifically, correlations between client firm and vendor firm BHARs are not significant in the pre-effective period but are significantly different from zero in the post-effective period.

Table 20 presents some evidence on the lead-lag relation between client and vendor stock returns in the post-signing period. The analysis of lead-lag relations is based on the estimation of the following VAR equations:

$$r_{V_i,t} = \alpha_{i,0} + a_{i,1} r_{V_i,t-1} + a_{i,2} r_{C_i,t-1} + \nu_{i,t} \tag{20a}$$

$$r_{C_i,t} = \beta_{i,0} + b_{i,1} r_{V_i,t-1} + b_{i,2} r_{C_i,t-1} + \mu_{i,t} \tag{20b}$$

where all variables have been defined before.

The results in Table 20 indicate that for the whole sample, the mean value of a_2 is 0.0354 while that for $a_2 - b_1$ is 0.0269 with both being statistically significantly at the 1 percent level. The above results suggest not only that the lagged returns of client firms can predict current returns of vendor firms, controlling for the predictive power of lagged returns of vendors themselves, but that the ability of lagged returns of client firms to predict current returns of vendors is better than the ability of lagged returns of vendors to predict current returns of client firms.

Panel B through Panel D report results for three different sub-samples based on a comparison on client and vendor sizes. Panel B reports results for the sub-sample where the client firm is bigger than the vendor firm. Panel C contains results for sub-samples where the two are the same size while Panel D reports result for the sub-sample where clients are smaller than vendors. In Panel B, the mean value of a_2 is 0.0357 with an associated significant level of 5 percent. The estimated value of $a_2 - b_1$ is 0.0384 with an associated significant level of 10 percent. In Panel C, the value of a_2 is 0.0369 and the coefficient $a_2 - b_1$ is 0.0422 with both being statistically significant at the 1 percent level. In Panel D, the corresponding coefficients are 0.0238 and -0.0116, respectively with the former being significant at the 1 percent level and the latter being not significantly different from zero. Overall our results suggest that the stock returns of the client firms lead those of the vendor firms implying that the two stocks become closely

linked to each other subsequent to the initiation of the outsourcing contract. The fact that the client leads the vendor is not surprising given the fact that the vendor's future revenues depend on the client.

6.3.2 The Relation between Client and Vendor Accounting Performance in the Pre and Post-Signing Period

Table 21, 22 and 23 report results for an analysis of the correlations between changes in operating performance of the client and vendor firms from years -3, -2 and -1 to the year of the effective date of the outsourcing contract (year 0) and from the effective date to years +1, +2 and +3. Accounting performance is proxied by gross profit margin (GRSMRGN), net profit margin (NETMRGN), return on assets (ROA) and asset turnover (TURNOVER). Table 21 presents results for correlation based on raw performance changes, correlations based on industry-adjusted changes are in Table 22. In Tables 21 and 22, the change in a performance measure from time t_1 to t_2 is measured as $Performance_{t_2} - Performance_{t_1}$, while in Table 23, the change is measured in percentage terms as $\frac{Performance_{t_2} - Performance_{t_1}}{Performance_{t_1}}$.

As can be seen from Tables 21 and 22, the correlation between the accounting performance measures for the two firms is not significantly different from zero in the pre-effective period. On the other hand, post-effective correlations are significantly positive. For example, the correlation between changes in raw (industry-adjusted) ROA from year -2 to year 0 is an insignificant 0.069 (0.058) while that from year 0 to +2 is 0.984 (0.964) with a significance level of 0.01 (0.01) percent. This result is robust to the method used to measure changes in performance. Specifically, if change is measured in percentage terms as in Table 23, the correlation for raw (industry-adjusted) changes from year -2 to 0 is an insignificant -0.025 (0.041) while that from year 0 to +2 is 0.999 (0.259) with a significance level of 0.01 (0.02) percent.

The above results are consistent with those based on stock returns and are supportive of the "strategic alliance" hypothesis.

7.0 CONCLUSIONS

We investigate a sample of outsourcing contracts signed by US publicly listed firms from 1990 to 2003. Our results indicate that the average abnormal return for client firms on the announcement day of outsourcing contracts (day 0) is an insignificant 0.145 percent. On the other hand, multivariate tests indicate that the announcement is associated with positive day 0 abnormal returns. Specifically, we find that the abnormal return decrease with client firm size and client firm flexibility while they increase with the relative size of the vendor firm to the client firm and client firm opacity. Based on these results, we conclude that the short-run of outsourcing transactions can be partially attributed information asymmetry. In addition, our results are consistent with the hypothesis that outsourcing is undertaken to take advantage of economies of scale, to have the ability to focus more on core competencies and to provide more operating flexibility.

We also find that the rivals of the client firms experience a negative day 0 abnormal return. This suggests that in the eyes of the market, signing the outsourcing contract provides the client firm with competitive advantages vis-à-vis the rest of the industry.

With respect to vendor firms, we find that they gain 1.303 percent on the announcement day. This gain decreases with vendor size and increases with the size of the deal. We also find those deals that are renewals of previously signed deals have a smaller impact on day 0 stock prices. Overall this suggests support for hypothesis that the short-term effect of the announcements of outsourcing transactions on vendor firms are partially driven by information asymmetry. In addition, the results also indicate support for the hypotheses that the sources of gains to vendor firms from outsourcing are economies of scale and the amount the contract enhances the vendor's revenue stream.

We also find that the rivals of vendor firms experience a positive abnormal return on day 0. This result is consistent with the good news associated with the announcement having a contagion effect in the industry.

Given that vendors experience a positive abnormal return when it is learned that they have been awarded an outsourcing contract, one would expect the opposite on an announcement of a contract being cancelled by the client firm or when the client firm announces that the vendor was not chosen to be the partner in a particular transaction. Our results are consistent with this hypothesis. Specifically, we find that vendors experience a negative day 0 abnormal return around such announcements.

In the case of client firms, long-run stock and accounting performance is consistent with the results reported above for short-run stock performance. Specifically, we find that the buy-and-hold returns (BHARs) for client firm stocks in the 3-year period prior to the outsourcing transaction are not significantly different from the BHARs for a control group of firms. On the other hand, BHARs for client firms in the post-outsourcing period are significantly larger than that for the control group. The same result hold for measures of accounting performance including sales per employee, income per employee, gross profit margin, net profit margin and asset turnover.

Finally are results are consistent with the view that outsourcing transaction create a strategic partnership between client and vendor firms. Specifically we find that client and vendor firm stock returns are not correlated prior to outsourcing transactions but the correlation becomes significantly positive in the post-outsourcing period. The same result holds true for changes in accounting performance when accounting performance is measures by return on assets and asset turnover.

REFERENCE

Banker, R. and C. Kemerer, 1992. Performance evaluation metrics for Information System Development. Information Systems Research 3, 379-400.

Barber, B. M. and J. D. Lyon, 1996. Detecting abnormal operating performance: the empirical power and specification of test statistics. Journal of Financial Economics 41, 359-399.

Barber, B. M. and J. D. Lyon, 1997. Detecting long-run abnormal stock returns: the empirical power and specification of test statistics. Journal of Financial Economics 43, 341-372.

Bradford M. and D. Pagach, 2005. Information conveyed in IS outsourcing announcements. Working paper, North Carolina State University.

Brown, S. J. and J. B. Warner, 1985. Using daily stock returns. Journal of Financial Economics 14, 3-31.

Chaudhury, A., K. Nam and H. R. Rao, 1995. Management of IS outsourcing: a bidding perspective. Journal of Management Information Systems 12, 131-159.

Clarke, R.N., 1989. SICs as delineators of economic markets, Journal of Business 62, 17-31.

Coase, R., 1937. The nature of the firm. Economica 4, 386-405.

Deavers, K., 1997. Outsourcing: a corporate competitiveness strategy, not a search for low wages. Journal of Labor Research 4, 503-519.

Drezner, D., 2003. The outsourcing bogeyman, Foreign Affairs, May-June.

Fama, E. F. and K. R. French, 1993. Common risk factors in the returns on stocks and bonds. Journal of Financial Economics 33, 3-56.

Farag, N. I. and M. S. Krishnan, 2003. The market value of IT outsourcing investment announcements: an event-study analysis. Ninth Americas Conference on Information Systems.

Fee, C. E. and S. Thomas, 2004. Sources of gains in horizontal mergers: evidence from customer, supplier, and rival firms. Journal of Financial Economics 74, 423-460.

Gallivan, M. J. and W. Oh, 1999. Analyzing IT outsourcing relationships as alliances among multiple clients and vendors. Proceedings of the 32nd Hawaii International Conference on System Sciences, 1-15.

Gellrich, T. and H. Gewald, 2005. Sourcing risk and the capital markets perspective: a study of the global financial services industry. E-FinanceLab working paper.

Girma, S. and H. Gorg, 2004. Outsourcing, foreign ownership and productivity: evidence from UK establishment level data. Review of International Economics 12, 817-832.

Grossman, G. and E. Helpman, 2002. Integration versus outsourcing in industry equilibrium. Quarterly Journal of Economics 117, 85-120.

Hayes, D. C., J. E. Hunton and J. L. Reck, 2000. Information systems outsourcing announcements: investigating the impact on the market value of contract-granting firms. Journal of Information Systems 14, 109-125.

Loughran, T. and J. R. Ritter, 1997. The operating performance of firms conducting seasoned equity offerings. The Journal of Finance 52, 1823-1850.

Lo, A. W. and A.C. MacKinlay, 1990. When are contrarian profits due to stock market overreaction? Review of Financial Studies 3, 175-205.

Natovich, J., 2003. Vendor related risks in IT development: a chronology of an outsourced project failure. Technology Analysis & Strategic Management 15, 409-419.

Quinn, J.B. and F. G. Hilmer, 1994. Strategic outsourcing. Sloan Management Review 35, 43-55.

Sharpe, M., 1997. Outsourcing, organizational competitiveness, and work. Journal of Labor Research 18, 535-549.

Williamson, O., 1979. Transaction-cost economics: the governance of contractual relations. Journal of Law and Economics 22, 233-261.

Williamson, O., 1985. Assessing Contract. Journal of Law, Economics, & Organization1, 177-208.

This figure is a year-by-year graph of the frequency of outsourcing deals signed by firms listed on the US markets from 1990 to 2003.

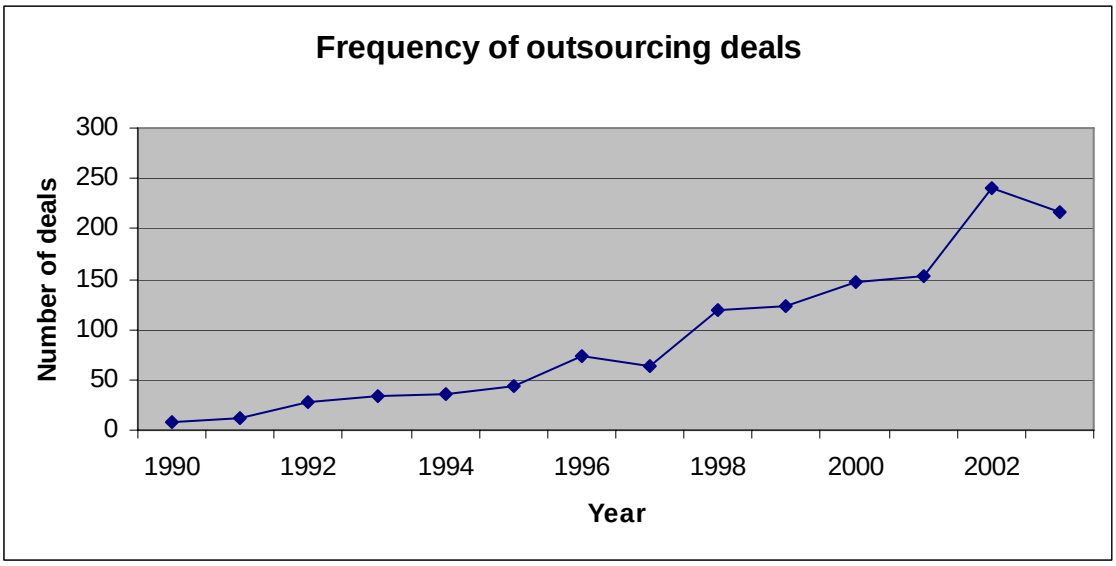

Figure 1. Frequency of outsourcing deals

This figure is a year-by-year graph of the value (in 2000 dollars) of outsourcing deals signed by firms listed on the US markets from 1990 to 2003.

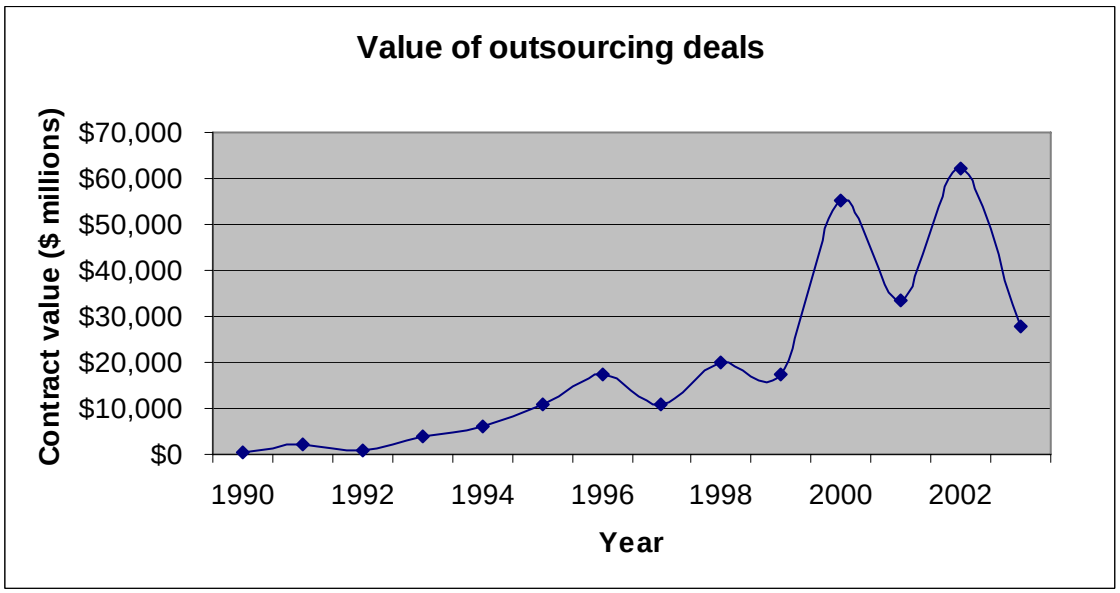

Figure 2. Value of outsourcing deals

This table provides descriptive statistics for signed outsourcing contracts between 1990 and 2003 identified from Factiva and meet the following criteria: (a) client and vendor firms are publicly traded on AMEX, NYSE or Nasdaq, (b) they have stocks returns available on Center for Research in Security Prices (CRSP) data base, (c) they have financial statement data available in Compustat on a consolidated basis and there are no other financial events around the announcement of the outsourcing contract. All accounting data are for the end of the year before the contract announcement year. All values are reported in 2000 dollars. MVE is the market value of equity, relative deal size is contract size per year divided by either MVE or cost of goods sold (CGS) for client firms (MVE or sales for vendor firms), opacity is net plant, property and equipment divided by total assets, current ratio is current assets divided by current liabilities and quick ratio is difference between current assets and inventories divided by current liabilities.

Table 1. Descriptive Statistics for Signed Contracts, Client and Vendor Firms

Variable	# obs.	Mean	Median	Maximum	Minimum	Std. dev.
Panel A: Client firm characteristics						
Sales ($ millions)	463	16,504.36	6,284.04	180,743.33	0.13	25,406.36
MVE ($ millions)	461	21,749.36	4,870.15	467,092.88	3.27	41,807.97
Relative deal size (MVE)	69	0.06	0.02	0.86	0.01	0.12
Relative deal size (CGS)	84	0.13	0.02	6.23	0.01	0.68
Opacity	424	0.27	0.19	0.94	0.01	0.23
Current ratio	331	1.50	1.25	13.27	0.10	1.13
Quick ratio	331	1.17	0.97	12.50	0.10	1.06
Panel B: Vendor characteristics						
Sales ($ millions)	847	12,683.57	1,836.03	94,737.80	0.90	24,139.99
MVE ($ millions)	817	19,632.82	2,567.82	256,307.20	1.62	44,862.44
Relative deal size (MVE)	143	0.09	0.02	2.37	0.01	0.27
Relative deal size (sales)	153	0.10	0.02	3.22	0.01	0.31
Panel C: Deal characteristics						
Contract years	471	6.13	5.00	20.00	1.00	2.94
Contract size ($ millions)	575	479.24	67.50	30,000.00	0.46	1,591.01
Contract size per year ($ millions)	471	77.37	13.20	6,000.00	0.19	324.11
(Vendor sales)/(Client firm sales)	365	4.85	0.55	82.68	0.01	12.82
(Vendor MVE)/(Client firm MVE)	372	13.61	0.60	526.92	0.01	57.28
Panel D: Deal classifications						
	# obs.			Ratio of total		
1. Deal is a renewal	147			13.73%		

2. Governmental deal (client firm is a governmental entity)	130	12.14%
3. US client firms outsource to foreign vendors	21	5.71%
4. US client firms outsource to US vendors	297	80.71%
Panel E: Client firm industry distribution		
Major outsourcing industries (SIC code)	Description of industry group	Percent of total (%)
35	Industrial And Commercial Machinery And Computer Equipment	11.05
73	Business Services	9.70
36	Electronic And Other Electrical Equipment And Components, Except Computer Equipment	8.36
37	Transportation Equipment	8.36
Panel F: Vendor industry distribution		
73	Business Services	47.41
36	Electronic And Other Electrical Equipment And Components, Except Computer Equipment	7.33
35	Industrial And Commercial Machinery And Computer Equipment	6.03
50	Wholesale Trade-durable Goods	5.60

This table provides descriptive statistics for cancelled outsourcing contracts between 1990 and 2003 identified from Factiva and meet the following criteria: (a) client and vendor firms are publicly traded on AMEX, NYSE or Nasdaq, (b) they have stocks returns available on Center for Research in Security Prices (CRSP) data base, (c) they have financial statement data available in Compustat on a consolidated basis and there are no other financial events around the announcement of the outsourcing contract. All accounting data are for the end of the year before the contract announcement year. All values are reported in 2000 dollars. MVE is the market value of equity.

Table 2. Descriptive Statistics for Cancelled Contracts

Specifications	# obs.	Mean	Median	Maximum	Minimum	Std. dev.
Panel A: Client firm characteristics						
Sales ($ millions)	23	16,732.22	10,602.12	75,483.05	48.12	19,368.28
MVE ($ millions)	22	27,756.49	4,103.60	259,598.33	9.13	57,568.23
Panel B: Vendor characteristics						
Sales ($ millions)	42	16,377.51	7,443.33	83,783.14	3.74	23,393.78
MVE ($ millions)	43	22,565.98	7,641.59	202,184.42	8.84	40,369.77
Panel C: Deal characteristics						
(Vendor sales)/(Client firm sales)	18	8.08	0.54	77.13	0.02	20.83
(Vendor MVE)/(Client firm MVE)	16	4.26	0.51	48.54	0.02	11.91
Panel D: Client firm industry distribution						
Major outsourcing industries (SIC code)	Description of industry group			Percent of total (%)		
73	Business Services			18.18		
63	Insurance Carriers			13.64		
35	Industrial And Commercial Machinery And Computer Equipment			9.09		
Panel E: Vendor industry distribution						
73	Business Services			51.16		
48	Communications			6.98		

This table presents abnormal returns for client firm stocks around the announcement of outsourcing contracts. Abnormal returns are calculated using the market model. The result for the whole sample is reported in Column 1. Columns 2 to 24 report the results for various sub-samples based on contract year (early deals are deals before 1998, late deals are from 1998 to 2003), client firm size, size of vendor relative to client, contract size, opacity, current ratio, quick ratio, whether the contract is a renewal and whether the vendor is a foreign-based company. Columns 25 to 27 report abnormal returns for the rivals of client firms. Column 28 reports abnormal returns for clients who cancel their contracts. t-statistics are based on tests that the mean cumulative abnormal returns are equal to zero and are reported in parentheses. MVE is the market value of equity, opacity is net plant, property and equipment divided by total assets, current ratio is current assets divided by current liabilities, quick ratio is difference between current assets and inventories divided by current liabilities and CGS is the cost of goods sold. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 3: Abnormal returns for client firms around outsourcing contract announcements

	1	2	3	4
Days relative to contract announcement day	All (n=475)	Early deals (n=111)	Late deals (n=364)	Small firms (sales) (n=232)
[-10, -1]	-0.00641 (-1.37)	-0.01132 (-1.38)	-0.00411 (-0.74)	-0.01356 (-1.65)
[-5, -2]	-0.00253 (-0.85)	-0.00741 (-1.01)	0.00016 (0.05)	-0.00604 (-1.16)
[-5, 0]	-0.00146 (-0.40)	-0.00219 (-0.92)	0.00216 (0.50)	-0.00279 (-0.44)
[-1, +1]	0.00071 (0.28)	-0.00365 (-0.81)	0.00206 (0.67)	0.00353 (0.78)
[-1, 0]	0.00107 (0.51)	-0.00180 (-0.49)	0.00200 (0.80)	0.00327 (0.89)
0	0.00145 (0.98)	-0.00221 (-0.85)	0.00223 (1.26)	0.00531 (2.04)**
[0, +1]	0.00103 (0.49)	-0.00388 (-1.06)	0.00224 (0.90)	0.00542 (1.47)
[0, +5]	0.00537 (1.48)	0.00925 (1.46)	0.00350 (0.81)	0.00934 (1.47)
[+2, +5]	0.00434 (1.46)	0.01313 (2.53)**	0.00125 (0.35)	0.00392 (0.75)
[+1, +10]	0.00009 (0.02)	0.00676 (0.83)	-0.00231 (-0.41)	-0.00477 (-0.58)

	5	6	7	8
Days relative to contract announcement day	Large firms (sales) (n=231)	Small firms (MVE) (n=231)	Large firms (MVE) (n=230)	(Vendor sales)/(client sales) > 1 (n=163)
[-10, -1]	-0.00191 (-0.32)	-0.01430 (-1.76)*	-0.00180 (-0.27)	-0.02770 (-2.79)**
[-5, -2]	0.00018 (0.05)	-0.00495 (-0.96)	-0.00091 (-0.22)	-0.00784 (-1.25)
[-5, 0]	-0.00268 (-0.58)	-0.00259 (-0.41)	-0.00268 (-0.52)	-0.00617 (-0.80)
[-1, +1]	-0.00332 (-1.02)	0.00289 (0.65)	-0.00229 (-0.63)	0.00585 (1.07)
[-1, 0]	-0.00287 (-1.08)	0.00238 (0.65)	-0.00177 (-0.59)	0.00167 (0.38)
0	-0.00303 (-1.61)	0.00459 (1.79)*	-0.00149 (-0.71)	0.00526 (1.67)*
[0, +1]	-0.00336 (-1.26)	0.00495 (1.36)	-0.00197 (-0.66)	0.00933 (2.10)**
[0, +5]	0.00039 (0.08)	0.00639 (1.01)	0.00270 (0.52)	0.01038 (1.35)
[+2, +5]	0.00375 (0.99)	0.00143 (0.28)	0.00467 (1.11)	0.00105 (0.17)
[+1, +10]	0.00297 (0.50)	-0.00508 (-0.63)	0.00211 (0.32)	-0.00467 (-0.47)

	9	10	11	12
Days relative to contract announcement day	(Vendor sales)/(client sales) < 1 (n=209)	(Vendor MVE)/(client MVE) > 1 (n= 165)	(Vendor MVE)/(client MVE) < 1 (n=211)	Small relative deal size (MVE) (n=34)
[-10, -1]	-0.00534 (0.69)	-0.03120 (-3.14)***	-0.00224 (-0.27)	0.00009 (0.01)
[-5, -2]	0.00155 (0.32)	-0.01017 (-1.62)	0.00574 (1.09)	-0.00343 (-0.59)
[-5, 0]	-0.00256 (-0.43)	-0.00617 (0.80)	-0.00145 (-0.22)	-0.00028 (-0.04)
[-1, +1]	-0.00294 (-0.70)	0.00971 (1.78)*	-0.00717 (-1.56)	0.00092 (0.18)
[-1, 0]	-0.00411 (-1.19)	0.00399 (0.90)	-0.00720 (-1.92)*	0.00315 (0.76)
0	-0.00378 (-1.55)	0.00551 (1.75)*	-0.00368 (-1.39)	0.00427 (1.46)
[0, +1]	-0.00257 (-0.75)	0.01112 (2.50)**	-0.00360 (-0.96)	0.00198 (0.48)
[0, +5]	0.00338 (0.57)	0.01728 (2.25)**	-0.00285 (-0.44)	0.00681 (0.95)
[+2, +5]	0.00595 (1.22)	0.00616 (0.98)	0.00075 (0.14)	0.00482 (0.82)
[+1, +10]	0.00500 (0.65)	0.00820 (0.83)	-0.00475 (-0.57)	0.01018 (1.10)

	13	14	15	16
Days relative to contract announcement day	Large relative deal size (MVE) (n=35)	Small relative deal size (CGS) (n=42)	Large relative deal size (CGS) (n=42)	Opaque firms (n= 212)
[-10, -1]	-0.00304 (-0.29)	0.00859 (0.97)	-0.00989 (-0.92)	-0.01517 (-1.94)*
[-5, -2]	0.00126 (0.19)	0.00574 (1.02)	-0.00710 (-1.04)	-0.00743 (-1.51)
[-5, 0]	0.00427 (0.53)	0.00609 (0.88)	-0.00213 (-0.26)	-0.00372 (-0.62)
[-1, +1]	0.00640 (1.13)	-0.00184 (-0.38)	0.00848 (1.44)	0.00363 (0.85)
[-1, 0]	0.00301 (0.65)	.000353305 (0.09)	0.00497 (1.03)	0.00371 (1.06)
0	-0.00396 (-1.21)	-0.00109 (-0.39)	0.00004 (0.01)	0.00974 (1.82)*
[0, +1]	-0.00042 (-0.09)	-0.00326 (-0.82)	0.00351 (0.73)	0.00352 (1.01)
[0, +5]	-0.00131 (-0.16)	-0.00696 (-1.01)	0.01214 (1.46)	0.00537 (0.89)
[+2, +5]	-0.00089 (-0.14)	-0.00370 (-0.66)	0.00862 (1.27)	0.00185 (0.37)
[+1, +10]	-0.01170 (-1.13)	-0.00906 (-1.02)	0.00684 (0.64)	-0.00819 (-1.05)

	17	18	19	20
Days relative to contract announcement day	Transparent firms (n=212)	Firms with low current ratio (n=96)	Firms with high current ratio (n=235)	Firms with low quick ratio (n=175)
[-10, -1]	-0.00292 (-0.46)	-0.00990 (-0.98)	-0.00634 (-0.85)	-0.01168 (-1.32)
[-5, -2]	-0.00025 (-0.06)	0.00118 (0.19)	-0.00501 (-1.06)	-0.00110 (-0.20)
[-5, 0]	-0.00310 (-0.63)	-0.00029 (-0.04)	-0.00306 (-0.53)	-0.00050 (-0.07)
[-1, +1]	-0.00261 (-0.74)	-0.00029 (-0.05)	0.00213 (0.52)	0.00262 (0.54)
[-1, 0]	-0.00286 (1.00)	-0.00147 (-0.33)	0.00196 (0.58)	.000598065 (0.15)
0	-0.00087 (-0.43)	0.00596 (1.87)*	0.00001 (0.01)	0.00717 (1.79)*
[0, +1]	-0.00059 (-0.21)	0.00702 (1.56)	0.00019 (0.06)	0.00603 (1.52)
[0, +5]	0.00634 (1.28)	0.01071 (1.37)	0.00528 (0.91)	0.00849 (1.24)
[+2, +5]	0.00692 (1.71)*	0.00369 (0.58)	0.00509 (1.08)	0.00246 (0.44)
[+1, +10]	0.00526 (0.82)	0.00474 (0.47)	-0.00294 (-0.39)	0 .00192 (0.22)

	21	22	23	24
Days relative to contract announcement day	Firms with high quick ratio (n=156)	Announcement is a contract renewal (n=62)	US firms outsource to foreign vendors (n= 21)	US firms outsource to US vendors (n=297)
[-10, -1]	-0.00306 (-0.36)	-0.02623 (-2.53)**	-0.01243 (-0.64)	-0.00556 (-0.93)
[-5, -2]	-0.00533 (-0.98)	-0.00872 (-1.33)	-0.00529 (-0.43)	-0.00047 (-0.13)
[-5, 0]	-0.00401 (-0.60)	-0.00781 (-0.97)	-0.01912 (-1.26)	0.00041 (0.09)
[-1, +1]	0.00024 (0.05)	0.00422 (0.74)	-0.01215 (-1.14)	0.00121 (0.37)
[-1, 0]	0.00132 (0.34)	0.00093 (0.20)	-0.01382 (-1.58)	0.00089 (0.33)
0	-0.000595 (-0.22)	0.00781 (1.68)*	-0.01102 (-1.78)*	0.00029 (0.15)
[0, +1]	-0.00166 (-0.43)	0.00467 (1.42)	-0.00935 (-1.07)	0.00061 (0.23)
[0, +5]	0.00524 (0.79)	0.01043 (1.30)	0.01646 (1.09)	0.00099 (0.21)
[+2, +5]	0.00690 (1.27)	0.00262 (0.40)	0.02580 (2.09)**	0.00038 (0.10)
[+1, +10]	-0.00332 (-0.39)	0.00788 (0.76)	0.00117 (0.06)	-0.00450 (-0.76)

	25	26	27	28
Days relative to contract announcement day	Rivals (n=461)	Rivals which later outsource (n=76)	Rivals which later do not outsource (n=385)	Firms who cancelled deals (n=22)
[-10, -1]	0.00089 (0.13)	-0.01566 (-1.10)	0.00044 (0.06)	-0.02483 (-0.93)
[-5, -2]	-0.00216 (-0.49)	-0.00194 (-0.22)	-0.00634 (-1.25)	-0.02780 (-1.65)
[-5, 0]	-0.00677 (-1.25)	-0.00230 (-0.21)	-0.00962 (-1.55)	-0.03267 (-1.58)
[-1, +1]	-0.00697 (-1.83)*	-0.00168 (-0.22)	-0.00496 (-1.13)	0.00960 (0.66)
[-1, 0]	-0.00476 (-1.53)	-0.00036 (-0.06)	-0.00340 (-0.95)	-0.00487 (-0.41)
0	-0.00476 (-2.16)**	-0.00315 (-0.70)	-0.00529 (-2.23)**	-0.01030 (-1.22)
[0, +1]	-0.00682 (-2.19)**	-0.00414 (-0.65)	-0.00383 (-1.47)	0.00584 (0.49)
[0, +5]	-0.00575 (-1.07)	-0.00770 (-0.70)	-0.00378 (-0.61)	-0.00405 (-0.20)
[+2, +5]	0.00106 (0.24)	-0.00356 (-0.40)	0.00150 (0.30)	-0.00989 (-0.59)
[+1, +10]	-0.00249 (-0.36)	-0.00087 (-0.06)	-0.00312 (-0.39)	0.03689 (1.39)

This table presents abnormal returns for vendor firm stocks around the announcement of outsourcing contracts. Abnormal returns are calculated using the market model. The result for the whole sample is reported in Column 1. Columns 2 to 13 report the results for various sub-samples based on contract year (early deals are deals before 1998, late deals are from 1998 to 2003), vendor size, contract size, whether the contract is a renewal and whether the client is a governmental entity. Columns 14 to 16 report abnormal returns for the rivals of vendor firms. Column 17 reports abnormal returns for vendors when clients cancel their contracts. Column 18 reports abnormal returns for vendors when a rival is awarded a contract. t-statistics are based on tests that the mean cumulative abnormal returns are equal to zero and are reported in parentheses. MVE is the market value of equity. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 4: Abnormal returns for vendors around outsourcing contract announcements

	1	2	3	4
Days relative to contract announcement day	All (n=932)	Early deals (n=209)	Late deals (n=723)	Small firms (sales) (n=424)
[-10, -1]	0.00099 (0.24)	0.00179 (0.24)	0.00270 (0.60)	0.01250 (1.70)*
[-5, -2]	0.00139 (0.54)	0.00311 (0.67)	0.00065 (0.23)	0.00618 (1.33)
[-5, 0]	0.01475 (4.65)***	0.01463 (2.58)**	0.01456 (4.18)***	0.02774 (4.87)***
[-1, +1]	0.01512 (6.74)***	0.01426 (3.56)***	0.01564 (6.34)***	0.02397 (5.95)***
[-1, 0]	0.01336 (7.30)***	0.01151 (3.52)***	0.01392 (6.91)***	0.02156 (6.55)***
0	0.01303 (10.07)***	0.01245 (5.38)***	0.01331 (9.35)***	0.02062 (8.86)***
[0, +1]	0.01452 (7.93)***	0.01482 (4.53)***	0.01481 (7.36)***	0.02288 (6.95)***
[0, +5]	0.01457 (4.60)***	0.01898 (3.35)***	0.01389 (3.98)***	0.02837 (4.98)***
[+2, +5]	0.00005 (0.02)	0.00416 (0.90)	-0.00092 (-0.32)	0.00549 (1.18)
[+1, +10]	0.00160 (0.39)	0.00850 (1.16)	-0.00066 (-0.15)	0.00518 (0.70)

	5	6	7	8
Days relative to contract announcement day	Large firms (sales) (n=423)	Small firms (MVE) (n=408)	Large firms (MVE) (n=409)	Small relative deal size (MVE) (n=71)
[-10, -1]	-0.00695 (-1.76)*	0.01641 (2.24)**	-0.00820 (-2.01)**	-0.01304 (-2.07)**
[-5, -2]	-0.00390 (-1.56)	0.01097 (2.36)**	-0.00521 (-2.02)**	-0.00165 (-0.41)
[-5, 0]	0.00093 (0.31)	0.03619 (6.37)***	-0.00270 (-0.86)	-0.00311 (-0.64)
[-1, +1]	0.00648 (3.00)***	0.02774 (6.90)***	0.00395 (1.77)*	0.00099 (0.29)
[-1, 0]	0.00483 (2.74)**	0.02522 (7.68)***	0.00251 (1.38)	-0.00146 (-0.52)
0	0.00489 (3.92)***	0.02348 (10.11)***	0.00313 (2.43)**	0.00087 (0.44)
[0, +1]	0.00639 (3.62)***	0.02587 (7.88)***	0.00447 (2.46)**	0.00329 (1.17)
[0, +5]	0.00219 (0.72)	0.03132 (5.51)***	0.00003 (0.01)	0.00109 (0.22)
[+2, +5]	-0.00420 (-1.68)*	0.00545 (1.17)	-0.00444 (-1.73)*	-0.00220 (-0.55)
[+1, +10]	-0.00234 (-0.59)	0.00731 (1.00)	-0.00300 (-0.74)	0.00032 (0.05)

	9	10	11	12
Days relative to contract announcement day	Large relative deal size (MVE) (n=72)	Small relative deal size (sales) (n=78)	Large relative deal size (sales) (n=78)	Announcement is a contract renewal (n=123)
[-10, -1]	0.01038 (0.99)	-0.01335 (-2.12)**	0.00696 (0.66)	0.00195 (0.23)
[-5, -2]	-0.00271 (-0.41)	-0.00315 (-0.79)	-0.00554 (-0.83)	0.00663 (1.25)
[-5, 0]	0.02964 (3.65)***	-0.00317 (-0.65)	0.02485 (3.03)***	-0.00020 (-0.03)
[-1, +1]	0.03847 (6.71)***	0.00145 (0.42)	0.03758 (6.48)***	-0.00400 (-0.87)
[-1, 0]	0.03234 (6.91)***	-0.00002 (-0.01)	0.03039 (6.42)***	-0.00584 (-1.32)
0	0.02303 (6.95)***	0.00255 (1.28)	0.02021 (6.03)***	-0.00272 (-1.02)
[0, +1]	0.02872 (6.13)***	0.00393 (1.39)	0.02715 (5.73)***	0.00023 (0.06)
[0, +5]	0.03683 (4.54)***	0.00084 (0.17)	0.03638 (4.43)***	0.00017 (0.03)
[+2, +5]	0.00811 (1.22)	-0.00309 (-0.77)	0.00923 (1.38)	-0.00007 (-0.01)
[+1, +10]	0.02071 (1.98)*	-0.00078 (-0.12)	0.02493 (2.35)**	0.00587 (0.70)

	13	14	15	16
Days relative to contract announcement day	Client is a governmental entity (n=82)	Rivals (n=887)	Rivals which later get contracts (n=303)	Rivals which later do not get contracts (n=584)
[-10, -1]	-0.00893 (-0.72)	-0.01719 (-1.73)*	-0.01978 (-1.87)*	-0.00646 (-0.25)
[-5, -2]	-0.00724 (-0.92)	-0.00081 (-0.13)	-0.00030 (-0.04)	-0.01120 (-0.69)
[-5, 0]	0.01303 (1.35)	0.00729 (0.94)	0.00904 (1.10)	-0.00802 (-0.40)
[-1, +1]	0.02162 (3.18)***	0.00659 (1.21)	0.00785 (1.35)	-0.00008 (-0.01)
[-1, 0]	0.02028 (3.65)***	0.00849 (1.91)*	0.00984 (2.08)**	0.00318 (0.28)
0	0.01484 (3.78)***	0.01584 (5.09)***	0.018026 (5.39)***	0.00473 (0.58)
[0, +1]	0.01619 (2.92)***	0.01372 (3.08)***	0.01561 (3.30)***	0.00146 (0.13)
[0, +5]	0.02089 (2.17)**	0.01199 (1.55)	0.01397 (1.71)*	0.01212 (0.61)
[+2, +5]	0.00469 (0.60)	-0.00175 (-0.28)	-0.00166 (-0.25)	0.01065 (0.65)
[+1, +10]	-0.00873 (-0.70)	0.00086 (0.09)	0.00078 (0.07)	0.00660 (0.26)

	17	18
Days relative to contract announcement day	Cancelled deals (n=43)	Contracts won by a vendor rival (n=33)
[-10, -1]	0.00604 (0.27)	0.01267 (0.51)
[-5, -2]	-0.00054 (-0.04)	0.01402 (0.90)
[-5, 0]	-0.00834 (-0.48)	0.00029 (0.02)
[-1, +1]	-0.02243 (-1.83)*	-0.04120 (-3.04)***
[-1, 0]	-0.00818 (-0.82)	-0.01425 (-1.29)
0	-0.01891 (-2.67)**	-0.02913 (-3.72)***
[0, +1]	-0.03177 (-3.17)***	-0.05272 (-4.76)***
[0, +5]	-0.01430 (-0.82)	-0.02411 (-1.26)
[+2, +5]	0.01747 (1.23)	0.02860 (1.83)*
[+1, +10]	0.03928 (1.75)	0.02654 (1.07)

This table reports the results from an estimation of the following regression:

$$A_j = \alpha + \beta CSize_j + \chi CSizevsVSize_j + \delta C\,\mathrm{Re}lativeDealSize_j + \phi Opacity_j$$
$$+ \varphi Liquidity_j + \eta\,\mathrm{Re}newal_j + \gamma ForeignV_j + \theta Early_j + \pi Interactive_j + \varepsilon_j$$

Where A_j is the client's abnormal return for the day of the announcement of contract j. $CSize_j$ is the log of client firm sales or MVE and $CSizevsVSize_j$ is the log of vendor size divided by client firm size. $C\,\mathrm{Re}lativeDealSize_j$ is the log of annual contract size divided by client firm CGS or MVE. $Opacity_j$ is the log of client firm's opacity level. $Liquidity_j$ is the log of client firm's current or quick ratio. $\mathrm{Re}newal_j$ is a dummy variable that equals 1 when the contract is a renewal. $ForeignV_j$ is a dummy variable representing that vendor firm is a foreign firm listed on US markets. $Early_j$ is a dummy variable that takes on a value of 1 when the deal is before 1998. $Interactive_j$ is the interaction of the time dummy with other independent variables. All the accounting variables are obtained from Compustat for the end of the year before the contract announcement year. All values are in 2000 dollars. t-statistics are reported in parentheses. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 5: The relation between client firms' announcement day abnormal stock returns and measures of firm and contracts' characteristics

Dependent variable	A					
Specifications	1	2	3	4	5	6
Observations	317	302	183	189	69	84
Constant	0.0154 (1.33)	0.0055 (0.77)	-0.0084 (-1.01)	-0.0179 (-1.40)	-0.0095 (-0.36)	-0.0006 (-0.03)
CSize (sales)	-0.0036 (-3.10)***					
CSize (MVE)		-0.0029 (-2.32)**				
CSizevsVSize (sales)			0.0008 (1.81)*			
CSizevsVSize (MVE)				0.0008 (1.78)*		
C Relative DealSize (MVE)					-0.0024 (-1.01)	
C Relative DealSize (CGS)						-0.0013 (-0.57)
Opacity	-0.0257 (-2.05)**	-0.0334 (-1.83)*	-0.0349 (-1.97)**	-0.0226 (-2.03)**	-0.0268 (-1.97)**	-0.0091 (-1.98)**
Liquidity (Current ratio)	-0.0168 (-1.96)**		-0.0104 (-1.71)*		-0.0115 (-2.23)**	
Liquidity (Quick ratio)		-0.0143 (-1.59)		-0.0078 (-1.77)*		-0.0064 (-1.69)*
Renewal	0.0083 (1.09)	0.0069 (0.87)	0.0055 (0.73)	0.0027 (0.34)	0.0160 (1.10)	0.0159 (1.13)
ForeignV	0.0023 (0.74)	0.0033 (0.99)	-0.0075 (-0.61)	-0.0088 (-0.64)	-0.0190 (-0.59)	-0.0124 (-0.81)
Early	-0.0055 (-0.87)			-0.0086 (-1.03)		-0.0027 (-0.57)

Interactive ($Early \times CSize$)		0.0004 (0.44)				
Interactive ($Early \times CSizevsVSize$)			0.0008 (0.91)			
Interactive ($Early \times C\,\mathrm{Re}\,lativeDealSize$)					0.0023 (0.64)	
Adjusted R^2	0.0875	0.0746	0.0682	0.0587	0.0840	0.0729

This table reports the results from an estimation of the following regression:

$$A_j = \kappa + \iota VSize_j + \lambda V\,\mathrm{Re}lativeDealSize_j + \nu\,\mathrm{Re}newal_j + \sigma Gov_j + \vartheta Early_j + \rho Interactive_j + \varpi_j$$

where A_j is the vendor's abnormal return for on the day of the announcement of contract j. $VSize_j$ is the log of vendor's size. $V\,\mathrm{Re}lativeDealSize_j$ is the log of contract value per year divided by vendor's size. $\mathrm{Re}newal_j$ is a dummy variable that equals 1 when the contract is a renewal. Gov_j is a dummy variable representing that vendor sign a contract with a governmental entity. $Early_j$ is a dummy variable that takes on a value of 1 when the deal is before 1998. $Interactive_j$ is the interaction of the time dummy with other independent variables. For a contract j, all the accounting variables are for the year-end before the contract announcement year. All values are in 2000 dollars. T-statistics are reported in parentheses. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 6: The relation between vendors' announcement day abnormal stock returns and measures of firm and contracts' characteristics

Dependent variable	A			
Specifications	1	2	3	4
Observations	834	808	143	156
Constant	0.0319 (1.87)*	0.0310 (1.97)**	0.0145 (0.57)	0.0323 (1.22)
$VSize$ (sales)	-0.0134 (-2.39)**			
$VSize$ (MVE)		-0.0143 (-2.88)***		
$V\,\mathrm{Re}lativeDealSize$ (MVE)			0.0060 (2.74)***	
$V\,\mathrm{Re}lativeDealSize$ (sales)				0.0111 (2.02)**
$\mathrm{Re}newal$	-0.0104 (-1.13)	-0.0187 (-1.29)	-0.0051 (-0.41)	-0.0117 (-0.44)
Gov	-0.0112 (-0.77)	-0.0116 (-1.03)	-0.0182 (-0.67)	0.0194 (0.82)
$Early$	-0.0098 (-1.74)*		-0.0088 (-1.81)*	
$Interactive$ ($Early \times VSize$)		0.0013 (1.15)		
$Interactive$ ($Early \times V\,\mathrm{Re}lativeDealSize$)				0.0007 (1.01)
Adjusted R^2	0.0856	0.0722	0.0693	0.0775

This table reports buy-and-hold returns from one day after to three years (756 trading days) after outsourcing contract takes effect. If a firm is delisted prior to its three-year contract anniversary date, we treat the delisting date as the end-of-period date. Panel A reports the results for the complete sample. The remaining panels report results for the sample stratified by client firm size, size of vendor relative to client, contract size, opacity, current ratio, quick ratio and whether the vendor is a foreign-based company . *, **, *** denote the statistical significance level of 10%, 5%, and 1%, respectively.

Table 7: *Ex-post* long-run holding period abnormal returns for client firms

Matching criterion	N	Client firm	Matching firm	Difference	t-stat
Panel A: All					
Size	306	0.4184	0.2018	0.2166	2.53**
Size and book-to-market	299	0.4426	0.1642	0.2784	3.18***
Panel B: Small firms (sales)					
Size	153	0.5101	0.2675	0.2426	1.76*
Size and book-to-market	150	0.5097	0.2120	0.2977	2.39**
Panel C: Large firms (sales)					
Size	153	0.4374	0.3759	0.0615	0.58
Size and book-to-market	149	0.4923	0.1871	0.3052	2.50***
Panel D: Small firms (MVE)					
Size	153	0.5975	0.3036	0.2938	2.12**
Size and book-to-market	150	0.5854	0.2004	0.3850	3.08***
Panel E: Large firms (MVE)					
Size	153	0.3458	0.3598	-0.0140	-0.15
Size and book-to-market	149	0.3939	0.2318	0.1621	1.64*
Panel F: (Vendor sales/client sales)>1					
Size	108	0.6507	0.2505	0.4002	2.42**
Size and book-to-market	105	0.4835	0.2035	0.2800	2.44**

Panel G: (Vendor sales/client sales)<1					
Size	169	0.4415	0.2485	0.1930	1.86*
Size and book-to-market	164	0.6270	0.4685	0.1585	0.80
Panel H: (Vendor MVE/client MVE)>1					
Size	125	0.7541	0.4660	0.2881	1.58
Size and book-to-market	119	0.7507	0.2242	0.5265	3.54***
Panel I: (Vendor MVE/client MVE)<1					
Size	141	0.3395	0.2616	0.0779	0.91
Size and book-to-market	138	0.3189	0.2075	0.1114	1.16
Panel J: Opaque firms					
Size	153	0.6069	0.3170	0.2899	1.71*
Size and book-to-market	150	0.6528	0.1373	0.5155	3.13***
Panel K: Transparent firms					
Size	153	0.3691	0.3098	0.0593	0.61
Size and book-to-market	149	0.3780	0.2640	0.1140	1.29
Panel L: Low current ratio firms					
Size	66	0.5455	0.3111	0.2344	1.56
Size and book-to-market	64	0.5386	0.2454	0.2932	1.93*
Panel M: High current ratio firms					
Size	220	0.2320	0.2950	-0.0630	-0.41
Size and book-to-market	118	0.2348	0.1545	0.0803	0.63
Panel N: Low quick ratio firms					
Size	145	0.5889	0.3188	0.2701	1.39
Size and book-to-market	142	0.5658	0.2131	0.3527	1.75*
Panel O: High quick ratio firms					
Size	131	0.3227	0.3029	0.0198	0.17
Size and book-to-market	128	0.3448	0.2370	0.1078	1.05

Panel P: Small relative deal size (MVE)					
Size	30	0.4442	0.4600	-0.0158	-0.15
Size and book-to-market	29	0.3833	0.2401	0.1432	1.47
Panel Q: Large relative deal size (MVE)					
Size	31	0.5385	0.3707	0.1678	0.90
Size and book-to-market	30	0.4493	0.1539	0.2954	2.19**
Panel R: Small relative deal size (CGS)					
Size	36	0.3684	0.3542	0.0142	0.15
Size and book-to-market	35	0.2915	0.1610	0.1305	1.24
Panel S: Large relative deal size (CGS)					
Size	36	0.5585	0.4257	0.1328	0.73
Size and book-to-market	35	0.4957	0.2302	0.2655	2.02**
Panel T: US client firms that outsource to non-US vendors					
Size	17	0.1451	0.0499	0.0952	0.98
Size and book-to-market	17	0.1134	0.0584	0.0550	0.31
Panel U: US client firms that outsource to US vendors					
Size	250	0.5653	0.4090	0.1563	1.46
Size and book-to-market	249	0.5813	0.2595	0.3218	3.39***

This table reports buy-and-hold return from three years (756 trading days) before to one day before the effective date of the outsourcing contract. The percentage buy-and-hold return for firm i is $R_{iT} = [\prod_{t=\min[3YearsBefore, listed]}^{t=-1}(1+r_{it})-1]$. *, **, *** denote the statistical significance level of 10%, 5%, and 1%, respectively.

Table 8: *Ex-ante* holding-period abnormal returns for client firms

Marching criterion	N	Client firm	Matching firm	Difference	t-stat
Size	287	0.3665	0.6342	-0.2677	-2.14**
Size and book-to-market	257	0.3675	0.4411	-0.0736	-0.78

This table reports the calendar-time abnormal returns for a portfolio of client firms using the Fama and French (1993) methodology. Specifically, we report the results of the estimation of the following regression:

$$R_{pt} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + \varepsilon_{it}$$

where R_{pt} is the simple monthly return on the calendar-time portfolio, R_{ft} is the monthly return on three-month Treasury bills, R_{mt} is the return on a value-weighted market index, SMB_t is the difference in the returns of value-weighted portfolios of small stocks and big stocks, and HML_t is the difference in the returns of value-weighted portfolios of high book-to-market stocks and low book-to-market stocks. The estimate of the intercept term α_i provides a test of the null hypothesis that the mean monthly excess return of our sample is zero. t-statistics are reported in parentheses. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 9: Calendar-time three-factor model for client firms

Specifications	α	*MKT*	*SMB*	*HML*	Adjusted R^2
12 months	0.12331 (2.45)**	0.73452 (2.43)**	0.37345 (3.35)***	0.19123 (1.76)*	0.35
24 months	0.21604 (3.67)***	0.67127 (2.28)**	0.31452 (3.24)***	0.15077 (2.08)**	0.51
36 months	0.28104 (3.46)***	0.67011 (2.25)**	0.37927 (3.30)***	0.22182 (2.85)***	0.56

This table presents estimates of the following regression:

$$BHAR_i = e_0 + e_1 CSize_i + e_2 CSizevsVSize_i + e_3 C\,\mathrm{Re}lativeDealSize_i + e_4 Opacity_i + e_5 Liquidity_i + e_6 ForeignV_i + \varepsilon_i$$

where $BHAR_i$ is client firms' 3-year buy-and-hold abnormal return as defined in table 7, $CSize_i$ is the log of client firm sales or market value of equity at year -1, $CSizevsVSize_i$ is the log of vendor size divided by client firm size, $C\,\mathrm{Re}lativeDealSize_i$ is the log of contract value per year divided either by client firm's costs of goods sold or by market value of equity, $Opacity_i$ is the log of client firm's opacity level, $Liquidity_i$ is the log of client firm's current or quick ratio, and $ForeignV_{l,i}$ is a dummy variable, which equals 1 when US client firm signs a contract with a non-US vendor. t-statistics are reported in parentheses. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 10: Regressions of client firms' long-run abnormal stock returns

Dependent variable	*BHAR*					
Observations	241	239	241	239	72	61
Constant	-0.9775 (-1.49)	0.8723 (1.34)	0.9456 (1.42)	-0.9315 (-1.29)	1.2720 (1.85)*	1.0357 (1.56)
CSize (sales)	-0.0734 (-1.81)*					-0.0914 (-1.90)*
CSize (MVE)		-0.0888 (-1.66)*			-0.1391 (-2.05)**	
CSizevsVSize (sales)			-0.0074 (-0.13)			
CSizevsVSize (MVE)				-0.0055 (-0.37)		
Re*lativeDealSize* (CGS)					-0.0617 (-0.91)	
Re*lativeDealSize* (MVE)						0.0279 (0.39)
Opacity	-0.0042 (-0.67)	-0.1456 (-1.64)*	-0.0497 (-2.02)**	-0.0645 (-2.20)**	-0.1677 (-1.71)*	-0.1551 (-1.65)*
Liquidity (Current ratio)	-0.1892 (-1.67)		-0.0028 (-0.73)		-0.0029 (-0.74)	
Liquidity (Quick ratio)		-0.2307 (-1.81)*		-0.0047 (-0.05)		-0.0413 (-0.40)
ForeignV	-0.3571 (-0.37)	-0.5466 (-0.57)	-0.7580 (-1.16)	-0.7561 (-1.18)	-0.8615 (-1.20)	-0.6815 (-1.04)
Adjusted R^2	0.0987	0.0816	0.0667	0.0714	0.0547	0.0529

This table reports buy-and-hold returns from one day after to three years (756 trading days) after outsourcing contract takes effect. If a firm is delisted prior to its three-year contract anniversary date, we treat the delisting date as the end-of-period date. *, **, *** denote the statistical significance level of 10%, 5%, and 1%, respectively.

Table 11: *Ex-post* long-run holding period abnormal returns of vendor firms

Matching criterion	N	Vendor firm	Matching firm	Difference	t-stat
Size	215	0.2126	0.3040	-0.0914	-0.94
Size and book-to-market	215	0.1616	0.3459	-0.1843	-1.31

This table reports median changes in accounting performance from one year before to three years after the outsourcing contract takes effect. Three different measures are reported: unadjusted changes, changes adjusted by subtracting SIC two-digit industry median changes (industry-adjusted), and changes adjusted by subtracting changes for a control group matched by both industry and prior accounting performance (control group-adjusted). SALEFF is sales efficiency defined as sales divided by number of employees, IEFF is income efficiency defined as operating income divided by number of employees, GRSMRGN is gross profit margin defined as costs of goods sold divided by sales, NETMRGN is net profit margin defined as net income divided by sales, TURNOVER is asset turnover defined as sale divided by total assets, and ROA is return on assets defined as operating income divided by total assets. Sample sizes and p-values based on the Wilcoxon signed-rank test are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table 12: *Ex-post* accounting performance changes for client firms

	All	Small firms (sales)	Large firms (sales)	Small firms (MVE)	Large firms (MVE)
Panel A: Changes in SALEFF					
Unadjusted	0.19349 (254, <.0001)***	0.18915 (127, <.0001)***	0.19682 (127, <.0001)***	0.16022 (127, <.0001)***	0.22660 (127, <.0001)***
Industry median-adjusted	0.08173 (254, 0.0433)**	0.10819 (127, 0.0238)**	0.09010 (127, 0.0968)*	0.10997 (127, 0.0246)**	0.09628 (127, 0.0607)*
Control group-adjusted	0.08275 (251, 0.0291)**	0.08550 (126, 0.0982)*	-0.00609 (125, 0.1355)	0.08275 (126, 0.0568)*	0.05270 (125, 0.5640)
Panel B: Changes in IEFF					
Unadjusted	0.24062 (251, <.0001)***	0.21340 (126, 0.0040)***	0.25407 (125, <.0001)***	0.26615 (126, 0.0002)***	0.23070 (125, <.0001)***
Industry median-adjusted	0.06822 (251, 0.0388)**	0.08230 (126, 0.6631)	0.02730 (125, 0.3887)	0.05364 (126, 0.0170)**	0.07821 (125, 0.0520)**
Control group-adjusted	0.05542 (249, 0.0381)**	0.07212 (125, 0.0706)*	-0.01261 (124, 0.5853)	0.05591 (125, 0.0562)*	0.04373 (124, 0.9296)
Panel C: Changes in GRSMRGN					
Unadjusted	0.00137 (251, 0.4740)	-0.00348 (126, 0.9032)	0.00629 (125, 0.4397)	-0.00232 (126, 0.9922)	0.01217 (125, 0.1595)
Industry median-adjusted	0.01302 (251, 0.0371)**	0.02015 (126, 0.0295)**	-0.00805 (125, 0.2708)	0.01307 (126, 0.0986)*	-0.01093 (125, 0.2693)
Control group-adjusted	0.00045 (249, 0.6977)	0.01154 (125, 0.7483)	-0.01503 (124, 0.5384)	0.01042 (125, 0.7605)	-0.013088 (124, 0.5085)

Panel D: Changes in NETMRGN					
Unadjusted	0.02251 (251, 0.0255)**	0.02025 (126, 0.0486)**	0.02372 (125, 0.0622)*	0.01438 (126, 0.0323)**	0.02842 (125, 0.0584)*
Industry median-adjusted	0.01589 (251, 0.0731)*	0.02841 (126, 0.0773)*	0.01993 (125, 0.2467)	0.01022 (126, 0.0934)*	0.01766 (125, 0.2086)
Control group-adjusted	0.00898 (249, 0.0586)*	0.01702 (125, 0.0926)*	0.00903 (124, 0.1146)	0.00937 (125, 0.0652)*	0.01154 (124, 0.1755)
Panel E: Changes in TURNOVER					
Unadjusted	0.01216 (254, 0.7403)	0.01281 (127, 0.8137)	0.01533 (127, 0.8398)	0.02287 (127, 0.9038)	0.01170 (127, 0.5309)
Industry median-adjusted	0.02578 (254, 0.0069)***	0.02924 (127, 0.0518)**	0.02186 (127, 0.1003)*	0.02643 (127, 0.0647)*	0.01872 (127, 0.1287)
Control group-adjusted	0.00541 (252, 0.1043)*	0.01522 (126, 0.2359)	-0.01356 (126, 0.7168)	0.01719 (126, 0.0873)*	-0.01356 (126, 0.7514)
Panel F: Changes in ROA					
Unadjusted	0.00463 (251, 0.0597)*	0.00686 (126, 0.0449)**	-0.00181 (125, 0.4075)	0.00049 (126, 0.6923)	0.01082 (125, 0.0195)**
Industry median-adjusted	-0.00263 (251, 0.9700)	-0.01233 (126, 0.1734)	0.00471 (125, 0.1349)	0.00858 (126, 0.6186)	-0.00174 (125, 0.8907)
Control group-adjusted	0.00281 (249, 0.8529)	0.00043 (125, 0.7212)	0.00253 (124, 0.6864)	0.01536 (125, 0.0966)*	-0.00519 (124, 0.3817)

	(Vendor sales/client sales)>1	(Vendor sales/client sales)<1	(Vendor MVE/client MVE)>1	(Vendor MVE/client MVE)<1
Panel A: Changes in SALEFF				
Unadjusted	0.30717 (97, <.0001)***	0.19637 (157, <.0001)***	0.31127 (119, <.0001)***	0.20849 (135, <.0001)***
Industry median-adjusted	0.18797 (97, 0.0375)**	0.05972 (157, 0.8905)	-0.02528 (119, 1.0000)	0.16983 (135, 0.2927)
Control group-adjusted	0.08530 (96, 0.4827)	-0.35107 (156, 0.1167)	0.16312 (119, 0.0614)*	-0.37167 (135, 0.1851)
Panel B: Changes in IEFF				
Unadjusted	0.25628 (96, 0.0029)***	0.27431 (157, 0.0310)**	0.26557 (119, 0.0168)**	0.28004 (135, <.0001)***
Industry median-adjusted	0.24405 (96, 0.1034)*	0.03491 (157, 0.8567)	0.02271 (119, 0.8030)	0.14595 (135, 0.0846)*
Control group-adjusted	0.13970 (96, 0.3817)	-0.10496 (156, 0.9259)	0.23045 (119, 0.0586)*	0.14911 (135, 0.4959)
Panel C: Changes in GRSMRGN				
Unadjusted	0.00753 (96, 0.3356)	0.00494 (157, 0.1752)	-0.00046 (119, 0.6402)	0.00652 (135, 0.1972)
Industry median-adjusted	-0.01644 (96, 0.3573)	-0.00197 (157, 0.9542)	-0.00794 (119, 0.4030)	-0.00450 (135, 0.6379)
Control group-adjusted	-0.00748 (96, 0.4456)	0.01503 (156, 0.1373)	-0.00155 (119, 0.9129)	0.00800 (135, 0.2333)
Panel D: Changes in NETMRGN				
Unadjusted	0.01772 (96, 0.1209)	0.00517 (157, 0.7738)	0.01718 (119, 0.0401)**	0.00590 (135, 0.5490)
Industry median-adjusted	-0.00161 (96, 0.4333)	0.00170 (157, 0.6079)	-0.00161 (119, 0.3692)	0.00818 (135, 0.4902)
Control group-adjusted	-0.00599 (96, 0.9425)	0.01296 (156, 0.1598)	0.01300 (119, 0.2996)	0.00877 (135, 0.2577)
Panel E: Changes in TURNOVER				
Unadjusted	-0.00672 (97, 0.4777)	-0.00781 (157, 0.9577)	0.02612 (119, 0.7302)	-0.01354 (135, 0.6009)
Industry median-adjusted	0.02890 (97, 0.7546)	0.03621 (157, 0.1496)	0.07711 (119, 0.0278)**	0.03315 (135, 0.2664)
Control group-adjusted	0.03429 (96, 0.1766)	0.00420 (156, 0.5238)	0.09328 (119, 0.0090)***	-0.00303 (135, 0.9744)

Panel F: Changes in ROA				
Unadjusted	-0.00545 (96, 0.6543)	-0.00583 (157, 0.2329)	0.00248 (119, 0.8898)	-0.00852 (135, 0.1144)
Industry median-adjusted	0.01093 (96, 0.4475)	-0.00398 (157, 09856)	-0.00263 (119, 0.7746)	-0.00286 (135, 0.8378)
Control group-adjusted	0.00537 (96, 0.7515)	0.00279 (156, 0.4378)	0.02625 (119, 0.0666)*	0.00154 (135, 0.9088)

	Opaque firms	Transparent firms	Low current ratio firms	High current ratio firms
Panel A: Changes in SALEFF				
Unadjusted	0.18975 (127, <.0001)***	0.20566 (127, <.0001)***	0.18250 (50, <.0001)***	0.20566 (204, <.0001)***
Industry median-adjusted	0.15799 (127, 0.0383)**	-0.00522 (127, 0.3038)	0.00332 (50, 0.8846)	0.17799 (204, 0.7966)
Control group-adjusted	0.12331 (126, 0.1007)*	0.11970 (126, 0.1990)	0.16577 (49, 0.6080)	-0.97140 (203, 0.3004)
Panel B: Changes in IEFF				
Unadjusted	0.21340 (127, 0.0405)**	0.25328 (127, <.0001)***	0.24046 (50, 0.0053)***	0.22265 (204, 0.0002)***
Industry median-adjusted	0.10249 (127, 0.0447)**	0.01895 (127, 0.8145)	-0.06533 (50, 0.8535)	0.22194 (204, 0.1022)*
Control group-adjusted	0.07512 (126, 0.0731)*	0.04982 (126, 0.8267)	0.30484 (49, 0.8145)	0.10185 (203, 0.7478)
Panel C: Changes in GRSMRGN				
Unadjusted	0.01207 (127, 0.1613)	-0.00309 (127, 0.5685)	-0.00145 (50, 0.2160)	-0.00181 (204, 0.4148)
Industry median-adjusted	-0.00752 (127, 0.5426)	0.01923 (127, 0.0578)*	-0.01886 (50, 0.8984)	-0.01914 (204, 0.0732)*
Control group-adjusted	0.01034 (126, 0.9312)	-0.00349 (126, 0.9680)	0.02544 (49, 0.1205)	-0.01527 (203, 0.1568)
Panel D: Changes in NETMRGN				
Unadjusted	0.01006 (127, 0.9205)	0.00520 (127, 0.4398)	0.00891 (50, 0.6209)	0.00595 (204, 0.5991)
Industry median-adjusted	0.00403 (127, 0.7322)	0.01091 (127, 0.1152)	0.00038 (50, 0.2379)	0.01091 (204, 0.1166)
Control group-adjusted	0.00005 (126, 0.5485)	-0.00052 (126, 0.4306)	-0.00191 (49, 0.9622)	-0.00142 (203, 0.8805)
Panel E: Changes in TURNOVER				
Unadjusted	-0.01086 (127, 0.8604)	-0.00860 (127, 0.5625)	0.00469 (50, 0.8113)	-0.01021 (204, 0.4948)
Industry median-adjusted	0.03603 (127, 0.0876)*	0.02802 (127, 0.2705)	0.04041 (50, 0.7856)	0.03259 (204, 0.2817)
Control group-adjusted	0.01279 (126, 0.6839)	0.01330 (126, 0.3833)	-0.01175 (49, 0.8032)	0.00440 (203, 0.3695)

Panel F: Changes in ROA				
Unadjusted	-0.00573 (127, 0.3392)	-0.00400 (127, 0.3506)	-0.01782 (50, 0.6052)	-0.00518 (204, 0.2031)
Industry median-adjusted	-0.00661 (127, 0.2570)	0.00145 (127, 0.4776)	0.02070 (50, 0.0488)**	0.00081 (204, 0.9486)
Control group-adjusted	-0.00700 (126, 0.2855)	0.00413 (126, 0.4178)	0.00270 (49, 0.7728)	0.00426 (203, 0.8514)

	Low quick ratio firms	High quick ratio firms	Small relative deal size (MVE)	Large relative deal size (MVE)
Panel A: Changes in SALEFF				
Unadjusted	0.22660 (134, <.0001)***	0.18996 (120, <.0001)***	0.41163 (30, <.0001)***	0.14109 (31, 0.0051)***
Industry median-adjusted	0.03417 (134, 0.2888)	0.07450 (120, 0.0987)*	0.34882 (30, 0.9673)	0.01992 (31, 0.9700)
Control group-adjusted	-0.11853 (132, 0.2887)	-0.64310 (118, 0.2151)	-0.08536 (29, 0.7706)	0.37167 (30, 0.7429)
Panel B: Changes in IEFF				
Unadjusted	0.26459 (134, <.0001)***	0.16900 (120, 0.0277)**	0.27959 (30, <.0001)***	0.00713 (31, 0.0639)*
Industry median-adjusted	0.02663 (134, 0.3636)	0.14385 (120, 0.3705)	0.20361 (30, 0.2821)	0.22926 (31, 0.2315)
Control group-adjusted	-0.14490 (132, 0.4197)	-0.13371 (118, 0.5332)	-0.14490 (29, 0.5786)	-0.58969 (30, 0.6625)
Panel C: Changes in GRSMRGN				
Unadjusted	-0.00207 (134, 0.9108)	-0.00188 (120, 0.8216)	-0.00309 (30, 0.5105)	0.00040 (31, 0.6244)
Industry median-adjusted	-0.01255 (134, 0.1552)	-0.01954 (120, 0.1870)	-0.02438 (30, 0.3644)	-0.02678 (31, 0.1571)
Control group-adjusted	-0.00560 (132, 0.7790)	-0.01169 (118, 0.5223)	0.00474 (29, 0.0660)*	-0.01049 (30, 0.1346)
Panel D: Changes in NETMRGN				
Unadjusted	0.00696 (134, 0.3692)	0.00485 (120, 0.8840)	0.00522 (30, 0.1583)	0.01479 (31, 0.0698)*
Industry median-adjusted	0.00120 (134, 0.7281)	0.01618 (120, 0.3261)	-0.00085 (30, 0.7541)	0.03129 (31, 0.5287)
Control group-adjusted	-0.00292 (132, 0.7077)	0.00105 (118, 0.6952)	-0.00603 (29, 0.1470)	0.01385 (30, 0.2757)
Panel E: Changes in TURNOVER				
Unadjusted	0.00202 (134, 0.6290)	-0.01516 (120, 0.1181)	0.01363 (30, 0.1738)	-0.00672 (31, 0.7626)
Industry median-adjusted	0.04729 (134, 0.1031)*	0.01977 (120, 0.7772)	0.06902 (30, 0.1403)	0.05367 (31, 0.0970)*
Control group-adjusted	0.01631 (132, 0.2583)	-0.01214 (118, 0.8992)	0.00771 (29, 0.5196)	0.07899 (30, 0.0239)**

Panel F: Changes in ROA				
Unadjusted	0.01332 (134, 0.0294)**	-0.01824 (120, 0.1756)	-0.00945 (30, 0.9341)	0.01998 (31, 0.0071)***
Industry median-adjusted	0.00338 (134, 0.1877)	0.00940 (120, 0.7323)	-0.01202 (30, 0.0848)*	0.00174 (31, 0.9811)
Control group-adjusted	0.00043 (132, 0.7980)	0.00409 (118, 0.3806)	-0.00569 (29, 0.5279)	0.01074 (30, 0.6896)

	Small relative deal size (CGS)	Large relative deal size (CGS)	US firms that outsource to non-US vendors	US firms that outsource to US vendors
Panel A: Changes in SALEFF				
Unadjusted	0.36323 (36, <.0001)***	0.16151 (36, <.0001)***	0.16169 (13, 0.0195)**	0.18955 (231, <.0001)***
Industry median-adjusted	0.14944 (36, 0.1879)	0.00541 (36, 0.9006)	0.02913 (13, 0.4961)	0.09449 (231, 0.0809)*
Control group-adjusted	-0.37960 (35, 0.9369)	0.02029 (35, 0.2976)	-0.02038 (11, 0.6523)	0.05191 (230, 0.0506)**
Panel B: Changes in IEFF				
Unadjusted	0.24381 (36, 0.0181)**	0.04338 (36, 0.1045)*	0.07675 (13, 0.7344)	0.23070 (230, <.0001)***
Industry median-adjusted	0.20152 (36, 0.2699)	0.22194 (36, 0.3043)	0.01510 (13, 0.9102)	0.13199 (230, 0.0454)**
Control group-adjusted	0.10185 (35, 0.5646)	0.69558 (35, 0.3269)	-0.01262 (11, 0.2087)	0.05591 (228, 0.0927)*
Panel C: Changes in GRSMRGN				
Unadjusted	-0.00079 (36, 0.7917)	-0.01170 (36, 0.2680)	-0.01210 (13, 0.3008)	0.00394 (227, 0.0892)*
Industry median-adjusted	-0.01368 (36, 0.2792)	-0.03647 (36, 0.1904)	-0.02351 (13, 0.4258)	0.00900 (227, 0.0916)*
Control group-adjusted	0.01087 (35, 0.5181)	-0.01506 (35, 0.1112)	-0.03253 (13, 0.7344)	-0.00390 (226, 04322)
Panel D: Changes in NETMRGN				
Unadjusted	0.00942 (36, 0.4194)	0.00951 (36, 0.5239)	0.02659 (13, 0.6523)	-0.02026 (227, 0.3221)
Industry median-adjusted	0.00699 (36, 0.9951)	0.00914 (36, 0.6132)	0.02680 (13, 0.8203)	0.01009 (227, 0.5708)
Control group-adjusted	0.00554 (35, 0.6987)	0.00199 (35, 0.9492)	0.03616 (13, 0.4961)	0.00837 (226, 0.3007)
Panel E: Changes in TURNOVER				
Unadjusted	0.00891 (36, 0.6184)	0.01166 (36, 0.7085)	-0.09605 (13, 0.8386)	-0.01021 (225, 0.5114)
Industry median-adjusted	0.06500 (36, 0.0954)*	0.08336 (36, 0.0495)**	0.07534 (13, 0.8201)	0.03157 (225, 0.0038)***
Control group-adjusted	0.00706 (35, 0.8202)	0.08247 (35, 0.0690)*	0.00236 (13, 0.9293)	0.00487 (223, 0.0936)*

Panel F: Changes in ROA				
Unadjusted	-0.01510 (36, 0.1196)	0.01706 (36, 0.2776)	-0.03416 (13, 0.1797)	-0.00864 (230, 0.1652)
Industry median-adjusted	-0.01072 (36, 0.4100)	0.00219 (36, 0.9908)	-0.01271 (13, 0.4258)	-0.00301 (230, 0.9690)
Control group-adjusted	-0.00732 (35, 0.4347)	-0.00196 (35, 0.8544)	-0.02725 (11, 0.3594)	-0.00208 (228, 0.7247)

This table reports median changes in accounting performance from three years before to one year before the outsourcing contract takes effect. Three different measures are reported: unadjusted changes, changes adjusted by subtracting SIC two-digit industry median changes (industry-adjusted), and changes adjusted by subtracting changes for a control group matched by both industry and prior accounting performance (control group-adjusted). SALEFF is sales efficiency defined as sales divided by number of employees, IEFF is income efficiency defined as operating income divided by number of employees, GRSMRGN is gross profit margin defined as costs of goods sold divided by sales, NETMRGN is net profit margin defined as net income divided by sales, TURNOVER is asset turnover defined as sale divided by total assets and ROA is return on assets defined as operating income divided by total assets. Sample sizes and p-values based on the Wilcoxon signed-rank test are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table 13: *Ex-ante* accounting performance changes of client firms

Specifications	Unadjusted changes	Industry median-adjusted changes	Control group-adjusted changes
SALEFF	0.13142 (278, 0.3442)	-0.01670 (278, 0.5378)	-0.06720 (278, 0.5779)
IEFF	0.11997 (278, 0.1455)	0.03363 (278, 0.4394)	-0.02855 (278, 0.4959)
GRSMRGN	-0.00061 (257, 0.9343)	0.00218 (257, 0.3174)	0.000095 (254, 0.5971)
NETMRGN	-0.00528 (274, 0.1892)	0.00217 (274, 0.7971)	0.00033 (271, 0.7766)
TURNOVER	-0.02128 (257, 0.0307)**	-0.00165 (257, 0.2805)	0.00504 (254, 0.6916)
ROA	-0.00993 (278, 0.0016)***	0.00076 (278, 0.7520)	0.00198 (278, 0.6853)

This table presents estimates of the following regression:

$$\Delta EFFICIENCY_i = e_7 + e_8 CSize_i + e_9 CSizevsVSize_i + e_{10} C\,\mathrm{Re}lativeDealSize_i$$
$$+ e_{11} Opacity_i + e_{12} Liquidity_i + e_{13} ForeignV_{l,i} + \upsilon_i$$

where $\Delta EFFICIENCY_i$ is the accounting performance change from year -1 to year +3. Table 12 provides a description of the efficiency measures that are used. $CSize_i$ is the log of client firm sales or market value of equity at year -1, $CSizevsVSize_i$ is the log of vendor size divided by client firm size, $C\,\mathrm{Re}lativeDealSize_i$ is the log of contract value per year divided either by client firm's costs of goods sold or by market value of equity, $Opacity_i$ is the log of client firm's opacity level, $Liquidity_i$ is the log of client firm's current or quick ratio, and $ForeignV_{l,i}$ is a dummy variable, which equals 1 when US client firm signs a contract with a non-US vendor. t-statistics are reported in parentheses. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 14: Regressions of client firms' long-run accounting performance changes

Dependent variable	$\Delta SALEFF$	$\Delta IEFF$	$\Delta GRSMRGN$	$\Delta NETMRGN$	$\Delta TURNOVER$	ΔROA
Observations	243	72	239	61	243	241
Constant	0.7567 (1.32)	0.6718 (1.22)	0.7441 (1.28)	0.8123 (1.44)	0.4001 (1.02)	0.5665 (1.20)
CSize (sales)	-0.0937 (-1.81)*			-0.1628 (-2.15)**		
CSize (MVE)		-0.0404 (-1.88)*	-0.0949 (-1.86)*			
CSizevsVSize (sales)					-0.0046 (-0.33)	
CSizevsVSize (MVE)						-0.0061 (-0.73)
Re*lativeDealSize* (CGS)		-0.0259 (-0.57)				
Re*lativeDealSize* (MVE)				-0.0455 (-0.67)		
Opacity	-0.0622 (-2.20)**	-0.0435 (-1.78)*	-0.0913 (-0.97)	-0.0877 (-0.64)	-0.0745 (-0.61)	-0.0623 (-0.44)
Liquidity (Current ratio)	-0.0216 (-0.54)		0.0025 (0.04)		-0.0717 (-0.89)	
Liquidity (Quick ratio)		-0.1190 (-0.24)		0.0194 (0.19)		-0.1235 (-0.98)
ForeignV	0.7984 (0.80)	-0.4228 (-0.16)	0.5703 (0.80)	0.0523 (0.37)	0.3244 (0.11)	0.5571 (0.70)
Adjusted R^2	0.0725	0.0620	0.0552	0.0533	0.0584	0.0512

This table reports median changes in accounting performance from one year before to three years after the outsourcing contract takes effect. Three different measures are reported: unadjusted changes, changes adjusted by subtracting SIC two-digit industry median changes (industry-adjusted), and changes adjusted by subtracting changes for a control group matched by both industry and prior accounting performance (control group-adjusted). SALEFF is sales efficiency defined as sales divided by number of employees, IEFF is income efficiency defined as operating income divided by number of employees, GRSMRGN is gross profit margin defined as costs of goods sold divided by sales, NETMRGN is net profit margin defined as net income divided by sales, TURNOVER is asset turnover defined as sale divided by total assets and ROA is return on assets defined as operating income divided by total assets. Sample sizes and p-values based on the Wilcoxon signed-rank test are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table 15: *Ex-post* accounting performance changes of vendor firms

Specifications	Unadjusted changes	Industry median-adjusted changes	Control group-adjusted changes
SALEFF	0.18993 (216, <.0001)***	-0.11012 (216, 0.9872)	-0.03403 (216, 0.2451)
IEFF	0.10090 (215, 0.0932)*	0.06801 (215, 0.0518)**	-0.03081 (215, 0.3821)
GRSMRGN	-0.01806 (215, 0.0464)**	-0.00412 (215, 0.4912)	0.01875 (215, 0.1427)
NETMRGN	0.01710 (214, 0.0303)**	0.01991 (214, 0.1152)	-0.00686 (214, 0.1295)
TURNOVER	0.06324 (214, 0.9340)	0.09196 (214, 0.0203)**	-0.02425 (214, 0.1850)
ROA	-0.02405 (215, 0.3703)	-0.00342 (215, 0.5254)	-0.01838 (215, 0.0772)*

This table presents estimates of the following regressions:

$$BHAR_i = e_{14} + e_{15}VSize_i + e_{16}V\,\mathrm{Re}lativeDealSize_i + e_{17}Gov_i + \varpi_i$$

$$\Delta EFFICIENCY_i = e_{18} + e_{19}VSize_i + e_{20}V\,\mathrm{Re}lativeDealSize_i + e_{21}Gov_i + \zeta_i$$

where $BHAR_i$ is vendor firms' 3-year buy-and-hold abnormal return as defined in table 11, $\Delta EFFICIENCY_i$ is the accounting performance changes from year -1 to year +3. Table 15 provides a description of the efficiency measures that are used. $VSize_i$ is the log of vendor's size. $V\,\mathrm{Re}lativeDealSize_i$ is the log of contract value per year divided by vendor's size. Gov_i is a dummy variable representing that vendor sign a contract with a governmental entity. For a contract i, all the accounting variables are taken from Compustat one year before the contract announcement year. All values are in 2000 dollars. T-statistics are reported in parentheses. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 16: Regressions of vendor firms' long-run abnormal stock returns and accounting performance changes

Dependent variable	*BHAR*			
Observations	215	215	62	70
Constant	0.2467 (1.09)	0.3453 (1.47)	0.3211 (1.14)	0.5247 (1.82)*
VSize (sales)	-0.0048 (-0.18)		0.0037 (0.10)	
VSize (MVE)		-0.0162 (-0.59)		-0.0693 (-1.90)*
Re*lativeDealSize* (sales)				0.0694 (1.82)*
Re*lativeDealSize* (MVE)			0.0084 (0.21)	
Gov	-0.5208 (-1.82)*	-0.5356 (-1.90)*	-0.3812 (-1.40)	-0.3724 (-1.23)
Adjusted R^2	0.0663	0.0600	0.0422	0.0457

Dependent variable	Δ*SALEFF*	Δ*IEFF*	Δ*GRSMRGN*	Δ*NETMRGN*	Δ*TURNOVER*	Δ*ROA*
Observations	216	70	215	62	214	215
Constant	0.7567 (1.32)	0.6718 (1.22)	0.2455 (1.33)	-0.3557 (-1.42)	0.2220 (1.27)	0.1945 (1.19)
VSize (sales)	-0.1274 (-2.33)**			0.0341 (0.80)	-0.0359 (-1.42)	
VSize (MVE)		-0.1360 (-1.88)*	-0.1620 (-2.14)**			-0.1363 (2.15)**
Re*lativeDealSize* (sales)		-0.0096 (-0.22)				
Re*lativeDealSize* (MVE)				0.1193 (2.37)**		
Gov	-0.0681 (-0.49)	-0.4547 (-1.34)	0.2827 (1.19)	-0.1294 (-0.74)	-0.1611 (-0.59)	-0.0721 (-0.51)
Adjusted R^2	0.0517	0.0421	0.0531	0.0433	0.0545	0.0529

This table reports Pearson correlation coefficients between client and vendor stock returns in the pre-contract signing period to the post-contract signing period. Single (multiple) contract vendors appear (more than) once in our sample. p-values are in parentheses. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 17: The changes in daily stock return cross-correlations between client and vendor firms

Pre-effective period correlation	Post-effective period correlation	Mean change in Cross-correlation coefficient
Panel A: Single contract vendor		
Period 1: (-756, -1) and (1, 756)		
0.1628	0.1918	0.0296 (0.0012)***
Period 2: (-504, -1) and (1, 504)		
0.1481	0.1949	0.0420 (0.0006)***
Period 3: (-252, -1) and (1, 252)		
0.1556	0.1871	0.0260 (0.0489)**
Panel B: Multiple contract vendor		
0.1675	0.1918	0.0243 (0.1470)

This table reports the results of an estimate of the following, cross-sectional regression is run for each contract i:

$$\rho(r_{C_i,t}, r_{V_i,t}) - \rho(r_{C_i,-t}, r_{V_i,-t}) = \alpha_i + \beta CSize_i + \chi VSize_i + \delta CSizevsVSize_i$$
$$+ \varepsilon C\,\mathrm{Re}lativeDealSize_i + \phi V\,\mathrm{Re}lativeDealSize_i + \varphi Opacity_i + \gamma Liquidity_i$$
$$+ \eta ForeignV_i + \iota Number_i + \sigma_i$$

where ρ is the stock cross-correlation coefficient, $r_{C_i,t}$ ($r_{C_i,-t}$) represents the daily stock return of the client firm for contract i during the post-effective (pre-effective) period, r_{V,t_i} ($r_{V_i,-t}$)represents the daily stock return of the vendor for the same contract i during the post-effective (pre-effective) period, $CSize_i$ is the log of client firm sales or MVE, $VSize_i$ is the log of vendor firm sales or MVE, $CSizevsVSize_i$ is the log of vendor size divided by client firm size, $C\,\mathrm{Re}lativeDealSize_i$ is the log of contract value per year divided either by client firm's costs of goods sold or by MVE, $V\,\mathrm{Re}lativeDealSize_i$ is the log of contract value per year divided either by vendor's sales or by MVE, $Opacity_i$ is the log of client firm's opacity level, $Liquidity_i$ is the log of client firm's current or quick ratio, $ForeignV_i$ is a dummy variable representing that vendor firm is a foreign firm listed on US markets, and $Number_i$ is the log of number of contract that vendor takes within the 7 year frame. All the accounting variables are obtained from Compustat one year before the year the contract becomes effective. p-values are reported in parentheses. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 18: Cross-sectional regression of daily returns cross-correlation changes

	1 (n=231)	2 (n=231)	3 (n=231)	4 (n=231)
Constant	-0.0279 (0.78)	-0.0946 (0.35)	0.0480 (0.47)	0.0186 (0.76)
CSize (sales)	-0.0018 (0.80)			
CSize (MVE)		0.0040 (0.60)		
VSize (sales)	0.0114 (0.08)*			
VSize (MVE)		-0.0101 (0.18)		
CSizevsVSize (sales)			-0.0070 (0.16)	
CSizevsVSize (MVE)				0.0030 (0.58)
C Re*lativeDealSize* (CGS)				
C Re*lativeDealSize* (MVE)				
V Re*lativeDealSize* (sales)				
V Re*lativeDealSize* (MVE)				
Opacity	-0.2533 (0.06)*	-0.0419 (0.69)	-0.1492 (0.09)*	-0.0442 (0.68)
Liquidity (Current ratio)	-0.0105 (0.83)		-0.0190 (0.71)	
Liquidity		0.0038		-0.0082

(Quick ratio)		(0.94)		(0.87)
ForeignV	0.0240 (0.66)	0.0216 (0.72)	0.0331 (0.54)	0.0340 (0.57)
Number	-0.0156 (0.07)*	-0.0104 (0.05)**	-0.0086 (0.53)	-0.0013 (0.93)
Adjusted R^2	0.0589	0.0496	0.0559	0.0457

	5 (n=80)	6 (n=65)	7 (n=80)	8 (n=65)
Constant	0.2262 (0.34)	-0.7146 (0.43)	-0.3488 (0.20)	0.1481 (0.53)
CSize (sales)			-0.0042 (0.83)	
CSize (MVE)				0.0021 (0.90)
VSize (sales)	0.0157 (0.22)			
VSize (MVE)		0.0096 (0.53)		
CSizevsVSize (sales)				
CSizevsVSize (MVE)				
C Re*lativeDealSize* (CGS)	-0.0002 (0.98)			
C Re*lativeDealSize* (MVE)		-0.0050 (0.78)		
V Re*lativeDealSize* (sales)			0.0159 (0.10)*	
V Re*lativeDealSize* (MVE)				-0.0200 (0.23)
Opacity	-0.3996 (0.08)*	-0.2960 (0.16)	-0.4167 (0.07)*	-0.3261 (0.13)
Liquidity (Current ratio)	-0.2502 (0.08)*		-0.2626 (0.06)*	
Liquidity (Quick ratio)		-0.2134 (0.09)*		-0.2125 (0.08)*
ForeignV	0.0091 (0.96)	0.0003 (0.98)	-0.0108 (0.94)	0.0700 (0.70)
Number	-0.0479 (0.13)	-0.0285 (0.35)	-0.0427 (0.08)*	-0.0335 (0.26)
Adjusted R^2	0.0582	0.0456	0.0568	0.0435

This table reports Pearson correlation coefficients between client and vendor buy-and-hold stock returns in the pre-contract effective period to the post-contract effective period. Single (multiple) contract vendors appear (more than) once in our sample. p-values are in parentheses. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 19: Long-run buy-and-hold stock return cross-correlations between client and vendor firms

$\rho(r_{C,-t}, r_{V,-t})$	$\rho(r_{C,t}, r_{V,t})$
Panel A: 3 years before and after	
0.0912 (0.3595)	0.1904 (0.0405)**
Panel B: 2 years before and after	
0.1013 (0.3087)	0.2611 (0.0066)***
Panel C: 1 year before and after	
0.1407 (0.1565)	0.3237 (0.0007)***

This table reports the results of an estimate of the following vector autoregression (VAR):

$$r_{V_i,t} = \alpha_{i,0} + a_{i,1} r_{V_i,t-1} + a_{i,2} r_{C_i,t-1} + \nu_{i,t}$$

$$r_{C_i,t} = \beta_{i,0} + b_{i,1} r_{V_i,t-1} + b_{i,2} r_{C_i,t-1} + \mu_{i,t}$$

For each contract, a separate VAR regression is run for the post-effective period. Coefficients reported in the table are averages of the coefficients across different contracts. The VCS variable is the return on vendor or client firms. N refers to the number of pairs of client and vendor firms used in the test. Panel A reports the results for the complete sample, Panel B reports results for the sub-sample where client firms are larger than vendor firms, Panel C reports results when the two firms belong to the same size quartiles and Panel D reports results for the sub-sample where client firms are smaller than vendors. p-values are based on tests that the mean difference equals to zero and are reported in parentheses. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 20: Granger causality tests

VCS	a_1	b_1	a_2	b_2	$a_2 - b_1$
Panel A: whole sample (N=169)					
$r_{V_i,t}$ ($r_{C_i,t}$)	0.0391 (0.0009)**	0.0085 (0.1276)	0.0354 (<.0001)***	0.0979 (<.0001)***	0.0269 (0.0067)***
Panel B: Client firm size > vendor firm size (N=51)					
$r_{V_i,t}$ ($r_{C_i,t}$)	0.0192 (0.3543)	-0.0027 (0.7857)	0.0357 (0.0519)**	0.0851 (0.0027)***	0.0384 (0.0802)*
Panel C: Client firm and vendor firm belong to the same size quartile (N=78)					
$r_{V_i,t}$ ($r_{C_i,t}$)	0.0881 (0.0005)***	-0.0053 (0.4447)	0.0369 (0.0004)***	0.1387 (<.0001)***	0.0422 (0.0011)***
Panel D: Client firm size < vendor firm size (N=40)					
$r_{V_i,t}$ ($r_{C_i,t}$)	0.0472 (0.0154)**	0.0354 (0.0007)***	0.0238 (0.0024)***	0.0343 (0.2018)	-0.0116 (0.3992)

This table reports Pearson correlation coefficients for measures of accounting performance in the pre-effective and post-effective periods where year 0 is the year the contract goes into effect. p-values are reported in parentheses. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 21: Unadjusted accounting performance change cross-autocorrelation test

Correlation/ Year	(-3, 0)	(-2, 0)	(-1, 0)	(0, 1)	(0,2)	(0,3)
GRSMRGN	0.0157 (0.8772)	-0.0123 (0.8977)	-0.0132 (0.8866)	-0.0838 (0.3999)	-0.0464 (0.6750)	-0.0832 (0.5168)
NETMRGN	0.0863 (0.3932)	-0.0072 (0.9404)	-0.0276 (0.7657)	0.0371 (0.7098)	0.1792 (0.1001)*	0.0210 (0.8701)
TURNOVER	0.0314 (0.5215)	0.0299 (0.5341)	0.0130 (0.7858)	0.1345 (0.0133)***	0.1237 (0.0709)*	0.2661 (0.0018)***
ROA	0.0433 (0.1322)	0.0692 (0.1529)	0.0696 (0.1471)	0.8269 (<.0001)***	0.9840 (<.0001)***	0.2973 (0.0006)***

This table reports Pearson correlation coefficients for measures of accounting performance in the pre-effective and post-effective periods where year 0 is the year the contract goes into effect. The performance measures are adjusted the industry medians. p-values are reported in parentheses. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 22: Industry-median adjusted accounting performance change cross-autocorrelation tests

Correlation/ Year	(-3, 0)	(-2, 0)	(-1, 0)	(0, 1)	(0, 2)	(0, 3)
GRSMRGN	0.0542 (0.5925)	-0.0406 (0.6726)	-0.0133 (0.8857)	-0.0439 (0.6600)	-0.0122 (0.9121)	-0.0676 (0.5987)
NETMRGN	0.1030 (0.3076)	-0.0143 (0.8816)	-0.0235 (0.7999)	0.0434 (0.6635)	0.0008 (0.9944)	-0.0461 (0.7201)
TURNOVER	0.0658 (0.1785)	0.0381 (0.4273)	0.0393 (0.4095)	0.2107 (<.0001)***	0.2165 (0.0014)***	0.3365 (<.0001)***
ROA	0.0303 (0.5277)	0.0581 (0.2306)	0.0669 (0.1635)	0.8176 (<.0001)***	0.9640 (<.0001)***	0.1909 (0.0296)**

This table reports Pearson correlation coefficients for percentage changes in return on assets in the pre-effective and post-effective periods where year 0 is the year the contract goes into effect. p-values are reported in parentheses. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 23: Cross-autocorrelations of percentage changes in return on assets

	(-3, 0)	(-2, 0)	(-1, 0)	(0, 1)	(0,2)	(0,3)
Panel A: Unadjusted change ratio cross-autocorrelation test						
ROA	-0.0530 (0.2844)	-0.0252 (0.6037)	0.0512 (0.2866)	0.9495 (<.0001)***	0.9990 (<.0001)***	0.1837 (0.0371)**
Panel B: Industry-median adjusted change ratio cross-autocorrelation test						
ROA	-0.0043 (0.9314)	0.0414 (0.3934)	0.0114 (0.8145)	0.3078 (<.0001)***	0.2585 (0.0002)***	0.0528 (0.5523)