

THE ACQUISITIONS OF INFORMATION TECHNOLOGY FIRMS BY M&A INTENTS: AN EMPIRICAL ANALYSIS

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Abstract

Over the last decades, a large number of firms have undertaken mergers and acquisitions (M&As) to create synergies through increased production efficiency, increased market power, and quality improvements. Moreover, we have also recently witnessed that an increasing number of firms acquire information technology (IT) firms to create synergies from the customer side as well as the production side. In this study, we examine the post-merger risk of the acquiring firm, measured as its return volatility when IT firms are acquired, and seek to understand the dynamics surrounding M&A transactions. We also identify the conditions under which acquiring firms can mitigate the risks resulting from M&A transactions. We find that a strong run-up in risk occurs before M&A transactions are initiated, but this risk begins to decline over the post-merger years. However, we expect that post-merger risks tend to persist when firms seek M&A transactions with a customer-side motive, whereas this does not occur with a production-side motive. Moreover, we expect to find the conditions under which a firm can mitigate risk from the acquisition of IT firms contingent on its M&A motives.

Keywords: mergers and acquisitions; information technology firms; risk; persistence

1 INTRODUCTION

Over the last decades, an increasing number of firms have undertaken mergers and acquisitions (M&As) for purposes such as cost reductions, market expansion, resource extension, and new product offerings. It is therefore not surprising that M&As have been considered a prominent corporate strategy: the size of worldwide M&A markets reached \$449.6 billion in the first quarter of 2014 and continues to increase. Moreover, we have witnessed high premiums being paid for M&A deals, especially when information technology (IT) firms are acquired as the target.

Given the economic significance of M&As as a major corporate event, a rich body of literature exists that examines why firms pursue M&As and the consequences thereof. However, most studies have estimated their value to acquiring firms as negative or, at best, zero (Houston et al. 2001, King et al. 2004). In the context of IT, Tanriverdi and Uysal (2013) also document that the stock market reacts negatively to M&A announcements when an acquiring firm is equipped with a higher level of IT capability than is its target.

Although these studies have important implications for the motives and outcomes of M&As, most studies in this domain have examined the stock market reaction to M&A announcements with a focus on the return, and little attention has been paid to possible shifts in risk following M&A deals over a long-term horizon. The primary objective of our study is to address the dynamics of post-merger M&A risks over a long-term horizon and examine the impact of M&A motives on an acquiring firm's post-merger risks. Specifically, we focus on the risk aspect of M&As when IT firms are acquired by examining the extent to which post-merger risks persist over time and by uncovering the conditions under which acquiring firm's post-merger risks can be alleviated, with special attention paid to the firm's motive for the M&A. To this end, we begin by computing abnormal returns and risks over a long-term horizon around the M&A date by using the buy-and-hold abnormal returns (BHAR). We then further extend the insights gained in relation to M&A risks by examining the complementary role of the M&A motives in the acquiring firm's post-merger risk.

Overall, we find that a strong run-up in risks occurs before M&As are initiated but that the risks begin to decline over time. However, our results suggest that the risk for an acquiring firm with a customer-side motive is larger and decays slowly relative to the risk for an acquiring firm with a production-side motive, possibly owing to the higher level of uncertainty embedded in an M&A with a customer-side motive. While not conducted yet at this stage, we plan to examine the impact of M&As on risk contingent on M&A motives and uncover the conditions under which firms can mitigate acquisition risks. Taken together, we expect to develop rich insights into the dynamics of post-merger risk over a long-term horizon under heterogeneous conditions.

2 THEORETICAL BACKGROUND

Firms have several motives for pursuing M&As, such as empire building, managerial hubris, market power, and synergy gains (Dube and Glascock 2006, Tanriverdi and Uysal 2013, Walter and Barney 1990). The motive for empire-building suggests that M&As are the consequence of managers' desire to have more control and power by creating larger firms through acquisitions. The second motive results from a manager's overconfidence or exaggerated belief in her or his own judgment (Li and Tang 2010, Roll 1986). It is also well recognized that firms are engaged in M&A deals to increase market power. That is, through the acquisition of competitors, acquiring firms are able to wield more market power by demanding higher prices (Singh and Montgomery 1987). Firms are also engaged in M&As to achieve synergy gains through a variety of sources, such as operational, financial, managerial, and collusive synergies (e.g., Chatterjee 1986, Katz and Simanek 1997, Montgomery and Singh 1984, Rumelt 1982). We recognize that the aforementioned theories can be adapted, at least partially, to explain a firm's acquisition decisions and performance from different points of view. Given the scope of our study, however, we focus on the theory for synergy gains for M&As, which is the most relevant to our research framework (Trautwein 1990).

Our study addresses the two types of synergies from the production and customer sides (Bower 2001, Ranft and Lord 2002) when IT firms are acquired. From the production side, we note that IT resources have great potential to create synergies because they can be used remotely, can be used simultaneously by multiple users, and can be exchangeable between heterogeneous systems (Cho et al. 2013). For instance, acquiring firms can reduce costs in manufacturing or operations through economies of scale or scope and can increase efficiency by pooling target's IT resources such as hardware, software, and developers. This eventually enables the acquiring firm to create synergetic gains from the production side by improving its IT capabilities for its products or services. From the customer side, the acquisition of an IT firm can also create synergistic benefits by facilitating the firm's access to new customers, by increasing its existing customers' willingness to pay, or both (Schmidt et al. 2012). For instance, the acquisition of WhatsApp allowed Facebook to expand its market to the messaging app market. Facebook was able to access WhatsApp's existing 450 million active users (Blodget 2014). In such cases, an acquiring firm can create synergies from the customer side, such as expanded customer pools after the acquisition. However, prior studies mainly focus on the view from the production side while having neglected the view from the customer side. As a result, limited attention has been paid to the heterogeneities in the impact of the two types of synergies on business (Adner and Zemsky 2006, Priem 2007, Priem and Swink 2012).

In sum, there has been much interest in evaluating the performance of M&As with an eye toward synergy gains. However, little is known about the risk of creating different types of synergies through acquisitions. We fill the gap in the literature by examining the risk implications of M&As contingent on the firm's motive for the M&A.

3 DATA AND METHODS

3.1 Data and Variables

Our study covers all M&A deals with IT firms that occurred between 1995 and 2010. The sample is obtained from the Securities Data Company's (SDC) Mergers and Acquisitions Database. Because our focus is on the risk dynamics of firms that acquire IT firms, we consider M&A deals in which a target firm's primary standard industry code (SIC) is matched to 737. Stock return data are obtained from the Center for Research in Security Prices (CRSP). However, we drop observations with fewer than 36 months of trading history before and after the event month, which is required to estimate the firm-specific risk around event periods. We also discard events in the presence of any confounding events, following the standard procedure (see e.g., Aggarwal et al. 2011, Han et al. 2012).¹ We do so because we are unable to isolate the impact of these confounding announcements. As a result, we are left with 1,094 M&A deals.

Once our sample is identified, we extract firm-specific factors that are likely to influence an acquiring firm's risk (Dutta and Jog 2009). These include characteristics of the acquiring firm, such as leverage, firm size, and R&D intensity, from the Compustat database, and M&A experience based on SDC Platinum. Leverage is measured as the ratio of the sum of long-term debt and debt in current liabilities to total assets. Firm size is measured as market capitalization. The R&D intensity is defined as the ratio of R&D expenditure to total assets. A firm's M&A experience is defined as its number of M&A transactions within 5 years before the specific deal. To control for the competition effect on a firm's risk, we construct the Herfindahl-Hirschman Index (HHI) as an inverse measure of the degree of competition (Irvine and Pontiff 2009). We measure market share as a firm's sales over total industry sales. Finally, following prior studies (Fang et al. 2008, Keats and Hitt 1988), we measure market dynamics by computing the standard deviation of sales in the firm's primary industry across the preceding 5 years, and then dividing it by the average industry sales for those years.

¹ We considered as confounding events announcements related to earnings, CEO turnovers, alliances, and stock repurchases or splits.

Descriptive statistics are reported in Table 1. The average market capitalization is \$29.2 billion, ranging from \$1.32 million to \$467.1 billion. The magnitude of total assets lies between \$4.07 million and \$1.1 trillion. The other variables, which include leverage, R&D intensity, total assets, and the HHI, also show large variations, resulting in high explanatory power in regression analyses.

Table 1 Descriptive Statistics

Variable	Mean	Std. Dev.	Min.	Max.
Market capitalization (\$M)	29,185.6	72,299.7	1.324	467,093
Total assets (\$M)	14,340.2	58,274.1	4.074	1,119,796
R&D intensity (\$M)	0.060	0.082	0.000	0.809
Leverage	0.148	0.192	0.000	1.428
HHI	0.224	0.153	0.021	1.000
Market dynamism	0.188	0.019	0.009	0.207

We are also required to identify deal-specific factors for our analyses. From the SDC database, we obtain the transaction value of a deal, which is defined as the total value of consideration paid by an acquiring firm. Two indicator variables are created to control for the methods of payment in M&A deals (Masulis et al. 2007). We also codify the information in press releases to identify the two types of M&A motives: customer- and production-side motive as follows. The acquisition of IT firms with a customer-side motive is coded as one if the press releases address the customer-side issues in M&A deals, such as market penetration or entry into new markets through acquisitions, cross-selling, or having complementary channels, and zero otherwise. Similarly, the acquisition of IT firms with a production-side motive is coded as one if the press releases describe the intent of the M&A as a cost reduction via resource sharing, scale economies or operational efficiency, or product enhancements, and zero otherwise. On average, 36% and 45% M&A deals in our sample are sought with customer- and production-side intents, respectively, although firms have undertaken M&A deals with more emphasis on the customer-side intent over the years. Finally, our sample shows that in our sample, 62% of the bidders are also IT firms, possibly indicating that IT firms make more related acquisitions (i.e., M&A deals between IT firms in our context).

3.2 Methods

Estimation of Post-merger Risks: The BHAR Approach

Our analysis with the BHAR approach has been widely applied in various contexts, such as stock splits, share repurchases, IT outsourcing, and initial public offerings (Byun and Rozeff 2003, Ikenberry et al. 1995, Mani et al. 2013, Ritter 1991). We measure the acquirer's long-term returns based on its buy-and-hold strategy, in which a stock is purchased at the market price in the event period and held until specified periods. We then compare this with a comparable strategy with portfolio benchmarks. That is, abnormal returns are computed as the difference between the BHAR of an acquiring firm and a benchmark portfolio. Following prior studies (Byun and Rozeff 2003, Ritter 1991), benchmark portfolios are constructed based on size and weighted average of non-M&A firms. First, we sort all returns in the CRSP file into 10 deciles according to size. We remove firms from the benchmark portfolio to contamination bias when they engage in M&A deals (Loughran and Ritter 2000). We then sort returns in each decile into 10 deciles based on the book-to-market (BM) ratio for each decile. This eventually gives us the average returns of the 100 portfolios for each period. Second, we use the weighted average returns of non-M&A firms at the three-digit SIC level for each period as a benchmark.

Once we obtain benchmark portfolios, it is a straightforward process to compute the BHAR for acquiring firms as follows:

$$(e.q. 1) BHAR_{it} = \prod_{t=1}^T (1 + r_{it}) - \prod_{t=1}^T (1 + r_{bt})$$

where r_{it} and r_{bt} are the month t stock returns of the acquiring firm and benchmark portfolio, respectively.

Estimation of Post-merger Risks: The Calendar Time Portfolio (CTP) Approach

We use the CTP approach to evaluate the long-term performance of acquiring firms (Fama 1998, Jaffe 1974). To this end, following a standard procedure, we first form each period by including all M&A firms in the last 36 months. We then specify the return equation with the Fama-French three-factor model as follows:

$$(e.q. 2) R_{pt} - R_{ft} = \alpha + \beta_{mt}(R_{mt} - R_{ft}) + \beta_{smb}SMB + \beta_{hml}HML + \varepsilon_t$$

where R_{pt} is the portfolio return of all M&A firms in the last 36 months at time t , R_{ft} is the risk-free rate, R_{mt} is the market return on month t , SMB is the difference in returns between a portfolio of small stocks and big stocks, and HML is “high minus low” in terms of the book-to-market ratio measuring historic excess returns of value stocks over growth stocks.

The CTP approach is based on average returns of all the M&A deals in each period. Specifically, in each calendar month over the entire sample period, we compute the return of equally weighted portfolio returns for firms that have initiated M&A deals in the last 36 periods. Because a portfolio is constructed based on all firms with an event within the previous 36 months, the number of firms in the portfolio is not constant over time. This rebalancing enables us to capture the changing nature of the underlying M&A firms while alleviating the cross-sectional dependency across firms (Mitchell and Stafford 2000, Mani et al. 2013).

Regression of the portfolio returns on the Fama-French three-factor model and intercept over a sample period allows us to obtain the systematic risk (β_{mt}) and abnormal returns (α) (Kothari and Warner 2006). This enables us to assess risks and returns for all firms that have undertaken M&As over the sample period. Although the CTP approach is widely accepted, it is not without limitations. First, this procedure may have low power to discover abnormal returns attributable to events (i.e., M&A deals in our context) because their positive and negative returns could average out close to zero (Loughran and Ritter 2000). Second, the model assumes that market parameters do not change over a long-term horizon. Moreover, we are unable to identify the firm-specific risk at the individual firm level because it uses the average value of returns across M&A deals in each period.

Although the aforementioned approaches complement each other, we use the BHAR as our main analytical approach but check the robustness of our results using the CTP approach. We do so because the BHAR approach better captures long-term investor experiences (Fama 1998, Mitchell and Stafford 2000). Moreover, unlike the CTP approach, we can obtain idiosyncratic risk for each firm in each period, which is computed as the standard deviation of BHAR (Dewan and Fei 2007). This allows us to assess the impact of firm and deal characteristics on risks by running a cross-sectional regression with risks against these characteristics.

4 RESULTS

Table 2 shows that acquiring firms earn negative abnormal returns at conventional significance levels, confirming that our data exhibit similar patterns in returns to prior studies (Hackbarth and Morellec 2008, Houston et al. 2001, Loughran and Vijh 1997, Moeller et al. 2003). The BHARs are negative and significant for all the time periods considered. For instance, for a 3-year holding period, an abnormal return is -13.44% and is statistically significant at conventional levels. Our results from the CTP approach also suggest that acquiring firms experience negative abnormal returns. For instance,

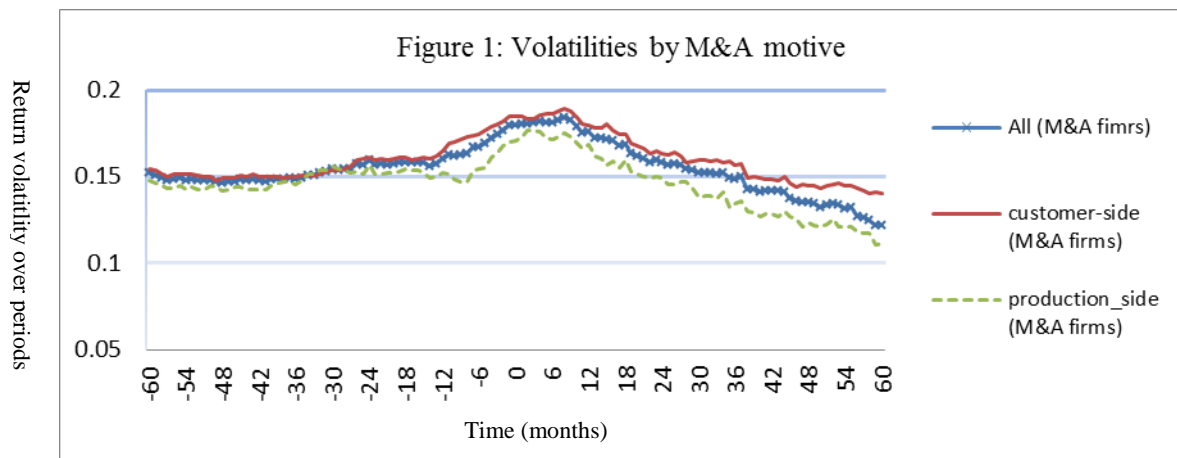
when portfolio firms are constructed with M&A deals in the last 36 months, the monthly abnormal return is estimated at -0.51% , suggesting that the implied 36-month abnormal return is -16.91% .

Table 2 Estimates of Post-merger Abnormal Returns

Months after the M&A	From BHAR (eq. 2)			From CTP (eq. 3)	
	BHAR (%)	<i>t</i> test	Signed-rank test	CTP (α)	Implied abnormal returns from CTP (%)
12	-4.39	-1.79*	-7.87***	-0.0029 (n.s.)	n.s.
36	-13.44	-2.79**	-12.95***	-0.0051*	-16.91
60	-30.09	-2.79***	-14.71***	-0.0062**	-20.01

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

We now turn our attention to the risk dynamics following M&A deals over a long-term horizon. To this end, we first document whether a change in risk occurs around the event periods. Figure 1 shows time-based patterns of the acquirers' risks by M&A motive for 60 months before the M&A events to 60 months afterward. That is, all positive numbers on the *x*-axes are months after the M&A events; all negative numbers on the *x*-axes are months prior to the M&A events. The *y*-axes display the magnitude of risk, measured as volatilities. The solid line with \times markers in Figure 1 displays monthly based idiosyncratic risks across all the M&A firms. Overall, the figure suggests strong runners-up in risks beginning from one year before to one and a half years after the M&A. It then begins to decline gradually over time. We also present the underlying risk dynamics around M&A events by separating acquiring firms with a customer-side motive from those with a production-side motive (see the solid lines for risks with a customer-side motive and dashed lines for risks with a production-side motive).



Although risks prior to M&A initiatives increase for all three cases, we see a difference in the level and rate of risk converging to the level it had been before the M&A, depending on the transactional attributes of the M&A deals (i.e., customer-side vs. production-side motive). Our results also suggest that when an M&A is pursued with a customer-side motive, the level of post-merger risk is greater than that when an M&A is pursued with a production-side motive. The magnitude of post-merger risk with a customer-side motive is 0.161, but its counterpart with a production-side motive is 0.143. That is, the difference between the two is 0.019 and is statistically significant at the 10% level. We also show that the coefficients of post-merger risk with the CTP approach [i.e., β_{mt} in equation (2)] are 1.458 and 1.106 when M&A deals are initiated with a customer-side motive and a production-side motive, respectively. In sum, as expected, our results show that acquiring firms are exposed to a higher level of risk when they initiate M&As with a customer-side motive.

5 CONCLUDING REMARKS

This paper examines the risk implications of M&As around event periods over a long-term horizon. We show a strong run-up in firm-specific risks beginning 3 years prior to M&As but that the risks begin to decline over the post-merger periods. Although firm-specific risks increase as a result of M&As, the magnitude of risk is greater when acquiring firms undertake M&As with a customer-side motive compared with a production-side motive. It is interesting that the post-merger risk is persistent when customer-side synergies are sought through M&As, whereas it dissipates over periods in other cases (i.e., an M&A with a production-side motive). While not analysed yet, it will be interesting to see how and whether post-merger risk varies contingent on the motive for the M&A (i.e., a customer- vs. production-side motive). As a result, we expect to uncover the conditions under which acquiring firms can mitigate risk stemming from the acquisition of IT firms. Taken together, our study contributes to the literature provides valuable implications regarding the extent to which post-merger risk persists over periods and how the magnitude of risk varies by M&A motives.

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