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Technology transactions, announcement effect, and reversal: Dissecting an anomaly

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ABSTRACT

We examine the short term stock price performance of firms that acquire or sell technology rights. We find significant positive announcement-period abnormal returns to the acquirers and sellers. However, the price increases reverse during the subsequent twenty trading days. These quick fortune reversals cannot be attributed to methodology; they prevail in the late 1970s through the 2000s, in bear and bull stock markets, and in both high and low technology industries. Upon splitting the sample into two subsamples comprised each of stocks with either pre-announcement price run-up or decline; we find that the abnormal return reversal is confined to the latter subsample. Stocks that witness price run-up prior to the announcement do not reverse to original prices but lose the momentum right after the announcement-period. We believe this is caused by the combination effect of the momentum prior to-and the impact of the announcement.

1. Introduction

Research and development (R&D) investment creates new strategic options for a firm (Bowman & Hurry, 1993; Czarnitzki & Toole, 2011; Dixit & Pindyck, 1995), and it is widely recognized as a major source of competitive advantage (Ansoff, 1965; Bulan, Mayer, & Somerville, 2009; Lev & Sougiannis, 1996; Schumpeter, 1934). Pisano (2010) argues that the fundamental challenges of science-based businesses are now governed more by markets rather than by corporate R&D labs. However, many researchers in the industrial organization and financial economics areas question whether a free-market economy allocates resources into that input efficiently (Drucker, 1986; Hall, 1993; Jensen, 1993; Porter, 1992; Stein, 1988). Even high-tech corporations hesitate in times between making and outsourcing critical technologies as their decision is based on a number of internal and external factors (Glimstedt, Bratt, & Karlsson, 2010).

The studies of Chan, Martin, and Kensinger (1990) and Szewczyk, Tsetsekos, and Zantout (1996) indicate that investors value R&D expenditure increases. Specifically, they report that investors react positively to announcements of corporate plans to increase R&D expenditures. They also report that investors rationally differentiate between value-creating and value-wasting R&D expenditure increases.

We revisit the question of whether investors value R&D investment. As the typical R&D strategy of a firm includes developing R&D capital in-house and outsourcing, we examine the short term stock price reaction to announcements of purchase and sale of rights to patented (or pending a patent) technologies. These technologies are already scientifically successful, but commercially not yet proven. Also, these announcements pertain to codified (as opposed to tacit) and protected intellectual properties.

Our sample of acquisition of technology rights consists of 1426 announcements made in the period from 1977 through 2009. Many of the sellers of these technologies are individual scientists, universities or privately held companies. Only 358 of these announcements pertain to sellers which are publicly traded firms with sufficient data on CRSP. These latter announcements constitute the sample of sale of technology rights.

We report statistically significant positive average abnormal stock returns on the magnitude of 1% and 5% for the acquirers and sellers, respectively, over the period from day −1 to day +1 relative to the initial announcement date. Assuming investor rationality, these initial results suggest two conclusions. First, shareholders

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of technology-acquiring firms value R&D. Second, shareholders of technology-selling firms seem to infer one or both of the following signals: (1) the purchase of the technology rights by another company represents a certification regarding the value of the selling firm's intellectual capital; and/or (2) the transaction with a typically much larger firm, with already established production, distribution, and promotion capabilities, will result in significant scope economies that are shared by the seller and buyer.[1]

When we examine the abnormal stock returns subsequent the announcement of purchase or sale of technology rights, we find that in the twenty trading days that follow the announcement, the gains that accrue to the shareholders during the announcement-period are reversed. The average abnormal return over the period from day +2 to day +20 is between −0.77% and −1.45% for the technology-acquiring firms and between −2.5% and −4.15% for the technology-selling firms, depending on the specifications of methodologies used. These abnormal returns are all significant at least at the 10% level and robust to changes in the specifications of the short term event-study method. They are also not confined to any sub-sample defined by sampling period, stock market condition, or the technology level of the industry of the sample firm.

Upon dissection of the sample, the results indicate that the reversal is dependent on the price movement prior to the announcement date and is confined to firms that have witnessed a pre-announcement downward trend in their stock prices. Conversely, the reversal does not occur for stocks that witness positive abnormal returns in the month leading to the announcement date. Specifically, we find that the pre-event abnormal return $AR_{[-30;-2]j}$ is a statistically significant variable with a positive coefficient in a model on the determinants of the post-event abnormal return $AR_{[+2;+20]j}$.

We propose an information based market reaction explanation for this puzzling reversal that is confined to firms having witnessed a pre-announcement downward trend in their stock prices. A positive pre-announcement abnormal return is an indication of possible leakage of the pending positive event. The announcement abnormal return embodies the remaining information and stops the leakage induced momentum. However, a negative pre-announcement abnormal return is not expected to be related to this positive news. When the unanticipated event is announced, the market reacts positively and instantly, after which the negative momentum resumes and acts as a reversal to the initial positive announcement abnormal return.

There are several studies about momentum effect (Carhart & Mark, 1997; Jegadeesh & Titman, 1993; Levy, 1967) and a very rich literature studying various corporate events and how market reacts to these events. Our results suggest that the study of how investors react to corporate events should not ignore the possible effect of the stock price momentum running into these events.

The remainder of this paper is organized as follows. Section 2 describes the samples of announcements of acquisition and sale of technology rights. Section 3 examines the short term stock price effects of these announcements. Section 4 includes sub-sample analyses. Section 5 reports regression analyses. Section 6 concludes this paper.

2. Samples

Similar to Szewczyk et al. (1996), we use the Dow Jones Factiva and LexisNexis computerized databases and try several key words to search for announcements of outright purchase and sale of rights to patented (or pending patent) technologies that are not yet developed commercially, over the period from 1977 through 2009. We do not include announcements of cooperative R&D joint ventures or R&D outsourcing agreements since we need announcements that pertain to technologies that are already scientifically successful. We exclude few of the relevant announcements that we obtained, because they are contaminated by the disclosure of some other corporate information, or they pertain to acquirers that are not in the database of the Center for Research in Security Prices (CRSP). Moreover, since an announcement is often times reported by several news media, we made sure that we have the date and source of the first public announcement of the event. The *Dow Jones News Service*, *PR Newswire*, *or Business Wire* are typically the first to report it.[2] Sometimes, the *Dow Jones News Service* reports the announcement briefly, and then the following day the *PR Newswire* and the *Business Wire* report it again but with more details.

The final sample of acquisition of technology rights consists of 1426 announcements over the period 1977 through 2009. Many of the sellers of these technologies are individual scientists, universities, or privately held companies. Only 358 announcements pertain to sellers which are publicly traded firms with sufficient data on CRSP. These 358 announcements over the period 1977 through 2009 form the sample of sale of technology rights.[3] Gambardella and Giarratana (2013) use a sample of licensing deals in the security software industry during the period 1993–2001, and obtain a data set of 694 observations from 87 firms. Our sample is different by not being industry specific, and requiring that both buyers and sellers are public firms.

We make three observations after reading the announcements forming the samples. First, most of the technology-acquisition announcements contain some arguably excessive praise about the technologies underlying these sale agreements. The use of words like breakthrough, leapfrog, etc., is not rare in these announcements, which, added to the fact that these disclosures are voluntary, suggest that there could be a concerted public relations effort by these firms to make their investors excited.

Second, when we analyze the financial terms of the sample agreements, we find that in some cases the proceeds to the selling firm, whether payable in one lump-sum or in installments, are not contingent on the successful commercialization of the technology. Therefore, the acquiring firm is assuming the entire risk of the investment. In other cases, the terms of the agreement call for an up-front payment plus a certain percentage of the profits if and when a product is launched, which means that the sunk costs will be lower for the acquirer if the technology fails commercially. Regrettably, most of the announcements do not provide specific information about the financial terms of the agreement.

Third, when we examine the size of the firms in our samples, we find that the technology-acquiring firm is typically much larger, with presumably more resources, than the technology-selling firm. The market value of the acquirers, which is measured as of one month prior to the announcement date, ranges between $1.009 million and $477.624 billion, with a mean of $13.832 billion, a median of $2.519 billion, and a coefficient of skewness of 6.83, indicating a right-tail skew. The market value of the sellers ranges from $0.821 million to $78.408 billion, with a mean of $2.466 billion, a

[1] The technology-acquiring firm in our sample is typically larger than the technology selling firm.

[2] Only two of the announcements in the samples are first reported by a news outlet which is different from the above mentioned media.

[3] Gambardella and Giarratana (2013) use a sample of licensing deals in the security software industry during the period 1993–2001, and obtain a data set of 694 observations from 87 firms. Our sample is different by not being industry specific, and requiring that both buyers and sellers are public firms.