ESSAYS ON MERGERS AND ACQUISITIONS
AND EVENT STUDIES

Mohammad Irani
Essays on Mergers and Acquisitions and Event Studies

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To my family
The meaning of life for me is experiencing new things and learning from them. Enrolling in the Ph.D. program has enabled me to gain invaluable experiences along the way. Though only my name appears on the cover of this dissertation, many people have helped me to produce it. I am indebted to all of them: it would not have been possible to reach this point in my life without their support. I would like to use this opportunity to thank them.

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Sammanfattning

Denna avhandling består av tre olika artiklar om marknadens förutsägelser gällande fusioner och förvärv av företag (M&As) samt deras inverkan på så kallade "eventstudier".

Artikel I undersöker om marknaden kan förutse företagsuppköp och deras betalningsform innan de tillkännagivits. För att undersöka detta introduceras en ny tidsseriemetodik som kan identifiera tidpunkten för förvärv och betalningsform innan dessa uppgifter blivit offentliga. De empiriska resultaten i denna artikel, baserat på 125 parvisa företagsobservationer, visar att majoriteten av förvärv och deras betalningsform kan förutses mycket tidigare än vad som hittills dokumenterats i litteraturen. Resultaten visar också att den förutsedda förvärvstidpunkten har betydelse för att förklara valet av betalningsform.

I Artikel II studeras hur antagandet att M&As är oförutsägbara i den skattningsperiod som vanligtvis används i "eventstudier" påverkar överavkastningen. De empiriska resultaten i denna artikel, baserat på samma urval som i Artikel I, visar att en del av uppköpssynergierna de facto införlivas i aktiekurserna kring tidpunkterna för de förutsedda förvärven. I praktiken innebär detta att antagandet om oförutsägbarhet i skattningsperioden ej håller eftersom den förutsedda tidpunkten generellt sett ligger i skattningsperioden. Som en lösning på detta problem estimeras parametrarna i marknadsmodellen i denna artikel i perioden innan förutsägelserna tar form, och därmed kan förutsägelsernas eventuella påverkan på hur överavkastningen beräknas kontrolleras. Detta förväntningsjusterade tillvägagångssätt förbättrar precisionen i estimeringen av överavkastningen i perioden kring "händelsefönstret" avsevärt, och bidrar med nya viktiga insikter till tidigare dokumenterade resultat kring företagsuppköp.


Nyckelord: fusioner och förvärv, event studie, förutsägelse, betalningssätt, CAPM, tidsvarierande parametrar, strukturella förändringar, varians, kovarians
Contents

Introduction ................................................................................................................................. 13
Summary of the dissertation ...................................................................................................... 15
Article I .................................................................................................................................... 15
Article II ................................................................................................................................... 17
Article III .................................................................................................................................. 17
Concluding remarks .................................................................................................................. 18
References ................................................................................................................................. 20

Article I: Anticipating Takeovers and their Payment Methods: A New Approach Using U.S. Acquisitions .......................................................... 1

1. Introduction ............................................................................................................................ 2
2. Anticipation shifts .................................................................................................................... 6
   2.1. Target return volatility .................................................................................................... 7
   2.2. Acquirer return volatility ............................................................................................... 8
   2.3. Acquirer-target return correlation ................................................................................ 9
   2.4. Acquirer-target return covariance ................................................................................ 9
3. Methodology and anticipation hypotheses .......................................................................... 10
   3.1. Data preparation ............................................................................................................ 10
   3.2. Detecting breaks in the variance-covariance structure .................................................. 11
   3.3. Tests for equality of second-order moments around the break dates ......................... 12
   3.4. Anticipation hypotheses ............................................................................................... 14
4. Data and descriptive statistics ............................................................................................ 15
   4.1. Sample selection ........................................................................................................... 15
   4.2. Summarized statistics of sample second-order moments ............................................ 17
5. Evidence on the anticipation of deal and payment form .................................................... 18
   5.1. Breaks in the variance-covariance structure ................................................................ 18
   5.2. Deal anticipation ........................................................................................................... 19
   5.3. Payment-form anticipation ............................................................................................ 21
6. Robustness tests ................................................................................................................... 23
   6.1. Firm-specific events as source of M&A anticipation .................................................... 23
   6.2. Placebo analysis: market-wide events as source of M&A anticipation ....................... 25
   6.3. Anticipation mechanism ............................................................................................... 26
   6.4. Methodological issues .................................................................................................. 27
7. Cross-sectional regressions .................................................................................................. 29
7.1. Determinants of M&A anticipation ........................................ 29
7.2. Determinants of early anticipation ........................................ 31
7.3. Takeover anticipation and choice of payment method in M&As . 32
8. Conclusion ............................................................................. 33
References ................................................................................ 35
Internet appendix ........................................................................ 56
A. Data preparation ...................................................................... 56
B. Detecting breaks in the second-order moments of a univariate series ............................................................................. 59
C. Additional data analysis ............................................................ 61
D. Methodological robustness checks in detail ............................... 64
References ................................................................................ 68

Article II: Takeover Anticipation and Abnormal Returns .......... 1
1. Introduction ............................................................................. 2
2. Empirical design ...................................................................... 4
   2.1. Sample construction ............................................................. 4
   2.2. Models for measuring abnormal returns ............................... 5
   2.3. Measuring cumulative average abnormal returns ................. 8
   2.4. Hypotheses ........................................................................ 10
3. Results ................................................................................... 12
   3.1. Gains around the deal-anticipation date ............................... 12
   3.2. Two uncertainties at the time of deal anticipation .................. 14
   3.3. Improving performance measures by controlling predictability of M&As .......................................................... 16
   3.4. Implications of the improved measurements ....................... 19
4. Robustness tests ...................................................................... 20
   4.1. Uniform versus float anticipation date .................................. 20
   4.2. Alternative models for the expected returns ......................... 21
5. Summary and concluding remarks ........................................... 22
References ................................................................................ 23
Appendix ..................................................................................... 25
   A. Test statistics ........................................................................ 25
   B. Alternative expected return models for the fixed estimation window .......................................................... 30

Article III: Event Study Analysis with Time-Varying Alphas, Betas and Variances: The Case of M&As ........................................ 1
1. Introduction ............................................................................. 2
2. Theoretical framework ................................................................ 4
   2.1. The market model ............................................................... 4
   2.2. Time-varying model of expected returns ............................... 4
   2.3. Regime-wise return generating process ................................. 5
3. Empirical framework ................................................................ 8
Introduction

Betton, Eckbo and Thorburn (2008, pp. 292) explain that “corporate takeovers are among the largest investments that a company ever will undertake.” Moreover, Li and Prabhala (2007, pp. 37) argue that “corporate finance decisions are not made at random, but are usually deliberate decisions by firms or their managers to self-select into their preferred choices.” This dissertation examines whether the market can anticipate the endogenous takeover decisions before their public announcements.

Accounting for the ex-ante predictability of the event is a difficult task, but it matters for the reliability of the conclusions made in the corporate studies. Campbell, Lo and MacKinlay (1997, pp. 174–175) warn that “one must be careful in interpreting the results of the cross-sectional regression approach. In many situations, the event-window abnormal return will be related to firm characteristics not only through the valuation effects of the event but also through a relation between the firm characteristics and the extent to which the event is anticipated.” Furthermore, Edmans, Goldstein and Jiang (2012) indicate that the ex-ante takeover anticipations contaminate the stock prices of merging firms, and so make the prices endogenous during the pre-announcement period. As a collection of three articles on the mergers and acquisitions (M&As) and event studies, this dissertation investigates how controlling the takeover anticipation affects the determinants of the payment method choice in article I and the estimation of acquisition returns in articles II and III.

Article I presents a new approach for identifying the ex-ante dates on which the market anticipates both M&As and their payment forms. Unlike the previous takeover studies that mainly examine the abnormal returns to the shareholders, this approach investigates the time-series properties of the variance-covariance structure of the target and the acquirer stock returns. The test of Aue, Hörmann, Horváth and Reinherr (2009) identifies the unknown locations of break dates in the variance-covariance structure of each bivariate returns series. The problem with the current event studies is that they mainly focus only on one of the pair of firms at a time (either the target or the acquirer firm), thereby neglecting the additional information contained in the second-order moments of the joint return distribution (e.g., the co-movement of the two stock returns). Using a sample of U.S. acquisitions, the proposed approach finds the market anticipates the majority of M&As and their payment forms much earlier than reported in the previous takeover event studies.

Using the deal-anticipation and payment-form-anticipation dates, this article also provides new insights into the choice between equity, cash and mixed-
payment in M&As. Houston and Ryngaert (1997), Officer (2004), and Bhagwat and Dam (2014) find that the fraction of the acquirer’s equity in the bid payment increases with the pre-merger target-acquirer return correlation (a proxy for the relatedness of the two firms). These studies explain this evidence by arguing that if the standalone target and acquirer stock prices are highly correlated, offering equity as the medium of payment reduces the risk of an ‘unfair’ merger—i.e., one in which the terms of the merger become unfair to one party at the deal completion date. However, after considering the anticipation effects, the correlation loses its explanatory power. This finding suggests that assuming the unpredictability of M&As causes the previous payment method regressions to suffer from two endogeneity issues: (1) omitted-variable bias: the anticipation likelihood is related to the firm characteristics, so the anticipation variables should be included in the takeover regressions; (2) measurement error: the price-related variables (e.g., the correlation) should be estimated from the pre-deal-anticipation period; otherwise they are contaminated with the anticipation effects.

Article II documents that the cumulative average abnormal returns (CAARs) to the target and acquirer shareholders are significantly positive around the deal-anticipation dates. This evidence validates the proposed deal-anticipation approach, since the market incorporates a part of the perceived synergy of future M&As into the target and acquirer stock prices at the anticipation time. The wealth effects of M&As are hence partly released during the estimation window of previous takeover event studies—i.e., around the deal-anticipation dates. This finding is contrary to the assumption in standard event studies, according to which M&As are totally unexpected in the estimation window, and indicates that their estimates of the expected returns and the abnormal returns might be biased.

This article introduces a new estimation window (the float window) to control the effects of M&A anticipation for the estimation of abnormal returns. While the estimation window of the standard event study is fixed across event firms, the float approach relaxes this assumption by letting the estimation window vary across firms based on the anticipation date of each deal. This approach measures the parameters of the expected returns model from the pre-anticipation period. This is a period in which the bid is totally unexpected, so the float approach (as compared to the fixed approach) can generate more accurate estimates and more reliable inferences. In fact, Article II presents that using the fixed window causes the standard approach (which is here based on Schwert, 1996) to misestimate significantly the acquisition returns. The size of the average bias is larger for the target compared to the acquirer firms, is dependent on the payment form, and increases with the size of the event window.

Article III finds that the parameters of the market model change during the estimation window of the previous event studies. The main reason for observing shifts in the parameters is the ex-ante anticipation of M&As. In particular, the beta remains constant while the alpha and the idiosyncratic variance shift
significantly during the pre-announcement period. This evidence not only rejects the parameter stability assumption of the standard event studies, but also casts doubt on the reliability of the estimated abnormal returns and the inferences.

This article proposes a new takeover event study (the two-break market model, TBMM) that allows the parameters of the market model to change twice during the sample period of each return series. The structural change methodology developed by Qu and Perron (2007) identifies the unknown locations of the two break dates. TBMM accounts for the time-variations in the model of the expected returns when it estimates the abnormal returns. The stability assumption causes the fixed approach to overestimate significantly the CAARs to the target and acquirer shareholders around the announcement date. The primary source of the bias is that the alpha increases during the pre-announcement period. The fixed approach hence underestimates the alpha and so the expected returns, which in turn magnifies the abnormal returns.

Summary of the Dissertation

This dissertation contains three articles and studies the anticipation of M&As and its effects on takeover event studies. Article I investigates the dates on which the market anticipates takeovers and their payment forms prior to their announcement dates. Article II examines the consequences of ex-ante takeover anticipations for the estimation of acquisition returns. Article III looks into the effects of time-variations in the parameters of the market model on the estimates of acquisition returns.

Article I

Merger negotiation usually starts on average three months in advance (Ahern and Sosyura, 2014). The seeking for a potential business combination starts even before that—i.e., the target firm seeks potential acquirers, and vice versa. However, studying stock prices in the pre-announcement period indicates that the market anticipates only the target firms and not the acquirer firms. This finding does not fully reflect the bid process and raises the question of whether the market is not able to anticipate the acquirer, or if this evidence is caused by a limitation in the current design of takeover event studies.

This article suggests that a proper approach is to consider the behavior of the variance-covariance structure of the target and acquirer returns to detect the ex-ante dates on which the market anticipates both the deal (a pair of target and acquirer firms) and its payment form. The second-order moments of the
joint return distribution contain additional information—e.g., the co-movement of the target and the acquirer stocks—which can be beneficial for the anticipation analysis. Article I indeed demonstrates that this is the case. Using a sample of U.S. acquisitions, the proposed approach finds that 86% of takeovers (62% of payment forms) are anticipated on average 187 (123) trading days before the announcement date. Thus, M&As are anticipatable much earlier than has been documented in previous takeover event studies. For example, Schwert (1996) reports that the market only anticipates the targets 42 trading days before the announcement.

The proposed approach in article I predicts that when the market anticipates a potential deal between a pair of target and acquirer firms in the pre-announcement period, it updates their merging likelihood and incorporates part of the expected takeover synergies into the stock price processes. Given that acquirers’ portion from the total takeover gains is rather trivial, so their abnormal returns are insignificant during the pre-announcement period. This evidence is a stylized fact in takeover studies (Jensen and Ruback, 1983; Martynova and Renneboog, 2008), and explains why the proposed approach investigates the variance-covariance structure to identify the deal-anticipation and payment-form anticipation dates. This approach is based on the structural breaks in the variance and covariance of the target and the acquirer return series and on the test developed by Aue et al. (2009). Bhagat, Brickley and Lovenstein (1987), Hutson and Kearney (2001, 2005) and Subramanian (2004) document changes in the second-order moments by assuming that the announcement is the only break date after which the moments can change. A break date in the pre-announcement period is identified as an anticipation date if shifts around that date are consistent with the ones reported by the above studies. Put differently, the proposed approach relaxes the assumption that the announcement is the only break date and lets the test detect the break date in the pre-announcement period that generates similar shifts.

Article I reports that early M&A anticipation dramatically affects both the target and acquirer return series—in particular, their variance-covariance structure. This is in line with the works of Edmans, Goldstein and Jiang (2012) and Betton, Eckbo, Thompson and Thorburn (2014), who predict that takeover anticipation contaminates the stock prices of merging firms during the pre-announcement period. Detecting the ex-ante anticipation dates provides a new avenue to improve the identification of takeover studies. Article I studies one of those cases—i.e., the choice of payment method by the acquirer firms to finance the bid. After controlling for the effects of deal-anticipation and payment-form anticipation dates, some of the previous cross-sectional determinants of the choice change significantly.
Article II

Event studies assume that the event is unanticipated during the estimation window, so the parameters and the event-window abnormal returns can be reliably estimated. The estimation window for Schwert (1996) starts at Day -379 and ends at Day -127 relative to the announcement date (Day 0). Using this window that ends much earlier than other studies, he assumes that M&As cannot be anticipated more than six months in advance. However, the results of article I indicate that 69% of bids are anticipated during this estimation window (the fixed estimation window), suggesting that the unpredictability assumption is indeed violated.

Article II demonstrates that the average monthly abnormal return to the target and the acquirer shareholders around the deal-anticipation date is 1.61% and 1.28%, respectively. Previous studies (e.g., Cai, Song and Walkling, 2011) report a puzzle that the acquirers’ managers do not create value via M&As, as their announcement gains are insignificant or even slightly negative. However, the positive CAARs to the acquirer shareholders during the post-anticipation period implies that they do indeed collect their gains long before the announcement date. Thus, previous studies might capture partial effects of M&As on the wealth of shareholders by estimating the acquisition gains only around the public announcement date.

The above significant gains also suggest that parameters, which are estimated from the fixed estimation window, are contaminated with the anticipation effects. To prevent such contamination, this article estimates the parameters from the pre-anticipation segment of each series (the float estimation window), in which the merging likelihood is trivial. Using the float approach provides new insights into the correct magnitude of the announcement abnormal returns. In particular, the anticipation-adjusted event study reduces the acquisition gains in cash bids, and increases them in equity deals. This finding implies that part of the documented different gains between the cash and equity offers (e.g., Travlos, 1987; Schwert, 1996) is due to the unpredictability assumption. Moreover, the size of the bias due to this assumption is larger for the target than for the acquirer firms.

Article III

The findings in articles I and II indicate that both the mean and the total volatility of the stock returns of merging firms change around the deal-anticipation dates—i.e., during the estimation window of previous takeover event studies. These results suggest that the parameters of the expected returns model might be unstable during the estimation window. Article III documents that the parameters indeed change significantly around the anticipation date. Namely, the alpha increases while the idiosyncratic variance declines during
the pre-announcement period. This evidence rejects the parameters stability assumption of standard event studies, implying that their abnormal returns and inferences might be misleading.

Article III introduces a time-varying market model to control time variation in the expected return model when it estimates the event-window abnormal returns. This approach (i.e., the TBMM), which is based on the test developed by Qu and Perron (2007), detects two break dates after which the parameters of the market model change. Using a sample of firm takeovers, this article shows that the ex-ante merging likelihood is constantly updated in the pre-announcement period, and the regime-wise parameters can capture those dynamics. This article documents that the size of the average annual bias due to the stability assumption is 23.81%, while for the acquirer firms it is 4.13%. Using the fixed estimation window causes the alpha to be underestimated, which in turn leads to lower expected returns during the event window. This evidence explains why the fixed approach, relative to the TBMM, overestimates the acquisition returns, and suggests that a takeover event study should allow the alpha to change in order to control the time-variations in the merging likelihood.

The TBMM enables us to decompose the dynamics of the total variances to the regime-wise betas and idiosyncratic variances. Article I documents that the total volatility of the target and acquirer stock returns declines after the deal-anticipation dates, suggesting that the beta and (or) the idiosyncratic variances should also decline in the pre-announcement period. Article III shows that while the beta remains unchanged, the idiosyncratic variances drop in the pre-announcement period. This result suggests that the ex-ante anticipation signals (which increase the merging likelihood) are specific to the pair of merging firms, as they affect only the idiosyncratic component of the total volatility.

Concluding Remarks

Article I demonstrates that the market indeed anticipates the majority of M&As and their payment forms long before the announcement date. It also presents how controlling the anticipation improves the identification of the payment-method regression. Overall, the proposed approach for detecting the anticipation dates in this article opens new avenues for future studies of corporate takeovers.

Articles II and III look into two potential problems in the current design of event studies that are triggered by ex-ante takeover anticipations. Both the float and the TBMM approaches make the event studies robust against early takeover anticipations; however, they differ from each other in the following ways. (1) Each of them relaxes a different assumption of the event studies: the
float approach relaxes the constancy of the estimation window, while the TBMM relaxes the stability assumption. (2) The float approach assumes that changes in the merging likelihood only affect the abnormal returns and not the expected returns. However, the TBMM additionally allows those changes to update the parameters of the expected returns model. This explains why the size of improvement in measurement of the acquisition returns is much more moderate in the float approach than in the TBMM. (3) Estimation of the float approach requires explicit knowledge of the deal-anticipation dates. Given that the anticipation mechanism that identifies those dates is specific to the takeovers, so the float approach presented in article II is applicable to the takeover event studies. Article III, however, shows that the first break date of TBMM often coincides with the deal-anticipation date. The TBMM hence captures the anticipation effect endogenously without explicitly using the anticipation dates, and so is a more general approach. All in all, the TBMM presented in article III is not specific to the takeovers and can be applied to other types of (corporate) event.
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