Research Methods and Objectives in the Study of Mergers and Acquisitions

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1. Introduction

The extensive scale of M&A transactions in the past decades originated a significant body of academic and practitioner literature examining various aspects of the mechanisms of these transactions. The research methods employed mirrored to large extent those used to investigate problems in other areas of corporate finance. Some empirical facts were consistently established in large-sample empirical studies while the answers to several key questions remain elusive. This is not surprising. Mergers and acquisitions are among the most complex transactions undertaken by corporations and the nexus of agency problems, market and operating gains, shareholder interests, financing and timing issues and organizational effort involved is not easy to analyze.

Several recent contributions to this research are reviewed briefly below. The survey is not intended to be comprehensive, but merely indicative of some research trends and methods. The papers fall broadly into the categories of large-sample/econometric studies [Andrade et al.(2001)], valuation-focused case studies [Weston (2002)], behavioral finance research [Shleifer and Vishny (2003)] and real option analysis [Lambrecht (2003), Morellec and Zhdanov (2003)].

2. Andrade et al. (2001)

Andrade et al. (2001) present an overview of merger transactions concluded in the 1973–1998 period. They concentrate on the fundamental reasons behind mergers as well as their terms and the market response. Mitchell and Mulherin (1996) established that mergers come in waves and cluster by industry. Andrade et al. use the CSRP database to check this result further and derive a number of statistics based on the sample of over 4,000 M&A transactions.

They compare basic features of three major merger waves that occurred in the 1960s, the 1980s and in the 1990s. The merger wave of the 1960s was rich in conglomerate-building transactions, stock-financed by extra-industry bidders. The deals of the 1980s included many buyouts by corporate raiders, fi-

nanciers using leveraged debt and junk bonds. In the 1990s another stock-financed wave occurred, reflecting intra-industry consolidations. The merger wave of the late 1990s approached the mid–1980s wave measured by the fraction of the market cap acquired annually (3%) and the 1960s wave measured by the fraction of all the listed firms acquired (ca. 5.5%) Nearly half of the deals in the quarter century under study happened in the 1990s. An important feature of the 1990s deals is the prevalence of the all-share transactions. Nearly 60% of the mergers involved stock, compared to 32.9% in the 1980s. The recent deals were less hostile, only 4%, compared to 14% in the 1980s. Almost half of the deals were within the same industry. The target premia in the 1990s were in line with those recorded earlier, at about 35%. The authors investigate to what extent the mergers were due to industry-shocks e.g. technological, supply or regulatory shocks. They show that deregulation was a powerful determinant of the merger activity in the recent decades.

An event-study measurement of abnormal returns in the short-term window around merger announcement and the longer window up to the deal completion date indicate positive returns of 1.8–1.9% on average, suggesting positive value creation in these transactions. As in the previous event studies, more value is shown to accrue to the target shareholders. The returns disaggregated by the method of financing show that cash deals were received more positively. There are well-known problems with significance and interpretation of long-term event studies and the authors do not alter their view in the light of the results of some of such studies that mergers enhance shareholder value. The authors update the findings of Healy, Palepu and Ruback (1993) and find that there was a post-merger improvement in the operating performance of the acquirers.

In conclusion the authors list a number of challenging claims related to mergers: the statistical negative post-merger drift of the acquirer price, the difficulty of the identification of the economic sources of merger efficiency gains, and the claim that market value gains accrue almost exclusively to the target companies. The authors largely dismiss the first challenge on methodological grounds, discuss the clinical research contribution and look forward to the future interdisciplinary research to provide deeper answers to the second, and, regarding the last challenge, recall some studies that found similar returns to other types of corporate investments.

3. Weston (2002)

Weston presents an analysis of the largest of the late 1990s mergers in the oil industry, the Exxon/Mobil merger. In this transaction Exxon bought Mobil for $74.2bn in shares. The price represented a premium of 26.4% over the market value of Mobil. The pre-merger value of Exxon and Mobil was $175bn and $58.7bn respectively with Exxon having a higher P/E valuation. The companies had a number of complementary assets, including exploration rights in various major oil-producing areas. While the short-term synergies were

estimated before the merger at $2.8bn, they turned out to be even higher in reality. The bulk of the paper contains a valuation exercise, similar to those carried out by investment banks advising the merging companies. Such valuation results are usually included in the merger-related SEC filings. Based on the valuation Weston also presents an estimate of the merger gains.

The valuation methods employed by the author are the standard industry/textbook methods: the relative valuation and the DCF analysis. As usual the interesting aspect of the latter is in the adopted assumptions. The relative valuation establishes basic financial ratios such as market price/EBITDA, price/sales, price/FCF for other industry firms as well as the premiums paid in comparable transactions and the values the transaction in question using the ratio ranges obtained through such comparative study. The result of such valuation is obviously mainly indicative.

The DCF valuations adopt usually discounting of free cash flows by WACC or unlevered cost of capital in the APV method. Weston estimates the cost of equity for both the pre-merger firms and the post-merger entity with the standard CAPM method. As usual the difficult question is what equity premium to adopt. Weston chooses higher premium range over a lower 4–5% range adopted in the end–1990s valuations. He uses a fixed debt-to-capital ratio of 0.3 to compute the cost of debt as well as beta and rating estimates to calculate the combined entity's WACC. He performs WACC and APV valuations projecting sales until 2010 using estimates of sales growth and deriving the NOPAT and FCF measures using the percentage of sales method. In the WACC-based valuation he discounts the terminal and 2000–2010 FCFs by the WACC, deducts the value of debt and obtains the value of equity. In the APV method FCFs are discounted with the unlevered cost of equity of the combined firm. The terminal FCF is also calculated using this measure instead of the WACC. This results in a lower terminal value. Then the PV of the tax shield is added to the discounted FCFs and the debt value is deducted. Both methods result in a similar valuation result. As usual with the DCF methods the sensitivity of the value to the key adopted parameters like the revenue growth rate, the cost of capital and the operating margin is substantial. Weston performs such sensitivity analysis.

The merger gains are calculated next. The DCF value is used as a measure of the post-merger value of the combined firm. The gain to the Exxon shareholders is taken to be the post-merger Exxon ownership share times the merger gains computed as the DCF value less the amount paid for Mobil less the pre-merger Exxon market value. The gain to the Mobil shareholders equals the merger gains times the post-merger Mobil ownership plus the merger premium. The gains are estimated at about $25bn to each company. To confirm the positive market response and the actual market value creation caused by the merger transactions in the oil industry the data for the increase in the market value in the 10-day window around the merger announcement date for the 1990s oil mergers are presented.

4. Shleifer and Vishny (2003)

The neoclassical theory of mergers sees these transactions as improving profitability within industry in response to industry shocks. Shleifer and Vishny see this theory as incomplete and propose another explanation. They consider rational managers operating in inefficient markets where there is a mispricing of various companies. The managers are aware of such mispricings and arbitrage them out by buying cheap firms.

The authors consider the relations between the market values of the bidder, the target and the post-merger firm and the acquisition price, expressed per unit of capital. They assume that in the long run firms earn their cost of capital and, since their model is not dynamic, their calculation of merger gains rests on the long-run value based on the cost of capital. In the model of stock-financed mergers, if the price paid is less than the perceived synergy value the target shareholders lose and the bidder shareholders gain; if the price exceeds synergy, the bidder shareholders lose and the target shareholders gain in the long run. In such a setup a merger is a zero-sum game and there is no value created. If the shares are overvalued the bidder shareholders would lose in the long run anyway, so financing a merger with overvalued shares may cushion such loss, and may be a reason to do the deal. This fact allows the authors to make an interesting distinction between the return and the value gains to the bidder shareholders. While the first may be negative a merger may still provide value to these shareholders.

The authors consider only stock market valuations, and not operating performance metrics. The implicit assumption is that in the long run prices are efficient, and that there is a long-run equilibrium governed by the cost of capital. Why are there any transactions in such a zero-sum world? Shleifer and Vishny posit that managers may differ with respect to their investment horizons. The managers and shareholders who do not cash in while the shares are overvalued lose. They give as an example the managers of entrepreneurial firms who become merger targets, who accept bidder shares only to cash out. Another explanation given is that the target managers are given considerable perks to do the merger, e.g. in the form of the ESO exercise acceleration, top positions in post-merger firms etc.

The authors conclude that we may see stock-financed acquisitions when the bidder stock is overvalued, market valuations are high, when the target managers benefit personally or if there is a high perceived synergy value. They try to fit their model in an approximate way to the large-sample statistical data on mergers and quote also the example of the AOL/TimeWarner merger to support the implications of the model. They conclude further that it pays off to have an overvalued stock to survive in the long run through the acquisitions. They also seem to place much stress on the earnings manipulation leading to increase the share prices. There is no doubt that market valuations play an important role in the merger decisions and the method of payment choice. But a model of mergers which puts less stress on profitability,

efficiency and technology transfer issues appears to rely to a large extent solely on the individual profit-making behavior of the corporate managers.

5. Real option models

Lambrecht (2003) builds a real option model to explain the procyclicality of merger waves when there are economies of scale. His approach includes the modeling of production technology. He considers, first, two price-taking firms faced with stochastic demand, and, second, firms with market power. The firms may merge after incurring fixed merger costs (legal and banking fees etc.) and fixing restructuring/merger terms i.e. the ownership shares in the combined firm. The merger creates synergies.

Lambrecht models merger decision as a real option with the payoff to each company computed as the synergy share minus costs under merger terms. The option is exercised, as is the case with any real option, when the option value equals the payoff value. The timing of the exercise is influenced by merger terms. Lambrecht models two situations: friendly mergers and hostile takeovers. Market power increase due to a merger creates an additional synergy. He provides a global optimum to the timing problem and computes the shares in the combined unit. He also derives optimal deal terms in a hostile takeover situation. Some of the assumptions of the model are: no agency costs (i.e. shareholder value maximization), efficient markets (i.e. no arbitrage profits on merger-related events, no jumps across merger exercise, the value of the merger option included in the pre-merger price of both firms), the existence of economies to scale. The single source of uncertainty in the model is the output price. The author obtains the merger option value, and shows that it is increasing in the output price, if there are economies to scale. The merger should take place if the output price hits a certain level. As this happens in a rising output market or a technology-shock driven market, the merger timing seems to be procyclical. As with any standard real option model, rising gains/ synergies speed up mergers, rising costs and output price volatility delay them.

The determination of post-merger shares is modeled using the Nash bargaining solution. The market power case of duopolists merging into a monopolist is modeled by combining a standard demand function, the Cournot-Nash equilibrium and the production function. Market power is shown to speed up mergers. The author links this to the choice between an internal investment and a merger. If the costs to merge are relatively smaller a merger may be preferred to an internal investment. For smaller firms the opposite may be true. Lambrecht discusses also a different structure of the merger game. Instead of a friendly transaction (i.e. first maximizing the merger profits and then dividing them) merging firms may choose first to determine their post-merger shares and then decide on the timing. In such a setup target extracts additional merger premium. Lambrecht models this as a Stackelberg game where the target first decides on its share of the post-merger firm and

the bidder decides on timing. He shows that the target prefers a takeover solution while the bidder prefers a merger. Since the bidder share is smaller in a takeover, the bidder will delay a takeover to reap more benefits.

Morellec and Zhdanov (2003) also combine real option and game-theoretic methods to model mergers. They treat merger/restructuring opportunity as an exchange option and consider option exercise games between the bidder and the target. There are two underlying random processes, the NPVs of future cash flows of the bidder and the target. The model assumes that they are perfectly observable. Moreover, investors, who unlike the managers are not fully informed on merger synergies, update their assessment of its value by observing the ratio of the underlying random processes and adjusting their beliefs, if the merger is not executed when this ratio hits new highs. The authors derive the optimal parameter value at which the merger should occur as well as the value of the exchange option to the bidder and to the target. At the time of merger event the optimal ratio values to both sides are equal and determine the division of shares in the new firm. The authors show that bidding competition changes the timing and terms of the deal and drives the negative returns to the bidder.

6. Concluding remarks

What can we learn about mergers by applying a particular research method? What are the main objectives and new challenges in the study of takeovers?

Event-type studies look at large samples of mergers to uncover average features of these transactions across time and industries. While some properties they report recur, some results contradict each other in various studies of this type. Theoretical papers point to possible economic explanations of the various aspects of merger behavior. Valuation approach focuses on the estimation of the operating gains from mergers and comes closest to the managerial point of view.

More detailed clinical studies as well as theoretical models are framed usually within the financial management or the financial economics perspective. The financial management-oriented merger research comes in several guises. It may take the form of a clinical study, a detailed examination of a single or a small number of transactions, with the aim of identifying the sources of value in mergers [Kaplan (2000), Tufano (2001)]. It may test the valuation methodologies employed in merger assessment. Or it may try to provide some analytical tools that may be of practical use. The difference between the two approaches is important. While a financial economist wants to build a model that explains some features of mergers in a way based on economic principles, a financial management-oriented researcher will try to present a framework that may be applied in actual corporate practice. Most successful models in finance span the financial economics-financial management divide and supply applicable formulas reasonably grounded in eco-

nomic theory. In the case of merger studies this should lead to models answering the basic questions: what is the fair price to be paid in a merger, how to include the post-merger risk and uncertainty facing managers doing the deal in the merger terms, what is the role of the stock market valuation in influencing the bidder and target shares in the combined firm and the timing of the transaction, how to value productivity and technology enhancements that may be created by these operations? One of the major objectives should be to provide executives with analytical tools that contribute to rational decision-making and reduce the chance of an unsuccessful merger. Such models should be based on easily observable and measurable variables derived from corporate financial data.

Many recent mergers involved tech companies. While some firms experienced unprecedented growth as a result of the successful merger strategy (e.g. Cisco), others (like JDS Uniphase) encountered difficulties. There are few in-depth studies of these transactions. Many tech and biotech mergers included a strong technology acquisition element and resembled perhaps closer strategic investment transactions than mergers in other industries. The investigation of value creation and destruction in these deals should also contribute to our broader understanding of the mechanisms of corporate strategies in the new economy.

The impact of the financial market dynamics on merger decisions, terms and timing, the search for analytical merger guidelines taking into account the high post-merger risks facing managers of merging companies and the examination of strategic technology ownership aspects of tech mergers are among the major topics open for further research.

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