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FINANCIAL SYNERGY IN MERGER BETWEEN RELATED COMPANIES

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วิทยานิพนธ์ฉบับนี้จัดทำขึ้นเพื่อศึกษาการประสานกำลังทางการเงินในการควบรวม
กิจการที่มีความเกี่ยวพันธ์กัน โดยได้ศึกษาการเปลี่ยนแปลงในความเสี่ยงที่เป็นระบบ ความ
เสี่ยงที่ไม่เป็นระบบ ความเสี่ยงทั้งหมด อัตราส่วนหนี้สินต่อทรัพย์สิน รวมถึงการเปลี่ยนแปลง
ในความแปรผันของการหารายได้ ที่เกิดขึ้นจากการควบรวมกิจการทั้งในกิจการที่มี
ความสัมพันธ์กันและในกิจการที่ไม่มีความสัมพันธ์เพื่อเปรียบเทียบและตรวจสอบการมีอยู่
ของความร่วมมือกันทางการเงิน การศึกษานี้ยังตรวจสอบตัวแปรเหล่านี้ซึ่งเป็นตัวแปรอธิบาย
กับปฏิกิริยาของตลาดในช่วงระยะเวลาการประกาศการควบรวมกิจการซึ่งเป็นตัวแปรตามเพื่อ
จับผลกระทบต่อความมั่นคั่งของผู้ถือหุ้นจากการเปลี่ยนแปลงในตัวแปรอธิบายของเรา ซึ่งตัว
แปรอธิบายเหล่านี้เป็นตัวแทนของการประสานกำลังทางการเงินที่เกิดขึ้น ตัวอย่างที่ยกมา
ทั้งหมดครอบคลุมถึงการเข้าซื้อกิจการเป็นระยะเวลากว่า 20 ปี โดยใช้กลุ่มตัวอย่างทั้งหมด
791 บริษัท ผลลัพธ์ที่ได้นั้นไม่สอดคล้องกับวรรณกรรมที่สนับสนุนการความสัมพันธ์เชิงบวก
เฉพาะระหว่างการลดความเสี่ยงและกิจกรรมการควบรวมกิจการที่ไม่มีความเกี่ยงเนื่องกัน
เท่านั้น โดยการศึกษานี้ได้พบว่ามีการเปลี่ยนแปลงที่มีนัยสำคัญในตัวแปรที่แสดงถึงการ
ประสานกำลังทางการเงินในการควบรวมกิจการที่มีความสัมพันธ์กัน แต่ตลาดตอบสนองเชิง
บวกอย่างมีนัยสำคัญกับการลดลงของความเสี่ยงที่ไม่เป็นระบบในการควบคุมกิจการที่มี
ความสัมพันธ์กันเท่านั้น ผลการวิจัยนี้ได้ให้หลักฐานเชิงประจักษ์ที่จะกล่าวอ้างได้ว่าไม่ใช่
เพียงแค่การควบรวมกิจการในกิจการที่ไม่มีความเกี่ยวพันธ์กันเท่านั้นที่จะสามารถประสบผล
ของการประสานกำลังทางการเงิน

ภาควิชา <u>การธนาคารและการเงิน</u>   ลายมือชื่อนิสิต <u>ศกยง   พัฒนเวคิน</u>
สาขาวิชา <u>การเงิน</u>   ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก <u>_____</u>
ปีการศึกษา <u>2553</u>

SAKAYONG PATTANAVEKIN: FINANCIAL SYNRGY IN MERGER BETWEEN RELATED COMPANIES.

THESIS ADVISOR: MANAPOL EKKAYOKKAYA, PH.D., 62 pp.

This study examines the existence of financial synergies in related merger. The study examines changes in systematic risk, residual risk, total risk, leverage ratio, and earnings volatilities due to merger activities in both related mergers and conglomerate mergers in order to compare and investigate the existence of financial synergy. The study also examines these variables as explanatory variables with the market reaction during merger announcement period (total return as a dependent variable) to capture the shareholder wealth effect by changes in our explanatory variables that represent financial synergy. The sample covers all quoted acquisitions over a 20 years period using a sample of 791 companies. The results are inconsistent with the literature that supports only conglomerate mergers that can achieve financial synergy. Even though the study finds significant changes in the variables that represent financial synergy in related mergers, but market does react significantly positively to only unsystematic risk reduction. The results provide an empirical evidence to assert that conglomerate merger is not the only type of merger that can achieve financial synergy.

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ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Chapter I

Introduction

1.1 Backgrounds and Problem Review

The worldwide economic depression of the 1930s and subsequent Second World War prevented the emergence of an M&A wave for several decades, it is a well-known fact that mergers and acquisitions (M&A) come in waves; each wave was particularly remarkable in terms of size and characteristics (Martynova and Renneboog, 2008). With a tightening of the anti-trust regime in 1950, US M&A changed to the new pattern of diversifying M&A that led to the development of large conglomerates[1]. By building conglomerates, companies intended to benefit from growth opportunities in new product markets unrelated to their primary business. This allowed them to achieve "financial synergy", which is a consequence of risk reduction – by pooling of imperfectly correlated income stream, then, their earnings volatilities will be less. Lower earnings volatility reduces expected default costs. Leverage can potentially be increased associate with greater debt capacity and greater tax benefits, as first suggested by Lewellen (1971). Copeland and Weston (1979) give a review of risk and return considerations that following, financial economics, risks are considered as the variability of returns and other risks, such as the risk of bankruptcy or the risk to management of a takeover, are not explicitly considered. They address that diversification, ceteris paribus, can lead to a reduction in the variability of operating earnings if the returns are negatively correlated, furthermore, given positive correlation, the lower the level of correlation the lower the variability of the sum of

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[1] In 1950, the Celler-Kefauver Act amended Section 7 of the 1914 Clayton Act to prevent anticompetitive mergers.

returns. Therefore, financial synergy provides a unique rationale for conglomerate acquisitions.

On the other hand, related mergers are likely to be unable to achieve financial synergy by the definition, merger with the firm in the same industry or high correlation industry. However, managerial literature suggests that the benefits of related mergers are operational synergy, market power, resource complementarities, knowledge transfer (Porter, 1985), and information sharing from upstream or to downstream business units (Harrigan, 1984). With these benefits, related mergers can manage the business uncertainty or business risk better. For example, upward vertical integration can control its supplier better and avoid the shortage of raw material or supply, downward vertical integration is able to reduce the bullwhip effect, or demand fluctuation[2] (Chen et al. 2000), and horizontal integration can gain market power, which lead to pricing ability that insulates its profit from market shocks (Moyer and Chatfield, 1983). Consequently, related mergers may achieve risks reduction and then financial synergy as well.

Whilst other researches (e.g. Levy and Sarnat, 1970; Melicher and Rush, 1974; Mueller, 1977; Han Kim and McConnell, 1977; Scott, 1977; and Thompson, 1984) are examining the existence of financial synergy associated with conglomerate mergers to argue whether conglomerate mergers can really produce financial synergy against what Lewellen (1971) addresses that financial synergy as a unique rationale behind conglomerate mergers but the results are mixed, we are trying to fill the literature gap of financial synergy as well in different way. Nevertheless, previous literature has not examined the financial synergy associated with non-conglomerate

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[2] Downward vertical integration, merger firms have a better ability to access to the demand information that can forecast demand explicitly.

acquisitions. We hypothesize that if related merger or non-conglomerate mergers can achieve financial synergy then we can imply that financial synergy is not longer as a unique rationale behind conglomerate merger. The literature gap of financial synergy may be filled by the study.

To fill the above gap in the literature, this study investigates the financial synergy associated with related M&A to present the empirical evidence whether related M&A can achieve financial synergy. The main research question is "can related mergers achieve financial synergy?"

1.2 Statement of Problem / Research Question

Despite the common perception in the literature that financial synergy is the only theoretically plausible for and hence unique to conglomerate acquisitions, which is the outcome of lowering income streams volatility by pooling of income streams. However, non-conglomerate acquisition may be able to lower volatility of income streams and achieve financial synergy as well by focusing on its core business through their operational and managerial synergy.

To fill the gap in the literature that discussed above, the problem to be investigated in this thesis can be stated as follow:

"Is a related merger able to achieve financial synergy?"

1.3 Objectives

The objective of this study is to examine the existence of financial synergy associated with related mergers in order to provide empirical evidence that financial synergy is not a unique rationale behind conglomerate mergers.

1.4 Scope of the Study

This empirical research examines the existence of financial synergy in related mergers. The research investigates and focuses on whether related mergers can achieve financial synergy by using the mergers and acquisitions data in US during 1991-2005.

1.5 Limitations

Our study includes only publicly traded firm. But, as long as the nature of financial synergy does not vary between listed and unlisted companies, our findings should also hold for unlisted firms. As well as we scope only US market, our results should also hold for other main market (e.g. UK market, EU market).

1.6 Contributions

This study provides empirical evidence on the existence of financial synergy that literature addresses as a unique rationale behind conglomerate mergers in related mergers and acquisitions event. The results may provide the additional aspect of financial synergy to literature that asserts that not only conglomerate mergers but also related mergers can achieve financial synergy. The findings will demonstrate and will serve as the new evidence in reaching the conclusion about financial synergy in the major corporate transactions (mergers and acquisitions). Moreover, this study will give the new and important aspect of financial synergy metric as a desirable management tool in creating shareholders value by evaluating the value of firm engaged in mergers and acquisitions event.

Chapter II

Literature Review and Research Hypotheses

2.1 Literature Review

Financial synergy refers to financial benefit (i.e. increase in borrowing capacity, lower cost of capital) that corporate can realize when it merges with or acquires another firm. Lewellen (1971) argues that mergers may achieve financial synergy by combining of imperfectly correlated income stream, or practically, acquiring another firm from an *unrelated* industry. Basically, this is the Markowitz portfolio diversification at the corporate level. The bad outcomes in one business can be offset by good outcomes in another business that brings lower earnings volatilities to merger firms. Lower earnings volatilities lead to the lower risk of default because both firms (bidder and target) jointly insure the debt of each merging firm, which is called as "coinsurance of corporate debt". Lower risk of default leads lower expected default costs and thereby increases the "debt capacity" or "borrowing ability" of the combined firm. The merger firm can gain benefit by increasing its financial leverage in order to achieve tax deductibility on behalf of its shareholders. Hence, financial synergy is addressed in literature (e.g. Lewellen, 1971; Mueller, 1969, Han Kim and McConnell, 1977; Scott, 1977) as the unique rationale behind conglomerate acquisitions.

However, the doubt that conglomerate mergers can really achieve financial synergy is still mixed. Levy and Sarnat (1970) first argue that the principle of risk pooling can be achieved more efficiently by portfolio diversification than by merger (R.S. Thompson, 1984: 98). Thompson (1984) also argues that the empirical studies in the US indicate that conglomeration may increase and not decrease risk, whether

the latter is measured by accounting or market based data[3]. These studies are of two kinds. The first type compares the risk characteristics of conglomerate and non-conglomerate firms. The second looks at the impact of conglomerate mergers on risk levels. In each case diversification does not appear to reduce risk. Melicher and Rush (1974) report higher levels of systematic risk in conglomerate firms: "the beta measures of non-diversifiable risk clearly indicate that conglomerate companies are characterized by higher levels of market risk than comparable non-conglomerate companies and that conglomerate companies are more volatile than the market as a whole". And Mueller (1977) uses a market-based risk measure concludes: "… There is no evidence that conglomerate firms achieved superior risk spreading performance. Indeed, to the extent that higher β's are a result of their merger activities, the conglomerates become more risky and volatile that a comparable non-conglomerates".

An additional evidence and explanation of risk reduction inexistence associated with conglomerate mergers, Montgomery and Singh (1984) address the relationship between diversification strategy and systematic risk (beta). Beta values are examined for six diversification categories, which are single businesses, dominant, related constrained, related linked diversifiers, unrelated portfolio, and overall. And it is found that betas for unrelated diversifiers are significantly higher than those of other firms. The conglomerate mergers can achieve an increase in debt capacity (Lewellen, 1971) and they tend to have higher percentages of debt in their capital structures than non-conglomerate firms (Weston and Mansinghaka, 1971 and Melicher and Rush, 1974), the debt financing magnifies a firm's intrinsic operating

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[3] The explanation why conglomerate merger may increase or not decrease risk is in the next paragraph, Montgomery and Singh (1984)

risk as measured by an unleveraged beta (Hill and Stone, 1980). In addition, there is a positive relationship between a firm's debt level and its systematic risk (Hamada, 1969). Therefore, to the extent that different levels of debt motivate merger strategies, leverage could be a factor in explaining any observed variance in systematic risk. Firms pursuing unrelated diversification rely largely on highly general financial or managerial/control competences which are not directed specifically to the critical success factors of a given market, therefore, unrelated diversifiers will have low market power in their respective markets[4]. With the low market power, conglomerate mergers will experience the higher systematic risk than those of other firms[5].

While the literature points that the conclusions of risks reduction in conglomerate mergers are unclear, literature (e.g. Subramanvam and Thomadakis, 1908; Moyer and Chatfield, 1983; Lubatkin and O'Neill, 1987) address that risks reduction can also be occurred in non-conglomerate mergers. Related mergers will achieve the higher market power in their respective markets though their operational synergy, economies of scales following natural monopoly theory (Sharkey, 1982) – with more market power, related merger can achieve lower systematic risk, according to Subramanvam and Thomadakis (1980). Subramanvam and Thomadakis (1980) find that market power and capital intensity are joint determinants of systematic risk and they also suggest that more monopolistic firms are also users of more capital-intensive techniques, it would imply that high beta stocks are mostly associated with competitive firms and low beta stocks with firms that have market power in their output markets. Moyer and Chatfield (1983) also address one explanation for a

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[4] Montgomery & Singn (1984) hypothesize that unrelated diversifiers would have low market power in their respective markets.

[5] Subrahmanvam & Thomadakis (1980) define degrees of monopoly power as degrees of demand elasticity, argue that more monopoly power implies lower beta (risk).

hypothesized link between market power and systematic risk may lie in the use of limit pricing as a barrier to entry. In the case of unfavorable market shocks, potential entrants into the market are more likely to be affected than existing firms because of their small size and attendant cost disadvantages. In short a risky entry into a concentrated industry will seem all the more risky under adverse market conditions. In this case some of the unliquidated monopoly gains may be taken by existing firms without significantly increasing the risk of new entry. Favorable market shocks, on the other hand, make entry look more attractive to potential competitors. The gains experienced by existing competitors as a result of the favorable market shocks must be passed along to customers through lower prices to continue to discourage new entry into the market. Thus the profits of a powerful firm in a concentrated industry may be insulated from market shocks. The study of Lubatkin and O'Neill (1987) has supported the notion that risk reduction is associated with related mergers. They examine changes in risk associated with a large group of acquiring firms, grouped by the degree of relatedness of their mergers. Their findings show that risk reduction may be a valid rationale for merger, but not for the reasons often cited. By controlling market condition, they find that on the average mergers tend to be associated with increased levels of unsystematic and total risk; however, the findings show that at least one type of merger, that related mergers, demonstrates the ability to reduce systematic risk regardless of market conditions.

The findings of Montgomery and Singh (1984) also find that the mean systematic risk associated with single businesses, dominant, related mergers approximates the market portfolio, whereas the systematic risk of unrelated diversifiers is significantly higher than that of the market portfolio. They address the debt position and lower market power of conglomerate mergers as the explanation of

this situation. This evidence also suggests that risk reduction may exist in and provide an incentive for firms to make non-conglomerate mergers. To this extent, it is unlikely that financial synergy provide unique rationale behind conglomerate mergers as has been suggested in the existing literature. Our study examines financial synergy in related mergers and compare to conglomerate mergers in order to provide empirical evidence that financial synergy is not a unique rationale behind conglomerate mergers.

2.2 Research Hypotheses

2.2.1 Related mergers and systematic risk

A firm's systematic risk, or the sensitivity of its returns to the aggregate returns of the marketplace, determines its cost of capital. The lower systematic risk, the lower the required rate of return on an investment and the greater the number of potential investment project; hence, the higher the value of the firm under ceteris paribus (Van Horne, 1980). Corporate managers can increase the wealth of their stockholders by pursuing actions that lower a firms' systematic risk.

The operational synergy (i.e. economies of scales, economies of scopes, resource complementarities, and managerial synergy) that most likely occurs in related mergers may lead related mergers to the risk reduction. Theoretically, related mergers that is most likely to be able to achieve economies of scales so that they can achieve higher market power. Although antitrust law prevent such a merger that affect the market competitiveness, antitrust law still has some room to do related mergers – Wasserstein (2000) addresses in his book that the antitrust law has exceptions for some related mergers by concerning cost saving and industry efficiency as key

considerations rather than anticompetitive effect (Exxon and Mobil merger case, 1998 – the number one and number two oil companies in the U.S.). Then, related mergers can become the dominant firm or big player in the industry (horizontal integration), which has bargaining power to negotiate with its suppliers, or be the price leader. With the ability to influence prices of outputs and costs of inputs through market power, related mergers are likely to achieve systematic risk reduction, according to Subrahmanyam and Thomadakis (1980) and Moyer and Chatfield (1983). Subrahmanyam and Thomadakis (1980) define degrees of monopoly power as degrees of demand elasticity; they argue that the more lower beta associated with the more higher monopoly power and capital intensity. Moyer and Chatfield (1983) also support the notion that the firm with high market power can achieve lower systematic risk. They give an explanation that a firm with high market power is more easily transfer cyclical risk to consumers through price and quality changes instead of causing an increase in the variance of profits, which reduces the firm's systematic risk and investors' risk.

Additional link on related mergers and systematic risk reduction, Lubatkin and O'Neill (1987) argue that the corporate level of a firm also affects levels of systematic risk by linking individual business units to certain common core technologies. Corporate product-market portfolio decisions establish the context in which single businesses develop their strategies. They also said that a firm could better achieve a competitive advantage if a corporate strategy provides opportunities to draw on common corporate resources. Support for that notion comes from, among others, Porter (1985), Lubatkin (1983), and Rumelt (1974). The operational synergy associated with related mergers can be used to attain competitive advantage. For example, a vertical acquisition might lower supply costs through increasing the

efficiency of scheduling and eliminating redundant inventories – avoid them from short of raw material (backward vertical integration), therefore, related mergers may achieve lower levels of systematic risk.

Lewellen (1971) requires an aversion by both borrowers and lenders to the risks and costs of default as a main assumption in the paper. With this assumption, borrowers are avoiding the undesirable liquidation of basically sound business activities because of short-run cash problems and lenders are avoiding the non-performing loan as well. Risks reduction will bring the increase in borrowing capacity to related mergers; lender is willing to lend more to the lower risk borrower, who is avoiding the undesirable liquidation. Therefore related mergers may achieve financial synergy through risks reduction. We hypothesize our first hypothesis as:

Hypothesis 1: Following a related merger, the systematic risk of the combined firm is lower than the sum of the systematic risk associated with the pre-merger firms.

And we assume in the same way as Lewellen (1971) that

<u>Assumption I:</u> both borrowers and lenders are risks aversion and also have low costs of default preference.

2.2.2 Related mergers, residual risk, and total risk

Related mergers can be skillful in multi areas if related mergers do create resource complementarities and managerial synergy, which are expected to arise when combining two firms with strength in different areas. This should bring efficiency in management and better performance to merger and lead to residual risk reduction. For example, management may intervene in positive ways, introducing more effective control systems, technological advances, and improved sources of capital that may reduce the business risk of a newly acquired business. Instances of

positive intervention are more likely to occur when corporate management is familiar with the product, market, and technical characteristics of a newly acquired business, as when firms pursue related diversification (Bettis and Hall, 1982). Moreover, related mergers are not only better to control the supply of raw material, quality of raw material and service in backward vertical integration, but also better to manage their customer (i.e. distribution management, inventory management, and quality of service control) in forward vertical integration (Chandler, 1977). Related mergers in vertical integration are also able to improve marketing or technological intelligence in order to improve its efficiency (Harrigan, 1984). These may allow related mergers to achieve the competencies that can manage and operate their respective business more stabilize and more fluently, which would bring the unsystematic risk reduction to the mergers.

Although unsystematic risk does not have an impact on the merger's cost of equity capital, it may nonetheless influence a firm's investment decisions. Unsystematic risk refers to the firm-specific risk that makes cash flows on investments being different from expected cash flows. Income streams uncertainty is one of the two factors that determine default risk, and the other one is debt obligation. Under ceteris paribus, low level of income streams uncertainty might lead to lower default risk, which is the source of financial synergy. Hence, related mergers that can improve its operating performance and operating management by operational synergy may reduce its unsystematic risk, which means it can stabilize its income streams, and leads to the lower default risk, finally. We hypothesize this as:

Hypothesis 2: Following a related merger, the unsystematic risk of the combined firm is lower than the sum of the unsystematic risk associated with the pre-merger firms.

In the way that related mergers could reduce the systematic risk and unsystematic risk, we also hypothesize that related mergers have ability to reduce its total risk. We hypothesize this as our:

Hypothesis 3: Following a related merger, the total risk of the combined firm is lower
than the sum of the total risk associated with the per-merger firms.

2.2.3 Related mergers and earnings volatilities

In addition to the magnitude of a firm's cash flows, the default risk is also affected by the volatility in these cash flows. The more stability there is in cash flows; the lower is the default risk in the firm. Firms that operate in predictable and stable businesses will have lower default risk than will otherwise similar firms that operate in cyclical or volatile businesses (Damodaran, 2003). The traditional benefit of related mergers are the information sharing among the target and acquirer, which brings efficiencies and accuracies in inventory management, manufacturing management, distribution management, or customer service management (Andel, 1996). With these benefits, related merger firms can reduce the lead time of ordering, lack or raw material in manufacturing process, or distribution delay time, then related mergers can serve their customers more smoothly and constantly that may smooth their earnings volatilities. This suggests us to hypothesize as:

Hypothesis 4: Following a related merger, the earnings volatilities of the combined
firm are lower than the sum of the earnings volatilities associated with the per-merger
firms.

2.2.4 Related mergers and Debt capacity

Subsequently, if related merger can reduce its risks and earnings volatilities by operational synergy (i.e. market power), resource complementarities and managerial synergy (i.e. information sharing), a direct implication of a reduction in the earnings volatilities is a reduction in its expected bankruptcy costs[6]. The net result is an increase in the debt capacity of related mergers compare to the pre-merger debt capacity of target and acquiring firms.

An increase in leverage following mergers might enhance shareholders' wealth through an expropriation of wealth from bondholders. An immediate consequence of higher debt capacity following mergers is the co-insurance effect – existing bondholders are better off because debt becomes relatively safer. Shareholders can appropriate part or all of the benefits from bondholders by financing the merger with debt and increasing financial leverage of the merged firm (Kim and McConnell, 1977). A firm can also enhance its firm value by increasing its financial leverage because of the tax deductibility of interest payments generated from additional debt (Ghosh and Jain, 2000). However, the tax advantage of debt must be balanced against bankruptcy and agency costs in determining the optimal maturity of the capital structure (Leland and Toft, 1996). So the merger firms will increase their financial leverage to the optimal level if there is an increase in debt capacity, which represents financial synergy. We hypothesize this as our:

Hypothesis 5: Following a related merger, the financial leverage of the combined

firm is higher than the sum of financial leverage associated with the per-merger firms.

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[6] See in Hypothesis 1, 2, 3 and 4 that how related merger can reduce systematic risk, unsystematic risk and earning volatilities.

2.2.5 Related mergers and market reaction

According to efficient market hypothesis, we expect that market can realize the all benefits associated with merger activities in the merger announcement period. Then the market is most likely to react in the proper way to each merger transaction. We assume this as;

Assumption II: The market is efficient market

A more powerful test of financial synergy associated with related mergers is to correlate the merger-related stock market performance that implies the wealth gains to shareholders of related mergers with the change in the proxies of financial synergy (i.e. systematic risk, unsystematic risk, total risk, earnings volatilities, and financial leverage) around related mergers announcement period. An efficient market will react responsively to the future benefits (including financial synergy) following merger activities. In summary, if related merger can actually achieve financial synergy, we expect to see market reacts positively to any risks (i.e. systematic risk, unsystematic risk, and total risk) reduction associated with related mergers. Negative relationship between changes in earnings volatilities associated with merger activities and market reaction that represents market reacts positively to the less earnings volatilities following merger activity is also our expectation. Furthermore, we also expect to obtain the positive relationship between changed in leverage associated with related mergers and market reaction. Because the reductions in systematic risk, unsystematic risk, total risk, and earnings volatilities and an increase in debt capacity, which signal the future benefits of financial synergy, then an efficient stock market will be able to capitalize expected benefits from future benefits of financial synergy at the time of the merger announcement.

Chapter III

Data and Research Methodology

3.1 Data

The sample of acquisitions comes from the Securities Data Company's (SDC) U.S. Merger and Acquisition Database. We select domestic merger and acquisition with announcement dates between 1991-2005 that both of target and acquirer are only traded in Nasdaq, NYSE, or AMX[7]. We consider only acquisitions in which acquiring firms end up with all the shares of the acquired firm or subsidiary, and we require the acquiring firm to control less than 25% of the shares of the target firm before the announcement for our sample. We focus on the full ownership acquisition (100% shares) rather than exceed 50% shares acquisition for strategic decision or partial acquisition because these mergers are capable to realize gains from acquisition (for example, operational synergy, financial synergy, or resource complementary) so they accept the risk and make a full acquisition.

Our additional requirements are:

1) The transaction must be completed,

2) All data of both acquirer and target are valid in data stream database for data of 1-year previous merger announcement year (-1 year) and data of 1-year to 3-year post merger announcement year (+1 to +3 year)

3) Both of target and bidder use US dollar currency

After collecting these acquisitions, we use a SIC code to classify the relative of bidder and target. The bidders and targets that have the same primary SIC 4-digit

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[7] To reach our assumption of efficient market assumption, we use the bidder and target data that are only traded in Nasdaq, NYSE, or AMX.

are defined as related mergers. As financial synergy is most likely to occur if bidder and target are completely in the different industry, hence, we define conglomerate mergers as the mergers that bidder and target have different in first 2-digit of primary SIC. We expect that the financial synergy is most likely to occur in these both scenarios.

Finally, our sample includes 391 deals for related mergers and 335 deals for conglomerate mergers.

Year	Related Mergers		Conglomerate Mergers	
1991	2	0.51%	1	0.30%
1992	4	1.02%	1	0.30%
1993	1	0.26%	2	0.60%
1994	4	1.02%	5	1.49%
1995	10	2.56%	8	2.39%
1996	7	1.79%	7	2.09%
1997	33	8.44%	22	6.57%
1998	60	15.35%	46	13.73%
1999	50	12.79%	48	14.33%
2000	51	13.04%	57	17.01%
2001	53	13.55%	37	11.04%
2002	25	6.39%	33	9.85%
2003	31	7.93%	27	8.06%
2004	34	8.70%	21	6.27%
2005	26	6.65%	20	5.97%
Total	391	1	335	1

Table 1: Sample year-wise distribution for 391 related mergers and 335 conglomerate mergers between 1991 and 2005.

3.2 Methodology

This part illustrates the literature related to the risk changes associated with corporate transaction. These subjects matter in and take a part of the hypothesis testing which are examined in the role of dependent variables. Lewis et al (2002) examines risk changes around convertible debt offerings. The paper examines idiosyncratic risk, systematic risk, and total risk for 1 year prior to and years 1 through 3 after the announcement date to provide risk changes evidence conveyed by merger activities. The paper estimates betas, residual variances, and total risk over the

500-trading day period surrounding the announcement date and do the industry adjustment by using industry-matched firm. Then, the paper computes t-statistics to test our hypotheses. As we study the financial synergy, which is the consequence of risk changes by merger and acquisition, we follow the Lewis et al (2002)'s study methodology to provide the risk changes evidence around merger and acquisition event.

In our study, systematic risk, residual risk, total risk, earnings volatility, financial leverage, and market reaction measure attributes are estimated for the related mergers, conglomerate mergers, and its industry median. We do the industry-adjustment for both related mergers and conglomerate mergers in order to eliminate industry effect by using industry median. Industry-adjusted results will allow us to compare the consequences of related mergers with ones of conglomerate mergers. Thus, we can detect the financial synergy that is associated with related mergers.

3.2.1 Systematic Risk, Unsystematic Risk, and Total Risk

The three components of risk were estimated using a standard two parameters market model (Lewis et al, 2002), as following form:

$$r_{it} = \alpha_i + \beta_i(r_{mt}) + e_{it}$$

Where t =   date t

i =   firm i

r_{it} =   the daily rate of return on the common shares of firm i in date t and is based on daily closing stock prices adjusted for stock splits, stock issues, and dividends,

r_{mt} =   is the average daily rate of return of US datastream-market in date t

$$\alpha_i \, , \, \beta_i =$$ firm-specific parameters, and

$$e_{it} =$$ a stochastic error term assumed to meet the assumptions of the linear regression model.

We use the United States - Datastream market return index as a market return index to calculate stock returns and betas.

We compute the residual variances by the standard error of the predicted r_{it} for each r_{mt} in a regression as followed:

$$residual \, \mathrm{var}iance = \frac{1}{n-2}\left[\sum(r_{it} - \overline{r_{it}})^2 - \frac{\left[(r_{mt} - \overline{r_{mt}})(r_{it} - \overline{r_{it}})^2\right]}{\sum(r_{mt} - \overline{r_{mt}})^2} \right]$$

And we compute the variances as:

$$Variance_i = \frac{\sum(r_{it} - \overline{r_{it}})^2}{n-1}$$

We estimate betas, residual variances and variance over the 500-trading day period surrounding the merger announcement date, so that year -1 (+1) is the 250-trading days immediately preceding (following) the merger announcement date and we also estimate betas and residual variances through year 3 after merger announcement date. Estimated betas represent systematic risk, residual variances represent unsystematic risk and variances represent total risk of merger firm.

We measure systematic risk reduction of each firm using estimated beta of 1 year after merger activity minus by 1 year prior to estimate beta:

$$Change \, in \, systematic \, risk_i = Beta_{+1i} - Beta_{-1i}$$

We note that for all pre-merger (-1) variables are weighted by the total assets of bidder and target.

Hypothesis 1 testing: Tests for change in systematic risk

H_0: Change in systematic risk following related merger is equal to zero

H_1: Change in systematic risk following related merger is not equal to zero

As well as residual risk reduction, we subtract the residual risk following mergers by residual risk of pre-mergers:

$$Change\,in\,residual\,Risk_i = residual\,Variance_{+1i} - residual\,Variance_{-1i}$$

Hypothesis 2 testing: Tests for change in unsystematic risk

H_0: Change in unsystematic risk following related merger is equal to zero

H_1: Change in unsystematic risk following related merger is not equal to zero

We also do the same for total risk reduction measurement by subtracting total risk (variance of return) of pre-mergers from post-mergers total risk:

$$Change\,in\,Total\,Risk_i = Variance_{+1i} - Variance_{-1i}$$

Hypothesis 3 testing: Tests for change in total risk

H_0: Change in total risk following related merger is equal to zero

H_1: Otherwise

To control for changes in systematic, unsystematic, and total risk for the bidder firms' industries, we do the industry adjustment by divided by the industry beta, residual variances, and variance in same INDC level 4 (datastream industry classification level 4) in the same period of each merger transaction that calculated by return for an industry index.

3.2.2 Earnings volatilities

We defined earnings per share as:

$$Earnings\,per\,Share_i = \frac{Profit_i}{Number\,of\,Common\,Shares_i}$$

We calculate the difference score of earnings volatilities by subtracting the variance of 3-pre-merger-year earnings per share (-3 to -1) from the variance of 3-post-merger year (+1 to +3):

$$Change\ in\ Earnings\ Volatiliti\ es_i = EPS\ Variance_{+1i} - EPS\ Variance_{-1i}$$

The difference score that results should represent the change in each merger's earnings volatilities characteristics that is due to merger activity.

Hypothesis 4 testing: Tests for change in earnings volatilities

H_0: Change in earnings volatilities following related merger is equal to zero

H_1: Otherwise

And again, to control industry effect, we do the industry adjustment in order to investigate changes in earnings volatilities due to merger activity. We use industry standard deviation earnings per share in the same period and same industry (INDC level 4) for each acquiring firm to do the industry adjustment.

3.2.3 Financial Leverage

We examine financial leverage changes due to merger activity using financial leverage ratio estimated for 1 year prior to and years 1 through 3 after the merger announcement date. We define financial leverage ratio as:

$$Financial\ Leverage_i = \frac{Book\ Value\ of\ Long\ term\ Debt_i}{Total\ Asset_i}$$

The total asset is the fiscal year total asset value from Datastream database. Debt is defined as the book value of long-term debt in the balance sheet, based on Datastream database. We do not examine market values of debt since it is difficult to

obtain reliable measures. However, we do not expect our results to be biased for this reason because the book and market values of debt are likely to be highly correlated[8].

The change in financial leverage is defined as the difference between the merged firms' financial leverage and the pro-forma financial leverage of the target and acquiring firms prior to the merger:

$$Change\,in\,Financial\,leverage_i = Financial\,Leverage_{+1i} - Financial\,Leverage_{-1i}$$

Hypothesis 5 testing: Tests for change in financial leverage

H_0: Change in financial leverage following related merger is equal to zero

H_1: Otherwise

We do industry adjustment to control the industry effect computing for each firm as the ratio of the sample firm value in the merger announcement year divided by the median for other firms in the same industry (INDC level 4).

3.2.4 Difference Tests

The difference tests for changes in beta and changes in financial leverage are based on two-tails t-tests for equality in means and a Wilcoxon-test for equality of medians. For changes in residual variance, changes in variance are changes in earnings volatilities difference tests are based on f-test.

3.2.5 Relationship between risk reduction and market reaction

To examine the market reaction due to merger activity, we observe the 3-days event window of stock price reaction surrounding the merger announcement date, which is represented by the excess return (ER) of bidders using following equation that controls for market movements. We use the market-adjusted model to capture

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[8] We use the definition of debt as same as a study of financial leverage changes associated with (A. Ghosh & Jain, 2000).

market reaction due to merger activity for both of bidder and target. According to Brown and Warner (1980), market adjusted model takes into account marketwide movements that occurred at the same time that the sample firms experienced event[9]. Implementation of the market-adjusted returns procedure involves a comparison of firm returns during the event period with the return of an appropriate market index. Any difference between the security return and the market return is labeled the abnormal or excess return due to the event in question (Dennis and McConnell, 1983)[10]. So we define excess return of firm i in date t as:

$$ER_{it} = r_{it} - r_{mt}$$

Whereas; r_{it} is the return of firm i in date t, r_{mt} is the US datastream-market return in date t

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[9] Fuller et al. (2002), Faccio et al. (2006), and Ekkayokkaya et al (2009) use this approach to estimate excess returns. Given the hypothesis that the nature of the market has changed due to institutional and regulatory changes, parameter estimates from one period may not be valid in a subsequent (event) period. Therefore, we calculate excess returns (ER) of each bidder and target firm by controlling for market movements.

[10] Dennis & McConnell (1983) report the results of mean-adjusted returns procedure and market-adjusted returns are similar, but not identical. The comparison period used to compute the average 'normal' return encompasses the period beginning fifteen days prior to the merger announcement and ending five days prior to the merger announcement and the period beginning four days after the merger announcement and ending twelve days after the merger announcement. In three samples leakage of information prior to the announcement date appears to have affected security returns over the comparison period. In those samples, the comparison period mean appears to be an upward biased measure of the 'normal' daily return. This 'bias' reduced the magnitude of 'excess' security returns around the merger announcement date, but the ability to reject (or not reject) the null hypothesis appeared to be unaffected. That is, in those cases in which the market-adjusted returns procedure leads to statistical rejection of the null hypothesis, the mean adjusted returns procedure also permitted rejection of the null hypothesis.

The short-term effects of merger activities are calculated by using the cumulative three-day event window excess return surrounding the merger announcement date (from t=-1 to +1)[11].

$$CER_i = ER_{+1} + ER_0 + ER_{-1}$$

We also weight CER_i of each merger deal by total asset of bidder and target. Because the synergy associated with merger activities may be transferred to target as well[12]. Then we have to observe cumulative excess return during merger announcement date of both bidder and target.

$$CER_i = w_{i,bidder}CER_{i,bidder} + w_{i,t\arg et}CER_{i,t\arg et}$$

whereas; $w_{i,bidder}$, $w_{i,tar}$ are the total asset weighted average of bidder and target respectively.

We use cross-sectional regression analysis to examine if the changes in financial synergy proxies are able to explain the wealth effects associated with related merger. CER is the dependent variable and changes in systematic risk, changes in unsystematic risk, changes in total risk, changes in earnings volatilities, and changes in leverage ratio are our explanatory variables.

We also need a set of control variables to make a proper regression analysis on the market reaction. Moeller et al. (2004) address that deal characteristics (i.e. payment method, relative size) and acquirer characteristics (i.e. acquirer size and acquirer's market-to-book equity) have significant effects to merged firm excess return during acquisition announcement period. Our controlled variables are:

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[11] The estimated cumulative ERi will be less likely biased by extraneous events in shorter horizon (Chatterjee & Lubatkin, 1990). Denote ri is the bidder's return and rm is the market return.

[12] Martynova et al (2008) cite that merger activities are expected to create value for the target and bidder shareholders combined (as reflected in the announcement abnormal returns).

1. *Payment method* – We use two dummy variables representing method of payment (1. Cash 2. Stock 3. Mixed) that are

    i. Cash

    ii. Stock

Travlos (1987) find the significant differences in the excess returns between equity and cash offer, acquisitions of public firms paid for with equity are accompanied by lower announcement returns than cash. Because cash payment may be expected to generate relatively higher returns to the shareholders of target firms since the receipt of cash is less risky than the receipt of an equity offering by an exchange of shares[13]. Payment by shares will affect the value of bidder firms and consequently in general bidder firms face a loss in share price drop. Heron et al. (2002) also propose that acquiring firms prefer to pay for their acquisitions with stock when the firm is overvalued. Thus, the average market reaction to the announcement of equity offering is negative resulting in bidder's stock price dropping during merger announcement period[14]. We control for payment method that has the impact on acquisition announcement excess return in order to capture relationship between merger announcement excess return and our financial synergy variables.

2. *Relative size* – we define as the deal value divided by total asset (book value) of bidder of one-year prior merger announcement year.

$$relative\ size_i = \frac{deal\ value_i}{total\ asset_{i(y-1)}}$$

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[13] See Heron et al. (2002)

[14] Draper & Paudyal (1999) and Hansen (1987) find the same that market react negatively to acquirers when the method of payment is stock rather than cash

We also control for relative-size in order to account for difficulties in measuring abnormal returns due to the larger size of bidders relative to the size of their deal. Asquith et al (1983) find a positive and statistically significant relationship between the acquirer's cumulative excess return and the relative size. They reason that, if acquisitions benefit bidder firms, large acquisitions should show up as having larger return effects on bidder firm returns. Therefore, we defined relative size as deal value divided by total firm asset (book value),

3. Firm size – we define as the total asset book value of bidder of one-year prior merger announcement year

   Moeller et al. (2004) provide empirical evidences that firm size does take a significant effect to market reaction to acquisition event. They report that excess return associated with acquisition announcements for small firms is larger than the excess return associated with acquisition announcements for large firms. They give an explanation that large firms offer larger acquisition premiums than small firms because managerial hubris plays more of a role in the decisions of large firms. Then, we expect that small bidding firms will experience significant shareholders' wealth gain more than larger bidder firms.

4. Market-to-book ratio – we define as market equity of bidder at the end of December of t-1 (one-year prior merger announcement year), divided by book common equity of bidder for the fiscal year ending in calendar year t-1 (one-year prior merger announcement year)[15]

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[15] We define Market-to-book ratio in the same way that Fama and French (1993) define book-to-market ratio

$$Martket - to - book\ ratio_{i} = \frac{market\,value_{i(y-1)}}{book\,value_{i(y-1)}}$$

Dong et al. (2002) argue that firms with low book-to-market ratios are more likely to be overvalued. Small firms are more likely to have higher book-to-market ratios rather than large firm. They give an explanation that this could be because highly values acquirers communicate to the market that these high valuations are not warranted by fundamentals, perhaps because they are undertaking efforts to acquire less overvalued assets with more overvalued equity. So we take acquirer's market-to-book equity ratios into account as our controlled variable.

5. Year of Acquisition – Lastly, we also control for year of acquisition as our dummy variable in order to eliminate the effect of economic shock that occurred in each year. The year of acquisition of our sample starts from 1991 to 2005 so our year of acquisition dummy variables should be 1991 to 2004.

Then we run weighted average least square to test the market reaction among our financial synergy proxies.

Chapter IV

Results

4.1 Changes in Systematic risk

After we measure beta by using two parameters market model, we find insignificant increase in median of beta (6.74%) associated with related merger[16]. Even we do the industry adjustment, the median changed of beta following related mergers are still higher than pre-merger of 3.71% in the first year after merger announcement year but the results of industry-adjusted are not significant either. Yet, the changes in beta in following year after the acquisition year (year + 2 and year +3) are still reported significant higher than pre-merger's beta. The results are far from what we have expected and also contrast with Lubatkin and O'Neill (1987) who examines changes in risk associated with a large group of acquiring firms, grouped by the degree of relatedness of their mergers. They show that related mergers have the ability to reduce systematic risk regardless of market conditions. But our findings are inconsistent with them - we find significant systematic risk increases associated with related merger. For conglomerate mergers, we do not find the significant changes in median of systematic risk (at 95% of confidence level). Our findings are also contrast with Subrahmanyam and Thomadakis (1980) and Moyer and Chatfield (1983) that report the significant systematic reduction associated with related merger because of market power (apparently be occurred in related merger).

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[16] With the high value of Jarque-bera that is reported in table 2, the distribution of beta is not normal distribution. Then we decide to use median to compare the difference between pre- and post-merger activities instead of mean.

We suggest an increase in industry concentration as the explanation for this case[17]. Related mergers may experience larger systematic risk due to the more concentration in the industry that they belong to.

However, our finding is consistent with Thompson (1984) that fails to find a general relationship between diversifying mergers and reductions in systematic risk. As Bettis and Hall (1982) have pointed out, it may be not diversification per se which may reduce systematic risk. Thus, they give one possible explanation of this result is that investors are wary of the market risk of conglomerates. From our findings, we conclude here that both types of mergers cannot reduce systematic risk.

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[17] Significant increase in systematic risk following related mergers but insignificant changes in systematic risk associated with conglomerate mergers.

Table 2
Descriptive statistics on the average differences in systematic risk

| | Related (391 Observations) | | | | | Conglomerate (335 Observations) | | | |
| | Year Relative to Acquisition | | | | | Year Relative to Acquisition | | | |
	-1	+1	+2	+3		-1	+1	+2	+3
Panel A: Estimates of Beta (Raw Values)									
Mean	0.8577	0.9094	0.9359	0.9430		0.8688	0.9144	0.9783	1.0034
Median	0.7750	0.8272	0.8685	0.9049		0.8143	0.7865	0.8595	0.9360
Std. Dev.	0.5437	0.5879	0.5966	0.5435		0.5425	0.5805	0.6468	0.5999
Jarque-Bera	206.4398	192.5808	228.7216	17.1148		110.3786	78.0738	114.8698	20.9006
Percentage change comparing with year (-1)									
Mean Change		6.03% ***	9.11% ***	9.94% ***			5.25% ***	12.61% ***	15.49% ***
Median Change		6.74% **	12.07% *	16.76% ***			-3.42% *	5.55%	14.93%
Panel B: Estimates of Beta (Industry adjustment)									
Mean	0.8408	0.9914	1.0234	1.0643		0.9016	0.9865	1.0068	1.1393
Median	0.8770	0.9095	0.9421	0.9579		0.8617	0.8866	0.9576	0.9913
Std. Dev.	3.5229	1.0558	1.0198	0.9931		0.8124	1.1768	0.6226	1.4587
Jarque-Bera	568689.40	89964.88	739366.80	85590.67		60791.66	114563.80	3396.66	139593.70
Percentage change comparing with year (-1)									
Mean Change		17.91% **	21.72% **	26.58% *			9.42%	11.67%	26.37%
Median Change		3.71%	7.42% **	9.23% ***			2.89%	11.13%	15.05% *

Table 2: Systematic risk over the 500-trading day period surrounding the merger announcement date for 1 year prior to and years 1 through 3 of both related merger and conglomerate merger. Industry adjustment is calculated by using the industry beta of same industry (at INDC level 4) of each firm at same period. Year relative to acquisition -1 (pre-merger) variables are weighted by total assets of bidder and target. Our sample includes 391 observations for related merger and 335 observations for conglomerate merger. With high Jarque-Bera values, we consider to use median in order to compare systematic risk changes associated with merger activities instead of mean changes. T-test of mean equal to zero versus not equal to zero is applied to examine the significance of the changes in systematic risk. Wilcoxon signed-ranks test for the significance of the median difference. ***, ** and * indicate statistical significance of the t-statistic for two-tails test, and of Wilcoxon-statistic at the 0.01, 0.05 and 0.1 level respectively.

4.2 Changes in Residual risk

We find a statistical and economic significant reduction of unsystematic risk in related merger (24.81 %, comparing with pre-merger as reported in table 3). Comparing with conglomerate (reduction in unsystematic risk of 30.03%), related mergers are likely to have same capability to reduce unsystematic risk. Industry adjustment results also report the strong significant reduction in unsystematic risk associated with both types of related merger and conglomerate merger. F-statistic shows that there is a significant unsystematic risk reduction in related mergers that is consistent to what we expected. Moreover, after doing industry-adjustment, we find that both of related mergers and conglomerate mergers have a capacity to reduce unsystematic risk better than other firms in the same industry on average. We can say that related mergers are likely to reduce unsystematic risk 38.44% better than other firms in the same industry on average while conglomerate mergers are likely to reduce unsystematic risk almost 35.88% better than other firms in the same industry on average. Therefore, our findings provide an evidence of economic and statistical significance of unsystematic risk reduction associated with related merger.

We can conclude in the same way with Lubatkin and O'Neill (1987) that related mergers do appear to represent an effective means to reduce unsystematic risks, or business-specific risks. The explanation of these findings is according to Salter and Weinhold (1979) observed, managers expend much effort on such very real company-specific risks. It is not surprising, therefore, that managers often justify mergers on the basis of their potential to reduce such unsystematic risk factors as dependence on a single product or service and seasonal and cyclical fluctuations in their present business.

Our finding is also contrast with previous literature that conglomerate merger is the only type of mergers that can reduce unsystematic risk by pooling risk of unrelated business. It turns out that related mergers are able to reduce unsystematic risk as well. Then our hypothesis 2 is hold. The operational in related merger is our explanation for the unsystematic risk reduction by related merger as we have discussed in chapter 2.

Table 3
Descriptive statistics on the average differences in unsystematic risk

| | Related (391 Observations) | | | | | Conglomerate (335 Observations) | | | |
| | Year Relative to Acquisition | | | | | Year Relative to Acquisition | | | |
	-1	+1	+2	+3		-1	+1	+2	+3
Panel A: Estimates of Residual Variance (Raw Values)									
Mean	0.001146	0.000862	0.000855	0.000733		0.001089	0.000762	0.000815	0.000733
Median	0.000501	0.000453	0.000427	0.000372		0.000539	0.000482	0.000437	0.000397
Std. Dev.	0.000985	0.001213	0.001213	0.001662		0.001249	0.000784	0.001196	0.001106
Difference from year (-1)									
Mean Change		-24.81% ***	-25.42% ***	-36.06% ***			-30.03% ***	-25.17% ***	-32.70% ***
Panel B: Estimates of Residual Variance (Industry Adjustment)									
Mean	13.983552	8.608663	9.066325	9.736787		13.568427	8.699845	9.160478	10.358400
Median	7.337362	5.044123	4.781802	4.507272		6.008974	4.763034	4.681091	5.243587
Std. Dev.	18.3628	11.9144	17.7871	18.8371		21.07774	12.83196	13.5909	22.23279
Difference from year (-1)									
Mean Change		-38.44% ***	-35.16% ***	-30.37% ***			-35.88% ***	-32.49% ***	-23.66% **

Table 3: Residual variance over the 500-trading day period surrounding the merger announcement date for 1 year prior to and years 1 through 3 of both related merger and conglomerate merger. Industry adjustment is calculated by using the industry residual variance of same industry (at INDC level 4) of each firm at same period. Unsystematic risk year-1 (pre-merger) is weighted average by total assets of bidder and target. Since the values on unsystematic risk results are very small, 6-digits reports are required to

compare the difference. F-test of the equality of two variances is applied to examine the significance of changes in unsystematic risk. ***, ** and * indicate statistical significance of the f-statistic at the 0.01, 0.05 and 0.1 level respectively.

4.3 Changes in Total Risk

We find that related mergers have a statistical and economic significant reduction in total risk by the reduced in mean of 19.45% (results report in table 4). Obviously, total risk can be reduced significantly in both of related merger and conglomerate merger activity. By doing industry adjustment, the results still show that related merger experience better total risk reduction than conglomerate mergers. The results on industry-adjusted can be implied that on average related mergers are likely to reduce total risk 32.03% comparing with other firms in the same industry that is better than conglomerate mergers (25.21%). According to the results, related mergers are likely to reduce total risk significantly.

Lubatkin and O'Neill (1987) find that conglomerate mergers do not pursue the total risk reduction; however, related mergers are the only one type of mergers that is associated with a significant decline in total risk. But our findings find significant reductions in total risk in both related mergers and conglomerate mergers. We can imply that the unsystematic risk reductions in both of related and conglomerate mergers are big enough that can impact total risk. Our hypothesis 3 is also hold.

Table 4

Descriptive statistics on the average differences in total risk

| | Related (391 Observations) | | | | | Conglomerate (335 Observations) | | | |
| | Year Relative to Acquisition | | | | | Year Relative to Acquisition | | | |
	-1	+1	+2	+3		-1	+1	+2	+3
Panel A: Estimates of Residual Variance (Raw Values)									
Mean	0.0013	0.0010	0.0010	0.0010		0.0013	0.0009	0.0010	0.0009
Median	0.0006	0.0006	0.0005	0.0005		0.0006	0.0006	0.0005	0.0005
Std. Dev.	0.0020	0.0014	0.0014	0.0017		0.0020	0.0010	0.0014	0.0012
Percentage change comparing with year (-1)									
Mean Change		-19.45% ***	-19.61% ***	-23.76% ***			-25.84% ***	-19.86% ***	-27.51% ***
Panel B: Estimates of Residual Variance (Industry Adjustment)									
Mean	6.0154	4.0887	4.4939	4.6872		5.3604	4.0088	4.2620	4.6972
Median	3.2967	2.6496	2.7373	2.4901		2.8064	2.4552	2.4541	2.6360
Std. Dev.	16.3967	4.5405	8.3282	10.7526		9.126893	5.232043	5.42875	10.35488
Percentage change comparing with year (-1)									
Mean Change		-32.03% ***	-25.29% ***	-22.08% ***			-25.21% ***	-20.49% ***	-12.37% **

Table 4: Variance over the 500-trading day period surrounding the merger announcement date for 1 year prior to and years 1 through 3 of both related merger and conglomerate merger. Industry adjustment is calculated by using the industry variance of same industry (at INDC level 4) of each firm at same period. Year relative to

acquisition -1 (pre-merger) variables are weighted by total assets of bidder and target. F-test of the equality of two variances is applied to examine the significance of changes in unsystematic risk. ***, ** and * indicate statistical significance of the f-statistic at the 0.01, 0.05 and 0.1 level respectively.

4.4 Changes in Earnings volatilities

We find a slightly significant increase in earnings volatilities in related mergers (at confidence level at 90%), however, the results of increased in earnings volatilities associated with conglomerate mergers is not significant that is reported in table 5. Doing Industry-adjusted, we find a significant reduction of 59.79% in earnings volatilities in related mergers (at 95% confidence) but the results reports a slightly significant earnings volatilities reduction in conglomerate mergers at confidence level of 90%. Even we find the significant reduction in earnings volatilities associated with related mergers comparing with other firms in the same industry, but the results are conflict. The results report almost 1 time increase in earnings volatilities due to related merger activities but when comparing with others, the results turn out that there are significant earnings volatilities reductions. Our results on changes in earnings volatilities are not economic significance. Since our model on earnings volatilities might be misspecified because of omitted some data, we interpret the results with caution.

According to the results, an insignificant in earnings volatilities increases in conglomerate mergers is inconsistent with what Lewellen, (1971) assert about the rationale behind conglomerate merger that conglomerate merger can reduce the earnings volatilities by pooling the income streams of unrelated businesses that supposing us to find a bold significant earnings volatilities reduction in conglomerate mergers. Our findings cast a doubt on the existence of income streams pooling by conglomerate merger as Lewellen, (1971) has addressed as the rationale behind conglomerate mergers. Our findings support that our hypothesis 4 cannot be hold.

Table 5
Descriptive statistics on the average differences in earnings volatilities

| | Related Merger | | Conglomerate | |
| | Year Relative to Acquisition | | Year Relative to Acquisition | |
	-1	+1	-1	+1
	363 Observations		*312 Observations*	
Panel A: Estimates of Earnings Volatilities				
Mean	0.9668	1.9359	0.8857	1.7603
Median	0.1567	0.1900	0.1328	0.1861
Std. Dev.	2.946916	5.682878	7.191492	8.914575
Percentage change comparing with year (-1)				
Mean Change		100.25% *		98.75%
Panel B: Estimates of Earnings Volatilities (Industry Adjustment)				
Mean	30.4971	12.2627	21.1412	15.1543
Median	3.4809	1.7965	2.4944	1.7263
Std. Dev.	127.737	33.28885	130.9621	108.3083
Percentage change comparing with year (-1)				
Mean Change		-59.7905% **		-28.3185% *

Table 5: Earnings Volatilities surrounding the merger announcement year for -3 to -1 year prior to and years +1 to +3 post of both related mergers and conglomerate mergers. There is likely to be data error then we eliminate those errors (30 firms of related mergers and 13 firms of conglomerate mergers). Table 9 in appendix B show that raw data before we eliminate the error firm data. Industry adjustment is calculated by using the industry Earnings Volatilities of same industry (at INDC level 4) of each firm

at same period. Year relative to acquisition -1 (pre-merger) variables are weighted by total assets of bidder and target. F-test of the equality of two variances is applied to examine the significance of changes in unsystematic risk. ***, ** and * indicate statistical significance of the f-statistic at the 0.01, 0.05 and 0.1 level respectively.

4.5 Changes in Debt capacity

We find a significant increase in median of financial leverage associated with related merger in the second year after merger announcement year[18]. But for the results of changes in financial leverage associated with related mergers in the first year are insignificant reduce while conglomerate mergers may increase their financial leverage in the following year after merger announcement year (at confidence level of 90%); the lag of merger announcement date and effective merger date is our explanation for this case. The merger firms may take time to complete the merger deal then they can increase their financial leverage after that. The results show that the median of leverage ratio increase associated with related mergers as well as conglomerate mergers.

Our findings provide empirical evidence that conglomerate mergers are not the only one type of mergers that appear to have more debt level in their capital structures than the others as Lewellen (1971) and Montgomery (1984) assert. The financial leverage represents the debt capacity as we have discussed above, the significant increases in financial leverage ratio can imply to the increases in debt capacity associated with related mergers.

Then our hypothesis 5 is still hold. We conclude that related mergers are likely to have an increase in debt capacity as well as conglomerate mergers.

Comparing with other firms in the same industry, we do not find any significant changes in financial leverage associated with merger activities (both of related mergers and conglomerate mergers). We get conflicting results on industry-adjusted changes in financial leverage. We can imply that industry might take impacts

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[18] With the high value of Jarque-bera that is reported in table 6, the distribution of financial leverage is not normal distribution. Then we decide to use median to compare the difference between pre- and post-merger activities instead of mean.

on financial leverage changes associated with merger activities. Ghosh and Jain (2000) also report the same when they do industry-adjustment that there are no significant changes associate with merger activities. We interpret the results with caution that there is weak evidence that financial leverage will be increased following merger activities. Our results are consistent with Berger and Ofek (1995). They report that there are no economic significant changes in financial leverage due to merger activities. They find just a small change in financial leverage due to merger activities.

Table 6
Descriptive statistics on the average differences in financial leverage

| | Related (391 Observations) | | | | Conglomerate (335 Observations) | | | |
| | Year Relative to Acquisition | | | | Year Relative to Acquisition | | | |
	-1	+1	+2	+3	-1	+1	+2	+3
Panel A: Estimates of Beta (Raw Values)								
Mean	0.2061	0.2199	0.2210	0.2217	0.1711	0.1921	0.1934	0.2036
Median	0.1703	0.1679	0.1781	0.1798	0.1407	0.1504	0.1569	0.1690
Std. Dev.	0.1819	0.1917	0.1883	0.1829	0.1438	0.1540	0.1590	0.1750
Jarque-Bera	58.8272	124.7939	97.5851	35.6606	224.7492	44.8817	202.0735	833.6287
Percentage change comparing with year (-1)								
Mean Change		6.66% **	7.22% **	7.54% **		-6.80% ***	-6.16% ***	-1.26% ***
Median Change		-1.40%	4.55% **	5.60% **		6.90% *	11.49% ***	20.14% ***
Panel B: Estimates of Beta (Industry adjustment)								
Mean	4.5400	8.0981	6.4262	5.1772	4.2249	7.8144	4.9165	3.4300
Median	1.1425	1.1229	1.1397	1.1100	1.0582	1.1164	1.0101	1.0483
Std. Dev.	15.7435	45.4429	46.9630	37.4603	23.0193	50.6393	29.3891	11.1956
Jarque-Bera	25486.95	90867.69	1218745.00	1244975.00	209853.30	163189.40	168150.20	20474.76
Percentage change comparing with year (-1)								
Mean Change		78.37% **	41.55%	14.03%		84.96% *	16.37%	-18.81%
Median Change		-1.71%	-0.24%	-2.85%		5.50%	-4.55%	-0.94%

Table 6: End year leverage ratio surrounding the merger announcement date for 1 year prior to and years 1 through 3 of both related mergers and conglomerate mergers.

Industry adjustment is calculated by using the industry median leverage ratio of other firms in the same industry (at INDC level 4) of each firm in the same year. Year relative

to acquisition -1 (pre-merger) variables are weighted by total assets of bidder and target. With high Jarque-Bera values, we consider to use median in order to compare systematic risk changes associated with merger activities instead of mean changes. T-test of mean equal to zero versus not equal to zero is applied to examine the significance of the changes in systematic risk. Wilcoxon signed-ranks test for the significance of the median difference. ***, ** and * indicate statistical significance of the t-statistic for two-tails test, and of Wilcoxon-statistic at the 0.01, 0.05 and 0.1 level respectively.

4.6 Market reaction

Table 7
Tests of the financial synergy
Total return (value-weighted average of acquirer return and target return cumulative excess return) as
Dependent Variable

Explanatory Variables	Predicted sign	Related			Conglomerate		
No. of Observations		391			335		
		Coefficient	Std. Error		Coefficient	Std. Error	
Constant		0.0113	0.0169		0.0403	0.0129	***
Lower Systematic risk Hypothesis							
Change in Beta	-	0.0040	0.0153		0.0551	0.0234	
Lower Unsystematic risk Hypothesis							
Change in Residual Variance	-	-6.0440	1.3806	***	1.5448	2.4930	
Lower Total risk Hypothesis							
Change in variance	-	3.1281	4.1525		-7.1267	23.3566	**
Debt Capacity Hypothesis							
Change in Leverage	+	0.0049	0.0464		0.0400	0.0591	
Lower Earnings Volatilities Hypothesis							
Change in Earnings Volatilities	-	-0.0005	0.0010		-0.0001	0.0011	
Controlled Variables:							
Relative Size	+	2.2719	4.1835	***	0.1201	13.1195	*
Size	+	0.0000	0.0000		0.0000	0.0000	
Market-to-Book	+	0.0011	0.0016		-0.0005	0.0002	
Cash (dummy)	+	0.0018	0.0118	**	0.0063	0.0108	*
Stock (dummy)	-	-0.0416	0.0112	***	0.0074	0.0120	
Y1991 (dummy)		0.0472	0.0549	**	-0.0208	0.0140	
Y1992 (dummy)		-0.0315	0.0567		-0.0209	0.0145	*
Y1993 (dummy)		-0.0867	0.0171	***	0.0029	0.0287	
Y1994 (dummy)		0.0575	0.0507		-0.0235	0.0271	
Y1995 (dummy)		0.0272	0.0283		-0.0037	0.0203	
Y1996 (dummy)		0.0194	0.0287		-0.0155	0.0238	
Y1997 (dummy)		-0.0248	0.0182		-0.0132	0.0181	
Y1998 (dummy)		-0.0165	0.0159		-0.0102	0.0203	
Y1999 (dummy)		0.0083	0.0178		-0.0266	0.0147	
Y2000 (dummy)		-0.0095	0.0212		-0.0299	0.0179	
Y2001 (dummy)		-0.0141	0.0206		-0.0556	0.0189	***
Y2002 (dummy)		0.0452	0.0309		-0.0079	0.0218	
Y2003 (dummy)		-0.0432	0.0198	**	-0.0358	0.0187	*
Y2004 (dummy)		-0.0144	0.0172		0.0081	0.0293	
R-squared (%)		34.42%			28.35%		
Adjusted R-squared (%)		29.76%			22.20%		
F-statistic		7.3920			4.6152		
Prob(F-statistic)		0.0000			0.0000		

Table 7: cross-sectional regression analyses of cumulative excess returns

The dependent variable is the three-day cumulative excess return measured using the market-adjusted model. Acquisition year and payment method are dummy variables. Changes in beta are the difference between post-merger beta and weighted average (by total asset) beta of target and bidder. Changes in residual variance are the difference between post-merger residual variance and weighted average (by total asset) residual variance of target and bidder. Changes in variance are the difference between post-merger variance and weighted average (by total asset) variance of target and bidder. Changes in financial leverage are the difference between total asset weighted average of bidder and target financial leverage in the end of y-1 and post-merger financial leverage in the end of y+1. Changes in earnings volatilities are the difference between post-merger variance and weighted average (by total asset) earnings volatilities of target and bidder. Relative size is the deal value divided by total asset value of bidder. Market-to-book ratio defined as market equity of bidder at the end of December of t-1 divided by book common equity of bidder for the fiscal year ending in calendar year t-1. Significance is based on White-adjusted standard errors with p-values reported beside each coefficient. The t-statistics is applied in testing the significance of each coefficient presented with ***, ** and * denoting statistical significance at the 0.01, 0.05 and 0.1 level respectively for a two-tails test. F-statistics shown at the end of the table for each merger type represents the result from jointly test of null hypothesis that each independent variable and each controlled variable are equal to zero.

According to our cross-sectional regression results, we find strong significant negative coefficient of changes in residual variance associated with related mergers that may be implied that market can capture the benefits from the reduction in unsystematic associated with related merger activities as we have expected. This also means that reduces in unsystematic risk will increase shareholders' wealth following related merger. However, we do not find any other significant relationship between market reaction and other risks reduction proxies (changes in systematic risk and changes in total risk) following related merger activities. For changes in leverage, results turn to opposite from our expectation to see positive sign on it because

shareholders can be better off if there is an additional debt capacity associated with related merger because shareholders will enhance their wealth through an expropriation of wealth from bondholders by increasing financial leverage (Kim et al, 1977) but the result of negative coefficient of change in leverage is not significant. For controlled variables, we find significant positive relationship between relative size and market reaction that is consistent with Asquith et al. (1983). And we also find significant positive relationship between cash payment acquisition and market reaction as same as Heron et al. (2002) and also negative relationship with stock payment as well. According to our results, we can conclude that only unsystematic risk reduction associated with related merger will increase shareholders' wealth, moreover, relative size and cash payment also affect positively to shareholders' wealth. Hence, we can say that related mergers can increase shareholders' wealth by reducing unsystematic risk, on the other word, the results provide the empirical evidence that financial synergy could be achieved by related mergers. Operational synergy associated with related mergers is our theoretical link of how related mergers achieve financial synergy.

Even the results show a significant negative sign of coefficient of change in variance associated with conglomerate merger activities as we have expected that means market can realize the benefits from the reduction of total risk associated with conglomerate merger. However, the results of insignificant changes in unsystematic risk and market reaction turn out opposite from what literature addresses that only conglomerate can reduce unsystematic risk by pooling incomes stream, which lead to financial synergy (Lewellen, 1971) supposing us to find the significant negative relationship between market reaction and changes in unsystematic risk. For change in leverage and change in earnings volatilities, the results are insignificant. From our

standpoint of view, it is likely to say that the decrease in total risk suggests the large increase in shareholders' wealth (coefficient of 7.1267).

Chapter V

Conclusions and Areas for Future Research

5.1 Conclusion

This research tried to examine the existence of financial synergy in related mergers. Despite we find significant results in systematic risk increase associated with related mergers that is inconsistent with Subrahmanyam et al (1980) and Moyer et al (1983), we still find the economic and statistical significant results of residual risk reductions, total risk reductions, and a weak evidence on increases in financial leverage ratio (represent debt capacity) that indicate the existence of financial synergy. Our results from related merger are also consistent with the results from conglomerate merger that can be implied that related mergers are likely to achieve risk reductions.

However, the cross-sectional results show us that only unsystematic risk reduction can affect shareholders' wealth significantly (for related mergers). Therefore, we may conclude that the unsystematic risk reduction associated with related mergers brings the increase in shareholders' wealth that represents financial synergy. Comparing with conglomerate merger, total risk reduction takes the impact to shareholders' wealth increasing. The results of market reaction on our financial synergy proxies are inconsistent with the literature (i.e. Lewellen (1971), Han Kim et al (1977) and Scott (1977)) that addresses financial synergy as the unique rationale behind conglomerate acquisitions supposing us to capture a significant negative relationship between market reaction and changes in unsystematic risk.

In conclusion, our research provides empirical evidence of risks reduction in both related mergers and conglomerate mergers. However, market reacts positively to only unsystematic risk reduction following related merger. Unsystematic risk

reduction following related mergers may bring an increase in shareholders' wealth that we can imply as a financial synergy achievement associated with related merger. Therefore, we can answer our research question that financial synergy can be also achieved by related mergers. The findings of this research are inconsistent with what Lewellen (1971) have addressed that financial synergy is a unique rationale behind conglomerate merger.

Future Research Area

The results show that both of related merger and conglomerate merger can achieve financial synergy, therefore, the type of merger cannot be used to determine the achievement of financial synergy. From the standpoint of future research, the results suggest a need of investigation on what factor or characteristic of the merger activities that leads to financial synergy. Knowing the characteristic that lead to the financial synergy, we can bring benefit knowledge to academic and business world.

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APPENDIX

Appendix A: Sample reported by Industry

Table 8

Sample Industry

This table reports the number of sample firms in each industry.

	Related Mergers		Conglomerate Mergers	
Aero/Defence	7	1.79%	15	4.48%
Alt. Energy	0	0.00%	0	0.00%
Auto & Parts	1	0.26%	2	0.60%
Banks	56	14.32%	47	14.03%
Beverages	2	0.51%	0	0.00%
Chemicals	2	0.51%	4	1.19%
Con & Mat	2	0.51%	3	0.90%
Electricity	5	1.28%	5	1.49%
Eltro/ElecEq	6	1.53%	15	4.48%
Fd& Drug Rtl	7	1.79%	8	2.39%
Financial Svs(4)	8	2.05%	4	1.19%
Fd Producers	2	0.51%	3	0.90%
Forestry & Pap	2	0.51%	1	0.30%
General Inds	2	0.51%	8	2.39%
Gen Retailers	20	5.12%	11	3.28%
Gs/Wt/MulUtil	5	1.28%	2	0.60%
H/C Eq&Svs	23	5.88%	18	5.37%
H/H Gds,Home Con	8	2.05%	9	2.69%
Inds Eng	4	1.02%	9	2.69%
Ind. Met & Mines	4	1.02%	6	1.79%
IndsTranspt	3	0.77%	7	2.09%
Leisure Gds	0	0.00%	1	0.30%
Life Insurance	1	0.26%	0	0.00%
Media	11	2.81%	9	2.69%
Mining	1	0.26%	0	0.00%
Nonlife Insur	6	1.53%	10	2.99%
Oil/EqSvs/Dst	6	1.53%	10	2.99%
Oil & Gas Prod	29	7.42%	5	1.49%
Personal Goods	2	0.51%	7	2.09%
Pharm& Bio	17	4.35%	15	4.48%
REITs	33	8.44%	7	2.09%
Real EstInv,Svs	0	0.00%	0	0.00%
S/W & Comp Svs	46	11.76%	17	5.07%
Support Svs	12	3.07%	18	5.37%
Tch H/W &Eq	30	7.67%	39	11.64%
Fxd Line T/Cm	10	2.56%	2	0.60%
Mobile T/Cm	3	0.77%	1	0.30%
Tobacco	0	0.00%	1	0.30%
Travel & Leis	15	3.84%	16	4.78%
Total	391	1	335	1

Appendix B: Table 9:

Table 9

Descriptive Statistic - Earnings Volatilities before eliminating error data (Related Mergers)

Panel A: Related Mergers

	Earnings Volatilities (-1)	Earnings Volatilities (+1)	Earnings Volatilities (-1) Industry-Adjusted	Earnings Volatilities (+1) Industry-Adjusted
Mean	129.9467	1006.1940	2992.6290	6203.5740
Median	0.1982	0.2155	3.7282	1.9293
Maximum	20315.3700	122635.8000	701059.6000	741842.4000
Minimum	0.0011	0.0004	0.0192	0.0026
Std. Dev.	1475.2830	9314.7660	39657.7800	56410.1700
Skewness	12.2344	10.1873	15.7167	9.8484
Kurtosis	155.3925	113.3314	261.9527	106.2390
Jarque-Bera	387110.5000	204557.4000	1105724.0000	179501.6000
Probability	0.0000	0.0000	0.0000	0.0000
Sum	50679.2200	392415.5000	1167125.0000	2419394.0000
Sum Sq. Dev.	847000000.0000	33800000000.0000	612000000000.0000	1240000000000.0000
Observations	391	391	391	391

Panel B: Conglomerate Mergers

	Earnings Volatilities (-1)	Earnings Volatilities (+1)	Earnings Volatilities (-1) Industry-Adjusted	Earnings Volatilities (+1) Industry-Adjusted
Mean	9124.8110	38217.4400	23686.17	19920.53
Median	0.1541	0.2221	2.816354	2.097093
Maximum	805181.3000	5736036.0000	2430858	1859673
Minimum	0.0005	0.0001	0.01299	0.000609
Std. Dev.	76820.6100	443706.8000	187786.9	168589.7
Skewness	8.9223	12.7030	9.330491	9.647141
Kurtosis	83.8503	163.3215	100.2672	98.4909
Jarque-Bera	95687.1000	367780.2000	136919.3	132475.5
Probability	0.0000	0.0000	0	0
Sum	3056812.0000	12802842.0000	7934867	6673378
Sum Sq. Dev.	1970000000000.0000	65800000000000.0000	1.18E+13	9.49E+12
Observations	335	335	335	335

BIOGRAPHY

Mr. Sakayong Pattanavekin was born in November 5, 1984 in Suratthani, Thailand. At the secondary school, he graduated from Suratthani School. In 2001, he got a scholarship from AFS program to be an exchange student at Seto High School, Aichi Prefecture, Japan. At the undergraduate level, he graduated from the Faculty of Economics, Thammasat University in Mar 2007, majoring in Industrial Economics. He joined the Master of Science in Finance Program, Chulalongkorn University in June 2007.