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**Empirical Analysis on Multiple Mergers
of US Banks**

Master Thesis

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Abstract

We use logistic analysis to predict the probability of making non-programmed merger in a data sample of 45 US banks. Non-programmed merger is the merger that happens next to the subject merger but has at least three years apart from the subject merger. We apply logistic regression of the occurrence of the non-programmed merger on main characteristics of the subject merger. We first examine the effects of each of three explanatory variables, which are firstly abnormal return around the approved date, secondly hubris management hidden in the subject merger, and thirdly the value of asset acquired, on the dependent variable. We then try to find the best prediction model by controlling some variables both confounding and rescaling. Our final prediction model shows that the probability of making a next merger at least three year after the subject merger will significantly decrease if there is abnormal return realized in the subject merger. On the other hand, using event study methodology to search for the abnormal return of the acquirer's stock price around the approved date, we prove that the information of FDIC s' merger decision is not totally confidential to public and has significant impact on the stock price of the acquirer.

Declaration of Authorship

The author hereby declares that she compiled this thesis independently, using only the listed resources and literature.

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Prague, May 17, 2012

Signature

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THESIS PROPOSAL

Author Le Thi Hong Minh
Supervisor Jiří Novák Ph.D
Proposed topic *Empirical Analysis of Multiple Mergers in US Banks*

Topic characteristics In this thesis, we use logistic analysis to predict the probability of making non-programmed merger in a data sample of 45 US banks. Non-programmed merger is the merger that happens next to the subject merger but has at least three years apart from the subject merger. We apply logistic regression of the occurrence of the non-programmed merger on main characteristics of the subject merger. We first examine the effects of each of three explanatory variables, which are firstly abnormal return around the approved date, secondly hubris management hidden in the subject merger, and thirdly the value of asset acquired, on the dependent variable. We then try to find the best prediction model by controlling some variables both confounding and rescaling. Our final prediction model shows that the probability of making a next merger at least three year after the subject merger will significantly decrease if there is abnormal return realized in the subject merger. On the other hand, using event study methodology to search for the abnormal return of the acquirer's stock price around the approved date, we prove that the information of FDIC s' merger decision is not totally confidential to public and has significant impact on the stock price of the acquirer..

Hypotheses

1. The abnormal return around the approved date of the current merger is significant predictor of the probability of making a next merger after at least three years from the current merger.
2. The management hubris associated in the current merger is significant correlated to the probability of making a next merger after at least three years from the current merger.
3. The value of asset acquired is significant predictor of the probability of making a next merger after at least three years from the current merger.

Methodology In testing the hypotheses, I will use event study to search for abnormal return around the approve date. We then apply to logistic regression and control

variable to find a best model of prediction. The research is based on data financial reports of the banks and official public information.

Outline

1. Introduction
2. Literature Review
3. Hypotheses
4. Methodology
5. Empirical Analysis
6. Conclusion

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ACRONYMS

AA	Asset Acquired
AR	Abnormal Return
APE	Average Partial Effects
BHRA	Buy-and-Hold Return
CAR	Cumulative Abnormal Return
AAR	Average Abnormal Return
FDIC	Federal Deposit Insurance Corporation
HUBRIS	Management Hubris
M&A	Mergers and Acquisitions
PMI	Post-Merger Integration
TA	Total Assets of the Acquirer

1. INTRODUCTION

Mergers and Acquisitions (M&A) is not a new but still the most prominent phenomenon which has attracted hundreds of global researchers and analysts in the field of finance, business or financial economics. M&A was initially triggered in US in early twentieth century and recently enter to almost big economies in the world. Many academic studies, discussions and international conferences have been debating on the economic profits of M&A. Some state that M&A is the superior method of development by acquiring competitors and helps acquirer becoming bigger and stronger firm; or purely defensive strategy (Jones, Critchfield 2006). Besides, some argue that M&A can ruin the competitive market by granting more market power to the successful acquirer thus deteriorate the health of the whole economy (Berger, Demsetz and Strahan, 1999). In different point of views, every argument has its own reasonable explanation. M&A is still growing as a popular trend and happens every day in every economy even though the world economy is experiencing turmoil and crises.

In this thesis, we focus our analysis on the mergers of US banking industry. The US banking industry has experienced many merger waves since 1900s. The long history of US banks merger has brought plenty of information and data to academic research fields of economics and finance. Most studies focus on single merger and investigate the characteristics of individual merger. However, studying on single merger might not produce comprehensive knowledge of US bank mergers and acquisitions. Statistical evidence based on annual reports of the Federal Deposit Insurance Corporation (FDIC), the main institution for monitoring US bank mergers, shows that 80% of US banks make multiple mergers from 2000 to 2010. Many US banks have multiple mergers in a single year or in a longer time interval. There are mainly two points of view on the manner of multiple mergers. On the narrow view of individual merger transaction, the typical assumption of multiple mergers is that each merger event is identical and equivalent in occurrence order and wealth effects of transaction. There are many objections on this point of view both based on theoretical and empirical background. The objections are

also complemented by studies on multiple mergers. Although studies on multiple mergers are limited and not extensive, they strongly show that multiple mergers are not simply the combination of separate individual merger but highly interconnected.

The connection of single merger to multiple mergers has been studied mostly in the field of multiple programming mergers (Cohen-Cole and Kraninger (2007), Klemmer, Kengelbach, Schwetzler and Sperling (2011)). Multiple programming mergers are multiple mergers occur in consecutive years. This manner is also called as planned merger program. There can be explanations for the occurrence of programming multiple mergers such as the aim of gaining efficiency or market power, or simply the overconfidence of the management. As we observe from the database US bank mergers from 2000 to 2010 which have been recorded by Federal Deposit Insurance Corporation, four fifth of the banks have multiple mergers. Programming multiple mergers appear mostly in early 2000s, while there are another kind of multiple mergers which we name as non-programmed multiple mergers. This kind of merger does not occur in consecutive years, it has some interrupted years between individual mergers, apart at least three year between two mergers. We are interested in investigation any connection in the non-programmed multiple mergers. Should the later merger be influenced by the previous merger? If in the programming merger, the subsequent merger is programmed to happen right after the previous merger no matter what happen on the previous merger, thus in the non-programmed merger, is the occurrence of subsequent merger affected by the previous merger? Can we predict the probability of subsequent merger using the information in the former merger in the case of non-programmed multiple mergers? We investigate this question by using logistic analysis to construct a model of prediction. We found that abnormal return of the previous merger is a significant predictor of the occurrence of the subsequence merger. Our finding is complemented to Cohen-Cole & Kraninger (2007) that multiple bank mergers are rational foresight.

The most different contribution of our study is that we do not examine the abnormal return on the announcement date; we use the approval date made by FDIC. Since 1960,

The Bank Merger Act of 1960 has assigned roles in merger applications to the FDIC. Federal Deposit Insurance Act was amended to require the approval of the FDIC for all mergers and consolidations between insured and noninsured banks. A US bank which want to acquire a target, must submit its merger request to FDIC for approval. FDIC then assesses the proposal and decides to approve or not. How does FDIC play an important role in US bank mergers? This important role can be justified by analyzing on the effect of FDIC decision on the requested bank. We assume that on the day of approval made by FDIC, the market reaction on the information can affect the stock price of the requested bank for an up-coming merger. In this thesis we use event study to examine the effect of FDIC merger decision on the stock price of the requested bank around the approval date. We found that FDIC's merger decision does impact on the stock price of the acquirer around the approval date by realizing significant abnormal return. This finding reveals the market expectations of the forthcoming merger. We then question on the reliability of the previous studies of the wealth effect of the merger to the acquirer and the target when they accounted only the effect of the merger on the announcement date. The problem is that, since some participants have already known the merger will happen, just soon or late does matter, the speculators might manipulate the stock price of both involved party which seriously distort the market reaction before the merger is officially announced.

In order to construct our prediction model, together with the realized abnormal return around the approval date, other two components of the previous merger as management hubris and the value of asset acquired are applied to the logistic regression to construct a prediction model of the probability of subsequent merger s' occurrence. When regress each explanatory variable on the dependent variable - probability of making a next merger at least 3 years afterward, we found both abnormal return and hubris have significant coefficient. When controlling for a set of variables associated with the characteristics of the subject merger, we found that the coefficient of abnormal return is strongly affected by the total assets of the acquirer. Our final model shows that the probability of making a next merger at least 3 years after the current merger is decreased

by 31.87% if there is abnormal return realized in the current merger. Our prediction model also has quite high of prediction power which matched nearly 80% of the deals.

The thesis is structured as follows: section 2 is literature review of bank M&A and multiple bank mergers; Hypotheses are comprehensively proposed in section 3; section 4 describe database and our main methodology used to test the Hypotheses; section 5 is the empirical results; section 6 is the conclusion of our main works.

2. LITERATURE REVIEW

In this section, there are three main parts. Firstly, we will briefly revise some significant findings on the literature of the determinants of merge wave in general. Next, we will focus on the driving forces and motivations of bank mergers and acquisitions. Final part is the most important source of our interest in multiple bank mergers.

2.1 Determinant Effects of Mergers and Acquisitions

The possibly most compelling theory of merger waves bases on the technological connection between firms and the same industry. Back to Coase (1937) who suggested that increasing scale *technological change* is an important driver of merger activity. According to Jensen (1993), the parallels between merger activity and the technological innovations drive the great industrial revolutions of the two latest centuries. Gort (1969) and Jovanovic and Rousseau (2002) based on the valuation discrepancies and Tobin s' Q to relate technology to resource reallocations. Rhodes-Kropf and Robinson (2008) argued a theory where bidders and targets match up based on the degree of their complementary resources.

There are numbers of researches focus on *the industry-clustering* of mergers. According to Andrade and Stafford (2004), mergers play both an expansionary and a contractionary role in the industry restructurings. They found evidence of excess capacity during the 1970s and 1980s which tended to drive industry consolidation though mergers, while peak capacity triggered industry expansion through non-merger investment (or internal expansion). Maksimovic and Phillips (2001) use performance improvements at the plant level to support the neoclassical reallocation theory of merger waves.

Regarding the main factors driving industry consolidation, five reasons can be intuitively identified as mostly accounted to the rapid trend of bank mergers – the regulatory deregulation, technological innovations, improvement in financial basements, and excessive capacity in the industry or market due to the growing demand, produce restrictions.

Amongst the main driving forces of the mergers and acquisitions activities in banking industry, *regulatory changes* have had an important influence on the merger waves. The event of Riegle-Neal, this was claimed to not only explanation for the unprecedented large number of merger and acquisitions in late 1990s, still is the perfect example of deregulatory trend.

The fact the merger waves are correlated with *economic expansions* (Andrade and Stafford (2004)) and *high stock market valuations* has also urged the development of studies on which merger waves result from the market overvaluation and managerial timing. Thus the bull markets more likely lead bidders or acquirers with overvalued stock as currency to acquire the assets of undervalued (or less overvalued) targets or acquired. According to Shleifer and Vishny (2003), target managements accept overpriced bidder stock as they are assumed to have a short time horizon, while in Rhodes-Kropf and Viswanathan (2004) overvalued bidders are more likely to make a takeover during market peaks because the synergies are overvalued during these periods. Thus the bidders or acquirers are more likely to take over the targets by selling their overpriced stocks. That phenomena partially explain for the post-merger underperformance of the acquirer or bidders when the market gradually corrects its overvaluation of the merged firm s' shares after the merge. Rhodes-Kropf, Robinson and Viswanathan (2005), Ang and Cheng (2006) and Dong, Hirshleifer, Richardson and Teoh (2006) found that merger waves coincide with high market-to-book ratio based on the argument that the market overvaluation is reliably explained by the market to book ratios and that investor missed-estimation tend to drive the merger waves.

When a firm announces a merger or acquisition deal, there might be substantial uncertainty in the market about the effect of the deal, including the concerning of synergy effect. According to Moeller, Schlingemann, and Stulz, 2007; Officer, Poulsen, and Stegemoller, 2007, asymmetric information regarding the benefits of the deal may cause acquirer stockholders to react improperly even to positive net present value deal announcements because they are still confused of the “good” or “bad” deal. Thus, the

managers of acquirer may use voluntary synergy disclosures as a signal to alleviate shareholder concerns about the value of the transaction.

Regarding the payment method of a takeover, there are generally three common methods: all-cash, all-stock, and cash-stock. Yook (2003) found greater bidder gains in all-cash offers when the takeover causes downgrading of the merged firm's debt due to the increase in leverage. Schlingemann (2004) argued that, after controlling for the payment method, financing decision during the year before the merge play an important role in explaining the bidder gains. Thus the debt financing for a merge is not significantly factor of the merger gains. Notably, Toffanin (2005) found that the well-know positive market reaction to all-cash bid requires the cash to have been financed either using internal funds as retained earnings or borrowing.

2.2 Literature review of Bank M&A Motivations

There is a long and thorough literature on why banks merge (Hereafter, we use “mergers” for shortening “mergers and acquisitions”). Generally, there are two kinds of motivation in bank mergers which are *value maximization* and *non-value maximization*. The maximizing value is primarily to shareholders' value, while the later is due to the agency problem which arises from the management hubris.

According to the most comprehensive study of bank mergers, Berger, Demsetz and Strahan (1999), value may be maximized through M&A primarily by increasing the market power in setting prices or by improving their efficiency. Perhaps the most prominent lines of thought relate merger decision-making to potential efficiency gains and to market power. Contradictory, management hubris is usually accounted for the managers' private benefits when making mergers decisions. Grinstein and Hribar (2004) found evidence that merger bonuses for managers are accounted for managerial power but not to the merger deal performance. So managers may have thoughtless to approve negative NPV mergers, as long as the mergers do not have serious detriment to the bank s' shareholders, to acquire personal compensations.

2.2.1 Efficiency motive of Bank Mergers and Acquisitions

Cohen-Cole and Kraninger (2007) suggest that the efficiency motivation for mergers can be divided into three categories: *economies of scale*, *economies of scope*, and *managerial effectiveness*. There are many studies on economies of scale and scope which lead to mix results. Some find no economies of scale and scope, while few others find a significant increase in cost economies with particularly megamergers in U.S banks. Regarding the managerial efficacy, it is reluctant to be categorized as value-maximizing motivation or non-value maximization in related to the agency problem.

2.2.1.1 Studies on scale and scope efficiency

Berger (1987) showed that cost economies of scale only exist for relatively small banks. One possible explanation is that by offering a wider range of financial product and services, large bank can capture higher market share. Again, many studies after that lead to the insignificant change in cost performance of bank mergers (Rhoades 1986, Srinivasin 1992, Berger and Humphrey (1991). Recently, more applicable data from 1990s found that there were more notable scale and scope efficiency achieved from bank mergers. Berger and Mester (1997) found the substantial cost scale economies on the order of about one-fifth of costs, for bank sizes over \$10 billion in assets. Relating to the contradiction of results, Akhavein and Berger (1999) argued that there are problems if using simple cost ratio in measuring the cost efficiency of bank mergers. The problem lied in the fact that output is taken as exogenous variable and the revenue effects on the cost performance are not considered and there is no way to solve from cost analysis separately whether the cost changes are greater than or less than the revenue performs. Base on this argument, Akhanvein and Berger (1999) had proven using profit function to find out the significant cost efficiency of “mega-bank” mergers. However, the data on mega banks were not pursuable to draw solid conclusions, but the evidences for cost efficiency or at least little or no losses from bank mergers appears to be greater overtime. According to Berger, Demsetz and Strahan (1999), this change may in part reflect technological progress and regulatory changes.

Berger, Demsetz and Strahan (1999) conclude that bank mergers also improve efficiency by diversifying the riskiness in the better conditions of a larger scale, a wider geographical spread of risks, a wide range of mix and complement products and services. Additionally, Milbourn, Boot and Thakor (1999) suggest that in the long term diversification from the bank mergers may also improve efficiency through the increasing in the management effectiveness. McAllister and McManus (1993) empirically studied on data of bank loans proved a significant decrease in the volatility of loan riskiness. Under macroeconomic cost of bank capital and liquidity requirements Roger, Jan (2011) suggests bank can reduce risky assets by shifting the composition portfolio towards less risky assets. Loretta (2005) suggest that merger motive by better diversification which is consistent to Benston, Hunter & Wall (1995) finding of US banks that bidders often bid more for the targets when they consider the significant achievement of diversification of the merger.

In addition, the objective of accessing to the financial asset safety net through consolidation is also remarkable motives for bank mergers. According to Berger, Demsetz and Strahan (1999), if financial institutions perceive to be “too big to fail”- that explicit or implicit government guarantees will protect debt holders or share holders of these organizations. Thus, merger may be driven by the incentives to increase the asset size, the shares' value, and lower the cost of funding (Sauders and Wilson (1999)). However, the financial crisis in 2007 which was turned out from U.S banking system has proved this motivation of to be “Too big to fail” less nontrivial.

2.2.1.2 Synergy effect of Bank Mergers and Acquisitions

To sum up, there are several motives that banks evolve in mergers and acquisitions. Generally “SYNERGY” is one the most common motives. From the efficiency theory of banks mergers we have mentioned, two types of synergies which are corresponding to efficiency theory are operating and financial synergy. Thus, the operating synergy includes both economies of scale and economies of scope. Milbourn, Boot and Thakor (1999) has attempted to answer the question of why banks currently are so interested in

strengthening their bank size and their scope of activities. One possible answer is that banking industry is getting more competitive, thus banks need to improve their cost efficiencies to compete more effectively by enlarging the scale to exploit economies of scale. Additionally, the competition in a given period squeezes margins making banks to look for other sources of profitability, especially in traditional commercial banking. Expanding scope means banks can offer a greater diversified products and services under a single brand.

Financial synergy is more applicable and questionable for bank mergers and acquisitions. It implies that the impact of a merge on the cost of capital to both acquirers and the merged partners should be lowered if financial synergy exists in that combination.

Relating the managerial synergy forecasts, Houston, James and Ryngaert (2001) reported a positive stock price impact of projected synergy estimates for large bank mergers during the period from 1985 to 1996. Extensively, Dutordoir, Roosenboom and Vascelos (2010) found that more than 50% of the acquiring firms' projected synergies are smaller than the takeover premium. This indicates that acquirer management's concern for the litigation costs associated with overestimating synergy. That offsetting cost is possibly the main explanation of why not all firms choose to engage in voluntary synergy disclosure.

2.2.1.3 Studies on Managerial Motives

Simply, the managerial efficacy motivation as dictated by Cohen-Cole and Kranninger (2007) that superior management can create value by acquiring the assets of poorly managed institutions. Since the inferior management could not realize the bank's true inherent worth, the bank was perpetually undervalued. A plausible story, this explanation is very difficult to prove or disprove empirically.

Existing discussion of managerial motives generally center on empire building. By increasing bank assets through consolidation, CEOs can often increase their personal compensation dramatically. Managerial hubris is an agency issue which is difficult to be

controlled or detected. A well-known study of agency problem which represents for firm takeover strategy at the managerial interest is Jensen (1986). The theory implies managers of firms with unused borrowing power and large free cash flows are more likely to undertake low-benefit or even value-destroying mergers. Thus, free cash flow theory implies the value of shareholders of either mergers or takeovers are more likely to be detrimental, rather than to create values. Acquisitions are one way managers spend cash instead of paying it out to shareholders. Therefore, while Roll (1986) pointed out that mergers can be legitimized by efficient management taking over inefficient management; the hubris hypothesis is that the optimism of managers leads to incorrect beliefs about their own abilities.

There are many discussion of the managerial efficacy of mergers and acquisitions and I will not rehearse here. However, bank mergers may experience something different than non-financial sectors. Cheng, Gup, and Wall (1989) note that bank mergers are quite different than nonbank mergers because of the regulatory process involved. Before a bank merger can occur, prior approval from one of the three federal bank regulatory authorities and approval at the state level are required. If an approval is granted, there is a waiting period in which the merger is examined. A total of four months may pass before the merger is approved by the government. Therefore, managerial motives or hubris are too difficult to exist in banking industry as a rational motivation of M&As.

2.2.2 Market power motive of bank M&As.

Bank Mergers and Acquisitions that have significant local market overlap may increase local market power and allow the consolidated bank to raise profits by setting prices favorable to it. This could affect interest rate and fees on retail business especially on local market. Thus internal market merges are more likely to gain market power than external market merger (or cross-border merges). Also supporting this presumption are the findings of VanderVennet (1997) that about half of the U.S bank mergers are internal market and many European bank M&As are in this type as well. However, the Antitrust Law of financial industry restricts the likeliness of the merger which might increase the

non-competitive environment for others. Consequently, the gain in market power from bank mergers can only be realized if it is within an acceptable level.

Similarly, while the theory behind market power enhancing profitability is straightforward, empirical analyses have shown unclear results from increased concentration. Berger and Hannan (1989) and Hannan (1991) demonstrate that local loan rates often increase alongside decreasing deposit rates following mergers that boost market share, thus banks with market power gain more profitably by widening their spreads and fees. Choice of control variables on both the demand and supply side drive these conflicting conclusions. This highlights the difficulty of separately identifying market power and efficiency effects. Nevertheless, Berger, Demsetz and Strahan (1999) suggest some reasons to suspect that market power may have declined due to the two following reasons. First, since the removal of geographic restrictions on banking organization, there may be increasing entry that allows existing institutions to enter more easily more objective local markets. Moreover, the development of financial innovations and the financial infrastructure may also have made local markets more accessible. The empirical evidence on the mergers' gain of market power is mixed. As Hannan (1997) and Radecki (1998), Hannan (1998) show the relationship between local market concentration and deposit rate seems to have less prevailed in the 1990s, although the retail loan pricing of banks in a concentrated market which study in Cysnak and Hannan (1998) still appears to be strong.

Despite the findings of market power in product pricing, some literature like Berger (1995), Maudos (1996), Berger and Hannan (1997) found quite small effects of concentration on bank profit, especially after statistical controls for efficiency were included in the analyses. Similarly, the banks that were found to have persistently higher profitability relative to the industry generally were those neither with high market power nor with the strict barriers to entry, as shown in Berger, Bonime, Covitz and Hancock (1998). One possible explanation given by Berger and Hannan (1998) is that market power may have a much greater effect on pricing power than on profits. Eventually,

mergers lead to increasing revenue but not in profitability if the merger is undertaken by weak management skill. Akhanvein, Berger and Humphrey (1997) although this study did not work on measuring market power through bank mergers, found very small changes in pricing strategy and much larger efficiency changes among large U.S banking institutions. The reason leads to mixed result of efficiency of raising market power through consolidation is the issue of statistical controlled for efficiency. Unless the efficiency is controlled for, effects of market power of bank mergers on prices or profits will not be distinguished and is the composition effect of market power and efficiency.

Regarding the profit efficiency of bank mergers, normal profitability ratios such as the return on assets and equities (ROA, ROE) are used to measure the effect of M&As by comparing both before and after M&As relative to peer groups in the industry that did not engage in M&As. Rhoades(1998) found improved profitability ratios associated with M&As, while others Srinivasin (1992), Srinivasin and Wall (1992), Akhavein, Berger and Humphrey (1997), found no improvement in these ratios. There is a problem with these ratios that the combination of both performance changes in market power and changes in efficiency appear then lead to unable disentangling separately. These studies may be biased in the coefficients of mergers' benefits. And the use of the cost or profitability ratios also does not account for the fact that some product mixes cost more to produce than others.

Theoretically, there are benefits associating to a bank merger such as market power, diversification, economies to scale and scope, managerial efficiency and access to asset safety net. However, empirical results are mixed whether bank mergers always profitable given some controlling variables to measure the profitability gaining from consolidations. Eventually, it cannot be deniable that consolidation in financial industry is inevitable in the development of firm and industry level conditions.

2.3 Multiple Bank Merges

We define multiple bank merges as repeating mergers or acquisitions by one acquirer. The target can be the same or different in each merge deal. There are few studies examining on the manner of bank repeating mergers which can only explained by a planning-program mergers. We will add to this literature field the non-programmed multiple bank merges and examine how the decision making of subsequent merger is affected by the previous merger.

It is clear that a successful merge bring benefits for the acquirer or bidder even though empirical evidences are mixed. This is possibly explained by the fact that, each decision making in a merge deal is conducted to attain the main objective of the manager, thus there are no universal standards for a successful merge. Some found neither profitable nor cost efficiency at all for the almost acquirers, however we still see that banks have attempted to repeat the mergers and acquisitions for many times. What is the reason behind the manner? Rosen (2004) argued that most of firms do merger program. And he considered that the mergers to be programmed if the next merge happens within the two years after the previous merge. He also found that programming-mergers mostly benefit the managers with growing compensation during the program. Thus there can be another explanation of why firms keep repeating mergers although they did not success in the previous times. Rosen (2004) also asserted that acquisitions under program are likely to be worse than non-programmed acquisitions and may destroy acquiring firm value which is consistent to the management hubris claim in merger decision making in Roll (1986).

Regarding the evolution of a merge program, the evidence is not extensive and mixed. According to Asquith (1983), there was no significant difference among the CARs for the first four programmed-mergers while Fuller (2002) found the first acquisition has a higher CAR than the fifth and the following acquisitions. Taking more advantages than the previous studies by examining both the CARs and the post-announcement return as the buy-and-hold return (BHRA), Rosen (2004) found that BHRA generally has a positive mean but a negative median which implies that the median acquirer s'

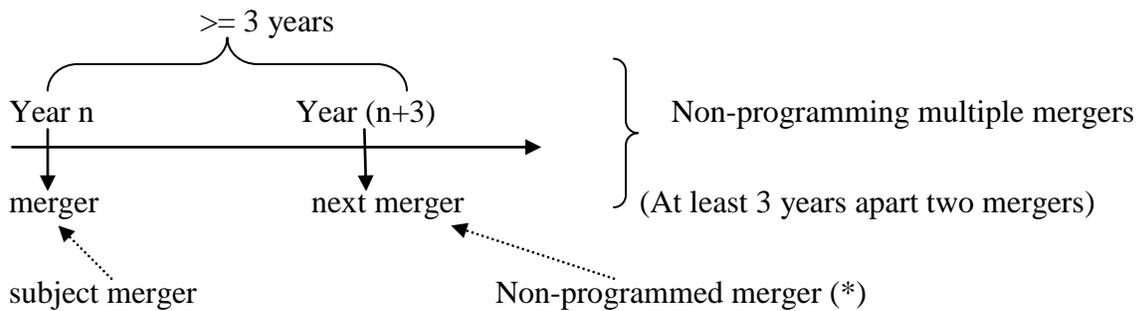
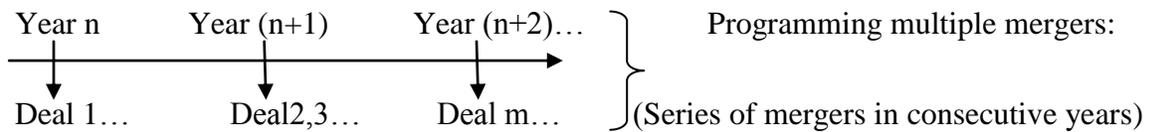
shareholders gain nothing remarkable. He also found that the CAR and BHRA of firms with merger program is significantly larger than other with one-off mergers. Rosen found some evidences suggesting that a subsequent acquisition is more likely if the post-merger performance was not necessarily strong enough, but when controlling for the firm strength, firms where CEOs get excessive compensation in a merger program are the reason more likely to make future acquisitions. It again supports that programmed-mergers are more likely motivated by managerial motivation rather than the shareholders' value-maximized motivation.

There is few studies focus on gains of firms that make multiple acquisitions. According to Schipper and Thompson (1983) find that on the average, the effect of announcements generates a positive cumulative abnormal return – CAR and changes in regulation which reduce the value of future mergers affect negatively on firms with programmed-mergers. This implies future merger activity is partially priced by the market which is somehow consistent to the findings of Asquith (1983) and Malatesta and Thompson (1985) that the market does not fully price future mergers. Our main interest in this framework extends to the non-programming mergers by looking at how previous merge deal affects the decision-making of the sequential of mergers. Similar to the argument of market pricing participant, we will analysis on the market reaction (AR) as part of effects of previous merge deal to the probability of the following merge.

Based on the findings of Rosen (2004) that the consequences of consecutive acquisitions might differ remarkably from those of single merge and when a firm acquires multiple targets, the early acquisitions the higher market return, Cohen-Cole and Kraninger (2007) applied similar assumption on multiple bank mergers to examine a farsighted merger program. Exploring on the multi-stage search model of the long term merger planning, Cohen-Cole and Kraninger (2007) found that long-term merger programs will more likely pay a larger acquisition premium than those with no future plans.

Doukas and Petmezas (2006) argue that management hubris as overconfident managers leads to the multiple acquisitions engagement because the manager believe that such

serial investment are most for the interest of shareholders than “rational” managers do. To examine the overconfident managers in relation with the shareholders’ wealth through acquisition, Doukas and Petmenzas (2006) used managers’ acquisitiveness (i.e propensity to acquire targets) within a short time as a proxy of overconfidence. Their overconfidence measurement stems from the belief that the undertaking of multiple acquisitions in a very short span of time is a poor investment and consistent with other works as Heaton (2002), Fuller, Netter and Stegemoller (2002), Malmendier and Tate (2004).



(*) Non-programmed at the year n

We find missing literatures studies on the non-programming multiple mergers. Non-programmed merger is not intentionally decided or scheduled in 3-year advance by the managers of the acquirer, while the programmed-merger is scheduled to occur, not depends on whatever the value creation or destruction of the stockholders of the acquirers. For example, Bank A decided to merger with bank B in 2000, bank A also had decided to merger with bank C in year 2001. A series of mergers in consecutive year is the evidence of programming multiple mergers.

We are interested in testifying the effect of the subject merger to the occurrence of the next merger. The subject merger is the latest merger in the year n , and the next merger is the merger happened 3 years after the subject merger. What happen in the subject merger can influence on the decision of involving in the next merger.

3. HYPOTHESES

Before we can examine the effects of previous merger deal to the probability of engaging in another non-programmed merger deal of firm, we formulate some testable Hypotheses which are based on the results of previous findings in the field of multiple bank mergers.

We define the non-program mergers are the mergers which occur at least three year following the previous one.

Hypothesis 1

The abnormal return (AR) on stock price around the approved date of acquirer in the current merger has significantly negative relation of the probability of repeating merger of the acquirer.

We expect the coefficient of AR is negative sign which indicate the negative correlation of the abnormal return of the subject merger to the occurrence of the next merger. This means the higher the abnormal return gained in the subject merger, the lower probability of repeating the next merger after 3 years or lower the probability of involve in a non-programmed merger. It sounds strange but it might relevant and consistent to the existing findings of abnormal return on the acquirers' stock price.

According to the findings of Moeller, Schlingemann & Stulz (2005) in a large sample of acquisitions in the recent wave, acquiring-firms massively experience the wealth destruction caused around the announcement date. This finding is also consistent to many other findings study on previous merger waves. Thus the logic behind our first hypothesis is that the abnormal return present in the subject merger might be negative abnormal return which destroys the value of its shareholders. This might prevent the acquirer from repeating a next merger in the near future (after 3 years).

Hypothesis 2

The management hubris of the acquirer in the previous merger is significant predictor of the probability of repeating merger of the acquirer.

We use number of mergers in consecutive years which associated with the current merger as the proxy for the management hubris. The coefficient of the management hubris is unclear to the probability of repeating merger of the acquirer in a non-program merge. The possible explanation is that non-program merger tend to be triggered by the maximized shareholder's value, thus the management hubris may play insignificant role or negative role. However, adding this variable is necessary because management hubris presented in the subject merger might influence the effect of AR of that subject merger. As explained later, the higher order of the merger in a sequence of mergers, the lower abnormal return can be found. If we assume that our subject merger is a high-ordered merger from a sequence of merger, thus the abnormal return of our subject merger, if existing, might be lower because of the influence of other previous merger in the sequence. Thus hubris is hidden in the AR of the subject merger if it is a high-ordered merger in a sequence of merger, and hubris will lower the effect of AR on the dependent variable.

Hypothesis 3

The value of the asset acquired by the acquirer in the previous merger is significant predictor of the probability of repeating merger.

We expect the coefficient of the asset acquired is a negative correlated with the probability of repeating merger. Intuitively, the bigger the target, the riskier the acquirer faces. If the merger results in unexpected performance of the new entity, the acquirer shall be more hesitate in repeating another transaction. It will decrease the probability of involving in a future merger.

4. METHODOLOGY

There are two main parts in this section which are Data Description and Methodology for Testing Hypotheses.

4.1 Data Description

Mergers and Acquisitions is the most attractive phenomenon to the economic and financial researchers. M&A deals often occur in a complicated process which might last for months or years. Therefore, M&As data generally are collected and recorded by specialized data research institutions or organizations. The access to M&As data is not easy and freely for every researcher.

In United State, where the mergers and acquisitions was triggered for hundreds years, there is a mechanism of merger progress in US banks. The merger applications have been submitted the proposal to the Federal Deposit Insurance Corporation – FDIC since 1930s.

“Regarding each application, the FDIC considered and found favorably with respect to the relevant statutory factors, including financial and managerial resource; future prospects of the existing and the proposed institutions; convenience and needs of the community to be served; and the effectiveness of each depository institution involved in the merger in establishing programs to combat money laundering activities, including overseas branches.

...Reports regarding the competitive factors were requested from the Attorney General and the Summary Report by the Attorney General indicated that the transaction would not have a significant adverse effect on competition...” (FDIC- Mergers Decision Annual Report)

We utilize the US Bank mergers data from annual reports of Federal Deposit Insurance Corporation (FDIC) from 2000 to 2010. A complete report of all merger applications approved by the FDIC during the previous calendar year is provided to Congress every year. There are main merger types including: regular mergers, corporate reorganization

mergers, interim mergers, and failed or closed bank mergers. The FDIC is a leading provider and a trusted source of information about the US banking industry. Thus there are many researchers have studied on FDIC-assisted mergers data, to name some of these such as Billett (1995), Cochran (1995), Zhang (1997).

Table 1: US bank mergers data recorded by FDIC from 2000 to 2010

Year	Total Deals recorded	Regular mergers	Corporate reorganization mergers	Interim mergers	Failed or closed mergers
2000	430	157	204	63	6
2001	410	204	160	45	1
2002	327	145	116	60	6
2003	317	153	107	54	3
2004	329	153	130	43	3
2005	313	115	156	42	0
2006	365	169	158	38	0
2007	324	147	132	42	3
2008	302	104	136	35	27
2009	282	69	129	13	71
2010	295	90	122	12	71

Source: Author’s calculation based on FDIC reports

In order to study the effects of previous merger on the probability of repeating future merger, we focus our analysis on the data of regular mergers. Regular merger is the transaction between two different partners: acquirer (bidder) and acquired (target). Each regular merger proposed by an applicant to the FDIC should be recorded in details with name of applicant institution, total assets of acquirer, name of target institution, certificates number of acquirer and target, value of assets acquired.

As can be seen from table 2, year 2001 experienced a record number of regular mergers but the value of per transaction was not so high, stayed behind year 2000, 2009 and 2010. Interestingly, year 2009 had the lowest number of regular mergers but value per deal and value per acquirer stand the second-highest level. This can be partly explained by the fact that in early twentieth century, merger wave in US banking industry was still strong and

appealed that many bankers and institutions could not stay beyond the trend. They might involve in mergers to indicate its visibility and capability. Later in this period, when the US banking faced financial crises, bankers more seriously considered when acquired potential partners. The mergers should be precise and beneficial decision for bankers than to deteriorate the existing bad situation. That was the reason why number of mergers transactions fall but the quality improved by the value showed per transaction.

Table 2: Sub-sample on Regular mergers of US banks recorded by FDIC from 2000-2010

Year	Regular mergers (*)	Total assets acquired (000s)	Number of acquirers	average transaction value (000s)	Transaction value per acquirer (000s)
2000	157	1,998,898,775	134	12,731,839.33	14,917,155.04(**)
2001	202	46,575,899	168	230,573.76	277,237.49
2002	143	29,956,745	126	209,487.73	237,751.94
2003	149	29,244,830	133	196,274.03	219,885.94
2004	148	30,547,510	129	206,402.09	236,802.40
2005	112	23,883,660	96	213,246.96	248,788.13
2006	166	23,302,798	136	140,378.30	171,344.10
2007	145	24,359,624	128	167,997.41	190,309.56
2008	102	16,311,622	99	159,917.86	164,763.86
2009	67	56,369,240	63	841,331.94	894,749.84
2010	89	30,002,340	78	337,104.94	384,645.38

Source: Author's calculation based on FDIC reports

(*): number of regular mergers less than those in table 1 because we exclude mergers with zero or unrecorded value of assets acquired

(**): the substantial high value of total asset acquired and related ratios caused by many mega-mergers which have made in the year2000.

Based on the annual reports of merger decision of FDIC from 2000 to 2010, we process the data in favor of multiple mergers. We exclude bankers which had single merger during the period, and keep all acquirers which had at least 2 mergers from 2000 to 2010. In Appendix 1, we construct a table of list of nearly 250 banks which involved in multiple mergers during 10-year period. This table is our main source of our analysis on behavior of multiple bank mergers. Some banks merged many times, while others had

few. The record high level is about 24 mergers deals per one acquirer in 10 years, while the lowest is 2 deals of one acquirer in the same period.

From the table in Appendix1, we categorize data into two groups: programmed mergers and non-programmed mergers. As explained early, we keep only non-programmed mergers for our analysis. Thus, repeating merger 3 years afterwards is considered a non-programmed merger. In order to collect precise data for testing out hypotheses, we first check the available for the data of acquirer's stock price. We decide to focus the stocks on the same stock exchange such as NASDAQ. Finally, we keep 45 multiple acquirers which satisfy our requirements for testing hypotheses. Chosen banks in our sample are bolded in the table in Appendix 1.

Main criteria of filtering banks in the total 250 multiple acquirers:

- Public or listed bank
- Stock of the bank is listed on NASDAQ
- Exclude banks which disappeared caused by later acquisitions

In total 250 bank multiple acquirers, there are many banks which are not listed. Thus we drop out and keep only listed bank for our study.

4.2 Methodology for Testing Hypotheses

The main methodology for our purpose of constructing a prediction model of future merger is Logit analysis. Before hand, we use Event Study to search for the independent variables of interest is Abnormal return of the subject merger. We will start with Event Study and then investigate the methodology of Logistic Regression.

4.2.1 Event Study Methodology

In order to test the first hypothesis of examination the abnormal return of the previous merger's effect on the decision of repeating merger after 3 years, we first use event study methodology to find the abnormal return (AR). Many studies on mergers and acquisitions

have use event studies to examine the value creation of the deal to the participants. Event studies are analyzed using abnormal returns of stocks of banks engaged in mergers or acquisitions in a certain period of time before and after the deal announcement. This method is broadly used to quantify the market expectations on shareholder's value creation related to the merger. Normally, the data needed for the event studies is the merger announcement date and daily stock price of the involved parties around that date. The information obtained by observing abnormal returns show shareholders' overall expectations. It includes the expected magnitude of efficiency gains, market power gains and other value creating effects compared with the announced purchase price and other expected costs related to the merger. The market reaction to the deal announcement therefore directly indicates the value implications for the target's and the bidder's shareholders separately. The event studies do not need to rely on the potentially manipulating of accounting numbers; they are relying on market expectation.

Day 0

It is important to set correctly the event day when the effective information is released. We relied on the approved date on FDIC reports to set the day 0. It is understandable because the merger can only occurred if it had been approved by FDIC. As soon as FDIC's approval of the merger proposal of acquirer, the information of upcoming merger can be leaked out and affects the stock price of acquirer. It is not necessary to wait until the announcement date of the merger of the acquirer to examine the value creation on stock price of the merger effect because the information of a future merger has already known since the date of approval. Thus choosing approved day as the day 0 is appropriate in case of our data sample provided by FDIC.

Event window

Literatures of event study show that there is no standard of days in event window. Event window is differed from authors to authors. Most of event studies chose the short event window of 3 to 5 days around the event date. Schipper and Smith (1986), Klein,

Rosenfeld and Beranek (1991) use event window $[-4,0]$, while Slovin Sushka and Ferraro (1995) use event window $[0,1]$ or Hullburt (2003) use $[-1,0]$. Many researchers use event window $[-1,1]$ such as Allen and McConnell (1998), Vijh (1999,2002), Mulherin and Boone (2000), Wagner (2004). Longer event windows are also used such as $[-30,+30]$ in Campa and Hernando (2005) or $[-40,+40]$ in Tourani-Rad and Van Beek (1999). The event window can be chosen depends on each researchers in order to capture the correct market reaction of the event. The event can be short to capture the correct market reaction on the event day, also it can be long enough to measure how large the market reaction can be.

In order to observe the market reaction around the approval of the merger, using methodology of Klemmer, Kengelbach, Schwetzler and Sperling (2011), we chose an event window $[-3,+3]$. Our 7-day event window might be not enough to capture the magnitude of abnormal return of the effect of the merger approval on the stock price, still it can be at least enough to test for the existing of abnormal return around the approval date. The effect of the merger can last till the announcement date and even days after the announcement date. However, our interest in this framework is to find out the effect of the subject merger on the probability of repeating a future merger after at least 3 years of the acquirer. Therefore, a part of abnormal return is enough for our analysis. In the event window, we will search for abnormal return from day -3 to day +3 around the approval date. Testing for the significance of abnormal return is described in the following sections.

Estimation Window

Estimation window is the period over which the market model parameters are estimated. It excludes the approval day and the announcement day in order to avoid any effect of the approval day and the announcement day on the estimation of parameters. The length of the estimation window differs from study to study. We chose estimation window of 126 days before the day 0, $[-132;-7]$. This estimation window is approximately 6 months. It is quite a short estimation window in comparison with normal 1-year estimation window.

The reason is that almost our sample is multiple mergers, it means acquirers in our sample often have a sequence of mergers during the research period, thus a long estimate window might not precise in estimate a correct market model. Notably, we exclude one month (January of year n+1) if the estimate window spans from year n to year n+1 because of the earnings announcement effect on January every year can distort the market model parameters.

Market Model

In order to estimate parameters, we applied standard *market model* (Brown and Warner, 1984; Cybo-Ottone and Murgia, 2000; Beitel and Schiereck, 2001; Fritsch *et al.*, 2007). The market model has the following form:

$$R_{it} = \alpha_i + \beta_i R_{Mt} + \varepsilon_{it}$$

where R_{it} is the observed return on security $i = 1, \dots, 46$ in trading day $t \in [-132; -7]$ and R_{Mt} is the observed market return (NASDAQ composite index) in day t . The returns were calculated as follows:

$$R_t = \ln \left(\frac{P_t}{P_{t-1}} \right)$$

Where P_t and P_{t-1} are the close prices in day t and $t-1$ respectively, obtained from NASDAQ. We applied the OLS regression to estimate the market model parameters α_i , β_i for each stock i .

Calculation of Abnormal Returns

The abnormal return (AR) on a stock I in day $t \in [-3; +3]$ is calculated as the difference between the observed return R_{it} and the expected return \hat{R}_{it} :

$$AR_{it} = R_{it} - \hat{R}_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{Mt})$$

Where $\hat{\alpha}_i$ and $\hat{\beta}_i$ are the estimated parameters.

Test for Significance

We applied a method proposed by Brown and Warner (1984). The test statistic for the null hypothesis that the observed abnormal returns are statistically indifferent from zero (99% level of confidence) is:

$$t = \frac{AR_t}{\hat{S}(AR_t)}$$

The test statistic is specified as abnormal returns standardized by standard deviation estimated over the estimation period [-132;-7]. If the null hypothesis is rejected, we can conclude that the stock price had been actually impacted by the merger.

The standard deviation of the abnormal return over the estimate window is:

$$\hat{S}(AR_t) = \sqrt{\frac{\sum_{t=-132}^{-7} (AR_t - \overline{AR})^2}{125}} \quad \text{where } \overline{AR} = \frac{1}{126} \cdot \sum_{t=-132}^{-7} AR_t$$

Average abnormal return (AAR) is defined as:

$$AAR = \frac{\sum AR_i}{\text{number of days which have abnormal return}} \quad \text{where } AR_i \text{ is the abnormal return realized in any day in event window}$$

4.2.2 Logistic Regression

Our main methodology in this research is the logistic regression. This is model of limited dependent variable. If we define our dependent variable is y which is the probability of repeating merger at least 3 years after the previous merger. We define the dependent variable y as followed:

$y = 1$ if the acquirer has the next merger at least 3 year after the subject merger; 0 if there is no merger at least 3 years apart from the subject merger.

The dependent variable is binomial thus using linear regression OLS for estimation of parameters can be bias. To solve this problem, Logistic regression is used to eliminate the

bias of OLS on binomial dependent variable. Dietrich (1984) had used logit analysis to predict a merger target.

Our main interest in this thesis is to find out the correlation of y and 3 explanatory variables (X_i). They are:

AR: Abnormal return

The first independent variable, AR, is clearly defined and calculated by the event study explained above. The probability of repeating merger might be impacted by the results of market reaction in the previous merger. What happen on the previous merger in the past might influence the expectation of market of future merger if it happens. In order to avoid the robustness of the value of abnormal return caused by the different event window, we decide to label AR as a binomial variable. We focus our analysis on the appearance of abnormal return, not the true value of abnormal return. Thus we define the variable AR as followed:

AR =1 if there is significant abnormal return caused by the event in any day in the period of event window; and 0 if there is no significant abnormal return in the period of event window

HUBRIS: Management hubris presented in the previous merger

The second independent variable, HUBRIS, is defined as the managerial motive of series of merger transaction associated with the previous merger. According to Doukas and Petmezas (2006), overconfident manager tend to underestimate the risks, or overestimate the synergy gains, associated with mergers and therefore they are less likely to postpone a merger decision. They argue that overconfident managers are prone to engage in multiple mergers since they strongly believe that such serial investment decisions are in the best interest of shareholders than “rational” managers do. Thus, managerial motive manifests in multiple mergers within a short period of time. The findings of Doukas and Petmezas (2006) are consistent with the findings of Billet and Qian (2005), although the former

focus on the private acquisition and the later studied on the public form. When examining multiple acquirers' wealth effects in low-order (1st deals) and high-order (5th or more deals) mergers conducted within a three-year period, they point out that if self-attribution bias develops managerial overconfidence, high-order mergers will be associated with lower wealth effects than low-order mergers. Thus management hubris does impact on the wealth effect of the high-order merger in a sequence of mergers. When using AR as an independent variable to predict the probability of repeating non-programmed merger, the coefficient of AR may be bias is this AR is of the high-order merger in a sequence of merger and be influenced by the effect of HUBRIS on high-order wealth effect. Therefore, without adding HUBRIS, the coefficient of AR in case of sequence mergers may be strongly bias, which does not exclude the effect of HUBRIS on AR.

Our methodology of identifying management hubris is consistent with Malmendier and Tate (2004) and Doukas and Petmezas (2006), which is stated that doing multiple mergers in a year is likely indicator of management hubris. For example, if in a single year n, acquirer i acquired 2 times or more, we will categorize this acquirer with HUBRIS effect.

We define variable HUBRIS as follow:

HUBRIS = 1 if the acquirer has multiple mergers in consecutive years; and 0 if it has only a single merger.

AA: Value of the asset acquired by the acquirer

The third independent variable, AA, is the value of asset acquired which is approved and recorded in reports of FDIC.

We applied logistic regression to find the value of dependent variable y :

$$\text{Logit}(y) = \text{const} + \beta_i X_i$$

We expect significant correlation implied as β_i of independent variable and dependent variable. Thus the independent variable can be significant predictor of y and marginal effect of independent variable on y can be measured by derivation from logit function. In order to find out the best model, we might introduce control variables to testify the variance of the explanatory s' coefficient when controlling for some factors. The main criterion for choosing a best prediction model is that the model should have the highest goodness-of-fit and high power of prediction.

Thus we have derivation from the chosen Logit function:

$$\ln\left(\frac{y}{1-y}\right) = \text{const} + \beta_i X_i$$

$$\frac{y}{1-y} = e^{(\text{const} + \beta_i X_i)}$$

$$y = \frac{e^{(\text{const} + \beta_i X_i)}}{1 + e^{(\text{const} + \beta_i X_i)}}$$

5. EMPIRICAL RESULTS

Findings on **Event Studies**

Using event studies on examining the effect of approved date made by FDIC on the merger of US banks, we find some significant impacts of the information on the stock price of the requested bank. Over the whole sample of 46 banks, we find 30% of the total banks have abnormal return. Others have no significant abnormal return due to the event.

14 out of 45 banks have recorded significant abnormal returns due to the event, while half of them have positive abnormal return and half have negative abnormal return. The result shows unclear pattern over the whole sample of abnormal return. However, our result is somehow consistent to many studies on examining effect of merger and acquisitions announcement on the stock price of acquirers. Findings show that almost acquirers experience no abnormal return or negative abnormal return.

Previous study on the FDIC assisted acquisitions such as Zhang (1997) found that repeated acquirers, on average, have positive abnormal returns. Our empirical result is different in the two assumptions. Firstly, we focus on the approval date, not the announcement date; secondly, the abnormal return is of the subject merger, which is defined as the latest merger in a sequence of mergers. Thus the abnormal return of the subject merger might be diminished.

The distribution of AR is statistically described in table 3 and table 4. The highest frequency of realized abnormal return is on day [-1] with 24% of the total AR realized days. Day [-3] contributes 12% of the AR realized days, which is the lowest frequency day.

In the sub sample of realized abnormal return (14 valid observations), 57% of the banks have negative abnormal return and 43% have positive abnormal return. Table 4 is summary statistics of abnormal return of the sub sample. The highest abnormal return recorded is 10.8% and the lowest abnormal return is -10%. Average abnormal return of

the sub sample is quite small, -0.8%.

Table 3: Event Study results on the whole sample

Summary Statistics, using the observations 1 - 45 for the variable AR (45 valid observations)			
Mean	Median	Minimum	Maximum
-0.00240217	0.000000	-0.100000	0.108000
Std. Dev.	C.V.	Skewness	Ex. kurtosis
0.0318297	13.2504	0.317550	5.34125

Table 4: Event Study Results of significant abnormal return

Summary Statistics, using the observations 1 – 45 for the variable SAR (14 valid observations)			
Mean	Median	Minimum	Maximum
-0.00789286	-0.0113000	-0.100000	0.108000
Std. Dev.	C.V.	Skewness	Ex. Kurtosis
0.0588244	7.45287	0.470067	-0.266677

Our evidence of abnormal return around the approval date asserts that the decision of FDIC on the merger proposal of bankers does have impact on the stock price of the acquirers. Examining the stock price change around the approval date might partially reflect the market expectation on the up-coming merger of the bank. Thus in further studying, we can project and extrapolate the market reaction around the announcement date of the merger by using the market reaction in the previous event of approval date.

Logistic Analysis

Logistic analysis in Model 1 found significant estimation of the coefficient of abnormal return (AR) is -1.94, which is significant at 99% confident level. The coefficient of AR is negative and significant as expectation which means that the appearance of abnormal return in the current merger will lower the probability of repeating the next merger apart at least three years from now. Model 2 found that the coefficient of HUBRIS is -1.31, which is significant at 90% level of confidence. This reflects that the HUBRIS presented in the subject merger will lower the probability of involving a next merger at least 3 years

afterwards. The results of estimation on the coefficient of AR and HUBRIS are as significant and meaningful as our expectations. In Model 3, we found meaningless of the relationship of the value of asset acquired on the dependent variable. From these results, Model 1 should be chosen because it has the highest good-of-fitness of the model which is indicated through R-square and the Log-likelihood. Although the coefficients also significant as expectation, any interpretation for the marginal effect of the explanatory on the dependent variable need to be clarified further by adding control variables to the right hand side of the regression in Model 1.

Table 5: Logistic analysis of y on individual explanatory variable

	Model 1	Model 2	Model 3
Const	1.65 (3.376)***	1.31 (3.082)***	0.65 (-1.63)
AR	-1.94 (-2.659)***		
HUBRIS		-1.31 (-1.829)*	
AA			8.87E-08 (-0.73)
Correct Prediction	76%	71%	71%
McFadden R ²	0.14	0.06	0.04
Log-likelihood	-23.26	-25.37	-26.11

Note: Numbers in parentheses are t-ratios; (***) (***) and (*) are signs denoted the significant at 99%, 95% and 90% level of confidence, respectively

We chose a set of control variables which are HUBRIS, AA and the total assets of acquirer (TA). The main explanation for this chosen set of control variables is to investigate the impact of rescaling and confounding on the effect of AR on dependent variable. When we test for the correlation of control variables and AR, both AA and TA have zero correlation with AR, while HUBRIS has significant correlation to AR. Therefore, controlling this set of diversified variables can clarify our result.

Notably, in case of control variable HUBRIS, we inspired by the finding of Karlson, Holm and Breen (2010) which state that the interpretation of coefficient in nonlinear

model can be biased caused by the inclusion of confounding variables if researchers use traditional method of Average Partial Effects (APE). The most typical identification of confounding variable is the correlation to explanatory variable. When we compare the coefficient of explanatory variable between the reduce model (without controlling for confounding variable) and the full model (with controlling for confounding variable), the difference can be reduced caused by the off-set of confounding and rescaling. The conclusion from the full model of the impact of confounding variable on the marginal effect of explanatory variable on depend variable will be not correct. In our case, HUBRIS is considered as confounding variable. When the full model produced by adding HUBRIS to Model 1 had justified as superior to Model 1, we will need to apply a new method of Karlson, Holm and Breen (2010) to interpret precisely the effect of confounding variable.

Return to our experiment of introducing control variable into Model 1. The results of logistic regression of y on AR when controlling for HUBRIS, AA, and TA are presented in table 6 as Model 4, Model 5 and Model 6, respectively. All three models result in significant change of the coefficient of AR in comparison with the original Model 1. In Model 4, introducing of control variable HUBRIS had increased the effect of AR on y by 8.8%. When controlling for AA in Model 5, the coefficient of AR had increased slightly smaller than the previous case, at 7.2%. In contrast, Model 5 show a substantial decrease from -1.94 (Model 1) to -2.36, which is approximately 21.6%, of the AR coefficient. What would be the best model for our purpose when controlling for variables HUBRIS, AA and TA had different response on the coefficient of AR on dependent variable? Using the method proposed in Baltagi (2005), we apply the log likelihood ratio to decide on the best model. The method is simply for application with the test of null hypothesis that the addition of specific variable (the full model) makes no difference with respect to the original regression without adding that specific variable (reduced model). The test statistic is defined as the double of the difference between the 2 log-likelihood of the full model and the reduced model. The t statistic is asymptotic χ^2 at one degree of freedom (as in our case). As we can see from table 6, the row “Test statistic” show that the Model

6 is significant difference than our original model which is model 1. Compare to Model 1, Model 6 has higher goodness-of-fit and also have higher correct prediction power.

Table 6: Logistic regression of AR on y when controlling for HUBRIS, AA, TA

	Model 4	Model 5	Model 6
Const	1.90079 (3.453)***	1.43764 (2.579)***	2.4062 (3.428)***
AR	-1.77538 (-2.374)**	-1.8045 (-2.45)**	-2.356 (-2.862)***
HUBRIS	-1.0131 (-1.292)		
AA		5.44E-07 (-0.451)	
TA			-2.93E-07 (-1.462)
Correct Prediction	80%	76%	79.10%
McFadden R ²	0.17	0.16	0.27
Log-likelihood	-22.43	-22.8	-19.16
Test Statistic (χ^2)	2.06	0.92	8.2***

Note: Numbers in parentheses are t-ratios; (***) (** and *) are signs denoted the significant at 99%, 95% and 90% level of confidence, respectively

Relating to Model 4 with confounding variable HUBRIS, Model 4 is justified not better than the Model 1, therefore it does not need to analysis further because of its inefficiency in comparison to Model 1.

Through many steps of analyzing and discussion, we believe that Model 6 is the most efficient and suitable model for our study purpose. Model 6 has highest goodness-of-fit (McFadden R-square at 27%) and correct prediction power (correction prediction at 79%)

Derivation of dependent variable from Model 6: (We rescale TA by unit of Million USD)

$$\text{logit } y = 2.406 - 2.356AR - 0.293TA$$

$$\log\left(\frac{y}{1-y}\right) = 2.406 - 2.356AR - 0.293TA$$

$$\frac{y}{1-y} = e^{(2.406-2.356AR-0.293TA)}$$

$$y = \frac{e^{(2.406-2.356AR-0.293TA)}}{1+e^{(2.406-2.356AR-0.293TA)}}$$

This is our prediction model: $y = \frac{e^{(2.406-2.356AR-0.293TA)}}{1+e^{(2.406-2.356AR-0.293TA)}}$

The marginal effect of AR is -31.87%. This means, one unit increase in Abnormal Return in the current merger or the appearance of abnormal return will decrease 31.87% of the probability of making a next merger at least 3 year afterward.

Our results are quite reasonable and connected to Post-Merger Integration (PMI) proposed in Klemmer, Kengelbach, Schwetzler and Sperling (2011). While studying on a very huge sample of approximate 25,000 global serial mergers in all industries from 1980s to 2010, the authors confirm the PMI on the average time of integration after serial mergers. Those serial mergers in this study are assumed equivalence of programming merger and non-programming merger. Our study complements on this study by analyzing on bank industry with multiple non-programming mergers. With multiple non-programming mergers, the subsequence merger is impacted by the very closely previous merger. Higher probability of the subsequence merger's occurrence is negative correlated to the realized abnormal return and hubris management in that previous merger. This result can be interpreted in the way that the integration and recovery progress of the merger will have significant impact on the acquirer when it considers a future subsequent merger. Apparently, a merger taken by maximizing-shareholder's value motivation should have no value wealth destruction because there is no negative abnormal return or management hubris, thus it will have quick recovery and integration progress which enables the acquirer might consider a next merger. In contrast, a merger motivated by management hubris will deteriorate the acquirer value and disturb acquirers' shareholder, thus it will have slow post-merger integration and recovery. This consequence will lower the willingness of the acquirer for a further merger.

6. CONCLUSION

The main goal of this thesis is to construct a model of prediction a non-programmed future merger base on the characteristics of the current merger in the case of multiple mergers in US banking industry. For this purpose, we studied 45 bankers in the period between 2000 and 1010. We tested 3 hypotheses concerning the relationship of the subject merger's characteristics and the probability of future merger's occurrence.

There are 2 main points in our empirical findings. The first contribution is that, to our best knowledge, we found the significant abnormal return of acquirers' stock price around the approved date made by FDIC. This illustrates the effect and information prudential of FDIC in regard of the merger decision on US bank mergers. Thus, examining the stock price change around the approval date might partially reflect the market expectation on the up-coming merger of the bank. For further studying, we can study to project and extrapolate the market reaction around the announcement date of the merger by using the market reaction in the previous event of approval date.

The second contribution of this thesis is our prediction model which can produce 79% of correct prediction of the acquirers' decision of making a future merger based on the characteristics of the current merger. From our prediction model, we found that the probability that the acquirer will make a next merger at least 3 year after the current merger will decrease by 31.87% if there is abnormal return in the current merger.

APPENDIX 1

Multiple mergers from 2000 to 2010 (*)

BANK	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Regions Bank	2										
First american bank	1			1							
West Alabama Bank & Trust	1					1			1		
East-West Bank	1			1	1						
Cathay Bank	1			1			1	1			
Bank of the West	2	1	1			1				1	
Summit Bank	1	1									
Peoples Bank	1						1	1			
Citizens Bank	5	1		1							
First Hawaiian Bank	1	1									
Mountain West Bank	3			1	1	1					
Chicago Community Bank	1	1						1			
Standard Bank and Trust Company	1			3							
Jacksonville Savings Bank	1	1									
First State Bank of Western Illinois	1				2						
Morton Community Bank	1					1	1	1			
The German American Bank	1						6				2
The Peoples Bank	1		1						1	1	
Sabine State Bank and Trust Company	1		1	1	1						
Rockland Trust Company	1				1				1		
South Shore Savings Bank	1				1						
Provident Bank of Maryland	1								1		
Signature Bank	1				1			1			
Northwestern Savings Bank & Trust	1		1								
First State Community Bank	2						2		1		3
Regional Missouri Bank	1						1				
BancorpSouth Bank	6		1		2	1	1				
Stockman Bank of Montana	1	3				1					
The Fidelity Bank	2			1							
The Heritage Bank	2	1							1	1	
Bank of Davie	1	1									
Southern Bank and Trust Company	2		1	1	1						
Capital Bank	1								1		
First-Citizens Bank & Trust Company	3		1	2	2						
First Bank	1	3		1			1				
The Berlin City Bank	1	1									

The Trust Company of New Jersey	1		1							
Hudson United Bank	1	1								
Beacon Federal	1	1								
Union State Bank	1				1					
The Oneida Savings Bank			1					1		
Richmond County Savings Bank	1	1								
Bank of the Cascades	1			1			1			
Fidelity Savings Bank	1	1	1							
Northwest Savings Bank	1	5	1	1		1	1	1		1
FirstBank of Puerto Rico	1		1						1	
First-Citizens Bank and Trust Company of South Carolina	3	1		4						
Carolina First Bank	1		1		1				1	
Farmers State Bank	1	1		1		2				1
Greene County Bank	1	1		1	1	1		1		
Community Bank & Trust	2									
First Prosperity Bank	1	1								
The First State Bank	1					1	2			1 1
American State Bank	1								1	
The Bank of Southside Virginia	1	1								
The Cowlitz Bank	1					1				
Vision Bank		1			1	1				
Bank of the Ozarks		1		1	1					
Heritage Oaks Bank		1						1		
Affinity Bank		2								
Salisbury Bank and Trust Company		1			1			1		1
Liberty Bank		1			1		1			1 1
American Savings Bank		1	1							
Juniper Bank		2								
Old Florida Bank		1		1						
Prosperity Bank		2	4	4	2	2	2	5	1	2
First State Bank		2			1		1			
Citizens State Bank		1		1	1			1	1	
Casey State Bank		1			1					
Union Savings Bank		1								1
Blackhawk State Bank		1		1						
The Peoples State Bank of Newton		1	1							1
Bloomfield State Bank		1						1		
The Peoples State Bank		3								
First Bank and Trust		1								1
Liberty Bank and Trust Company		1		1						1
The Provident Bank		1	1	1	1			1		

The Boston Bank of Commerce		1	1								
Compass Bank for Savings		1		1	1						
Shoreline Bank		2									
Independent Bank - South Michigan		1					1				
Citizens Bank and Trust Company		2									
Allegiant Bank		1		1							
Delta Bank & Trust		2									
Hancock Bank		2									
MountainBank		2									
Lincoln State Bank		1	1								
Security First Bank		1									1
Hudson River Bank & Trust Company		1	1								
North Fork Bank		1			1						
Berkshire Bank		1			1	1	1	2			
New York Community Bank		1		1				2			
Advantage Bank		1			1						
First Bank & Trust Company		1	1		1			1			1
Premier West Bank		1		1							
Umpqua Bank		7	1		1			1			
Fulton Bank		2				1					1
Parkvale Savings Bank		1			1						
Royal Bank of Pennsylvania		1	1								
Citizens Bank of Pennsylvania		1	2	1							
Sun Bank		3									
F&M Bank		1	2								
First Volunteer Bank of Tennessee		3									
First Bank & Trust East Texas		2									
Sterling Bank		1						2			
Merrick Bank		1				1					
Banner Bank		1						2			
Peoples Bank of North Alabama			1	1							
Citizens Business Bank			1	1		1		1			
First Bank & Trust			1	1		1	1				
United Commercial Bank			2	1		3	1	1			
Main Street Bank		1	1								
Pinnacle Bank			1					1	1		1
Cresco Union Savings Bank			1			1					
United Community Bank			2	2	2		2			1	
Banterra Bank			1					1			
People's Trust Company			2								
Patriots Bank			2				1		1		

The Citizens State Bank			1							1
The Morrill and Janes B & T Co.			2							
The Bank of Kentucky			1				1		1	
Citizens Bank of Massachusetts			1	2						
Independent Bank			1		3		1			1
Peoples Community State Bank			1			1				
The Citizens Bank of Philadelphia		1	1							
Yadkin Valley Bank and Trust Co.			1	1			1		1	
RBC Centura Bank			2			1				
Bank of North Carolina			1			1				
Great Western Bank			1		2	2	1	1		3
Bank of Nevada			2							
Oak Hill Banks			1		1	1				
Armstrong Bank			1					2		
Brentwood Bank			1				1			
S&T Bank			1					1		
Standard Bank, PaSB			1			1				
Eurobank			1		1					
R-G Premier Bank of Puerto Rico			1	1						
Firstbank of Puerto Rico			1					1		
First-Citizens Bank and Trust Company			2							
The Weakley County Bank			3							
Citizens Tri-County Bank			1			1				
Texas Bank			1				1			
First State Bank Central Texas			2		1	1			1	
State Bank of Cross Plains			1				1			1
Waumandee State Bank			1		1			1		
First Financial Bank				2	3					
First Security Bank				1					1	1
Bank of Stockton				1						1
FirsTier Bank				2						
Community Bank of Florida		1		1						
Iowa State Bank				1				1		
Security State Bank				1					1	1
Enterprise Bank				1			1			
Premier Bank				1	1	1		1		
Timberwood Bank				1				1		
Liberty Bank of Arkansas					1		1			
Central Valley Community Bank					1				1	
The New Haven Savings Bank					2					
WashingtonFirst Bank					1	1	1			

Lincoln Savings Bank					1				1		
Panhandle State Bank				1	1						
Community State Bank					3		1				
Eastern Bank					1			1	1		1
Androscoggin Savings Bank					1		1				
United Prairie Bank - Owatonna					2						
Town & Country Bank					1						1
First South Bank					1	1					
Nevada Security Bank					1		1				
Cattaraugus County Bank					1				1		
First Columbia Bank & Trust Co.					1		1		1		
First Commonwealth Bank				1	1		1				
Mid Penn Bank					1		1				
Farmer's and Merchants Bank					1						1
Franklin Bank				2	2	3	1	1			
State Bank	1				1		1				
Towne Bank					1						1
Community First Bank		1			1						
Citizens Bank & Savings Company						1	1				
Colorado East Bank & Trust						1		1	1		
NewAlliance Bank						2	1				
MainSource Bank						1	1			1	
Hillcrest Bank						1	1				
Community Trust Bank						1					1
Mercantile-Safe Deposit and Trust Company						1	1				
Community Central Bank				1		1					
Sun Security Bank						1	1				
Great Southern Bank						1					1
Mid-Missouri Bank						1	1				
State Bank & Trust Company						1	1	1			
Laconia Savings Bank						1			1		
First Republic Bank						1	1				1
Woori America Bank				1		1					
First United Bank and Trust Company						2					
Keystone Nazareth Bank & Trust Company						2					
Clearfield Bank & Trust Company						2					
The Legacy Bank				1		1					
Minersville Safe Deposit Bank and Trust Company				1		1					
Beneficial Mutual Savings Bank						1		1			
First Citizens Bank and Trust Company						3	1	1	1		

Bank of the South						1			1		
First State Bank of Uvalde						1	1				
Peoples State Bank						1					1
Union Bank						1		1			
U.S. Bank Trust Interim							5				
Farmers Bank							2				
Bank of Florida							1	1			
Hamilton State Bank							1		1		
American Banking Company							2				
United Bank of Iowa		1					1				1
Beardstown Savings				1			1				
First State Bank of Campbell Hill				1			1				
Meridian Bank							1	1			
Security Bank of Kansas City							2				
The Citizens Bank				1			1	2			
Kentucky Bank				1			1				
Bridgewater Savings Bank							1			1	
First Community Bank		1					1			1	
Merchants and Farmers Bank		1					3				
Shinhan Bank America							1	1			
ACB							2				
Reliance Savings Bank							2				
CommunityBanks							1	2			
Allegheny Valley Bank of Pittsburgh							1	1			
Peoples State Bank of Commerce							2				
Happy State Bank							1		1	1	1
Carter Bank & Trust							10				
Passumpsic Savings Bank							1		1		
Frontier Bank							1	1			
AmericanWest Bank							1	1			
Sterling Savings Bank							1	1			
The Port Washington State Bank							2				
The Bancorp Bank								1		1	
First Choice Community Bank								2			
Security Savings Bank				1				1			
The Bank of Protection								1			1
PBI Bank								2			
Danversbank								1		1	
Legacy Banks								1		1	
Mechanics' Co-operative Bank								1	1		
The Miners State Bank								1		1	

Exchange State Bank		1					1		1	
Citizens Union State Bank and Trust			1				2			
United Central Bank							1	1		
International Bank of Commerce							2			
Columbia State Bank							2			
AnchorBank							1			1
Marshfield Savings Bank							1	1		
Security Bank			1				1			

Source: Author’s calculation based on FDIC reports

(*) This list of US Bank- multiple acquirers- is collected manually from annual reports of FDIC from 2000 to 2010. The figures represent number of merger transaction in the corresponding year. The bolted banks are the banks which we choose for our research of multiple non-programmed mergers.

We identify any two mergers from the same acquirer in which one merger happens next to the other with at least 3 year apart. The proceeding merger is label as the “subject merger” and the latter merger is the “non-programmed merger”. We then assess the probability of having latter merger based on the characteristics of the proceeding merger.

APPENDIX 2

Model 1: Logit, using observations 1-45
Dependent variable: y

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	1.64866	0.488325	3.3761	0.00074	***
AR	-1.93634	0.728099	-2.6594	0.00783	***
Mean dependent var	0.711111	S.D. dependent var		0.192375	
McFadden R-squared	0.140297	Adjusted R-squared		0.066365	
Log-likelihood	-23.25662	Akaike criterion		50.51323	
Schwarz criterion	54.12656	Hannan-Quinn		51.86025	

Number of cases 'correctly predicted' = 34 (75.6%)
f(beta'x) at mean of independent vars = 0.192
Likelihood ratio test: Chi-square(1) = 7.59061 [0.0059]

Model 2: Logit, using observations 1-45
Dependent variable: y

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	1.31219	0.425815	3.0816	0.00206	***
HUBRIS	-1.31219	0.717393	-1.8291	0.06738	*
Mean dependent var	0.711111	S.D. dependent var		0.200014	
McFadden R-squared	0.062150	Adjusted R-squared		-0.011782	
Log-likelihood	-25.37063	Akaike criterion		54.74127	
Schwarz criterion	58.35459	Hannan-Quinn		56.08828	

Number of cases 'correctly predicted' = 32 (71.1%)
f(beta'x) at mean of independent vars = 0.200
Likelihood ratio test: Chi-square(1) = 3.36257 [0.0667]

Model 3: Logit, using observations 1-45
 Dependent variable: y

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>
const	0.653058	0.400711	1.6297	0.10315
AA	8.96819e-07	1.23478e-06	0.7263	0.46766
Mean dependent var	0.711111	S.D. dependent var		0.137818
McFadden R-squared	0.038466	Adjusted R-squared		-0.035466
Log-likelihood	-26.01134	Akaike criterion		56.02267
Schwarz criterion	59.63600	Hannan-Quinn		57.36969

Number of cases 'correctly predicted' = 32 (71.1%)
 f(beta'x) at mean of independent vars = 0.138
 Likelihood ratio test: Chi-square(1) = 2.08117 [0.1491]

Model 4: Logit, using observations 1-45
 Dependent variable: y

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	1.90079	0.550439	3.4532	0.00055	***
AR	-1.77538	0.747754	-2.3743	0.01758	**
HUBRIS	-1.0131	0.784281	-1.2918	0.19644	
Mean dependent var	0.711111	S.D. dependent var		0.189400	
McFadden R-squared	0.170748	Adjusted R-squared		0.059850	
Log-likelihood	-22.43286	Akaike criterion		50.86571	
Schwarz criterion	56.28570	Hannan-Quinn		52.88623	

Number of cases 'correctly predicted' = 36 (80.0%)
 f(beta'x) at mean of independent vars = 0.189
 Likelihood ratio test: Chi-square(2) = 9.23813 [0.0099]

Model 5: Logit, using observations 1-45
Dependent variable: y

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	1.43764	0.557494	2.5788	0.00992	***
AR	-1.80405	0.736396	-2.4498	0.01429	**
AA	5.44151e-07	1.2058e-06	0.4513	0.65179	
Mean dependent var	0.711111	S.D. dependent var		0.152595	
McFadden R-squared	0.156999	Adjusted R-squared		0.046101	
Log-likelihood	-22.80481	Akaike criterion		51.60962	
Schwarz criterion	57.02961	Hannan-Quinn		53.63014	

Number of cases 'correctly predicted' = 34 (75.6%)
f(beta'x) at mean of independent vars = 0.153
Likelihood ratio test: Chi-square(2) = 8.49422 [0.0143]

Model 6: Logit, using observations 1-45
Dependent variable: y

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	2.4062	0.701872	3.4283	0.00061	***
AR	-2.35603	0.823277	-2.8618	0.00421	***
TA	-2.93235e-07	2.00549e-07	-1.4622	0.14370	
Mean dependent var	0.697674	S.D. dependent var		0.201102	
McFadden R-squared	0.272861	Adjusted R-squared		0.159014	
Log-likelihood	-19.16110	Akaike criterion		44.32219	
Schwarz criterion	49.60580	Hannan-Quinn		46.27062	

Number of cases 'correctly predicted' = 34 (79.1%)
f(beta'x) at mean of independent vars = 0.201
Likelihood ratio test: Chi-square(2) = 14.3805 [0.0008]

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