ESSAYS ON FIRMS BEHAVIORS AND EFFICIENCIES

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In Chapter 1, we study the relationship between the target value creation and acquirer corporate governance measures. We show that, based on the 2-day, 5-day and 10day announcement windows, the targets acquired by companies with more antitakeover provisions (ATP) experience higher announcement returns. We also study the link between acquirer's corporate governance measure and net synergistic effects on the capital market. We find that high-ATP acquirers engage in mergers that are not only destructive to their own firm values, but as a whole high-ATP acquirers also on average make acquisitions that yield lower net synergistic values. We also study the acquirer returns to confirm MWX's results. Lastly, we examine the impacts of G-indices on combined company's value changes in asymmetric windows, and we find the breakeven G-indices under which the net synergistic effects tend to be positive for different windows. In Chapter 2, we examine the relationship between various types of market shares and net interest margins in the Taiwanese banking industry. The study uses previously untapped Taiwanese banking data with more than 5000 observations and three model specifications over a 19-year span. The results show that the market shares have positive and statistically significant impacts on net interest margins for most aggregate samples. But the results also show that as the banking industry became saturated and banks began engaging in pricing wars and risky lending, the deposit and branch market shares have had negative impacts on bank spreads since 2001. The credit lending market share became a much more important factor for profitability; it was less important before around 2001 because (non-collateralized)

credit lending was not as prevalent, and the market for credit cards or cash cards, which yield higher interest rates, was small. The results support the argument for further industry consolidation to build healthier and larger financial institutions.

BIOGRAPHICAL SKETCH

Hao-Ting (Seth) Huang was born in Taiwan in 1982. He received his education up to junior high school in Taipei. At age 15, he moved to New York to attend a boarding school. He then has lived and learned in New York, Boston, Orlando, Los Angeles and Ithaca. He received his bachelors' degree from Boston University. At age 23, he won a literary award and published his first novel that focuses on the cultural development and financial environment in Greater China. He found passion in the area of finance and enrolled in Cornell's economics program to pursue his Ph.D when he was 24.

At age 27, he received his Ph.D in economics. Armed with the fundamental knowledge, network and passion for his birthplace's financial development, though faced with much obstacle, he plans to move back to the Greater China region and hopes to earn his place in the financial field.

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CHAPTER 1

ACQUIRER CORPORATE GOVERNANCE, TARGET VALUE CREATION AND NET SYNERGIES

Introduction

Corporate governance has been an area of focus by both scholars and investors in the past decade. It is especially true after the Enron and WorldCom scandals in which the managers profited at the expense of the shareholders. Aside from the CEO and board separation and the independence of the board members, the number of antitakeover provisions (ATPs) is another proxy for the quality of corporate governance. ATPs are set in place to protect the managers. It means that the more antitakeover provisions a firm has, the harder it is to unseat the managers through a takeover. It also implies that the more antitakeover provisions there are in a company, the less protection the shareholders have against poor management practices.

In this paper, we examine target value creation, acquirer corporate governance measures, and their combined net synergistic effect on the capital market. We contribute to the series of literature in the area of corporate governance and merger synergies. Specifically, we extend the paper by MWX in which they examine the relationship between the acquirer corporate governance and the value destruction upon merger announcements.

Although the agency problem has been an area of academic studies for decades, to the author's knowledge, scholars have only recently begun conducting empirical analyses

based on corporate governance measures. Core, Holthausen and Larcker (1999) give support to the negative relationship between a firm's corporate governance measure and its agency problem, and they show that firms with agency problems perform worse than their peers. After Gompers, Ishii and Metrick's (2003, hereon referred to as "GIM") milestone paper in which they first began using ATPs for corporate governance research, the most frequently cited paper related to corporate governance was written by MWX. They show that firms with many ATPs tend to make value-destroying acquisitions. In our study, we extend their argument and study the target investor's reaction to acquirers' corporate governance measures, and we take a step further to examine the net synergistic effect of the acquisitions on the capital market.

The proxy for corporate governance we use in this paper is the number ATPs a firm has. ATPs were originally created in the 1980s to protect a corporation from being taken over by corporate raiders. However, as the hostile takeover tactics faded into the woodwork as the U.S economy entered a recession at the end of 1980s, the ATPs evolved and became the managers' tools to protect themselves from being unseated whether they are acting in the shareholders' best interests or not.

For a firm that does not have ATPs in place, when it performs poorly, another firm can acquire it and replace the top managers. With sufficient number of ATPs, managers can be less cautious and make poor business decisions such as engaging in expensive M&A buying sprees or risky projects, but they are protected from the market for corporate control. Firms with more ATPs are much less attractive to a potential acquirer since it would be more costly to take them over. Many ATPs, most prominently the *poison pill*, can significantly raise the acquisition cost for the acquirer.

Therefore, as a result of many ATPs, executives of the firm can stand to make poor decisions without being punished through the means of a takeover.

In this paper, we contend that the market can determine, based on available information, whether high-ATP acquirers cause the target prices to increase more because of their tendency to overpay. The paper consists of **Part I** and **Part II** following the introduction and the literature review. To be clear, each part has its own hypotheses, regression models, methodologies and analyses. Parts of the models and methodologies are the same, but we include them in both parts.

Part I: Acquirer Corporate Governance and Target Value Creation

Theory and Hypothesis

In this section we establish the link between an acquirer's corporate governance measure and a target's value change upon a merger announcement. We examine how stock market participants interpret merger announcements made by firms with differing numbers of ATPs. The number of ATPs is a proxy for a firm's management quality – the more ATPs a company has, the worse the management quality.

Assuming the market absorbs information relatively efficiently, we contend that when high-ATP acquirers make a bid for targets, the target shareholders will profit more from them in spite of the worse corporate governance measures that the targets will eventually adopt. In other words, when a higher-ATP acquirer's value decreases after a merger announcement, then its target's value should increase more. This creates a

wealth transfer mechanism between the acquirer shareholders and the target shareholders.

As mentioned, it has been shown by MWX that when acquirers with many ATPs make acquisitions, their contemporaneous share prices decrease more severely, indicating that the market evaluates this decision unfavorably and believes that these acquisitions are poor investments. Part I addresses the following key questions: Do targets respond more favorably to acquirers with high ATPs upon merger announcements? Since a target eventually adopts the acquirer's corporate governance, does a low-G acquirer's better corporate governance measures increase the target value more than the "high-G premium?"

Methodology

The basic methodology follows MWX. The M&A data are based on the Securities Data Corporation's (SDC) U.S Acquisitions database. We identify 1427 acquisitions between January 1990 and December 2007 that meet the following criteria:

1. Public acquirers incorporated in the U.S.
2. Public targets incorporated in the U.S.
3. Transaction value of more than $1 million.
4. In a given transaction, the acquirer controls less than 50% of its target's shares prior to the announcement and owns 100% of the target's shares after the transaction
5. In a given transaction, the acquirer has annual financial statement information available from Compustat and stock return data (210 trading days prior to

acquisition announcements) from the University of Chicago's Center for Research in Security Prices (CRSP) Daily Stock Price and Returns file.

6. Targets have beta less than 10 and more than -10.
7. The acquirer is included in the Investor Responsibility Research Center's (IRRC) database of antitakeover provisions.

The IRRC published eight volumes in years 1990, 1993, 1995, 1998, 2000, 2002, 2004 and 2006. These volumes provide information on ATPs for about 1,500 firms these years. Following MWX and GIM, we assume that during the years between two consecutive publications, firms have the same ATPs as in the previous publication year. Based on the empirical standpoint, it does not affect the results much if we assume that the firms have the same corporate governance as the next publication year. IRRC includes firms of the S&P 500 index and some others include the firms on the annual lists of the largest corporations published by Forbes, BusinessWeek and Fortune magazines[1]. Based on MWX, the IRRC database represents about 90% of the U.S. stock market capitalization in each volume, and the more recent volumes include more firms. The number of ATPs a firm has is then used to compose a corporate-governance index, or G-index. Criterion 6 filters out observations that may have had data errors. This means that a stock tends to follow the broad-base market index by more than ten times the fluctuation. It only affects three observations in our sample.

We measure the target value creation by a market model adjusted stock returns around initial acquisition announcements, following conventional practices of event studies.

[11] The methodology and the description of the IRRC database largely follows Masulis, Wang and Xie (2007).

The 2-day, 5-day and 10-day windows' cumulative abnormal returns (CARs) are computed. The 2-day window's CAR includes the returns of the two days before and after the announcement day and announcement day itself, hence it contains five total days. The 5-day and 10-day windows' CARs follow the same logic. The CARs are the value creation effects based on the merger announcements. Following MWX, we use the CRSP equal-weighted return as the market return and estimate the market model over the 200-day period from event day -210 to event day -11 in order to capture stock run-ups:

$$R_{it} = \alpha_{it} + \beta_{it}^{m} R_{mt} + \varepsilon_{it}$$

,

where i is each merger deal's corresponding target. R_{it} is the target daily stock return on day t, where $t = 0$ is the merger announcement day from the market model. We also obtain α_{it}, the market alpha and β_i^m, the target market beta. r differs from t such that r is the time periods within our preset windows, which ranges from 10 days before until 10 days after the merger announcement.

$$\hat{\varepsilon}_{ir} = R_{ir} - (\alpha_i + \beta_i^m R_{mr}) \qquad r \in [-10, +10]$$

$\hat{\varepsilon}_{ir}$ is the target daily abnormal return within the event window, and:

$$21day CAR_i = \{ \prod_{r=-10} (1 + \varepsilon_{ir}) \} - 1$$

Based on Da Graca and Masson (2009), we also extract VAR_i, the target's variance based on the model, which serves as an indication as to whether the market model is good in predicting each target's stock performance. Mathematically, VAR_i is the squared standard deviation with respect to β_i^m in a regression based on the above market model. The reason to extract this information is because the market model often gives poor predictions; in other words, some individual stocks follow the broad-

based indices poorly. The CARs are dependent on the predictive power of each firms' respective market model, and if the variance is large, that means the abnormal returns inferred from these models are not precise. In the following regressions, we use an inverse-variance weighting (as in Generalized Least Squares) and assign more weight to firms that experience lower variances during the 200-day periods.

Below, Table 1 provides the basic statistical summary of the data we use to conduct the analyses. The Mean Target Market Value of Equity is the averaged market values of targets on merger announcement days. This information is provided to serve as a contrast to the Mean Deal Value, which is the averaged value of total deal values in a given year. As shown on Table 1, the Mean Deal Value tends to be higher than the Mean Target Market Value of Equity. The Offering Price/ Target Earnings Ratio indicates how much an acquirer is paying for each dollar of its target's earnings per year. These numbers vary widely according to the market conditions, but generally speaking, the higher the ratio is, the more an acquirer is paying (or overpaying) for the target's potential synergies.

Empirical Results

In the following sections, we base our discussions on three key categories of variables: the target value creation (CAR) as the dependent variable, the G-index as the explanatory variable of interest, and the control variables of interest which include the deal characteristics, acquirer characteristics, macroeconomic effects on the M&A industry and penny-stock considerations. The analyses are based on a Generalized Least Squares method with the *VAR* that we obtain for each observation the inverse

Table 1
Sample Distribution by Announcement Year

The sample consists of 1456 completed U.S mergers and acquisitions as given by SDC between 1990 and 2007. All firms are covered by the IRRC antitakeover provision database.

Year	Number of Acquisitions	Percentage of Sample	Mean Target Market Value of Equity ($mil)	Mean Deal Value ($mil)	Offering Price/ Target Earnings Ratio[2]
1990	28	1.92%	463	465	36.9
1991	32	2.20%	470	525	54.2
1992	37	2.54%	326	342	30.4
1993	49	3.37%	522	500	31.5
1994	41	2.82%	685	651	57.3
1995	82	5.63%	1201	1237	35.5
1996	82	5.63%	1302	1405	32.0
1997	98	6.73%	1150	1201	106.2
1998	171	11.74%	2475	2634	69.9
1999	176	12.09%	2086	2257	191.2
2000	147	10.10%	3281	3548	46.6
2001	101	6.94%	1178	1311	71.9
2002	57	3.91%	1541	1566	42.9
2003	79	5.43%	1470	1507	68.4
2004	65	4.46%	2557	2668	36.9
2005	72	4.95%	4081	4237	28.3
2006	66	4.53%	2090	2133	62.3
2007	73	5.01%	1779	1852	35.4

variance weighting[3]. Regression results based on Ordinary Least Squares are provided in the Appendix. The following are the variable summaries:

[2] There are significant outliers in 1997 and 1999, but we decided not to drop these observations since they are provided straight from the database and do not change the overall results.

[3] Da Graca and Masson (2009) proposed a better methodology for event studies by performing event studies using a Generalized Least Squares (GLS) approach to estimation rather than the typical traditional approach, which imposes the assumption of homoscedasticity in the second stage estimation. They demonstrated that the GLS model is far more powerful by contrasting p-values for the full data set.

Table 2: Summary of Percentage Changes of Target CARs					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
2-Day Combined Target CAR	1427	0.263158	0.267763	-0.3671	2.520148
5-Day Combined Target CAR	1427	0.277139	0.278775	-0.21971	2.635234
10-Day Combined Target CAR	1427	0.301628	0.311512	-0.51945	3.463247

Table 3: Summary of Independent and Control Variables				
Variable	**Mean**	**Std. Dev.**	**Min**	**Max**
G-Index	9.310441	2.633993	1	17
Cash Dummy	0.4849334	0.4999482	0	1
Acquirer Tobin's Q	2.313785	3.35265	0.4613136	78.56468
Acquirer Leverage[4]	0.1472411	0.1264589	0	0.7703276
Acquirer Free Cash Flows	0.0460007	0.0746202	-0.342581	0.3531846
Acquirer Assets[5]	8.656828	1.734835	3.28515	14.07155
Table 3 Continued				
Relative Deal Size[6]	0.6647129	5.52885	0.0014006	137.2205
Acquirer High Tech Dummy	0.278206	0.4482725	0	1
Target High Tech Dummy	0.2915207	0.454622	0	1
Transaction Value[7]	6.077552	1.646428	1.47819	12.01217
Acq High Tech X Relative Deal Size	0.3662622	5.476155	0	137.2205
Diversifying Dummy	0.6489138	0.4774772	0	1

Deal Characteristics

Here we examine the relationship between target abnormal returns and acquirer's corporate governance measures, controlling for deal characteristics. The regression model includes each acquirer's G-index, the cash dummy, log deal value and whether the acquirer and target are in the high-tech industries.

[4] Acquirer leverage is the book value of debt over the market value of total assets. The market value of assets is usually larger than the book value of assets, so the leverage ratio tends to be smaller than if the book value of assets is used.

[5] Acquirer assets is the logged value of assets in $millions.

[6] The relative deal size is defined as the logged deal size over the logged acquirer size. The large number could be the result of acquirer size being close to 1.

[7] Transaction value is the logged transaction value in $millions.

Table 4 shows that, in accordance with the theory developed in the last section, the targets experience higher abnormal returns when the acquirers have higher G-indices. The results are consistent for 10-day, 5-day and 2-day windows. In other words, controlling for deal characteristics, the target experiences more value creation when the acquisition is announced by an acquirer with a higher G-index.

Table 4
Target Returns & G-index – Base Model

The sample consists of 1,427 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variable is the targets' 2-day, 5-day, 10-day windows of cumulative abnormal returns around announcement dates. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	2-Day Window	5-Day Window	10-Day Window
G-index	0.00265	0.00406+	0.00402+
	(1.27)	(1.92)	(1.84)
Transaction Value	-0.01432*	-0.01732*	-0.02345*
	(4.11)	(4.90)	(6.44)
Cash-Dummy	0.07216*	0.06769*	0.05613*
	(6.38)	(5.90)	(4.74)
Acquirer High-Tech	-0.01354	0.01012	0.02104
	(0.58)	(0.42)	(0.86)
Target High-Tech	0.08456*	0.06563*	0.06708*
	(3.62)	(2.76)	(2.74)
Intercept	0.23492*	0.25194*	0.30914*
	(7.31)	(7.73)	(9.20)
Number of Obs	1427	1427	1427
R-squared	0.06191	0.06269	0.06811

There are several other factors that affect target abnormal returns. First, target shareholders find cash to be more attractive as consideration. A merger is usually considered to be a drastic strategic move, whether operationally or legally (with respect to board fiduciary duties). After a firm announces a merger, its stock price

tends to experience higher volatility, making equity payments more unstable. It is an industry standard that a higher portion of cash in a deal is considered to be more attractive. Therefore, we expect the mergers at least partially financed by cash to experience higher abnormal returns for target firms.

The deal size also plays an important role in affecting the target CARs. In mergers, if transactions' absolute sizes are large, given limited financing resources, the acquirers will not be able to pay excessive premiums. This curbs the managers' ability to overpay, causing the target CARs to be lower.

Whether the target is a high-tech firm also plays an important role in affecting the target's CARs. Company valuations depend largely on their growth rates. In all valuation models, the expected growth rate can affect the price substantially. High-tech firms are considered to be fast-growing firms, so they are expected to be paid higher premiums for prospective growth. The results are statistically significant for all event windows.

Since MWX shows that acquirers with higher G-indices experience more severe value destruction around merger announcements, our finding supports the argument that these announcements form a wealth-transfer mechanism between acquirer and target shareholders. This being said, we note that in Table 4 the statistical significance of the G-index is low, less than 90 percent for the 2-day window and less than 95 percent in the other windows. So the support of the MWX interpretation is weak in this base model. We turn to more powerful models below.

Adding Acquirer Characteristics

Here we account for other relevant information of an acquisition such as a company's financial and operating conditions. Although the target characteristics are inherently important because we are studying the price responses of targets, COMPUSTAT does not have enough information on most targets.

Looking at the acquisitions for which we have data on all three categories of characteristics (deal, acquirer and target), we have only 90 observations remaining. Based on the sample, the ratio between the mean transaction value and the mean acquirer size is about 11.8%, meaning that on average targets are much smaller than acquirers. It may be the reason there is insufficient data on the targets. While ideally we would include all three sets of characteristics, the remaining sample provides insufficient information to run the model. Therefore, only the acquirer characteristics are included in our study, which leaves us with 525 observations[8]. The only target characteristic we use that does not affect the sample size is the high tech dummy for the target firms.

Again, adding simply the acquiring firm characteristics reduces our sample size down to 525, but these observations, when run on the base model, yield results which are consistent with those in Table 4, indicating these 525 observations are representative of the entire sample. The acquirer characteristics include acquirer Tobin's Q, leverage ratio, free cash flow ratio, the relative deal size and whether it is a diversifying

[8] The statistical summaries of the 525 observations are provided in Part II.

acquisition and others. The regression results based on the deal and acquirer characteristics are in the next page:

Table 5
Target Returns & G-index – Adding Acquirer Characteristics

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variable is the targets' 2-day, 5-day, 10-day windows of cumulative abnormal returns around announcement dates. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	2-Day Window	5-Day Window	10-Day Window
G-index	0.00744+	0.00773+	0.00814**
	(1.77)	(1.85)	(2.06)
Transaction Value	-0.01942**	-0.02271**	-0.03184*
	(2.06)	(2.44)	(3.61)
Cash-Dummy	0.09892*	0.09969*	0.09345*
	(4.14)	(4.21)	(4.17)
Acquirer High-Tech	-0.10955*	-0.08542**	-0.06292+
	(2.78)	(2.19)	(1.70)
Target High-Tech	0.10478*	0.06350	0.03735
	(2.63)	(1.61)	(1.00)
Acquirer Tobin's Q	0.00370	0.00507	0.00749
	(0.40)	(0.55)	(0.87)
Acquirer Leverage	-0.08788	-0.18341**	-0.15002+
	(0.94)	(1.98)	(1.71)
Acquirer FCF	0.37295+	0.17567	0.11959
	(1.65)	(0.78)	(0.56)
Acquirer Asset	-0.00037	-0.00552	-0.00433
	(0.04)	(0.58)	(0.48)
Diversifying Dummy	0.03219	0.05222**	0.04479**
	(1.38)	(2.25)	(2.04)
Relative Deal-Size	-0.02861**	-0.03102**	-0.02256+
	(1.98)	(2.17)	(1.66)
Acquirer Deal-Size X Target High-Tech	0.02864**	0.03028**	0.02120
	(1.97)	(2.10)	(1.55)
Intercept	0.23669**	0.32404*	0.38163*
	(2.47)	(3.42)	(4.25)
Number of Obs	525	525	525

Table 5 Continued

R-squared	0.10015	0.10881	0.12114

After controlling for these charactderistics, Table 5 provides consistent support for our hypothesis. The G-index in this model is much more significant statistically than in the previous one, albeit still somewhat weak. In this model, whether the acquirer is a high-tech firm is statistically significant, whereas the target's industry does not affect the target CARs based on this model.

It is interesting to note that based on our sample the acquirer's leverage has the strongest effect on the target CARs. It means that higher leveraged firms lead to lower target CARs. There are three apparent possible interpretations. First, investors are concerned with the financial management of the acquirer. If an acquirer is in a weak financial position, acquiring other firms only further worsens its financial health. Second, highly-leveraged firms may have lower possibility and fewer resources to complete the deal. Third, existing leverage limits reckless managers' ability to overpay for a target, restricting the excessive premium expected by target shareholders.

One reason to control for the target size stems from an argument made by Moeller, Schlingemann and Stulz (2004). They find robust evidence that acquirer size is negatively correlated with the acquirer's announcement-period CAR. It is also a support for the managerial hubris hypothesis (Roll 1986) since they find that larger acquirers pay higher premiums. MWX offers an alternative explanation such that large firm size serves as a rather effective takeover defense, since it requires more resources to acquire them. Following their argument, if larger targets are harder to acquire simply because of their sheer sizes, then we should expect targets to experience lower CARs. Our finding supports the above argument.

The Diversifying acquisition dummy has significant effects on target CARs for the 5-day and 10-day windows. We define a diversifying acquisition as when the acquirer and target have different four-digit SIC codes. Targets experience higher CARs if the acquirer is from a different industry.

In Table 5, the relative deal size is significant in all event windows: the smaller the ratio between the deal size and acquirer's market capitalization, the larger are target CARs. In a perfect world, all targets would be valued relatively correctly and both buyers and sellers would not have to negotiate the acquisition price. This means that a justifiable premium is paid to the target despite the target size. But in reality, whether a deal goes through depends largely on the premium that an acquirer is able to pay. It is not only a result of a proper valuation of the target but the result of the acquirer's financing ability. Naturally, the larger a target is, the harder it is for an acquirer to finance the acquisition.

Prior literature has shown that Tobin's Q has an ambiguous effect on CAR, so the need to incorporate this factor is debatable. We do include Tobin's Q in our model but find no significance.

Whether a deal is cash-financed or not still plays an important role in how investors are evaluating the deals. Table 5 shows that deals that are financed at least partially by cash experience far higher CARs, which is consistent with the literature and the previous model specification.

Given that by adding acquirer characteristics we achieve a much higher statistical significance, and the base model seems inadequate to give meaningful results, for the

next two sections on the M&A market condition and the penny stock consideration we will only present the regression results based the model in Table 5. From here on, we will typically refer to it as the "key" model specification.

Controlling for M&A Market Condition

The mergers and acquisitions market experiences different cycles. M&A activity can be fueled by the financing capabilities of potential acquirers through the use of debt instruments such as high-yield bonds in the 1980s and collateralized debt securities in the past decade. M&A activity can also be fueled by positive outlooks in an expansionary economy.

In this regression model, we control for such effects by adopting a proxy for the M&A market condition. The proxy is defined as the average premium paid to targets in a given year. A premium is defined to be the offer price less the target's market price on the announcement day. If an acquisition is announced during a boom year, it is likely that an acquirer can be overly optimistic and offers a higher premium.

In the following regression (Table 6), we see that controlling for the market condition strengthens the effects of the G-indices, albeit only marginally. The market condition proxy is significant for all three windows, indicating that the target CARs are higher during periods of market prosperity.

Table 6
Controlling for M&A Market Condition

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variable is the targets' 2-day, 5-day, 10-day windows of cumulative abnormal returns around announcement dates. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	2-Day Window	5-Day Window	10-Day Window
G-index	0.00802+	0.00828**	0.00863**
	(1.94)	(2.02)	(2.22)
Transaction Value	-0.01326	-0.01679+	-0.02659*
	(1.42)	(1.81)	(3.02)
Cash-Dummy	0.10844*	0.10884*	0.10155*
	(4.60)	(4.66)	(4.58)
Acquirer High-Tech	-0.10265*	-0.07878**	-0.05705
	(2.65)	(2.05)	(1.57)
Target High-Tech	0.11973*	0.07787**	0.05008
	(3.04)	(2.00)	(1.35)
Acquirer Tobin's Q	-0.00208	-0.00050	0.00256
	(0.23)	(0.05)	(0.30)
Acquirer Leverage	-0.14370	-0.23707**	-0.19756**
	(1.55)	(2.58)	(2.27)
Acquirer FCF	0.40680+	0.20821	0.14842
	(1.83)	(0.95)	(0.71)
Acquirer Asset	-0.00095	-0.00609	-0.00483
	(0.10)	(0.65)	(0.54)
Diversifying Dummy	0.03685	0.05670**	0.04876**
	(1.60)	(2.48)	(2.25)
Relative Deal-Size	-0.03285**	-0.03510**	-0.02618+
	(2.31)	(2.49)	(1.95)
Deal-Size X Target High-Tech	0.03289**	0.03436**	0.02481+
	(2.29)	(2.41)	(1.84)
M&A Market Condition	0.00483*	0.00464*	0.00412*
	(4.42)	(4.29)	(4.00)
Intercept	-0.04009	0.05798	0.14589
	(0.36)	(0.52)	(1.37)
Number of Obs	525	525	525
R-squared	0.13335	0.13975	0.14788

As for the other control variables, both the magnitude and statistical significance of the parameters are consistent with those in Table 5. We feel that the market condition proxy is not necessary since the results for the G-index varies little whether the proxy is added although five-day return skips from 10% to 5%.

Penny Stocks Consideration

In this section, we study whether these results arose because of price irregularities associated with penny stocks. In our study, we define penny stocks to be targets whose stock prices are traded for less than $10.00 on announcement days. It is a general knowledge that penny stocks are typically riskier and their prices fluctuate more wildly than other higher-priced stocks. Penny stocks are also often associated with companies on the brink of bankruptcy, suffering from rumors of financial difficulties, or they are very small firms traded as OTCs. And since the price is low, the standard deviation associated with the price movement tends to be much larger than higher-priced stocks. That means that the result can potentially skew the effect of the G-index. The regression results based on the penny stock dummy and the key model specification are as the following:

Table 7
Controlling for Penny Stocks

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variable is the targets 2-day, 5-day, 10-day windows of cumulative abnormal returns around announcement dates. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	2-Day Window	5-Day Window	10-Day Window
G-index)	0.00739+	0.00768+	0.00803**
	(1.76)	(1.84)	(2.03)
Transaction Value	-0.01790+	-0.02209**	-0.02721*

Table 7 Continued

	(1.77)	(2.20)	(2.87)
Cash-Dummy	0.09736*	0.09725*	0.09152*
	(4.08)	(4.10)	(4.08)
Acquirer High-Tech	-0.10950*	-0.08277**	-0.05855
	(2.78)	(2.12)	(1.58)
Target High-Tech	0.10570*	0.06431	0.03484
	(2.64)	(1.62)	(0.93)
Acquirer Tobin's Q	0.00353	0.00463	0.00669
	(0.38)	(0.51)	(0.77)
Acquirer Leverage	-0.09751	-0.19775**	-0.16117+
	(1.05)	(2.14)	(1.84)
Acquirer FCF	0.40193+	0.22028	0.13129
	(1.78)	(0.98)	(0.62)
Acquirer Asset	0.00163	-0.00284	-0.00205
	(0.17)	(0.30)	(0.23)
Diversifying Dummy	0.02726+	0.02842+	0.01948
	(1.87)	(1.96)	(1.42)
Relative Deal-Size	-0.02713+	-0.02909**	-0.02071
	(1.88)	(2.02)	(1.53)
Deal-Size X Target High-Tech	0.01763	0.01678	0.06483
	(0.42)	(0.40)	(1.65)
Penny Dummy	0.15180	0.15345	0.07876
	(1.56)	(1.59)	(0.86)
Intercept	0.22528**	0.32582*	0.35181*
	(2.25)	(3.28)	(3.75)
Number of Obs	525	525	525
R-squared	0.10167	0.10492	0.12042

Table 7 shows that, after controlling for penny stocks, the effects of the G-indices are consistent and almost identical with those in Table 5 across all windows. It appears that the penny stock dummy itself is not significant and does not affect the results obtained from the key model specification. Like controlling for the market condition in Table 6, controlling for the penny stocks in Table 7 does not alter the results. Given the same reason as discussed in the last section, from here on, we will use the Table 5

model that includes the acquirer characteristics and 525 observations for the Part II analyses.

Conclusions: Part I

Based on the base model with 1427 observations and more advanced model with 525 observations, point estimates in both models are about the same. The results justify our hypothesis that targets acquired by acquirers with more ATPs, a negative proxy for the management quality, experience higher announcement returns for 2-day, 5-day and 10-day event windows around merger announcement days. The results extend MWX's argument that acquirers with more ATPs make more value-destroying acquisitions. Based on the data, the results provide evidence for our argument that acquirer ATPs create a wealth transfer mechanism between the acquirer shareholders and the target shareholders upon merger announcements. The results are marginally significant for the two and five day window and significant at 5% for the ten day window[9].

The above results have demonstrated that the regression model based on the deal characteristics and acquirer characteristics does the best job at explaining the effects of the G-index on target firm value. Controlling for the M&A market condition and penny stocks do not change the explanatory power of the G-index much. The regression results are virtual identical whether we control for M&A market condition and penny stocks or not. Therefore, for Part II, we will only use the "key" model in Table 5 as the basis for other analyses.

[9] The asymmetric windows are examined in Part II.

Part II: Acquirer Corporate Governance and Net Synergistic Effects

Theory and Hypotheses

In Part II, we study the impact of acquirers' corporate governance on net synergistic effects. Specifically, we examine how the capital market responds to the change in the acquirer and target's combined value with differing values of the acquirer's G-index. As mentioned in Part I, we will use only the "key" model from Table 5, which incorporates deal characteristics and acquirer characteristics. In Part II, we provide more detailed discussions on asymmetric windows, acquirer returns and a "breakeven" G-index.

The results in Part I provide support for our hypothesis that targets benefit more upon merger announcements from acquirers with poorer corporate governance. But as discussed earlier, there are two potential forces counteracting each other upon merger announcements. First, targets may benefit more from acquirers with poorer corporate governance because these acquirers tend to overpay. Second, targets may also benefit from acquirers with good corporate governance due to the eventual transfer of the corporate governance measures. Gompers, Ishii and Metrick (2003) and Bebchuk, Cohen and Ferrel (2002, 2004, 2005) find that better governance measures, stock ownership of board members, and CEO-Chair separation are significantly and positively correlated with better contemporaneous and subsequent operating performance. Therefore, the target's value can be impacted by the transfer of acquirer's corporate governance measures, though not as directly as the quantifiable merger premium paid to the target shareholders.

It is a common knowledge that acquirers' share prices tend to decline upon merger announcements. As discussed before, MWX provides evidence that acquirers with higher-ATPs experience more severe price declines than lower-ATP counterparts. But despite their finding, the mergers may still be synergistic after completion. Suppose that due to the hefty price a high-ATP acquirer pays for the target, the acquirer's share price decreases. Further suppose that this decrease is then perfectly matched by an increase in the target's public valuation upon the merger announcement. If so, then the merger has a zero net impact on the capital market. However, if the target's value increase outweighs the acquirer's value decrease, then the difference is positive, making the merger a positive impact on the market, and the combined company is greater than the sum of the acquirer and target as separate entities. In short, one plus one is greater than two. In the following, this difference is interpreted as the "corporate governance synergy," which may be positive or negative.

We then make a logical assumption: an acquisition is only bad when it yields negative net present value. The market cannot foresee the future; therefore, this present value is the expectation of future profits based on observable information. Corporate governance is one set of information that can be readily used to evaluate the merger and adjust expectations. An acquirer's good governance is transferred to the target upon merger completion, and a better managed combined entity emerges. Therefore, our main hypothesis is: If an acquirer has good corporate governance transferred to the target, the net effect of a merger should be more positive (or less negative) as evaluated by the capital market.

Methodology

The methodology largely follows Part I and specifically the methodology underlying Table 5 on the subsample of the mergers with acquirer characteristics. We acquired the data from the Securities Data Corporation's (SDC) U.S Acquisitions database. We identify 525 acquisitions between January 1990 and December 2007 that meet the following criteria:

1. Public acquirers incorporated in the U.S.
2. Public targets incorporated in the U.S.
3. Transaction value of more than $1 million.
4. The acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction
5. The acquirer has annual financial statement information available from Compustat and stock return data (210 trading days prior to acquisition announcements) from the University of Chicago's Center for Research in Security Prices (CRSP) Daily Stock Price and Returns file.
6. The acquirer is included in the Investor Responsibility Research Center's (IRRC) database of antitakeover provisions.
7. Both the acquirers and targets have beta less than 10 and more than -10.
8. Has acquirer information based on the model in Table 5, the "key" model.

The G-index methodology is already discussed in Part I. In Part II, following conventional practices of event studies, we begin by measuring both the acquirer and target announcement effects by market model adjusted stock returns around initial acquisition announcements. Acquiring firm and combined firm Cumulative abnormal

returns (CARs) are initially analyzed in 2-day, 5-day and 10-day windows as was done for target firms in Part I. We then analyze some asymmetric windows to case light on additional issues.

Calculating Combined Company Returns

We first obtain the share prices on the announcement days or the closest observable share prices (some transactions were announced on non-trading days) before announcement days, and the total shares outstanding. With the stock prices and shares outstanding, we calculate the combined values for the acquirers and their targets. To put simply, this combined value is simply the sum of the acquirer and target's market capitalizations. Note that this value is treating the acquirer and the target as independent companies, thus no synergistic measures are included.

We then obtain the acquirers and targets' CARs for 2-day, 5-day and 10-day windows for both the targets and acquirers. With this information, we calculate the abnormal changes in their stock prices in dollars. Combined with their shares outstanding, we arrive at abnormal value changes in actual dollar amounts.

With the abnormal value changes in actual dollar amounts, we are able to obtain the percentage value changes of the combined entities due to the merger announcements. These percentage value changes are the net synergies of mergers.

Empirical Results

The empirical results are based on the key model in Table 5. The statistical summaries of the obtained value changes and the explanatory control variables are as the following:

Table 8: Summary of Percentage Changes of Combined Companies					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
2-Day Combined Value Change	525	-0.01%	6.34%	-47.35%	28.42%
5-Day Combined Value Change	525	0.44%	9.11%	-52.73%	39.81%
10-Day Combined Value Change	525	0.72%	12.66%	-52.87%	48.57%

Table 9: Summary of Independent and Control Variables based on 525 Observations				
Variable	**Mean**	**Std. Dev.**	**Min**	**Max**
G-Index	9.329524	2.668015	1	16
Cash Dummy	0.5428571	0.498635	0	1
Acquirer Tobin's Q	2.303886	2.238831	0.8569028	38.41925
Acquirer Leverage[10]	0.1524272	0.1296178	0	0.7371824
Acquirer Free Cash Flows	0.050073	0.0662432	-0.3409396[11]	0.3531846
Acquirer Assets[12]	8.431283	1.552842	3.800443	13.90826
Relative Deal Size[13]	0.7939625	6.761617	0.0014006	137.2205

[10] Same as part I. Acquirer leverage is the book value of debt over the market value of total assets. The market value of assets is usually larger than the book value of assets, so the leverage ratio tends to be smaller than if the book value of assets is used.

[11] Acquirer Free Cash Flow is the year's free cash flow over the acquirer asset, thus it can be negative if the acquirer has negative cash flow that year.

[12] Same as part I. Acquirer assets is the logged value of assets in $millions.

[13] Same as part I. The relative deal size, defined as the logged deal size over the logged acquirer size, can be quite large, indicating that the acquirer size is close to 1, resulting in a logged value close to zero.

Table 9 Continued				
Acquirer High Tech Dummy	0.3047619	0.4607455	0	1
Target High Tech Dummy	0.2952381	0.4565848	0	1
Transaction Value[14]	6.544817	1.631246	3.003353	11.39827
Acq High Tech X Relative Deal Size	0.5248381	6.712816	0	137.2205

The summary table is based on the 525 observations that we use for the following analyses. The mean of the combined changes are close to zero; the 2-day, 5-day and 10-day combined value changes are -0.01%, 0.44% and 0.72%, respectively.

Combined Value Changes and Acquirer G-index

We examine the estimated influence of the G-index and additional control variables on the combined value changes. Target characteristics are not included due to data limitations; if included, the number of observations drops to 90, as explained in Part I. The regression results based on the key model and symmetric windows are the following:

TABLE 10
Combined Value Change

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variables are the combined company's 2-day, 5-day, 10-day windows of cumulative abnormal returns around announcement dates. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	2-Day Combined Value Change	**5-Day Combined Value Change**	**10-Day Combined Value Change**
G-Index	-0.00292*	-0.00577*	-0.01118*
	(5.06)	(7.09)	(8.37)

Excluding relative deal size larger than 10 (n=4), the mean becomes 0.35, and the standard deviation is 0.64

[14] Same as part I. Transaction value is the logged transaction value in $millions.

Table 10 Continued

Transaction Value	0.01112*	0.00388**	0.00305
	(8.58)	(2.12)	(1.02)
Cash Dummy	0.00655*	0.00865**	0.01117+
	(2.63)	(2.47)	(1.94)
Acquirer High-Tech	0.01090	0.02043**	0.02860+
	(1.54)	(2.05)	(1.75)
Target High-Tech	-0.01036+	-0.00817	-0.01619
	(1.82)	(1.02)	(1.23)
Acquirer Tobin's Q	0.00155	-0.00045	-0.00236
	(0.65)	(0.13)	(0.43)
Acquirer Leverage	-0.06228*	-0.10672*	-0.10765*
	(5.95)	(7.23)	(4.45)
Acquirer FCF	-0.17289*	-0.20147*	-0.11921
	(3.76)	(3.11)	(1.12)
Acquirer Asset	-0.00528*	-0.00453**	-0.00637**
	(4.15)	(2.52)	(2.17)
Relative Deal-Size	0.00208	-0.00381	0.00162
	(1.26)	(1.64)	(0.42)
Deal-Size X Target High-Tech	-0.00178	0.00404+	-0.00079
	(1.02)	(1.65)	(0.20)
Constant	1.00541*	1.09410*	1.17224*
	(75.46)	(58.25)	(38.06)
Observations	525	525	525
R-squared	0.18059	0.19885	0.18958

Table 10 provides support to our hypothesis that the acquirers' G-indices are negatively correlated with the net synergies of their mergers. It means that poor corporate governance leads to lower combined value changes in mergers. The results show that the capital market tends to be more negatively impacted by merger announcements coming from firms with poor corporate governance.

In Table 10, the cash dummy plays an important role. A target usually has a more positive response when the deal is financed by cash, meaning the target shareholders find cash to be more attractive as consideration, as discussed in Part I. But the combined company values are also affected positively when cash is used. It may be

that the shareholders of the acquirers are more comfortable when a merger is financed with cash; their stocks' earnings per share would not be diluted too much when additional shares are issued to finance the transaction.

Here, whether the target industry is high-tech has a minor effect on the combined firm value changes. The variable is only significant for the 2-day window, but this effect quickly disappears for the 5-day and 10-day windows. Whether an acquirer is a high-tech firm has a positive effect on the synergistic value change, which may be attributed to the high-growth strategy the acquirer adopts, as discussed in Part I. It is significant for the 5-day and 10-day windows. Tobin's Q continues to have no effects as was the case in Part I.

In Table 10, the acquirer leverage has negative and significant impacts. This can be looked at from two possible angles: First, leverage limits the acquirer's ability to raise merger premiums, as discussed in Part I. Second, when high-leveraged firms seek to expand through mergers, it is probable that the firms would have to increase their leverage. Stockholders may perceive this as a risky weakening of the firm's financial position, leading to a value decline.

An acquirer's free cash flow has a negative effect on the synergistic value for the 2-day and 5-day windows. The higher an acquirer's free cash flow, the more room it has to overpay. By definition, free cash flow is the cash that is readily distributable to shareholders and debt holders. Using the cash flows to pay for a merger instead of distributing them in the form of dividends or stock buybacks may have a negative signaling effect. Since free cash flows are the cash flows less other necessary capital expenditures for organic growth, a company that has high free cash flows tends to be

in an industry where growth prospects are more limited. Given that, the manager of a firm may resort to acquiring the competitors as a source of growth. However, shareholders may prefer dividend payouts to money spent on mergers.

We have now examined the effects of the G-index on target value and the combined value. Next, we look at synergies in more detail in the following sections, but first we look at the other component of the combined company value, the acquirer value. The combined value is particularly important as the change indicates the net impacts of mergers themselves. This goes beyond the mere zero-sum- game of shareholders of the acquirers and targets. We here are trying to gauge the net impacts of the mergers as calculated by the market model. The next section will start by discussing the G-index again and move on to discuss the methodology we use in calculating the net impacts.

The G-Index and Acquirer Returns

We examine the effects of the G-index on acquirer announcement returns in Table 11. The results here are consistent with those found by MWX. The negative impacts of high-G values are expected based on Table 10 (the combined values) because acquiring firms are usually larger than their targets. Therefore, greater G-index means lower acquirer CARs in Table 11, inferring from Table 10. The value of using the 10-day window is apparent since the coefficient is doubled that for the 5-day window, which is in turn triple the 2-day window.

TABLE 11
Acquirer Returns & G-index

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variables are the acquirer's 2-day, 5-day, 10-day windows of cumulative abnormal returns around announcement dates. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	2-Day Acquirer CAR	5-Day Acquirer CAR	10-Day Acquirer CAR
G-index	-0.00229*	-0.00689*	-0.01352*
	(4.02)	(7.93)	(7.88)
Transaction Value	0.01179*	0.00670*	0.00290
	(9.03)	(3.36)	(0.74)
Cash Dummy	0.00619**	0.01887*	0.03420*
	(2.38)	(4.75)	(4.36)
Acquirer High-Tech	0.00431	0.02111+	0.02902
	(0.59)	(1.90)	(1.32)
Target High-Tech	-0.01531**	-0.01189	-0.02629
	(2.54)	(1.29)	(1.44)
Acquirer Tobin's Q	0.00010	-0.00066	-0.00178
	(0.04)	(0.17)	(0.24)
Acquirer Leverage	-0.08664*	-0.11423*	-0.16264*
	(7.58)	(6.54)	(4.72)
Acquirer FCF	-0.21211*	-0.16729**	-0.09113
	(4.59)	(2.37)	(0.65)
Acquirer Asset	-0.00530*	-0.00521**	-0.00403
	(4.02)	(2.58)	(1.01)

Table 11 Continued

Relative Deal-Size	0.01586*	0.00574	0.01320+
	(6.21)	(1.47)	(1.71)
Deal-Size X Target High-Tech	0.00062	0.00046	0.00280+
	(1.11)	(0.53)	(1.67)
Constant	-0.00248	0.07775*	0.15215*
	(0.18)	(3.74)	(3.70)
Observations	525	525	525
R-squared	0.25963	0.18802	0.19537

Although cash is considered a more costly source of funding in an acquisition, in our data cash has positive effects on acquirer returns. Investment banks usually conduct an accretion/ dilution analysis for an acquirer to determine whether its earnings per share is diluted after accounting for the new shares that are to be issued to finance the acquisition. Investors may respond negatively to an acquisition that may severely dilute their earnings per share since the capital market usually responds to dilutions negatively. Financing a deal using cash limits such negative price responses, which may be the reason why the cash dummy has positive impacts on acquirer returns.

Combined Company Return with Asymmetric Windows

In this section, we examine the combined returns in asymmetric windows. The reason to look at the asymmetric windows is because the effects of the G-index are considerably different across the three event windows. It is conceivable that larger windows have greater effects because the market may have a lag in reaction after the announcement date, but it is also conceivable that the difference is attributed to a market "run-up" before the announcement date. In order to gain perspective as to whether the results are being driven by behavior after the announcement or by run-up before the announcement, we need to examine asymmetric windows.

Table 12 is a simple table demonstrating the G-index's effects in the asymmetric windows for the synergy model. The detailed regressions are presented in Table 13-15 below:

Table 12: Statistical Significance of G-Index for Asymmetric Windows		
minus2_plus2	**minu2_plus5**	**minus2_plus10**
-0.00292*	-0.00353*	-0.00458*
minus5_plus_2	**minus5_plus5**	**minus5_plus10**
-0.00574*	-0.00577*	-0.00738*
minus10_plus2	**minus10_plus5**	**minus10_plus10**
-0.01111*	-0.01166*	-0.01118*

The diagonal elements of Table 12 replicate the values from Table 10, and they are also in Tables 13-15. Starting in the first row, results show slightly more negative effects as the days 3-5 are added and again slightly more if the days 6-10 are added. A similar pattern emerges for the second row as well. The third row, however, yields almost the same result for the windows [-10, +2] and [-10, +5] or [-10, +10]. This suggests that much of the value changes come in the time frame [-10, -5], indicating a run up effect. This suggests either insider trading, rumors or information leakage prior to the announcement date.

If the capital market is highly efficient, one expects the G-index within [-2, +2] (the "2-day" window) days to have the strongest impact from the explanatory variables on the combined returns. The effects should be stronger because of less noise. However, as Table 12 also indicates, [-10, +10] has the strongest impacts.

Table 13 includes windows that are between [-2, +2], [-2, +5] and [-2, +10] days around the announcement days. Table 14 includes windows that are between [-5, +2],

[-5, +5] and [-5, +10] days. Table 15 includes windows that are between [-10, +2], [-10, +5] and [-10, +10] days.

Table 13
Combined Company's Value Change in Asymmetric Windows (1)

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variables are the combined company's cumulative abnormal returns around announcement dates for symmetric and asymmetric windows. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	minus2_plus2	minu2_plus5	minus2_plus10
G-Index	-0.00292*	-0.00353*	-0.00458*
	(5.06)	(5.49)	(4.66)
Transaction Value	0.01112*	0.00659*	0.00979*
	(8.58)	(4.58)	(4.44)
Cash Dummy	0.00655*	0.00392	0.01001**
	(2.63)	(1.42)	(2.36)
Acquirer High-Tech	0.01090	0.01324+	0.01037
	(1.54)	(1.69)	(0.86)
Target High-Tech	-0.01036+	-0.00169	0.01544
	(1.82)	(0.27)	(1.59)
Acquirer Tobin's Q	0.00155	-0.00370	-0.00583
	(0.65)	(1.40)	(1.44)
Acquirer Leverage	-0.06228*	-0.11565*	-0.11458*
	(5.95)	(9.95)	(6.43)
Acquirer FCF	-0.17289*	-0.16756*	-0.13493+
	(3.76)	(3.28)	(1.73)
Acquirer Asset	-0.00528*	-0.00433*	-0.00552**
	(4.15)	(3.06)	(2.55)
Relative Deal-Size	0.00208	-0.00245	-0.00239
	(1.26)	(1.34)	(0.85)
Deal-Size X Target High-Tech	-0.00178	0.00250	0.00261
	(1.02)	(1.30)	(0.88)
Constant	1.00541*	1.05968*	1.05724*
	(75.46)	(71.62)	(46.62)
Observations	525	525	525
R-squared	0.18059	0.30602	0.19251

Table 14
Combined Company's Value Change in Asymmetric Windows (2)

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variables are the combined company's cumulative abnormal returns around announcement dates for symmetric and asymmetric windows. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	minus5_plus_2	minus5_plus5	minus5_plus10
G-Index	-0.00574*	-0.00577*	-0.00738*
	(7.48)	(7.09)	(6.28)
Transaction Value	0.00968*	0.00388**	0.00808*
	(5.62)	(2.12)	(3.06)
Cash Dummy	0.01237*	0.00865**	0.01603*
	(3.74)	(2.47)	(3.16)
Acquirer High-Tech	0.01871**	0.02043**	0.01801
	(1.99)	(2.05)	(1.25)
Target High-Tech	-0.01648**	-0.00817	0.00915
	(2.18)	(1.02)	(0.79)
Acquirer Tobin's Q	0.00420	-0.00045	-0.00320
	(1.33)	(0.13)	(0.66)
Acquirer Leverage	-0.05800*	-0.10672*	-0.10931*
	(4.17)	(7.23)	(5.13)
Acquirer FCF	-0.21289*	-0.20147*	-0.17133+
	(3.49)	(3.11)	(1.83)
Acquirer Asset	-0.00680*	-0.00453**	-0.00698*
	(4.03)	(2.52)	(2.69)
Relative Deal-Size	0.00098	-0.00381	-0.00363
	(0.44)	(1.64)	(1.08)
Deal-Size X Target High-Tech	-0.00002	0.00404+	0.00450
	(0.01)	(1.65)	(1.27)
Constant	1.05018*	1.09410*	1.10306*
	(59.35)	(58.25)	(40.68)
Observations	525	525	525
R-squared	0.15041	0.19885	0.13475

Table 15
Combined Company's Value Change in Asymmetric Windows (3)

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variable is the combined company's cumulative abnormal returns around announcement dates for symmetric and asymmetric windows. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	minus10_plus2	minus10_plus5	minus10_plus10
G-Index	-0.01111*	-0.01166*	-0.01118*
	(10.82)	(10.34)	(8.37)
Transaction Value	0.00464**	0.00012	0.00305
	(2.01)	(0.05)	(1.02)
Cash Dummy	0.00793+	0.00536	0.01117+
	(1.79)	(1.10)	(1.94)
Acquirer High-Tech	0.03103**	0.03337**	0.02860+
	(2.47)	(2.42)	(1.75)
Target High-Tech	-0.04367*	-0.03513*	-0.01619
	(4.31)	(3.16)	(1.23)
Acquirer Tobin's Q	0.00305	-0.00248	-0.00236
	(0.72)	(0.54)	(0.43)
Acquirer Leverage	-0.07996*	-0.13346*	-0.10765*
	(4.30)	(6.53)	(4.45)
Acquirer FCF	-0.18521**	-0.18177**	-0.11921
	(2.27)	(2.03)	(1.12)
Acquirer Asset	-0.00726*	-0.00644*	-0.00637**
	(3.21)	(2.59)	(2.17)
Relative Deal-Size	0.00748**	0.00265	0.00162
	(2.54)	(0.82)	(0.42)
Deal-Size X Target High-Tech	-0.00526+	-0.00071	-0.00079
	(1.71)	(0.21)	(0.20)
Constant	1.15330*	1.20907*	1.17224*
	(48.71)	(46.47)	(38.06)
Observations	525	525	525
R-squared	0.26457	0.30646	0.18958

Now we have examined the effects of the G-index in the asymmetric windows and concluded that most effects are driven by stock run-ups. In the next section, we will use the three windows [-10, +2], [-10, +5] and [-10, +10] to see whether there exists a "breakeven" G-index under which the combined value is positive.

Breakeven G-index

In this section, we examine the "breakeven" G-index, meaning the number of ATPs, under which the expected value of the combined returns of the companies are positive. Using the key model specification, we set the combined change in these [-10. +2], [-10, +5] and [-10, +10] windows equal to zero to solve for the critical G-indices based on the regression results for the three windows. The following are the critical G-indices in the three windows:

	minus10_plus2	minus10_plus5	minus10_plus10
Breakeven G	13.24	13.02	13.52
Obs with G-index < 13	487	487	487
Obs with returns > 0	465	449	488

These three values are interpreted as "the critical point under which the value changes tend to be positive based on the model specification." For the following table, we drop the observations with G-indices larger than 13. The breakeven G-indices are around 13 for the three windows, higher than the mean G-index in the sample (mean=9). Given that the maximum G-index in the 525 observations is 16, it indicates that the G-index has to be pretty high for it to bring the combined values to become negative. In fact, if the positive values for returns are 487 observations, only 7% of the sample has negative returns seemingly induced by high values of the G-index. Table 16 is the regression result for the observations with G-indices less than the critical G-index value for the three windows.

Table 16
Combined Company's Value Change in Asymmetric Windows under Breakeven G-Index

The sample consists of 487 observations for G-index<13 out of 525 observations from the previous regression tables. The dependent variables are the combined company's cumulative abnormal returns around announcement dates for symmetric and asymmetric windows. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	minus10_plus2	**minus10_plus5**	**minus10_plus10**
Table 16 continued			
G-Index	-0.01242*	-0.01266*	-0.01205*
	(10.83)	(9.98)	(7.81)
Transaction Value	0.00697*	0.00171	0.00368
	(2.95)	(0.65)	(1.16)
Cash Dummy	0.00725	0.00305	0.00958
	(1.57)	(0.60)	(1.55)
Acquirer High-Tech	0.01443	0.01804	0.01905
	(1.08)	(1.22)	(1.06)
Target High-Tech	-0.03963*	-0.03143*	-0.01395
	(3.86)	(2.77)	(1.01)
Acquirer Tobin's Q	0.00682	0.00061	-0.00108
	(1.60)	(0.13)	(0.19)
Acquirer Leverage	-0.07775*	-0.12637*	-0.09867*
	(4.07)	(5.98)	(3.84)
Acquirer FCF	-0.25829*	-0.22494**	-0.11654
	(3.06)	(2.41)	(1.03)
Acquirer Asset	-0.00823*	-0.00728*	-0.00678**
	(3.64)	(2.91)	(2.23)
Relative Deal-Size	0.01287**	0.00363	-0.00333
	(2.51)	(0.64)	(0.48)
Deal-Size X Target High-Tech	-0.01036**	-0.00143	0.00429
	(1.99)	(0.25)	(0.61)
Constant	1.15321*	1.21090*	1.17677*
	(48.65)	(46.16)	(36.93)
Observations	487	487	487
R-squared	0.29038	0.31666	0.18501

We can see that the coefficients for the G-indices are stronger than before. Also, the coefficients for the three windows are highly similar, meaning that the additional information between [+3, +10] does not really affect the information structure with respect to the influence of the G-index.

Based on the above two sections, we see that most effects of acquirer corporate governance measures start days before the merger announcements. It is interesting to note that by including larger windows for event studies, one may strengthen the impacts of explanatory control variables. Most previous event studies on corporate governance include only the [-2, +2] windows, but the capital market may have begun responding to information leakage and rumors days before formal event announcements.

Conclusions: Part II

Based on the above results, we show that high-ATP acquirers engage in mergers that are not only destructive to their own firm values but on average result in lower net synergies. Moreover, the impact has to do with the fraction of sample with dependent variable negative or with G-index less than 13 based on our sample. Additionally, we confirm in Table 9 the results in MWX by showing that high-ATP acquirers engage in value-destroying acquisitions, or, to put it more mildly, an acquirer's higher G-index is negatively correlated to its stock price and causes a more severe decline in the stock price upon a merger announcement.

In asymmetric windows, the impact of the G-index on the combined company's value change is more significant when more days are included prior to announcement days, indicating that the "run-up" effects are more pronounced than the public announcement effects. Although slightly outside the scope of this paper, it would be interesting to see whether such run-ups are caused by information leakage or insider trading such that an acquirer's insider took actions to sell or buy stocks prior to the merger announcement based on its management quality (represented by the G-index).

In addition, based on our study of asymmetric windows, smaller windows tend to have weaker results, indicating that the capital market does not absorb the information in the days immediately around the announcement date, but rather the effects appear to be mostly run-up effects, with the stock market anticipating the announcement. Lastly, we calculate the breakeven G-index under which the net synergistic effects tend to be positive based on the three asymmetric windows. We find that the information after the announcement day does not affect the breakeven G-index.

Conclusions from This Study

Results from Part I and Part II are have provided support for our hypothesis that targets acquired by acquirers with more ATPs experience higher merger announcement returns. We also confirm MWX's argument in Part II such that acquirer with many ATPs experience greater decline in its stock price upon a merger announcement, and the results support our claim that acquirer ATPs create a wealth transfer mechanism between the acquirer shareholders and the target shareholders upon merger announcements. For the net synergistic effects, based on the above results, very high-ATP acquirers, roughly top 7 percent of in G-index values, engage in mergers that are not only destructive to their own firm values but on average result in lower net synergies. The broad, negative implications of a firm having many ATPs should not be ignored, and the market for corporate control should be allowed to function properly to protect shareholders.

Chapter 2

MARKET SHARES AND NET INTEREST MARGINS IN THE TAIWANESE BANKING INDUSTRY

Introduction

In Asia, the market structures of the banking industries in many newly industrialized countries have gone through significant changes in the past decade due to the Asian financial crisis, and rapid consolidation and high net interest margins (NIMs) have been the special characteristics for the financial markets in developing countries[15]. Among other developing nations, the Taiwanese banking industry is special for its consistent low market concentration and NIMs.

A competitive price is beneficial to consumers, but an overly-competitive banking industry may be harmful to a nation's economic development in the long run. In Taiwan, the banking industry is such a case where a fiercely competitive banking industry, combined with the previous administration's refusal to open up the border toward the Chinese government, resulted in small and unprofitable banks that are unable to compete internationally and service Taiwanese corporation's operations overseas. The increase in the number of competing commercial and retail banks was the result of the financial liberalization in 1991. In this study, we examine the gradual

[15] Demirguc-Kunt and Huizinga's (2000) empirical study finds that, for countries with underdeveloped financial systems, a move toward a more developed financial system reduces bank margins and profitability. More specifically, in developing countries, both the banks and stock markets are less developed, and the greater the development of a country's banks, the harsher is the competitive environment, the greater is the efficiency, and the lower are the bank margins and profits.

erosion of the NIMs of Taiwanese banks and their relationships with different market shares.

For this study, we obtain access to a comprehensive Taiwanese banking dataset. This dataset has never used in published academic papers studying the Asian banking industries. Because the time span of the database traces back to the origin of the financial liberalization in Taiwan in 1991, by conducting panel regression analysis, we are able to confirm some predictions regarding bank profitability and behavior. In addition, the Taiwanese banking industry serves as a good example for this type of study because its services have been largely unchanged for the previous two decades, and the only drastic changes were the rapid growth in the number of banks in the 1990s and the shift of focus from collateralized lending to credit lending after 2001[16]. Therefore, there is little noise in analyzing the relationship between NIMs and banks' market shares.

In what follows we examine some determinates of the NIMs of banks in Taiwan (the lending rate net of the borrowing rate). We will look at these margins as affected by concepts like "market power." In this regard it is important to distinguish between types of market power and to also understand the limitations of looking solely at NIMs.

Market power, as used in the literature, often carries a pejorative connotation, e.g., the implication of collusion or coordination between sellers. This should not be the case in all instances. Patents, for example, are a temporary granting of monopoly power (or

[16] This claim is discussed later in the paper.

market power) to encourage invention and technological progress. The market power here is generally for a single firm and considered to be a social good.

The tension between these two interpretations can be traced primarily to Bain (1951) and Demsetz (1973). Bain found a correlation between industry concentration and firm profits, which he interpreted as meaning that industries with higher concentration had higher profits due to collusion (tacit or explicit), supporting the pejorative interpretation of the term.

Demestz points out that, just as with patents, any innovations which lead to either superior technologies (low production costs) or superior products can lead to some firms enjoying the economics rents from their insights through individual firm (not collective) market power. His insight was that this could lead to a firm developing a higher market share and higher profits. The result could then be that industry concentration rises and industry profits rise, the correlation between concentration and profits could be due to market power, but unilateral market power rewarding successful entrepreneurial competition, a desired outcome just as with the patent system.[17]

What is the likely explanation for the concentration - profits relationships found in the literature, collective market power or unilateral market power? Scherer and Ross (1990) state that this is the "main question" in empirical industrial organization in the latter part of the twentieth century. Their conclusion is that the Demsetz hypothesis

[17] Dixit (1986) shows that with heterogeneous goods outcomes are highly dependent upon demand structures. So, for example, if Porsche comes out with a superior product it will gain higher profits and its very small share will increase, possibly eroding industry concentration. We ignore such effects.

"wins" the day with them saying that market "power appears to be wielded *not collectively*..." Although Jakubson, Jeong, Kim and Masson (2009) have a working paper which questions this (for Korean data) we will not pursue the issue in detail.

The reason for the importance of this debate to our work has to do with the distinction between market share and market concentration. Following Demsetz's work one might interpret a market share - firm profit correlation as "good" unilateral market power. An industry market concentration - industry profits correlation, however, can be due to either Bain's collusive hypothesis or Demsetz's superior firm hypothesis. So, in modeling NIMs, as functions of market shares or functions of market concentration, we have to be careful about interpretation of results. So correlations may be interesting, yet not determinative of a particular interpretation of results.

The second issue of importance is a certain limitation of looking at NIMs alone. Suppose one had identical firms and perfect competition. Suppose that it takes a dollar of deposits to make a dollar of loans. Further suppose that it costs \$c to convert a dollar of deposits to a dollar of loans. Then one would expect something like $r_{loans} = r_{deposits} + c$ where the NIM $\equiv r_{loans} - r_{deposits}$. Collective behavior could raise the NIM by creating $r_{loans} > r_{deposits} + c$. Alternative, one firm facing a lower c than its rivals might make profits while its rivals are breaking even.

To distinguish types of behavior, such as the behaviors implied by Bain or Demsetz's hypotheses one would need information not only on interest rates, but also on firm marginal costs. Without this information this study focuses on NIMs to see if shares, concentration or other factors explain these margins.

In this paper, we investigate how NIMs are affected by different types of market shares, macroeconomic variables and financial market structures, controlling for several firm-specific variables such as bank financial structures and lending practices. Then we will move on to different types of market concentration to examine the relationship between NIMs and market concentration.

Banking Industry Literature Review

Recent research, as surveyed by Levine (1997), shows that the efficiency of financial intermediaries can affect economic growth. Specifically, banks affect the net returns on savings and determine the required returns on investments. In order to achieve efficiency and service corporations, banks have to be sufficiently large to achieve the economies of scales which reduce operating costs. Bank consolidation waves in Hong Kong, Korea and Japan have produced some of the largest and competitive financial institutions in the world.

In general, financial institutions may benefit from consolidation for positive reasons. First, consolidation may create economies of scale, economies of scope and managerial efficiencies which may reduce costs. Second, financial institutions can expand and enter into other segments through consolidation, potentially lowering operating risks by further diversification. Third, consolidation may increase surviving banks' market power and induce collusion.

Berger and Hannan (1989) and Hannan (1991) study how U.S. banks in more concentrated local markets charge higher rates on corporate loans and pay lower rates on retail deposits, resulting in higher NIMs. Many papers have focused on the impacts

of concentration on the degree of competition in the banking sector and bank profitability. Demiguc-Kunt, Laeven and Levine (2004) analyzed the effects of concentration and bank regulation on U.S. bank spreads.

As for NIMs, Hanson and Rocha (1986) summarize the role that implicit and explicit taxes play in raising spreads and discuss some of the determinants of bank costs and profits, such as inflation, scale economies and market structure. The authors use aggregate interest data for 29 countries between 1975 and 1983; they find a positive correlation between NIMs and inflation.

Barth, Nolle and Rice (1997) use 1993 data from 19 industrial countries to study the impacts of banking power on bank returns on equity controlling for several bank and market characteristics. They find that variations in bank power, concentration, and the existence of explicit deposit insurance do not significantly affect the return on bank equity. However, their study does not control for many important variables that affect the base lending rates.

Kunt and Huizinga (1999) use bank-level data of 80 countries from 1988 to 1995 to show that differences in NIMs and bank profitability reflect a variety of determinants: bank characteristics, macroeconomic conditions, explicit and implicit bank taxation, deposit insurance regulation, overall financial structure and underlying legal and institutional indicators. They find that a larger ratio of bank assets to gross domestic product and a lower market concentration ratio lead to lower margins and profits, controlling for differences in bank activity, leverage and the macroeconomic environment.

Salas and Saurina (2002) provide empirical evidence on the effects of regulatory changes on the market power of Spanish banks. They study how banks responded to regulatory changes in terms of risk-taking behavior as the result of increased competition and reduced economic profits. In addition, the study shows that industry liberalization measures have increased competition and eroded banks' market power. They also find that banks with lower charter values tend to have lower equity-assets ratios, indicating lower solvency, and they experience higher risk.

Several papers examine the effects of bank M&As on prices. Mergers or consolidations increase market concentration, which increase banks' market power (by collusion, tacit or explicit) and theoretically create more unfavorable prices for customers on deposits and loans. But alternatively, banks may also reach better economies of scale and efficiency savings that may be passed on to customers. Prager and Hannan (1998) find that M&As increased local concentration in U.S. banking markets and had unfavorable price effects. Others such as Akhavein, Berger and Humphrey (1997) find mixed or insignificant effects of M&As' effects on prices in the U.S. Sapienza (2002) also finds mixed results for the Italian banking industry. Panetta and Focarelli (2003) explain that, based on their empirical research on the Italian banking sector, short-run effects of M&As may have short-run effects on prices that are unfavorable to customers, but that the long-run effects were favorable due to efficiency gains. In short, their logic is that the market power effects dominate in the short-run and the efficiency effects dominate in the long term.

Demiguc-Kunt, Laeven and Levine (2004) examine the impact of bank regulations, concentration and national institutions on bank NIMs using data on 1400 banks across

72 countries. They control for bank-specific characteristics and macroeconomic factors. The results show that tighter regulations on bank entry, restrictions on bank activities and regulations that limit the freedom of bankers to conduct their business all boost NIMs. However, we feel that comparing the NIMs across different countries without controlling for important economic variables such as the base lending rate for banks or the discount rate set by the central bank may result in ambiguity. They find a weak positive relationship between bank margins and concentration, but the relationship becomes insignificant when controlling for institutional development.

In this literature review we find several factors influencing banking competition and NIMs. From our review of the literature, it appears to us that there are some gaps which should be explored. For example, no papers have considered the basic sources of income and lending practices - some banks may depend on account service fees as an important source of revenue. Such banks, if large, may charge lower lending rates because they are volume-based, or they may charge lower interest rates because they are trying to expand.

In terms of actual lending practices, collateralized lending is also different from credit lending. If a bank focuses on the former type of lending, such that the borrowers have assets that can be seized and liquidated in the event of default, then banks can afford to charge lower lending rates. This type of lending usually consists largely of institutional lending or mortgages. As for credit lending, because the default possibility is based on a firm or a person's credit history, a bank usually charges higher lending rates to compensate for the additional risk. If a bank focuses more on credit lending than on collateralized lending, it will have higher average lending rates,

resulting in higher NIMs, holding all else equal. To the author's knowledge, no paper has taken this factor into account when conducting industry analysis.

The Taiwanese Banking Industry

Before 1989, most Taiwanese banks were state-owned. In 1989, the Lee administration passed and instituted a new banking law, essentially opening up the Taiwanese banking industry to the establishment of new privately-owned banks. The policy officially came into effect in 1991 and drastically lowered the barriers to entry in the banking industry. As soon as the deregulation went underway, 13 new banks were created. Before 1991 there were only twelve banks. In 1991, the entry of 13 new banks doubled the number of banks which continued to shoot up until there were 52 banks in 2002 after which consolidation and exit saw a decline to 37 banks in 2008.

Due to the competitive banking landscape, bank profits have been decreasing since the 1990s. The continuous, decades-long decline of the NIMs has posed a serious challenge. Interest earned from banking loans to consumers and firms is still the biggest income source for banks and the decrease in NIMs directly affects banks' returns on equity (ROE). Based on the data provided by the Financial Supervisory Commission and the Central Bank in Taiwan, in 1993 the seven state-owned major banks had an average ROE of 22.90% and the domestic non-state-own average was 12.46%. In 2000, the domestic average declined to 6.19% in 2000, -6.93% in 2002, 10.30% in 2004 and 1.95% in 2006.

Recognizing the over-banking problem, the Taiwanese government began a series of actions to meet these challenges. One law that was passed was the *Financial Holding*

Company Act. After the passage of the *Financial Holding Company Act* in 2001, fourteen financial holding companies were established, owning banks, insurers or securities firms. The government purposefully allowed the creation of such powerful financial conglomerates in hopes of seeing accelerated consolidation in the banking industry. However, the passage of the act did not facilitate the banking industry consolidation to an ideal level. After eight years, there are still 37 banks in Taiwan as of 2009, far too many when compared with other Asian countries such as Hong Kong, Singapore, Japan and South Korea. In these countries, the total assets market share of the three largest banks was 63% in South Korea, 83% in Hong Kong, 72% in Singapore, 68% in Australia, but only 16% in Taiwan (Hwang and Wu, 2007)[18]. Moreover, the state-owned banks continued to hold the majority market shares in Taiwan. These banks lack international competitiveness in terms of service qualities and product offerings[19], and a privatization of these state-owned banks would be necessary for these banks to get stronger market positions and increase the competitiveness in both domestic and international markets.

At the beginning of the millennium, pressured by the low profitability, banks began to focus on credit lending and offer innovative products. Products like the cash cards (many stores do not allow credit-card purchases in Taiwan), credit cards and collateralized debt obligations became popular. Because the lending amount is relatively small for each consumer, banks could charge higher lending rates.

[18] Of these countries only Hong Kong and Singapore are smaller than Taiwan, but both have stronger financial institutions than those in Taiwan.

[19] Indicated by the ranking of the World Economic Forum (WEF) and the Global Competition Index (GCI) in 2007.

Methodology

Data

Two databases owned by the National Taiwan University are used. One database includes the monthly data on the operational information such as bank lending rates, bank deposit rates, the deposit market shares, lending, depositing amounts and etc. The other database extracts the information from banks' quarterly filings; it has the basic performance measures, profitability and cost structure on a quarterly basis. The frequencies of these two databases are different such that the data extracted from the quarterly reports have only four observations for a bank per year, whereas the other database has twelve observations. If only quarterly data is used, some monthly data would be sacrificed. To utilize all available information, we replace the missing values based on the information available at the last observation. Aside from the above adjustments, there are no other modifications done to the datasets.

Over 400 variables are identified in the combined dataset, and the most important ones are chosen to construct the regression model. Moreover, aside from the high frequency and long length of data, this study is also unique in that it includes many control variables. The control variables include a comprehensive set of bank characteristics such as size, leverage and lending practices, macroeconomic indicators and financial market structure. As discussed earlier, the Taiwanese financial industry was largely stale before 1991. In this study, we use observations between 1991 and 2009 and end up with 5081 observations in total.

Model

This paper uses panel data regression with fixed effects to analyze the impacts of various types of market shares on bank NIMs. The pricing power is conventionally defined as the net interest margin, also called the bank spread. This study controls for a host of bank characteristics and macroeconomic variables by estimating regressions of the following form (base model):

$$
\begin{aligned}
NIM_{i,t} = \alpha_{0i} + \alpha_1 \text{Debt to Assets Ratio}_{i,t} + a_2\ \text{NPL Percentage}_{i,t} \\
+ a_3\ \text{Service to Interest Income Ratio}_{i,t} \\
+ a_4\ \text{Administrative Cost Percentage}_{i,t} \\
+ a_5\ \text{Discount Rate}_{t} + a_6\ \text{Base Lending Rate}_{t} + a_7\ \text{Market Share}_{i,t} \\
+ a_8\ Liquid\ Ratio_{i,t} \qquad (1),
\end{aligned}
$$

where i is the bank id, t refers to the time period considered in monthly frequency. Equation (1) is motivated by the dealership model of bank spreads developed by Ho and Saunders (1981), extended by Allen (1988), Angbazo (1997) and others, and the firm theoretical framework developed by Zarruck (1989) and Wong (1997). The two models predict how operating costs, regulatory costs, credit risks and market structure can affect interest spreads. Their models are modified in this paper, and we use ex ante NIMs whereas they use ex post NIMs[20].

The NIM is the difference between the weighted-average lending rate of the month, which is defined as the ex ante weighted-average contractual lending rates and

[20] Ex ante NIM is the pre-determined, contractual net interest margins, and ex post NIM is the difference between the interest payment actually received and the deposit interest paid out by the bank.

weighted-average lending rate on new loans, and the average deposit rate of the month, which is defined as the ex ante weighted-average contractual deposit rates and weighted-average lending rate on new deposits.

The debt-to-asset ratio is the ratio of total debt (bank liabilities) to total assets. Buser, Chen and Kane (1981) examine the theoretical relationship between bank profitability and bank capitalization. Banks that have high levels of liabilities compared with their equity would have higher incentives to get better-capitalized and engage in more prudent lending behavior, causing lower NIMs. In the 1990s, Berger (1995b) shows that U.S. banks have a positive relationship between bank profitability and capitalization. Banks that are well-capitalized also face lower expected bankruptcy costs for themselves and their customers, and they are able to engage in more profitable (riskier) lending practices.

The administrative cost refers to the ratio of administrative expenses to average assets. Banks which incur higher administrative costs per unit of business may have higher marginal costs of lending and in equilibrium some or all of the difference in marginal costs may be passed on in terms of greater NIMs.

The NPL percentage is the ratio of non-performing loans to total loans. Non-performing loans include the preexisting and current NPLs. NPLs typically only stay on a bank's balance sheet for a couple years, and then are written down at the discretion of bank managers or partially recovered by collection agencies. This variable captures the credit risk imbedded in the preexisting bank portfolio, which may likely affect the bank's attitude toward future risks and types of customers. This variable is often included in the literature, but it is especially important since we are

using ex ante NIMs. The NPL in this case captures the differing portfolio risks. Specifically, banks will charge higher rates of interest on riskier loans so banks with riskier loans and facing similarly riskier loans in the future will have higher average NIMs.

The discount rate is the government's marginal lending rate to banks, and it is set by the central bank. It is a fixed rate for banks to borrow money from the central bank. It is also called the interest rate for "discount window lending." The discount rate has not been studied much in the literature on bank spreads, but it represents a cost for the banks to borrow money from the central bank. Banks may be incentivized to pursue more deposits if liquidity is needed by paying more for them in the form of higher deposit interest rates, which may have a negative impact on NIMs. In equilibrium a bank may want to hold these safer assets because of having higher risk loans and wanting to balance those in its portfolio.

The base lending rate is targeted by the central bank. This interest rate is also known as the "federal funds rate," and it is the shot-term rate at which the banks lend to each other. It is also known as the minimum lending rate and serves as the basis for debtors to refinance loans, meaning that a higher base lending rate should have a positive relationship with the NIMs.

The liquid ratio is measured as the ratio of liquid assets to total assets. Liquid assets include cash and deposit balances in other banks, including reserve requirements at the central bank. A high liquidity ratio, whether self-imposed or required by regulatory authority, inflicts a cost on banks since they have liquid assets on their balance sheets that can be reallocated to less-liquid but higher-return assets.

Four different kinds of market shares are used. There are the average monthly deposit market share, the bank branch market share (out of total branches in the country), credit lending market share and collateralized lending market share. The first two are concerned with the absolute bank size in the industry, and the latter two address the bank lending practices. The average monthly deposit market share is the market share of the total deposits a bank has in the financial market. Bank branch market share is self-explanatory, though not often used in the literature. The bank branch market share is important in Taiwan since online banking is not yet prevalent in Taiwan, and most customers have to go to a physical location to receive banking services. Credit lending and collateralized lending market shares are the market shares of how much credit loans and collateralized loans a bank makes in a month. To the author's knowledge, these two explanatory variables have never been used in literature.

Net Interest Margin and Profitability

This study uses ex-ante interest spreads. The ex-ante spread is the difference between the contractual rates charged on loans and rates paid on deposits. It is appropriate in our context to use the ex-ante NIMs because this study examines the pricing power of banks. In the literature, researchers usually use ex-post NIMs, which is the spread between banks' actual interest revenue and their actual interest expense. The reason is that ex-ante spreads are generally only available at the aggregate industry level and are put together from a variety of sources. In this study, we are able to obtain historical ex-ante data at the firm level.

Again, most papers use ex-post spreads because the ex-ante spreads, determined by contractual agreements, are not available. The ex-post spread is the difference

between the implicit average interest charged on loans and the implicit average interest paid on deposits. The spread is calculated by taking the total quarterly interest received divided by the average loans for the period less the total interest paid on deposits divided by average deposits. But the ex post spread in reality does not represent the pricing power of banks. There are several shortcomings. First, the interest received by a bank already incorporates default risks – when a debtor defaults, a bank does not receive interest. A debtor would not have lower default risk because the lender has more market share or because the banking industry is more or less concentrated. Second, the interest rate received by a bank during the quarter does not represent the bank's pricing power – the bank can be receiving interest this quarter from a loan made years ago.

Empirical Results

Before we get to the empirical results, we must first discuss the limitations of looking only at NIMs. As mentioned earlier, by using market shares, we are examining whether banks benefit as described by Demsetz's "superiority" hypothesis. There are two sides when looking at a firm's superiority – the cost side and the demand side.

On the cost side, the concept can be illustrated by a simple Bertrand model. First, assume there are 100 buyers of one unit each. Each buyer has value of \$1.00 for a unit with no service and \$1.10 for a unit with service. Assume constant returns to scale and that all sellers (banks) have marginal cost of $c_i = c = \$0.25$ for the product and of s_i = infinity for the service added to any unit. And assume that N is large.

In a symmetric Bertrand game, P=MC implies that P=$0.25. It is conventional but not necessary to assume that each firm sells 100/N units. Clearly, P not only equals MC, but P=AC, and the profits are zero.

Now, assume a firm learns how to produce units at MC<$0.25, say MC=$0.20. It will charge a price equal to its rival's MCs minus epsilon (price differences) and get the entire market. To keep things simple, call the innovating firm, firm 1, and suppose that epsilon were a penny, $0.01. Then price falls to P=0.24 and firm 1 share goes to 100%, the entire market. Note that the price of firm 1 falls as its share goes up (and it is conventional to say that all other firms remain in the market at price $0.25 and shares = 0). The apparent "margin" in terms of price falls. Or maybe put another way, the margin relative to MC, where MC is defined as pre-innovation MC has fallen from $0.00 to -0.01 (a negative margin). The problem here is that the true margin has gone up from $0.00 to $0.04 for the superior firm. To put into the context of this paper, we need to observe not only P (the lending rate) over time but also c_i (the lending cost) over time. This is the problem with looking at NIMs, they are pure prices, and do not reflect costs and cost changes over time. Therefore, in this paper, results obtained from the regression do not examine the cost side of the superiority hypothesis. But one can predict that if a bank does attain a cost advantage, then as the bank gains share, the NIMs go down.

As for the demand side of the superiority hypothesis, we can illustrate some issues using a particular set of preferences. This is a game in which consumers have preferences between sellers. In particular these preferences are not at all like Hoetelling preferences (a much harder model) or like Chamberlin's symmetric

differentiation. They are simply that some consumers happen to like any seller who offers one unit of s per sale to all others if the prices are identical.

Now again suppose firm 1 is a superior firm and learns how to add a unit of service to its product for s_1 =0.05 (a nickel). It could choose to not offer service, and earn zero profits and have a share of 100/N. But it could offer service. Service is worth $0.10 to half the population. To avoid epsilons, suppose that if sellers 2,...N are selling at P=0.25, that firm 1 can capture the service folks at $0.25 + $0.09 (nine cent premium, rather than a $0.099… premium reflecting an epsilon below $0.35).

Firm 1 now has a price of $0.34 and earns *unobservable* profits of (0.09-0.05)*50=$2.00 and its share increases to 50% of the market. Firms 2,...N still charge a price of 0.25 in equilibrium and following convention each now has a share of 50/N.

What one can observe, without seeing costs, is that the *average* price of product goes from $0.25 to $0.295 (using industry data) and firm 1's price goes from $0.25 to $0.34 using firm data. One cannot observe the superiority rents (market power) due to the fact that marginal costs, with and without service, are unobservable. (Note that although firm 1's price goes up by $0.09, its margin only goes up by $0.04, but one can't see this if costs are unobservable).

Here the superiority leads to a higher observed price (NIMs) for firm 1 because the superiority is on the demand side, not the cost side. This is a story in which market share and NIMs are positively correlated. So, cost side superiority leads to firm shares associated with lower firm NIMs and demand side superiority to firm shares associated with higher NIMs. In what follows we find that NIMs are related to shares

as would be expected in a demand superiority model, not like they would be in a cost superiority model.

Table 1: Variable Summary

Variable	Obs	Mean	Std. Dev.	Min	Max
NIMs	5278	3.571449	2.339307	0	64
Debt to assets ratio	5272	89.76445	11.46907	0.73	99.17
NPL percentage	5278	3.001228	2.432975	0	16.33
Service/ interest income	5242	0.0571841	0.052747	0	0.779462
Administrative cost/ total revenue	5260	23.23901	7.73967	0	64.17
Discount rate	5278	3.575374	1.550582	1.25	6.25
Base lending rate	5278	6.08897	1.898596	3.162	8.647
Credit/ collateralized lending	5042	9.644629	69.92915	0	556.5624
Liquid ratio	5272	0.2645425	0.0972346	0.0317914	0.9690241
Loss reserve ratio	5199	1.231333	0.7663322	0	10.42
Total assets growth	5260	15.03355	36.75141	-38.76	902.81
Lending to deposit ratio	5244	90.19424	36.0609	0	508.93
Bank asset to GDP	5149	5210.793	1385.181	818.3441	7586.106
GDP growth rate	5149	4.721824	4.214922	-9.88	12.62
Stock cap to GDP ratio	5149	0.7818385	1.335686	0.1760109	7.555964
Monthly total assets	5279	1.35E+10	5.37E+09	0	2.15E+10
Mkt share of credit lending	5230	0.0397706	0.0495375	0	0.4465027
Mkt share of collateralized lending	5230	0.0397706	0.0485395	0	0.6360543
Log total branches	4754	7.929741	0.19211	7.499424	8.105609
Average monthly market share (%)	5117	2.214688	2.036833	0	9.21
Bank branch market share	4651	0.0234938	0.0171975	0.0006037	0.0919118

Average Monthly Deposit Market Share and Branch Market Share

In spread estimations such as Peria and Mody (2004), authors usually make some assumptions in the panel regression analysis. First, they assume there are no structural shifts in the relation between bank spreads and their determinants, and second, they ignore possible common shocks or time trends. In this paper, we divide the time horizon into two sub-periods. The first period is from year 1991 to 2000. This is

because the first financial reform began in 2001 and worsened the situation; it induced the banks to engage in fierce competition for depositors by lowering the collateralized lending rate. They wanted to get bigger in order to avoid being acquired and absorbed by competitors. Therefore, after 2001 one may expect the deposit market share to have a negative impact on NIMs because the kind of market share was earned by lowering the NIMs. Since the consolidation progressed quite slowly, this price war became a continuous practice, causing Taiwanese banks to have the lowest profitability in Asia. The sub-periods are a unique aspect of this study. By doing so, we can capture the structural shifts of the industry and conduct analysis without assuming there were not structural shifts, common shocks or time trends.

Tables 2, 3 and 4 report the results of panel regressions based on the first two market share types. The three tables are based on three different model specifications; Table 2 is based on firm characteristics (base model), Table 3 adds control variables based on lending practice information, and Table 4 adds more control variables based on macroeconomic data.

Table 2 reports the results of the base model. Two types of market shares are included: the average monthly deposit market share and the bank branch market share. The average monthly deposit market share is measured by a bank's total deposit amount over the total deposits owned by the entire industry. The second type of market share is the bank branch market share. This proxy is rarely used, but in practice, the more branches a bank has, the more convenient it is for depositors to engage in daily transactions. A higher bank branch market share may give a bank some power to price the loans higher since consumers may not compare the lending rates of all banks before making a borrowing decision. Also, the branch market share is important

because first, depositors can sacrifice some pricing advantages for convenience, and second, a bank with a high branch market share may have a more established reputation in the marketplace, and depositors may not compare different deposit rates and go directly with large banks, implicitly ceding pricing power to the banks. Additionally, the higher a bank's branch share is, the higher the service income, which may result in a higher service income to interest income ratio. The panel regression already controls for this ratio, so if branch market share still has positive impact on NIMs, such impact may be the result of a bank's unilateral market power. With more branches, customers may find a bank more convenient and deposit their money at the bank. With the higher demand for deposits, the bank may effectively lower the deposit rates and enjoy higher NIMs. Later we will control for different lending practices to see which types of market shares directly impact the NIMs. In Table 2, banks that have higher debt ratios have lower NIMs, and the result is economically and statistically significant and consistent across time periods. The NPL percentage, which is the non-performing-loans to total loans ratio, has a positive effects on NIMs between 2001 and 2009. Non-performing loans may be the result of risky lending. Banks generally charge higher lending rates for riskier borrowers.

Table 2: Deposit and Branch Market Shares – Base Model

Average monthly deposit and branch market shares are used as the explanatory variables of interest. The regression model uses fundamental bank information, excluding macroeconomic and lending practice information. Absolute value of t statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

	Average Monthly Deposit Market Share			Bank Branch Market Share		
	All	**1991~2000**	**2001~2009**	**All**	**1991~2000**	**2001~2009**
Debt-to-Asset Ratio	-0.06503***	-0.03433***	-0.06772***	-0.18554***	-0.23689***	-0.07322***
	(15.51)	(4.95)	(11.19)	(43.33)	(38.98)	(11.89)
NPL Percentage	0.06416***	0.01672	0.12501***	0.11648***	0.04651	0.12597***
	(7.05)	(1.02)	(13.57)	(10.26)	(1.64)	(13.55)
Service Interest to Total Income	3.64992***	11.69017***	2.33535***	4.44110***	27.34636***	2.23780***
	(7.06)	(8.68)	(5.13)	(7.27)	(13.98)	(4.82)
Administrative Cost Percentage	0.03917***	0.16737***	-0.03520***	0.01251***	0.15853***	-0.03369***
	(11.35)	(21.89)	(9.89)	(2.93)	(12.02)	(9.27)
Discount Rates	-0.05206***	-0.51979***	-0.11768***	-0.02824	-0.47715***	-0.10248***
	(2.68)	(8.86)	(5.00)	(1.22)	(5.22)	(4.27)
Base Lending Rate	0.14704***	0.77028***	-0.09895***	0.01795	0.59308***	-0.10413***
	(8.24)	(8.80)	(6.17)	(0.85)	(3.60)	(6.38)
Liquid Ratio	6.37397***	5.24137***	2.07630***	6.80676***	-0.24302	2.42186***
	(24.53)	(10.44)	(7.48)	(21.40)	(0.30)	(8.19)
Average Monthly MKT Share	0.15968***	0.12501**	-0.22880***			
	(5.97)	(2.26)	(6.44)			
Bank Branch MKT Share				0.48439***	0.56965***	-0.06160*
				(14.73)	(5.58)	(1.90)
Observations	5081	2290	2791	4621	1802	2819
Number of Banks	32	29	32	32	29	32
R-squared	0.23392	0.49333	0.24600	0.39503	0.59988	0.23167

The NPL percentage is then a proxy for the overall risk profile of bank's lending portfolio. The results are consistent with each other and significant at 1% level when the panel regressions include all observations from 2001 to 2009. The reason why the NPL is not significant between 1991 and 2000 may be because banks mostly engaged in collateralized lending, and NPL ratio was consistently low at the time. In Taiwan, the NPL was not a problem until banks began issuing too many credit cards and cash cards while underestimating or neglecting to monitor the default risks of the consumers.

The administrative cost is the ratio of administrative expenses to average total assets. If banks incur high administrative costs in the process of providing their services as intermediaries, given the increased marginal cost, in equilibrium this should lead to higher lending rates for some or all banks. In previous papers, including Peria and Mody (2004), this variable always has a positive impact in NIMs. However, it is interesting to note that the administrative cost has different effects in different time periods in my sample. Overall, the administrative cost has a positive effect on NIMs, but between 2001 and 2009, the effect is negative. It illustrates a unique phenomenon in the Taiwanese banking industry such that banks were still expanding rapidly during the period, resulting in higher administrative cost, but they were not able to pass the expenses on to the borrowers and depositors for fear of losing market shares.

The liquid ratio is measured as the ratio of liquid assets to total assets. Liquid assets are defined as cash, deposits in other banks and excess reserves at the central bank. Excess reserves are defined as the federal deposits in excess of the required reserves. For example, a bank has a deposit of $100, and if the Federal Reserve requirement is

10%, then $10 will be the required reserve. If the bank deposits $20 at the central bank for the $100 deposit, then the $10 is the excess reserve. In the literature, high liquidity ratios are said to inflict a cost on banks since they have to give up holding higher-yielding assets. Supposedly, banks would transfer this opportunity cost to borrowers, resulting in higher spreads. In Table 2, one can see that in all samples and sub-samples except one, higher liquidity ratios do result in higher NIMs.

The average monthly market share and bank branch market share both have positive and significant impacts on NIMs for the entire sample and between 1991 and 2000. But from 2001 to 2009, the average monthly market share has a negative impact on NIMs. In Taiwan, after the first financial reform, according to *Current Asian Banker Analysis*'s publication in 2006, banks began issuing credit cards and cash cards because they yielded higher interests. Gradually, banks' operations became largely focused on credit lending. The fact that the average monthly market share has a negative impact from 2001 to 2009 may potentially be attributed to the changing lending practice from collateralized lending to credit lending. As Taiwanese banks became more leveraged and focused on credit lending, the deposit and branch market shares became less relevant.

Table 3 adds several more control variables. With these additional variables, samples and sub-sample panel regressions all have improved R-squares. This regression model includes the variables from the base model and four other variables that are related to a bank's internal operation and lending practices.

The loan-loss reserve is what the bank managers set aside from earnings to prepare for possible defaults. The managers have a lot of latitude in deciding how much to set

aside, and this amount would be booked as expenses. If the loan-loss reserve overestimates the actual default rate, the remaining amount shows on the next year's financial statement as the loan recovery. There are several reasons why managers set aside different amounts in different years. First, if a manager feels that the bank's lending portfolio is riskier than that of the previous year, the manager will set aside a higher portion of earnings into the loan-loss reserve. The loan-loss reserve to total lending ratio is another proxy for portfolio risk. Second, managers may also set aside such funding in preparation for a possible downturn of the financial market. Third, managers also use it as a tool for income management in order to meet analyst expectations.

Table 3 shows that the overall effect of the loan-loss reserve to total lending ratio is positive and significant. However, in subsamples, the effects are positive between 2001 and 2009 and negative between 1991 and 2000. As mentioned above, Taiwanese banks mostly engaged in collateralized lending in the early years of deregulation, and future cash flows from collateralized lending were more predictable. The bank managers may have been setting aside money for a possible financial downturn instead of using the loan-loss reserve as a risk management tool.

Table 3: Deposit and Branch Market Shares – Adding Lending Practice Information

Average monthly deposit and branch market shares are used as the explanatory variables of interest. The regression model uses fundamental bank information, excluding macroeconomic and lending practice information. Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

	Average Monthly Deposit Market Share			Bank Branch Market Share		
	All	1991~2000	2001~2009	All	1991~2000	2001~2009
Debt-to-Asset Ratio	-0.03246***	-0.03401***	-0.06153***	-0.18169***	-0.21607***	-0.06725***
	(7.09)	(5.10)	(10.35)	(43.43)	(37.26)	(11.08)
NPL Percentage	0.06000***	0.07866***	0.12781***	0.11713***	0.13906***	0.12817***
	(6.58)	(5.13)	(13.73)	(10.41)	(5.19)	(13.63)
Service Interest to Total Income Ratio	3.92158***	13.12071***	1.40197***	4.14365***	25.60361***	1.35685***
	(7.49)	(9.57)	(2.98)	(6.71)	(12.75)	(2.83)
Administrative Cost Percentage	0.03305***	0.15423***	-0.02727***	0.00750*	0.12635***	-0.02594***
	(9.61)	(22.34)	(7.73)	(1.79)	(10.46)	(7.18)
Discount Rates	-0.07128***	-0.28636***	-0.06618***	-0.04543**	-0.07021	-0.05204**
	(3.66)	(4.95)	(2.83)	(1.99)	(0.72)	(2.18)
Base Lending Rate	0.15457***	0.57027***	-0.09410***	0.00426	0.31988**	-0.09636***
	(8.95)	(6.80)	(6.01)	(0.21)	(2.11)	(6.04)
Liquid Ratio	5.33713***	1.42019***	1.77920***	7.13189***	-0.21343	2.19049***
	(20.80)	(2.87)	(6.61)	(23.11)	(0.26)	(7.62)
Loss Reserve to Total Lending Ratio	0.17275***	-0.25029***	0.05006**	0.08386***	-0.05653	0.05175**
	(7.11)	(2.98)	(2.43)	(2.98)	(0.44)	(2.45)
Total Assets Growth Rate	0.01306***	0.01269***	0.01701***	0.01163***	0.00611***	0.01716***
	(17.23)	(17.86)	(13.84)	(20.21)	(8.12)	(13.66)
Lending to Deposit Ratio	-0.00574***	-0.03142***	-0.00210***	-0.00452***	-0.04210***	-0.00208***
	(7.65)	(14.36)	(3.28)	(5.10)	(11.49)	(3.19)
Credit-to-Collateralized Lending Ratio	-0.00072***	0.02709	-0.00064*	-0.00031	-0.11461	-0.00050
	(2.68)	(0.29)	(1.76)	(0.96)	(0.73)	(1.36)
Average Monthly MKT Share	0.10812***	0.18975***	-0.25218***			

Table 3 Continued

	(3.95)	(3.87)	(7.18)			
Bank Branch MKT Share				0.53610***	0.50941***	-0.04771
				(16.23)	(5.41)	(1.49)
Observations	4947	2214	2733	4524	1763	2761
Number of Banks	32	29	32	32	29	32
R-squared	0.29187	0.62342	0.29645	0.45581	0.69793	0.28113

As for the total asset growth rate, given that the shareholders' equity at book does not fluctuate greatly from year to year, the total assets growth mainly reflects an increase in deposits. A bank that is growing in deposits would have more room for profitable but riskier lending. The overall effect of the total asset growth rate is positive and significant for all samples.

The lending to deposit ratio is the total lending to the total deposit ratio. The lending to deposit ratio has the same effect on the bank lending practices as the debt-to-asset ratio. If a bank's deposits are low compared to what the bank has lent out, then a bank would be forced to engage in more prudent lending practices, avoiding higher risk borrowers. Table 3 shows that the lending to deposit ratio has a negative and significant effect on NIMs, indicating that banks with higher ratios make loans at lower NIMs across all periods.

Table 4 includes additional variables based on macroeconomic data. For the third model specification, we incorporate the total bank assets as an indicator of market structure and scale effects. The total bank assets to GDP ratio is a proxy for the banking industry's power in the country. If the ratio is large, it means that the banking industry is more powerful in the country. In the panel regression analysis, we get positive and significant results for all samples except for monthly average deposit market share from 1991 to 2000. It means that the banking industry is able to impose higher NIMs as it becomes larger relative to the country's economy.

The annual GDP growth rate provides inconclusive results. A central bank tends to raise interest rates during a bull market to fight inflation, and banks follow suit to raise their lending rates. As a result, banks usually experience high NIMs when the GDP

growth rate is high. Of course, to attract more deposits to fuel a bank's lending activity, it has to raise the deposit rate eventually. But there is usually a lag between the raising of the lending rate and the raising of the deposit interest rate, and Table 4's inconclusive results may be a result of this lag.

Table 4: Deposit and Branch Market Shares – Adding Macroeconomic Information

Average monthly deposit and branch market shares are used as the explanatory variables of interest. The regression model uses fundamental bank information, lending practice and macroeconomic information. Absolute value of t statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

	Average Monthly Deposit Market Share			Bank Branch Market Share		
	All	1991~2000	2001~2009	All	1991~2000	2001~2009
Debt-to-Asset Ratio	-0.04030***	-0.03870***	-0.06353***	-0.05996***	-0.06785***	-0.07091***
	(8.19)	(5.54)	(9.76)	(9.66)	(5.16)	(10.74)
NPL Percentage	0.05840***	0.03055*	0.13299***	0.08685***	0.05954***	0.13684***
	(6.33)	(1.82)	(13.34)	(9.25)	(3.14)	(13.70)
Service Interest to Total Income Ratio	3.88882***	12.07762***	1.22730***	3.53967***	14.33368***	1.16710**
	(7.50)	(8.83)	(2.60)	(6.83)	(10.59)	(2.43)
Administrative Cost Percentage	0.03024***	0.15156***	-0.02740***	0.01127***	0.16136***	-0.02671***
	(8.60)	(21.28)	(7.42)	(3.14)	(19.26)	(7.11)
Discount Rates	-0.08349***	0.21138**	-0.05050**	0.04239*	0.26551**	-0.03941
	(3.70)	(2.31)	(1.98)	(1.76)	(2.50)	(1.51)
Base Lending Rate	0.11540***	0.15396	-0.07554***	0.07552***	0.33024***	-0.06835***
	(6.27)	(1.61)	(4.34)	(4.19)	(2.79)	(3.86)
Liquid Ratio	5.15146***	1.55733***	1.84433***	5.93222***	1.13674*	2.30483***
	(18.56)	(2.77)	(6.47)	(20.73)	(1.86)	(7.79)
Loss Reserve to Total Lending	0.15884***	-0.29814***	0.03983*	0.12539***	-0.15460*	0.03776*
	(6.60)	(3.56)	(1.91)	(5.35)	(1.87)	(1.78)
Total Assets Growth Rate	0.00973***	0.01286***	0.01553***	0.00341***	-0.00052	0.01537***
	(10.15)	(11.20)	(12.39)	(2.77)	(0.27)	(12.03)
Lending to Deposit Ratio	-0.00519***	-0.02972***	-0.00236***	-0.00410***	-0.03435***	-0.00243***
	(6.91)	(12.62)	(3.69)	(5.49)	(13.59)	(3.74)
Credit-to-Collateralized Lending	-0.00078***	-0.09523	-0.00063*	-0.00044	0.06189	-0.00049
	(2.92)	(1.03)	(1.75)	(1.64)	(0.59)	(1.33)
Bank Assets to GDP Ratio	-20.79080***	-29.56286***	10.54492***	11.06077***	10.15738*	11.57668***
	(8.47)	(9.26)	(3.07)	(3.19)	(1.87)	(3.31)

Table 4 Continued

GDP Growth Rate	-0.01890***	-0.05628***	0.01198***	0.00385	-0.01886	0.01177***
	(4.00)	(4.12)	(2.78)	(0.79)	(1.30)	(2.68)
Stock Capitalization to GDP Ratio	-0.08756***	0.64845***	-0.02012*	-0.09836***	1.11856***	-0.02891**
	(6.46)	(2.66)	(1.80)	(7.37)	(4.49)	(2.52)
Monthly Total Assets	0.36699***	0.93384***	0.33883	0.27287**	-0.05567	0.58025***
	(3.80)	(5.78)	(1.56)	(2.43)	(0.26)	(2.62)
Average Monthly MKT Share	0.10014***	0.11480**	-0.23911***			
	(3.65)	(2.33)	(6.72)			
Bank Branch MKT Share				0.40110***	-0.035820	-0.047369
				(14.36)	(0.47)	(1.42)
Observations	4922	2189	2733	4507	1746	2761
Number of Banks	32	29	32	32	29	32
R-squared	0.28840	0.61266	0.30484	0.25143	0.36631	0.29347

The average monthly deposit market share yields significant results consistent with the previous two model specifications, and the branch market share's aggregate sample result is significant and consistent as well. However, the subsamples' results are insignificant in this model specification. Moreover, this specification is not better than the second one based on the R-square, since the R-squares are all lower than those of the second model specification.

Based on the above results, we can see that the deposit market shares and branch market shares overall are positively correlated with banks' NIMs. But the coefficients become negative between 2001-2009. It indicates that the absolute size and the number of branches do not provide a bank with an advantage during this period. Interpreting the results from the demand side of the superiority hypothesis, bank sizes (the level of deposits and the number of physical locations) allow the banks to enjoy greater demands during 1991-2000, pushing up the NIMs. This advantage may be attributed to superior convenience to the depositors or more popular choices for borrowers (a popular bank may have been the first place to go to obtain loans). During 2001-2009, the above advantages may disappear as many banks have a higher number of branches, borrowers have easier access to bank lending information, and collateralized lending became less profitable for banks due to the increasing competition.

Credit Lending and Collateralized Lending Market Shares

This section includes the regression results based on the other two types of market shares, credit lending market share and collateralized lending market share. They each represent different types of lending and are used not only as unilateral market power

proxies but also to capture the structural shift in the Taiwanese banking industry. Here we again make the distinction between the collusive firms and the superiority hypotheses. Market shares are distinct from concentration. By examining market shares, we see whether banks seem to have higher pricing advantage due to having a degree of superiority in their product offerings. Based on these two proxies, we conduct panel regression analyses based on the previous three model specifications to determine whether the regressions yield consistent results. Since credit lending market share and collateralized market share are explanatory variables, the credit lending to collateralized lending ratio is excluded from the variable list.

In Table 5, the regression results indicate consistent implications with those of the base model regression using the monthly average deposit market share and branch market share. The market shares of credit lending and collateralized lending are important factors that affect the NIMs.

First, the credit lending market share is highly significant in affecting the level of NIMs, and its effect is stronger for the second sub-period. As discussed earlier, the lending practice shifted from collateralized to credit lending, and the results here indicate this shift as well. The results show that, given this shift, in the second sub-period one can see that a bank's credit lending market share gives greater power to a bank to charge higher NIMs. Second, credit card or cash card products are mostly homogeneous since they are just small credit loans in nature, so a relatively popular cash card or credit card may induce potential customers to apply, raising the demand and resulting in higher lending rates.

The collateralized lending market share, on the other hand, has significant impacts between 1999 and 2000, but it loses its significance from 2001 to 2009. This implies that the Taiwanese banks strayed away from safer lending practices (making loans based on collateral) and let the profitability be driven by credit loans. Without proper risk monitoring, given that the result of credit loans are much harder to predict than collateralized loans, the banks faced the danger of higher default rates if hit by an economic slump, which did happen in 2004.

In addition, the R-squares for the period between 1991 and 2000 are much higher than for the period between 2001 and 2009, showing that the model specification works much better in the early years of the financial liberalization. After the market became saturated in the beginning of the millennium, the gradual reduction in the number of banks had not helped the banks resuscitate their profitability; the competition is still fierce. The gradual, and continuing reduction in the number of banks is mostly a result of unprofitable banks becoming insolvent and exiting the industry through acquisitions by other larger banks.

There is a dramatic period-to-period change in the statistical significance of the service income to total income ratio. As discussed earlier, banks may charge higher lending rates if they have a higher portion of income coming from service fees, and the results are highly significant in the period of 1991-2000. But the variable experiences a drop in significance for 2001-2009.

Table 6 is based on the second model specification. The R-squares are improved with additional bank information as they were previously. For the period between 1991

and 2000, the R-squares are as high as 0.76, indicating a very high predictive power. The two market shares yield consistent results as before.

Table 7 is based on the third model specification, and it shows consistent results. However, it does not exhibit higher R-squares as before. One potential reason is that the credit lending market share may not be important to demand side superiority. For example, when one owns a mortgage, it is not necessary to visit the bank frequently. For daily transactions, he may use another bank and visit the bank's branches often. So demand superiority based on locational convenience may only be based on deposits, and not on loans.

The GDP annual growth rate still exhibits a negative relationship with the NIMs in the period between 1991 and 2000 and positive in the period between 2001 and 2009. Typically, the GDP growth should be positively related to NIMs because the central bank tends to raise interest rate to combat inflation, but our data does not show that higher GDP growth is accompanied by higher NIMs.

Table 5: Credit Lending and Collateralized Lending Market Shares – Base Model

Monthly credit lending market share and collateralized lending market share are used as the explanatory variables of interest. The regression model uses fundamental bank information, excluding macroeconomic and lending practice information. Absolute value of t statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

	Credit Lending			Collateralized Lending		
	All	1991~2000	2001~2009	All	1991~2000	2001~2009
Debt-to-Asset Ratio	-0.12560***	-0.18245***	-0.01779***	-0.12448***	-0.18370***	-0.01844***
	(32.39)	(32.78)	(4.61)	(32.16)	(33.43)	(4.75)
NPL Percentage	0.10167***	-0.00916	0.12463***	0.09650***	0.01099	0.11910***
	(7.37)	(0.37)	(13.23)	(7.03)	(0.45)	(12.60)
Service Interest to Total Income Ratio	12.80739***	33.15070***	1.54377***	12.96833***	33.46166***	1.34533***
	(20.72)	(37.72)	(3.42)	(20.99)	(38.34)	(2.98)
Administrative Cost Percentage	0.00636	0.05634***	-0.02513***	0.00670	0.06152***	-0.02702***
	(1.28)	(6.01)	(6.90)	(1.35)	(6.55)	(7.44)
Discount Rates	0.08606***	-0.48621***	-0.16855***	0.08742***	-0.46846***	-0.17106***
	(2.95)	(5.09)	(7.23)	(2.99)	(4.95)	(7.28)
Base Lending Rate	0.02408	-0.05262	-0.06029***	0.03150	-0.10843	-0.06231***
	(0.92)	(0.35)	(3.81)	(1.21)	(0.74)	(3.90)
Liquid Ratio	6.66927***	6.29387***	1.97553***	6.75137***	6.13639***	1.76519***
	(17.84)	(8.32)	(7.51)	(18.06)	(8.16)	(6.62)
Mkt Share of Credit Lending	5.42561***	3.65599***	6.54808***			
	(7.12)	(4.59)	(4.55)			
Collateralized Lending Mkt Share				4.05908***	4.73289***	0.17938
				(6.13)	(6.72)	(0.14)
Observations	5230	2322	2908	5230	2322	2908
Number of Banks	34	31	34	34	31	34
R-squared	0.37784	0.70559	0.19732	0.37627	0.70863	0.19153

Table 6: Credit Lending and Collateralized Lending Market Shares – Adding Lending Practice Information

Monthly credit lending market share and collateralized lending market share are used as the explanatory variables of interest. The regression model uses fundamental bank information and lending practice information, excluding macroeconomic information. Absolute value of t statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

	Credit Lending			Collateralized Lending		
	All	1991~2000	2001~2009	All	1991~2000	2001~2009
Debt-to-Asset Ratio	-0.12989***	-0.17699***	-0.02396***	-0.12919***	-0.17906***	-0.02512***
	(33.81)	(33.74)	(5.69)	(33.66)	(34.61)	(5.94)
NPL Percentage	0.10487***	0.05813**	0.11825***	0.09825***	0.07367***	0.11433***
	(7.73)	(2.37)	(12.29)	(7.30)	(3.02)	(11.78)
Service Interest to Total Income Ratio	13.46061***	29.83820***	1.43106***	13.62388***	30.17610***	1.18764***
	(22.54)	(35.45)	(3.12)	(22.83)	(36.14)	(2.59)
Administrative Cost Percentage	0.00163	0.04865***	-0.02518***	0.00092	0.05350***	-0.02682***
	(0.33)	(4.98)	(6.85)	(0.19)	(5.50)	(7.31)
Discount Rates	0.08460***	-0.23835***	-0.14301***	0.08206***	-0.22810**	-0.14337***
	(2.97)	(2.60)	(6.07)	(2.88)	(2.52)	(6.03)
Base Lending Rate	0.03026	-0.08768	-0.05863***	0.03684	-0.17272	-0.06213***
	(1.20)	(0.64)	(3.69)	(1.47)	(1.29)	(3.88)
Liquid Ratio	6.13545***	4.83278***	2.02017***	6.18788***	4.53672***	1.77151***
	(16.90)	(6.41)	(7.55)	(17.05)	(6.05)	(6.53)
Loss Reserve to Total Lending Ratio	0.06246*	-0.36152**	0.06007***	0.07261**	-0.30781**	0.05561**
	(1.72)	(2.54)	(2.77)	(2.00)	(2.19)	(2.56)
Total Assets Growth Rate	0.00880***	0.00729***	0.00504***	0.00879***	0.00731***	0.00530***
	(14.41)	(10.26)	(7.32)	(14.38)	(10.44)	(7.66)
Lending to Deposit Ratio	-0.01220***	-0.04258***	-0.00199***	-0.01206***	-0.04308***	-0.00184***
	(11.03)	(12.86)	(2.95)	(10.89)	(13.20)	(2.72)
Mkt Share of Credit Lending	5.93356***	3.84844***	6.36734***			
	(7.82)	(4.99)	(4.43)			
Collateralized Lending Mkt Share				4.54213***	5.05363***	-0.53637

Table 6 Continued

				(7.19)	(7.87)	(0.41)
Observations	5187	2302	2885	5187	2302	2885
Number of Banks	33	30	33	33	30	33
R-squared	0.43807	0.75882	0.21904	0.43704	0.76267	0.21369

The market stock cap to the quarterly GDP ratio represents the strength of the capital market. The regression from the overall sample indicates that if the market index, which consists of the largest corporations in the country, is performing strongly relatively to the nation's GDP, it has negative impacts on NIMs. In subsamples, the effect is positive during 1991 to 2000 and it has a negative impact during 2001 to 2009. Usually, a strong growth prospect (indicated by a high stock-cap-to-GDP ratio) should increase demand for loans, driving up lending rates. But based on our data, the results are inconclusive.

Based on the above results, we can see that collateralized lending market shares cease to give banks advantages such that higher collateralized market shares do not drive up NIMs during 2001-2009. After 2001, credit lending becomes more crucial for banks' profitability, and if a bank can produce popular credit cards or cash cards (small credit loans), their popularity may drive up demand for loans and raise the bank's NIMs. This also provides support for Demsetz's superiority hypothesis when the changing lending practice is taken into account.

Table 7 : Credit Lending and Collateralized Lending Market Shares – Adding Macroeconomic Information

Monthly credit lending market share and collateralized lending market share are used as the explanatory variables of interest. The regression model uses fundamental bank information, lending practice information and macroeconomic information. Absolute value of t statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

	Credit Lending			Collateralized Lending		
	All	1991~2000	2001~2009	All	1991~2000	2001~2009
Debt-to-Asset Ratio	-0.04527***	-0.02947***	-0.06678***	-0.04413***	-0.03374***	-0.06564***
	(9.07)	(4.47)	(10.28)	(8.90)	(5.13)	(10.04)
NPL Percentage	0.06796***	0.00253	0.13606***	0.06397***	0.00899	0.13072***
	(7.39)	(0.16)	(13.98)	(7.01)	(0.57)	(13.30)
Service Interest to Total Income	3.58904***	8.06275***	1.48868***	3.74984***	8.24047***	1.12515**
	(7.20)	(6.85)	(3.23)	(7.54)	(7.03)	(2.44)
Administrative Cost Percentage	0.03093***	0.15013***	-0.02275***	0.02988***	0.15683***	-0.02423***
	(8.84)	(20.95)	(6.15)	(8.57)	(21.86)	(6.53)
Discount Rates	-0.03138	0.21714**	-0.03018	-0.04229*	0.17807**	-0.03127
	(1.36)	(2.39)	(1.17)	(1.87)	(1.97)	(1.21)
Base Lending Rate	0.10636***	0.17348*	-0.05879***	0.10733***	0.14994	-0.06584***
	(5.78)	(1.86)	(3.34)	(5.83)	(1.61)	(3.71)
Liquid Ratio	5.81027***	2.08095***	2.78083***	5.78300***	1.78543***	2.41221***
	(20.97)	(3.76)	(9.63)	(20.90)	(3.22)	(8.32)
Loss Reserve to Total Lending	0.15232***	-0.30219***	0.05151**	0.15887***	-0.27804***	0.04989**
	(6.31)	(3.64)	(2.45)	(6.58)	(3.34)	(2.36)
Total Assets Growth Rate	0.01048***	0.01167***	0.01481***	0.01022***	0.01304***	0.01603***
	(10.81)	(9.87)	(11.64)	(10.58)	(11.19)	(12.47)
Lending to Deposit Ratio	-0.00573***	-0.02843***	-0.00254***	-0.00559***	-0.02953***	-0.00239***
	(7.59)	(12.17)	(3.92)	(7.40)	(12.58)	(3.67)
Bank Assets to GDP Ratio	-15.76297***	-35.38536***	14.04391***	-17.54651***	-27.84597***	13.30336***
	(5.95)	(10.19)	(4.11)	(6.85)	(8.27)	(3.87)

Table 7 Continued

GDP Growth Rate	-0.01376***	-0.06601***	0.01471***	-0.01525***	-0.05344***	0.01384***
	(2.88)	(4.84)	(3.42)	(3.21)	(3.95)	(3.20)
Stock Capitalization to GDP Ratio	-0.09349***	0.79136***	-0.04606***	-0.09384***	0.78051***	-0.04095***
	(7.03)	(3.25)	(4.15)	(7.05)	(3.21)	(3.68)
Monthly Total Assets	0.56520***	1.04400***	0.42608**	0.55240***	1.05445***	0.34439
	(5.89)	(6.60)	(2.01)	(5.77)	(6.69)	(1.62)
Mkt Share of Credit Lending	4.45871***	-1.32599*	7.60108***			
	(6.32)	(1.78)	(5.48)			
Collateralized Lending Mkt Share				3.25418***	1.93268***	-1.10599
				(6.06)	(3.61)	(0.87)
Observations	5092	2241	2851	5092	2241	2851
Number of Banks	32	29	32	32	29	32
R-squared	0.29121	0.60319	0.30638	0.29077	0.60496	0.29915

Market Concentration

In this section, we examine the correlations between NIMs and different types of market concentration. The market concentrations used in this paper are Herfindahl indices, calculated as the sum of squared market shares of each bank. As discussed earlier, we are trying to examine the correlations between NIMs and their determinants. Only a general discussion of the results is included.

Overall, the regression results are inconclusive and provide little support for Bain's collusion hypothesis. The coefficients across different model specifications and time periods are unstable. The coefficients of different concentration measures yield opposite but significant results. For example, in Table 8 and 9, the market branch Herfindahl index for the overall period yielded significant results, but the coefficients have opposite signs for the first two model specifications (negative and then positive). Table 10 then yields a negative and significant coefficient for the overall period.

When we turn to the Herfindahl indices for credit lending and collateralized lending, the results are more consistent. Both types of Herfindahl indices in Table 11-13 indicate that for the overall period and the first period (1991-2000), there is evidence of collusion based on the data such that higher market concentrations lead to higher NIMs. But this effect disappeared during 2001 to 2009 such that higher market concentration for both types of lending leads to lower NIMs. As discussed earlier, this is a period of fierce pricing wars and industry consolidation, and the result may potentially be attributed to the rapid erosion of NIMs among banks. In other words, during this period, the Herfindahl indices became higher but NIMs continued to drop. This may yield a negative correlation between the Herfindahl indices and NIMs during he period. It also does not provide support for Bain's collusion hypothesis.

Table 8: Herfindahls based on Bank Deposits and Branches - Base Model

Average monthly deposit and branch market shares are used as the explanatory variables of interest. The regression model uses fundamental bank information, excluding macroeconomic and lending practice information. Absolute value of t statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

	Herfindahl based on Bank Deposits			**Herfindahl based on Bank Branches**		
	All	1991~2000	2001~2009	All	1991~2000	2001~2009
Debt-to-Asset Ratio	-0.12096***	-0.18250***	-0.00928**	-0.11950***	-0.18089***	-0.00869**
	(31.72)	(33.52)	(2.35)	(30.98)	(33.49)	(2.21)
NPL Percentage	0.08404***	-0.01231	0.10699***	0.08789***	-0.07799***	0.10342***
	(6.20)	(0.51)	(11.47)	(6.37)	(3.02)	(11.04)
Service Interest to Total Income	13.23573***	32.88878***	1.67148***	13.25493***	33.11185***	1.55452***
	(21.48)	(37.65)	(3.75)	(21.42)	(38.04)	(3.50)
Administrative Cost Percentage	0.00635	0.04457***	-0.01858***	0.00597	0.06728***	-0.01838***
	(1.28)	(4.78)	(5.03)	(1.20)	(7.10)	(4.99)
Discount Rates	0.04834	-0.39797***	-0.05852**	0.09784***	-0.48827***	-0.06258**
	(1.60)	(4.24)	(2.25)	(3.34)	(5.19)	(2.45)
Base Lending Rate	-0.00436	-0.15891	-0.12574***	0.02871	0.92955***	-0.10500***
	(0.16)	(1.08)	(7.38)	(1.04)	(5.46)	(6.48)
Liquid Ratio	6.23430***	6.09701***	0.84729***	6.66575***	6.78287***	0.84165***
	(16.02)	(8.16)	(3.10)	(17.08)	(9.17)	(3.09)
Deposit Herfindahl	-42.72997***	-58.40136***	-108.38176***			
	(5.91)	(6.84)	(9.33)			
Branch Herfindahl				-7.59199**	35.74178***	-48.13836***
				(2.09)	(7.17)	(9.73)

Table 8 Continued

Observations	5242	2334	2908	5242	2334	2908
Number of Banks	34	31	34	34	31	34
R-squared	0.37606	0.70882	0.21535	0.37240	0.70940	0.21737

Table 9: Herfindahls based on Bank Deposits and Branches - Adding Lending Practice Information

Average monthly deposit and branch market shares are used as the explanatory variables of interest. The regression model uses fundamental bank information, excluding macroeconomic and lending practice information. Absolute value of t statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

	Herfindahl based on Bank Deposits			**Herfindahl based on Bank Branches**		
	All	1991~2000	2001~2009	All	1991~2000	2001~2009
Debt-to-Asset Ratio	-0.17667***	-0.17638***	-0.05389***	-0.17994***	-0.17517***	-0.05184***
	(45.44)	(33.97)	(8.21)	(45.57)	(33.58)	(7.90)
NPL Percentage	0.09102***	0.06923***	0.11780***	0.08076***	0.02820	0.11499***
	(7.37)	(2.85)	(12.30)	(6.44)	(1.07)	(11.94)
Service Interest to Total Income	17.70783***	31.08173***	1.60124***	17.66008***	31.51755***	1.53622***
	(30.67)	(36.36)	(3.33)	(30.62)	(36.81)	(3.20)
Administrative Cost Percentage	-0.00413	0.04804***	-0.02164***	-0.00371	0.06019***	-0.02090***
	(0.90)	(4.90)	(5.83)	(0.81)	(6.06)	(5.63)
Discount Rates	0.05556**	-0.03627	-0.02865	0.06411**	-0.10690	-0.02480
	(2.03)	(0.39)	(1.12)	(2.41)	(1.13)	(0.98)
Base Lending Rate	0.06847***	-0.09451	-0.10624***	0.12615***	0.47421***	-0.09944***
	(2.82)	(0.66)	(6.33)	(5.15)	(2.91)	(6.20)
Liquid Ratio	6.55249***	3.77862***	1.93548***	7.29438***	4.15112***	1.85923***
	(18.53)	(4.95)	(6.53)	(20.48)	(5.41)	(6.32)
Loss Reserve to Total Lending Ratio	0.11569***	-0.32449**	0.07100***	0.12226***	-0.20620	0.07207***
	(3.46)	(2.28)	(3.34)	(3.67)	(1.45)	(3.40)
Total Assets Growth Rate	0.00687***	0.00636***	0.01657***	0.00754***	0.00630***	0.01660***
	(10.88)	(9.15)	(13.04)	(11.92)	(9.03)	(13.14)

Table 9 Continued

Lending to Deposit Ratio	-0.00898***	-0.04481***	-0.00195***	-0.00854***	-0.04421***	-0.00196***
	(8.81)	(13.74)	(2.98)	(8.36)	(13.32)	(3.00)
Credit-to-Collateralized Lending	-0.00113***	-0.17812	-0.00049	-0.00119***	-0.18824	-0.00051
	(3.07)	(1.27)	(1.33)	(3.26)	(1.34)	(1.39)
Deposit Herfindahl	-16.71014**	-44.24583***	-45.96409***			
	(2.53)	(5.45)	(3.75)			
Branch Herfindahl				15.19869***	15.99483***	-23.44774***
				(4.52)	(3.34)	(4.52)
Observations	5027	2233	2794	5027	2233	2794
Number of Banks	32	29	32	32	29	32
R-squared	0.54128	0.77392	0.28268	0.54258	0.77202	0.28432

A potential reason for some of the inconclusive results for Table 8-10 may be caused by the overall low concentration of the Taiwanese banking industry. As mentioned earlier, the top 3 banks in Taiwan only sum up to less than 20% market share. Based on general findings using Herfindahl indices (Geithman, Marvel and Weiss, 1981), if the top four (top eight firms) firms' market shares sum up to less than 50% (70%) the derivative of profits with respect to concentration is essential zero. This means that any meaningful results would have to come from data sets which have higher concentration.

Furthermore, based on Taiwan's Financial Supervisory Commission's report, out of the top 10 banks in Taiwan, nine are government-owned or the government has the majority shares. It is quite possible that government banks are not likely to be collusive between each other or with private sector rivals, and government banks should not set prices to maximize profits but should maximize the consumer welfare

Table 10: Herfindahls based on Bank Deposits and Branches - Adding Macroeconomic Information

Average monthly deposit and branch market shares are used as the explanatory variables of interest. The regression model uses fundamental bank information, lending practice and macroeconomic information. Absolute value of t statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

	Herfindahl based on Bank Deposits			**Herfindahl based on Bank Branches**		
	All	1991~2000	2001~2009	All	1991~2000	2001~2009
Debt-to-Asset Ratio	-0.03778***	-0.02580***	-0.05966***	-0.03426***	-0.03621***	-0.05906***
	(7.72)	(3.81)	(9.11)	(6.93)	(5.48)	(9.10)
NPL Percentage	0.05887***	0.01423	0.13520***	0.05955***	0.01010	0.13680***
	(6.32)	(0.90)	(13.74)	(6.45)	(0.63)	(14.00)
Service Interest to Total Income	4.13089***	10.95732***	1.35435***	3.96478***	12.15072***	1.13212**
	(7.89)	(7.93)	(2.83)	(7.56)	(8.90)	(2.38)
Administrative Cost Percentage	0.02704***	0.15423***	-0.02413***	0.02709***	0.15302***	-0.02447***
	(7.67)	(21.60)	(6.50)	(7.72)	(21.45)	(6.64)
Discount Rates	-0.06664***	0.12942	-0.02898	-0.04549**	0.10401	-0.04444*
	(2.94)	(1.40)	(1.12)	(1.96)	(1.09)	(1.73)
Base Lending Rate	0.09712***	0.27398***	-0.05944***	0.08879***	0.37761***	-0.00633
	(5.17)	(2.80)	(3.38)	(4.78)	(3.34)	(0.34)
Liquid Ratio	5.54071***	1.64172***	1.92084***	5.43984***	1.61177***	1.82978***
	(19.90)	(2.96)	(6.55)	(19.57)	(2.89)	(6.33)
Loss Reserve to Total Lending	0.15455***	-0.27549***	0.05581***	0.15532***	-0.31947***	0.05496***
	(6.36)	(3.29)	(2.65)	(6.41)	(3.84)	(2.63)
Total Assets Growth Rate	0.00953***	0.01335***	0.01373***	0.00957***	0.01238***	0.01355***
	(9.84)	(11.57)	(10.62)	(9.91)	(10.80)	(10.63)
Lending to Deposit Ratio	-0.00566***	-0.02897***	-0.00216***	-0.00573***	-0.02886***	-0.00215***
	(7.45)	(12.39)	(3.33)	(7.56)	(12.31)	(3.34)
Credit-to-Collateralized Lending	-0.00094***	-0.21486**	-0.00044	-0.00093***	-0.11098	-0.00047
	(3.55)	(2.28)	(1.20)	(3.52)	(1.21)	(1.28)
Bank Assets to GDP Ratio	-21.83327***	-40.23366***	4.97412	-23.95032***	-24.22385***	0.23261

Table 10 continued

	(8.19)	(10.15)	(1.35)	(9.45)	(6.61)	(0.06)
GDP Growth Rate	-0.01923***	-0.05270***	0.01253***	-0.01670***	-0.06393***	0.00607
	(4.00)	(3.86)	(2.88)	(3.48)	(4.66)	(1.38)
Stock Capitalization to GDP Ratio	-0.09020***	0.66033***	-0.00448	-0.07861***	1.03643***	0.00786
	(6.27)	(2.72)	(0.36)	(5.72)	(3.89)	(0.64)
Monthly Total Assets	0.40050***	1.13940***	2.03419***	0.69262***	0.52280**	3.22142***
	(4.09)	(6.78)	(6.05)	(5.86)	(2.56)	(8.36)
Deposit Herfindahl	2.83207	33.00630***	-132.58194***			
	(0.41)	(4.14)	(6.21)			
Branch Herfindahl				-14.93339***	12.34532***	-88.90192***
				(4.26)	(3.32)	(8.69)
Observations	4984	2191	2793	4984	2191	2793
Number of Banks	32	29	32	32	29	32
R-squared	0.28837	0.61506	0.30332	0.29096	0.61398	0.31247

Table 11: Herfindahls based on Credit Lending and Collateralized Lending - Base Model

Monthly credit lending market share and collateralized lending market share are used as the explanatory variables of interest. The regression model uses fundamental bank information, excluding macroeconomic and lending practice information. Absolute value of t statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

	Herfindahl based on Credit-Lending			**Herfindahl based on Collateralized-Lending**		
	All	1991~2000	2001~2009	All	1991~2000	2001~2009
Debt-to-Asset Ratio	-0.12171***	-0.17742***	-0.01298***	-0.12260***	-0.17801***	-0.00996**
	(32.02)	(32.49)	(3.38)	(32.26)	(32.57)	(2.56)
NPL Percentage	0.10722***	-0.01061	0.11955***	0.10680***	-0.01225	0.10754***
	(7.78)	(0.43)	(12.99)	(7.78)	(0.50)	(11.59)

Table 11 Continued

Service Interest to Total Income Ratio	12.75995***	33.21168***	1.45121***	12.60076***	33.11386***	1.51763***
	(20.73)	(37.49)	(3.28)	(20.45)	(37.35)	(3.42)
Administrative Cost Percentage	-0.00167	0.05085***	-0.01908***	-0.00155	0.05103***	-0.01838***
	(0.33)	(5.41)	(5.23)	(0.31)	(5.45)	(5.01)
Discount Rates	0.05447*	-0.47037***	-0.15229***	0.04627	-0.48211***	-0.04809*
	(1.85)	(4.77)	(6.61)	(1.57)	(4.94)	(1.86)
Base Lending Rate	0.03077	0.10886	-0.10694***	0.02682	0.05020	-0.10235***
	(1.19)	(0.72)	(6.62)	(1.03)	(0.33)	(6.38)
Liquid Ratio	6.38434***	6.55204***	0.99594***	6.41490***	6.44708***	0.87874***
	(16.99)	(8.59)	(3.76)	(17.14)	(8.45)	(3.27)
Credit-Lending Herfindahl	6.29515***	1.30249	-22.03993***			
	(8.65)	(1.58)	(10.39)			
Collateralized-Lending Herfindahl				4.97988***	1.33060**	-21.88726***
				(9.36)	(2.27)	(10.31)
Observations	5242	2334	2908	5242	2334	2908
Number of Banks	34	31	34	34	31	34
R-squared	0.38078	0.70322	0.22084	0.38227	0.70356	0.22043

Table 12: Herfindahls based on Credit Lending and Collateralized Lending - Adding Lending Practice Information

Average monthly deposit and branch market shares are used as the explanatory variables of interest. The regression model uses fundamental bank information, excluding macroeconomic and lending practice information. Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

	Herfindahl based on Credit-Lending			**Herfindahl based on Collateralized-Lending**		
	All	1991~2000	2001~2009	All	1991~2000	2001~2009
Debt-to-Asset Ratio	-0.17571***	-0.17422***	-0.05643***	-0.17612***	-0.17455***	-0.05344***
	(45.24)	(33.38)	(9.04)	(45.46)	(33.39)	(8.30)
NPL Percentage	0.10618***	0.06996***	0.12360***	0.10881***	0.06798***	0.11791***

Table 12 continued

	(8.37)	(2.82)	(13.17)	(8.63)	(2.77)	(12.40)
Service Interest to Total Income Ratio	17.45906***	31.17732***	1.55065***	17.30645***	31.12799***	1.52768***
	(30.20)	(35.96)	(3.23)	(29.92)	(35.87)	(3.19)
Administrative Cost Percentage	-0.00836*	0.05134***	-0.02207***	-0.00901*	0.05164***	-0.02132***
	(1.81)	(5.18)	(6.03)	(1.96)	(5.24)	(5.77)
Discount Rates	0.05464**	-0.12168	-0.06787***	0.04504*	-0.12362	-0.02143
	(2.04)	(1.24)	(2.88)	(1.68)	(1.27)	(0.84)
Base Lending Rate	0.07884***	0.08210	-0.10026***	0.07447***	0.05016	-0.09795***
	(3.42)	(0.57)	(6.23)	(3.23)	(0.34)	(6.13)
Liquid Ratio	6.50911***	3.76100***	2.00782***	0.00000	3.74770***	1.90455***
	(18.95)	(4.85)	(7.08)	(19.01)	(4.84)	(6.55)
Loss Reserve to Total Lending Ratio	0.11122***	-0.25746*	0.06637***	0.11190***	-0.25957*	0.06727***
	(3.34)	(1.81)	(3.15)	(3.36)	(1.82)	(3.19)
Total Assets Growth Rate	0.00692***	0.00640***	0.01583***	0.00694***	0.00642***	0.01602***
	(11.07)	(9.13)	(12.18)	(11.13)	(9.16)	(12.46)
Lending to Deposit Ratio	-0.00912***	-0.04600***	-0.00207***	-0.00907***	-0.04578***	-0.00204***
	(8.97)	(14.06)	(3.17)	(8.94)	(13.98)	(3.13)
Credit-to-Collateralized Lending	-0.00116***	-0.26652*	-0.00041	-0.00117***	-0.27311*	-0.00049
	(3.17)	(1.87)	(1.12)	(3.20)	(1.92)	(1.34)
Credit-Lending Herfindahl	3.83385***	1.72059**	-9.70925***			
	(5.19)	(2.01)	(4.35)			
Collateralized-Lending Herfindahl				3.64713***	1.42264**	-10.05430***
				(6.60)	(2.28)	(4.45)
Observations	5027	2233	2794	5027	2233	2794
Number of Banks	32	29	32	32	29	32
R-squared	0.54316	0.77128	0.28394	0.54468	0.77140	0.28416

Conclusions

As discussed in the beginning of this paper, too many banks entered the market during the 1990s, and the competition became fierce as the government began to encourage an industry-wide consolidation. Banks were eager to gain market share by offering higher deposit rates and lower lending rates, resulting in the lowest industry NIMs in Asia.

The overall results show that firm market shares tend to have positive and significant impacts on the bank NIMs. Specifically, the credit lending market share is highly significant in affecting the level of NIMs, and its effect is stronger for the second sub-period. As discussed earlier, the focus of lending type shifted from collateralized to credit lending, and the results here indicate this shift as well. The results show that, given this shift, in the second sub-period one can see that higher credit lending market share led to higher NIMs. Based on the demand side of the superiority hypothesis, high credit lending market share increases demand for a bank's credit loans and raise the NIMs. It means that a relatively popular cash card or credit card may induce more potential customers to apply, raising the demand and resulting in higher lending rates.

The collateralized lending market share, on the other hand, has significant impacts between 1999 and 2000, but it loses its significance from 2001 to 2009. This also indicates the shift of lending type.

There is a dramatic period-to-period change in the statistical significance of the service income to total income ratio. As discussed earlier, banks may charge higher lending rates if they have a higher portion of income coming from service fees, and

the results are highly significant in the period of 1991-2000. But the variable experiences a drop in significance for 2001-2009. The results support the demand side of Demsetz's superiority hypothesis.

For market concentration, we are unable to draw firm conclusions based on the data as some regression yield contradictory results, hence providing little support for Bain's collusion hypothesis. There are two potential reasons. First, the Taiwanese banking industry's concentration is too low for the Herfindahl indices to yield meaningful results. Based on general findings using the Herfindahl indices (Geithman, Marvel and Weiss, 1981), if the top four (top eight) firms' concentration ratios are less than 50% (70%) the derivative of profits with respect to concentration is essential zero. This means that any meaningful results would have to come from data sets which have higher concentration. Second, the biggest banks in Taiwan are all state-owned banks. It is quite possible that government banks are not likely to be collusive between each other or with private sector rivals, and that government banks do not set prices to maximize profits but to maximize the consumer welfare and break even. Therefore, efficiency and unilateral market power may affect the NIMs, and the market concentration would not affect them.

APPENDIX

Variable Definitions

Variable	Definition
Panel A: Abnormal Returns and Antitakeover Provision Index	
CAR 2-Day Window	Five-day cumulative abnormal return (in percentage points) calculated using the market model.
CAR 5-Day Window	Eleven-day cumulative abnormal return (in percentage points) calculated using the market model.
CAR 10-Day Window	Twenty-two-day cumulative abnormal return (in percentage points) calculated using the market model.
G-index	Taken from GIM (2003), based on 24 antitakeover provisions. Higher index levels correspond to more managerial power and low corporate governance measure
Panel B: Deal Characteristics	
Transaction Value	Log Transaction Value recorded on SDC
Cash-Dummy	A binary variable: 1 if the deal is at least partially financed by cash, 0 otherwise.
Acquirer High-Tech	Dummy variable: 1 if acquirer is from high tech industries defined by Loughran and Ritter (2004), 0 otherwise.
Target High-Tech	Dummy variable: 1 if Target is from high tech industries defined by Loughran and Ritter (2004), 0 otherwise.
Panel C: Acquirer Characteristics	
Acquirer Asset	Log of book value of total assets (item6).
Tobin's Q	Market value of assets over book value of assets: (item6−item60 + item25 ∗ item199)/item6.
Leverage	Book value of debts (item34 + item9) over market value of total assets (item6−item60 + item25 ∗ item199).
Free Cash Flow (FCF)	Operating income before depreciation (item13) – interest expenses (item15) – income taxes (item16) – capital expenditures (item128), scaled by book value of total assets (item6).
Diversifying Dummy	Dummy variable: 1 if acquirer and target do not share a Fama–French industry, 0 otherwise.
Relative Deal-Size	Logged Deal value over logged acquirer assets.
M&A Market Condition	The average premium paid for all deals in a given year, computed as the average of premium paid based on the target stock price four weeks prior to merger announcement in a given year for all announced mergers in our sample.
Penny Dummy	Binary variable: 1 if the target stock price is less than $10.00 on the day of merger announcement, 0 otherwise.

Chapter 1: Part I Regression Results without Weighting

In what follows we note the importance of our use of inverse variance weighting to provide GLS estimates. Much of event study analysis assumes homoscedasticity, e.g., that all CARs are measured with the same precision. In reality this is not the case. Generalized Least Squares tells us how to efficiently adjust for differences in the precision of estimates using inverse variance weighting as analyzed in Da Graca and Masson (2009). Many of our text tables have high and significant *t*-values for the G-index coefficient. Here we show that the traditional OLS methodology gives remarkably weaker results in all models, and even some sign switches. We replicate each of the GLS regression tables in text with OLS to demonstrate the importance of applying the GLS methodology.

Table 4A Corresponding to Table 4 Using GLS
Target Returns & G-index – Base Model

The sample consists of 1,427 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variables are the targets 2-day, 5-day, 10-day windows of cumulative abnormal returns around announcement dates. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	2-Day Window	5-Day Window	10-Day Window
G-index	-0.00035	0.00012	0.00058
	(0.13)	(0.04)	(0.19)
Transaction Value	-0.02517*	-0.02857*	-0.03426*
	(6.03)	(6.59)	(7.06)
Cash-Dummy	0.09650*	0.10163*	0.08880*
	(7.01)	(7.11)	(5.55)
Acquirer High-Tech	-0.01109	0.01639	0.00568
	(0.50)	(0.71)	(0.22)
Target High-Tech	0.05360**	0.03605	0.06604*
	(2.44)	(1.58)	(2.59)
Intercept	0.36008*	0.38534*	0.44054*
	(9.61)	(9.90)	(10.11)
Number of Obs	1427	1427	1427
R-squared	0.06801	0.07343	0.06914

Table 5A Corresponding to Table 5 Using GLS
Adding Acquirer Characteristics

The sample consists of 526 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variable is the acquirer's 2-day, 5-day, 10-day windows of cumulative abnormal return around announcement dates. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	2-Day Window	5-Day Window	10-Day Window
G-Index)	0.00153	0.00155	0.00312
	(0.35)	(0.34)	(0.65)
Transaction Value	-0.02807*	-0.03414*	-0.04458*
	(3.10)	(3.65)	(4.54)
Cash-Dummy	0.07614*	0.07974*	0.07385*
	(3.09)	(3.14)	(2.76)
Acquirer High-Tech	-0.03075	-0.01024	-0.01625
	(0.84)	(0.27)	(0.41)
Target High-Tech	0.04589	0.00677	0.00927
	(1.27)	(0.18)	(0.24)
Acquirer Tobin's Q	-0.00152	-0.00051	0.00626
	(0.26)	(0.08)	(0.97)
Acquirer Leverage	-0.06627	-0.14823	-0.08707
	(0.62)	(1.35)	(0.76)
Acquirer FCF	0.39741**	0.31195	0.28478
	(1.97)	(1.50)	(1.30)
Acquirer Asset	0.00987	0.01088	0.01556
	(1.03)	(1.10)	(1.50)
Diversifying Dummy	-0.00530	0.02169	0.02329
	(0.21)	(0.85)	(0.87)
Relative Deal-Size	-0.01469	-0.01541	-0.00844
	(1.17)	(1.19)	(0.62)
Acquirer Deal-Size X Target High-Tech	0.01441	0.01455	0.00660
	(1.14)	(1.12)	(0.48)
Intercept	0.31257*	0.35695*	0.36619*
	(3.56)	(3.94)	(3.85)
Number of Obs	525	525	525
R-squared	0.06725	0.07642	0.08438

Table 6A Corresponding to Table 6 Using GLS

Controlling for M&A Market Condition

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variables are the targets 2-day, 5-day, 10-day windows of cumulative abnormal returns around announcement dates. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	2-Day Window	5-Day Window	10-Day Window
G-index)	0.00199	0.00201	0.00360
	(0.46)	(0.45)	(0.76)
Transaction Value	-0.02446*	-0.03056*	-0.04084*
	(2.73)	(3.30)	(4.19)
Cash-Dummy	0.08794*	0.09142*	0.08607*
	(3.60)	(3.62)	(3.24)
Acquirer High-Tech	-0.02399	-0.00356	-0.00926
	(0.66)	(0.10)	(0.24)
Target High-Tech	0.04846	0.00931	0.01193
	(1.36)	(0.25)	(0.31)
Acquirer Tobin's Q	-0.00427	-0.00323	0.00342
	(0.73)	(0.53)	(0.53)
Acquirer Leverage	-0.09969	-0.18128+	-0.12164
	(0.95)	(1.67)	(1.07)
Acquirer FCF	0.46113**	0.37497+	0.35070
	(2.31)	(1.82)	(1.62)
Acquirer Asset	0.01093	0.01193	0.01666
	(1.16)	(1.23)	(1.63)
Diversifying Dummy	-0.00036	0.02656	0.02840
	(0.01)	(1.05)	(1.07)
Relative Deal-Size	-0.01876	-0.01943	-0.01266
	(1.51)	(1.52)	(0.94)
Deal-Size X Target High-Tech	0.01834	0.01843	0.01066
	(1.47)	(1.43)	(0.79)
M&A Market Condition	0.00436*	0.00431*	0.00451*
	(4.05)	(3.87)	(3.86)
Intercept	0.06120	0.10833	0.10611
	(0.57)	(0.98)	(0.92)
Number of Obs	525	525	525
R-squared	0.09620	0.10277	0.11026

Table 7A Corresponding to Table 7 Using GLS

Controlling for Penny Stocks

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variables are the targets' 2-day, 5-day, 10-day windows of cumulative abnormal returns around announcement dates. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	2-Day Window	5-Day Window	10-Day Window
G-index)	0.00157	0.00192	0.00351
	(0.36)	(0.43)	(0.75)
Transaction Value	-0.01799+	-0.02352**	-0.02814*
	(1.84)	(2.34)	(2.67)
Cash-Dummy	0.07472*	0.07789*	0.07275*
	(3.07)	(3.10)	(2.76)
Acquirer High-Tech	-0.03498	-0.01197	-0.01497
	(0.97)	(0.32)	(0.38)
Target High-Tech	0.04810	0.00765	0.00692
	(1.35)	(0.21)	(0.18)
Acquirer Tobin's Q	-0.00179	-0.00071	0.00601
	(0.30)	(0.12)	(0.95)
Acquirer Leverage	-0.08058	-0.17033	-0.10740
	(0.77)	(1.57)	(0.95)
Acquirer FCF	0.41994**	0.32507	0.25767
	(2.09)	(1.57)	(1.19)
Acquirer Asset	0.01173	0.01498	0.01989**
	(1.26)	(1.57)	(1.98)
Diversifying Dummy	-0.01310	-0.01324	-0.00644
	(1.06)	(1.04)	(0.48)
Relative Deal-Size	0.01303	0.01257	0.00486
	(1.04)	(0.98)	(0.36)
Deal-Size X Target High-Tech	0.05121	0.07105**	0.12282*
	(1.56)	(2.10)	(3.47)
Penny Dummy	0.23990*	0.24271*	0.17608**
	(3.19)	(3.13)	(2.16)
Intercept	0.21257**	0.24528**	0.20717**
	(2.25)	(2.52)	(2.03)
Number of Obs	525	525	525
R-squared	0.09049	0.10129	0.11335

Chapter 1: Part II Regression Results without Weighting

TABLE 10A Corresponding to Table 10 Using GLS
Combined Value Change

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variables are the combined company's 2-day, 5-day, 10-day windows of cumulative abnormal returns around announcement dates. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	2-Day Combined Value Change	5-Day Combined Value Change	10-Day Combined Value Change
G-Index	0.00044	-0.00053	-0.00042
	(0.42)	(0.35)	(0.20)
Transaction Value	-0.00128	0.00390	0.00552
	(0.60)	(1.28)	(1.32)
Cash Dummy	0.00430	0.00218	0.00506
	(0.72)	(0.26)	(0.44)
Acquirer High-Tech	-0.00420	-0.00232	0.02656
	(0.48)	(0.18)	(1.54)
Target High-Tech	-0.00191	0.00445	-0.01917
	(0.22)	(0.36)	(1.13)
Acquirer Tobin's Q	0.00006	-0.00143	0.00228
	(0.04)	(0.70)	(0.81)
Acquirer Leverage	-0.02650	-0.05862	-0.09977**
	(1.04)	(1.60)	(2.00)
Acquirer FCF	-0.05259	-0.03186	-0.24744*
	(1.08)	(0.46)	(2.60)
Acquirer Asset	-0.00293	-0.00670**	-0.01395*
	(1.30)	(2.07)	(3.16)
Relative Deal-Size	-0.00272	-0.00202	-0.00551
	(0.90)	(0.47)	(0.93)
Deal-Size X Target High-Tech	0.00274	0.00112	0.00395
	(0.90)	(0.26)	(0.66)
Constant	1.03566*	1.05330*	1.11212*
	(49.38)	(35.00)	(27.08)
Observations	525	525	525
R-squared	0.01389	0.01728	0.05199

TABLE 11A Corresponding to Table 11 Using GLS

Acquirer Returns & G-index

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variables are the acquirer's 2-day, 5-day, 10-day windows of cumulative abnormal returns around announcement dates. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	2-Day Acquirer Return	5-Day Acquirer Return	10-Day Acquirer Return
G-index	0.00061	-0.00069	-0.00074
	(0.52)	(0.40)	(0.32)
Transaction Value	-0.00130	0.00415	0.00633
	(0.54)	(1.17)	(1.32)
Cash Dummy	0.00195	-0.00012	0.00574
	(0.30)	(0.01)	(0.44)
Acquirer High-Tech	-0.00026	0.00298	0.03607+
	(0.03)	(0.21)	(1.91)
Target High-Tech	-0.00543	-0.00113	-0.02996
	(0.57)	(0.08)	(1.57)
Acquirer Tobin's Q	-0.00052	-0.00251	0.00153
	(0.33)	(1.08)	(0.49)
Acquirer Leverage	-0.04406	-0.09227**	-0.15227*
	(1.56)	(2.23)	(2.70)
Acquirer FCF	-0.04652	-0.03704	-0.26662**
	(0.87)	(0.47)	(2.49)
Acquirer Asset	-0.00338	-0.00748**	-0.01498*
	(1.35)	(2.03)	(2.99)
Relative Deal-Size	0.00434	0.00531	0.01457
	(0.66)	(0.55)	(1.11)
Deal-Size X Target High-Tech	-0.00003	-0.00104	-0.00171+
	(0.07)	(1.54)	(1.86)
Constant	0.03861+	0.06494+	0.11711**
	(1.70)	(1.95)	(2.58)
Observations	525	525	525
R-squared	0.01709	0.02291	0.05679

Table 13A Corresponding to Table 13 Using GLS
Combined Company's Value Change in Asymmetric Windows (1)

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variables are the combined company's cumulative abnormal returns around announcement dates for symmetric and asymmetric windows. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	minus2_plus2	minu2_plus5	minus2_plus10
G-Index	0.00044	0.00028	0.00225
	(0.42)	(0.22)	(1.36)
Transaction Value	-0.00128	0.00156	0.00278
	(0.60)	(0.60)	(0.84)
Cash Dummy	0.00430	-0.00090	-0.00141
	(0.72)	(0.12)	(0.15)
Acquirer High-Tech	-0.00420	0.00039	0.01712
	(0.48)	(0.04)	(1.24)
Target High-Tech	-0.00191	-0.00343	-0.01564
	(0.22)	(0.32)	(1.15)
Acquirer Tobin's Q	0.00006	-0.00136	0.00058
	(0.04)	(0.78)	(0.26)
Acquirer Leverage	-0.02650	-0.02960	-0.02797
	(1.04)	(0.95)	(0.70)
Acquirer FCF	-0.05259	-0.06418	-0.13578+
	(1.08)	(1.08)	(1.79)
Acquirer Asset	-0.00293	-0.00526+	-0.00882**
	(1.30)	(1.91)	(2.50)
Relative Deal-Size	-0.00272	-0.00225	-0.00178
	(0.90)	(0.61)	(0.38)
Deal-Size X Target High-Tech	0.00274	0.00177	0.00121
	(0.90)	(0.48)	(0.26)
Constant	1.03566*	1.04774*	1.04651*
	(49.38)	(40.88)	(31.87)
Observations	525	525	525
R-squared	0.01389	0.01451	0.03124

Table 14A Corresponding to Table 14 Using GLS

Combined Company's Value Change in Asymmetric Windows (2)

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variables are the combined company's cumulative abnormal returns around announcement dates for symmetric and asymmetric windows. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	minus5_plus_2	minus5_plus5	minus5_plus10
G-Index	-0.00071	-0.00053	0.00109
	(0.54)	(0.35)	(0.58)
Transaction Value	0.00138	0.00390	0.00544
	(0.52)	(1.28)	(1.44)
Cash Dummy	0.00753	0.00218	0.00107
	(1.01)	(0.26)	(0.10)
Acquirer High-Tech	-0.00622	-0.00232	0.01476
	(0.56)	(0.18)	(0.94)
Target High-Tech	0.00481	0.00445	-0.00837
	(0.44)	(0.36)	(0.54)
Acquirer Tobin's Q	-0.00001	-0.00143	0.00065
	(0.00)	(0.70)	(0.25)
Acquirer Leverage	-0.05062	-0.05862	-0.05292
	(1.58)	(1.60)	(1.17)
Acquirer FCF	-0.02099	-0.03186	-0.11032
	(0.34)	(0.46)	(1.28)
Acquirer Asset	-0.00422	-0.00670**	-0.01006**
	(1.49)	(2.07)	(2.51)
Relative Deal-Size	-0.00236	-0.00202	-0.00168
	(0.62)	(0.47)	(0.31)
Deal-Size X Target High-Tech	0.00204	0.00112	0.00081
	(0.54)	(0.26)	(0.15)
Constant	1.04145*	1.05330*	1.05264*
	(39.53)	(35.00)	(28.20)
Observations	525	525	525
R-squared	0.01265	0.01728	0.02353

Table 15A Corresponding to Table 15 Using GLS

Combined Company's Value Change in Asymmetric Windows (3)

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variables are the combined company's cumulative abnormal returns around announcement dates for symmetric and asymmetric windows. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	minus10_plus2	minus10_plus5	minus10_plus10
G-Index	-0.00293+	-0.00299+	-0.00042
	(1.82)	(1.65)	(0.20)
Transaction Value	0.00128	0.00426	0.00552
	(0.40)	(1.18)	(1.32)
Cash Dummy	0.01147	0.00548	0.00506
	(1.28)	(0.54)	(0.44)
Acquirer High-Tech	0.00805	0.01276	0.02656
	(0.60)	(0.85)	(1.54)
Target High-Tech	-0.01118	-0.01214	-0.01917
	(0.85)	(0.82)	(1.13)
Acquirer Tobin's Q	0.00157	0.00022	0.00228
	(0.73)	(0.09)	(0.81)
Acquirer Leverage	-0.10005*	-0.10213**	-0.09977**
	(2.59)	(2.36)	(2.00)
Acquirer FCF	-0.16727**	-0.18620**	-0.24744*
	(2.25)	(2.24)	(2.60)
Acquirer Asset	-0.00880**	-0.01097*	-0.01395*
	(2.58)	(2.87)	(3.16)
Relative Deal-Size	-0.00750	-0.00724	-0.00551
	(1.65)	(1.42)	(0.93)
Deal-Size X Target High-Tech	0.00676	0.00609	0.00395
	(1.47)	(1.18)	(0.66)
Constant	1.11854*	1.12763*	1.11212*
	(34.97)	(31.45)	(27.08)
Observations	525	525	525
R-squared	0.04891	0.04631	0.05199

Table 16A Corresponding to Table 16 Using GLS

Combined Company's Value Change in Asymmetric Windows under Breakeven G-Index

The sample consists of 525 completed U.S. mergers and acquisitions (listed in SDC) between 1990 and 2007 made by firms covered by the IRRC antitakeover provision database. The dependent variables are the combined company's cumulative abnormal returns around announcement dates for symmetric and asymmetric windows. Absolute value of t statistics in parentheses + significant at 10%; ** significant at 5%; * significant at 1%

	minus10_plus2	minus10_plus5	minus10_plus10
G-Index	-0.00387**	-0.00322	-0.00009
	(2.00)	(1.49)	(0.04)
Transaction Value	0.00165	0.00487	0.00609
	(0.49)	(1.28)	(1.39)
Cash Dummy	0.01185	0.00638	0.00594
	(1.24)	(0.60)	(0.48)
Acquirer High-Tech	0.00617	0.01436	0.03032+
	(0.44)	(0.91)	(1.66)
Target High-Tech	-0.01139	-0.01487	-0.02294
	(0.82)	(0.96)	(1.28)
Acquirer Tobin's Q	0.00186	0.00039	0.00236
	(0.84)	(0.16)	(0.82)
Acquirer Leverage	-0.09965**	-0.10370**	-0.10457**
	(2.43)	(2.26)	(1.97)
Acquirer FCF	-0.17426**	-0.19976**	-0.26468*
	(2.27)	(2.32)	(2.69)
Acquirer Asset	-0.00963*	-0.01220*	-0.01496*
	(2.70)	(3.05)	(3.23)
Relative Deal-Size	-0.00758	-0.00729	-0.00504
	(1.59)	(1.36)	(0.81)
Deal-Size X Target High-Tech	0.00684	0.00613	0.00345
	(1.43)	(1.14)	(0.55)
Constant	1.13088*	1.13629*	1.11509*
	(33.18)	(29.77)	(25.47)
Observations	487	487	487
R-squared	0.05316	0.05127	0.05780

REFERENCES

Chapter 1

Bebchuk, Lucian A., and Alma Cohen, 2005, "The Costs of Entrenched Boards." *Journal of Financial Economics*, 78: 409-433.

Bebchuk, Lucian A., John C. Coates IV, and Guhan Subramanian, 2002, "The Powerful Antitakeover Force of Staggered Boards: Theory, Evidence and Policy." *Stanford Law Review*, 54: 887-951.

Bebchuk, Lucian A., John C. Coates IV, and Guhan Subramanian, 2003, "The Power of Takeover Defenses." Working Paper, Harvard Law School and NBER.

Da Graca, Tarcisio, and Robert T. Masson, 2009, "More Power to You: Demonstrating Increased Power of GLS for Event Studies." Working Paper, Cornell University

DeAngelo, Harry, and Edward M. Rice, 1983, "Antitakeover Charter Amendments and Stockholder Wealth." *Journal of Financial Economics*, 11: 329-360.

Fama, Eugene F., and Kenneth French, 1997, "Industry Costs of Equity." *Journal of Financial Economics*, 43: 153-194.

Gompers, P., J Ishii, and Andrew Metrick, 2003, "Corporate Governance and Equity Prices." *The Quarterly Journal of Economics*, 118(1): 107-155.

Masulis, Ronald, Cong Wangm and Fei Xie, 2007, "Corporate Governance and Acquirer Returns." *The Journal of Finance*, 62(4): 1851-1889.

Mitchell, Mark L., and Kenneth Lehn, 1990, "Do Bad Acquirers Become Good Targets?" *Journal of Political Economy*, 98: 372-398.

Moeller, Sara B., Frederik P. Schlingemann, and Renffe Stulz, 2004, "Firm Size and the Gains from Acquisitions." *Journal of Financial Economics*, 73: 201-228.

Roll, Richard, 1986, "The Hubris Hypothesis of Corporate Takeovers." *Journal of Business*, 59(2): 197.

Chapter 2

Akhavein, Jalal D., Allen N. Berger and David B. Humphrey (1997). "The Effects of Megamergers on Efficiency and Prices: Evidence from a Bank Profit Function." *Review of Industrial Organization* 12 (1), 05-139.

Allen, Linda (1988). "The Determinants of Bank Interest Margins: A Note." *Journal of Financial and Quantitative Analysis* 23, 231-35.

Barth, James R., Daniel E. Nolle, and Tara N. Rice. 1997, "Commercial Banking Structure, Regulation, and Performance: An International Comparison." Comptroller of the Currency Economics Working Paper 97-6. Comptroller of the Currency, Washington, D.C.

Berger, Allen N. 1995a. "The Profit-Structure Relationship in Banking: Tests of Market-Power and Efficient Structure Hypotheses." *Journal of Money, Credit, and Banking* 27 (2), 404-31.

Berger, Allen N. 1995b. "The Relationship between Capital and Earning in Banking." *Journal of Money, Credit, and Banking* 27 (2), 432-56.

Berger, Allen N., and Timothy H. Hannan (1989). "The Price-Concentration Relationship in Banking." *Review of Economics and Statistics* 71, 291-99.

Buser, Stephen A., Andrew H. Chen, and Edward J. Kane. 1981. "Federal Deposit Insurance, Regulatory Policy, and Optimal Bank Capital." *Journal of Finance* 35 (1), 51-60.

Demirguc-Kunt, Ash and HarryHuizinga (1999). "Determinants of Commercial BanksInterest Margins and Profitability: Some International Evidence." *World Bank Economic Review* 13 (2), 379-408.

Demirguc-Kunt, Asli and Harry Huizinga (2000). "Financial Structure and Bank Profitability." World Bank Policy Research Working Paper No. 2430.

Demirguiq-Kunt, Asli, Luc Laeven, and Ross Levine (2004). "Regulations, Market Structure, Institutions, and the Cost of Financial Intermediation." *Journal of Money, Credit, and Banking* 36, 593-622.

Focarelli, Dario and Fabio Panetta (2003). "Are Mergers Beneficial to Consumers? Evidence from the Market for Bank Deposits." *The American Economic Review*, 93 (4), 1152-1172.

Geithman , Frederick E., Howard P. Marvel and Leonard W. Weiss (1980). "Concentration, Price, and Critical Concentration Ratios." *The Review of Economics and Statistics* 63 (3), 346-353.

Hannan, Timothy H., and Allen N. Berger (1991). "The Rigidity of Prices: Evidence from the Banking Industry." *American Economic Review* 81, 938-45.

Hannan, Timothy H., and Robin A. Prager (2004). "The Competitive Implications of Multimarket Bank Branching." *Journal of Banking and Finance* 28, 1889-1914.

Hanson, James A., and Roberto de Rezende Rocha. 1986. "High Interest Rates, Spreads, and the Cost of Intermediation: Two Studies." *Industry and Finance Series* 18. World Bank, Industry Department, Washington, D.C.

Ho, Thomas, and Anthony Saunders (1981). "The Determinants of Bank Interest Margins: Theory and Empirical Evidence." *Journal of Financial and Quantitative Analysis* 4, 581-600.

Hwang, Dar-Yeh and Wei-Hsiung Wu. "Financial system reform in Taiwan." *Journal of Asian Economics* 18 (1), 21-41

Masson, Robert, G. Jakubson, K. Jeong and D. Kim (2009). "*Cycles in Economic Activity, Industrial Structure and Price-Cost Margins: A New Methodology using a Structural Model." Working paper, Cornell University.*

Peria, Maria Soledad Martinez and Ashoka Mody (2004). "How Foreign Participation and Market Concentration Impact Bank Spreads: Evidence from Latin America." *Journal of Money, Credit and Banking* 36(3), 511-37.

Prager, Robin A., and Timothy H. Hannan (1998). "Do Substantial Horizontal Mergers Generate Significant Price Effects? Evidence from the Banking Industry." *The Journal of Industrial Economics* 46 (4), 433-52.

Salas, Vicente and Jesús Saurina (2002). "Credit Risk in Two Institutional Regimes: Spanish Commercial and Savings Banks." *Journal of Financial Services Research* 22 (3), 203-24.

Sapienza, Paola (2004). "The Effects of Government Ownership on Bank Lending." *Journal of Financial Economics* 72, 357-84.

Scherer, F. M. and D. Ross (1990). Industrial Market Structure and Economic Performance (3rd ed.). Houghton Mifflin, Boston, MA.

Wong, Kit Pong (1997). "On the Determinants of Bank Interest Margins under Credit and Interest Rate Risks." *Journal of Banking and Finance* 21, 251-71.

Zarruck, Emilio R. (1989). "Bank Margin with Uncertain Deposit Level and Risk Aversion." *Journal of Banking and Finance* 14, 803-20.