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Market Misreaction? Leverage and Mergers and Acquisitions

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Abstract: Using a large database of U.S. mergers and acquisitions (M&As) announced from 2010 through 2017, we examine the effects of capital ratio (leverage) on the announcement period stock price reaction as well as on longer-term stock returns and performance, for banks, making comparisons with non-banks. We compare announcement period reactions (computed in different ways) for lower (lower than sample median) capitalized banks and non-banks with that for higher capitalized banks and non-banks. We confirm our results using multivariate analyses—after controlling for year and industry fixed effects—and we check the associations of capital ratio with announcement period abnormal returns, longer-term performance, as well as certain bank-specific and non-bank specific performance measures. For banks, we find that a lower capital ratio of acquirers at the time of the announcement of the M&A is significantly associated with negative announcement period abnormal returns. However, for these banks, the longer-run abnormal returns and performance are positive. The opposite is true for non-bank M&A announcements: higher equity ratios (lower leverage) of acquirers as at the time of the announcement is significantly associated with negative announcement period abnormal returns. Yet, for such non-banks, the longer-run abnormal returns and performance are positive. This shows that the market may misreact, on average, to both bank and non-bank M&A announcements based on the acquirer's leverage at the time of the announcement.

Keywords: mergers and acquisitions; M&A; acquirer leverage; capital ratio; equity ratio; bank M&As; non-bank M&As; announcement period returns; post-announcement returns; post M&A performance

JEL Classification: G34

1. Introduction

Our research agenda in this paper is to examine the effects of acquirer capital ratio (leverage)—as at the time of mergers and acquisitions (M&A) announcements—on market reaction and compare and contrast the effect for banks and non-banks. We then relate the announcement period abnormal returns to longer-run abnormal returns and performance. Thus, we evaluate market efficiency: does the market react efficiently to a relatively opaque type of corporate event, mergers and acquisition announcements, or even in the right direction? If there is a misreaction, then what may cause the market to misreact? These are some interesting questions we attempt to address in this paper.

Several papers have analyzed abnormal returns regarding mergers and acquisitions (M&A) announcements or effective dates (e.g., Hofstede 1980; Masulis et al. 2007; Francis and Martin 2010; Harford et al. 2012; Ahern 2012; McNichols and Stubben 2015). Announcement period acquirer stock prices likely react to the possibility of—or the lack of—synergies, integration benefits, and restructuring plans (Angwin 2001). Other papers have looked at post-acquisition performance; for example, Ma et al. (2011) found that acquirers tend to have significantly negative buy-and-hold abnormal returns (BHAR) over 12, 24, and 36 Months post acquisition, and Qian and Zhu (2014) found that while the average BHAR is negative over the 3 years after the acquisition, profitability tends to increase over the same

period of time. For banks, extant research has looked at the short-term and the longer-term effects of equity issuances (Dinger et al. 2020) and M&As (Beccalli and Frantz 2009).

On the effects of leverage as at the time of an M&A announcement, papers have found evidence of significantly negative effects of a firm's leverage on the chances of firms successfully completing acquisitions, even in periods with favorable funding conditions (Becher et al. 2020). Furthermore, according to Harrison et al. (2014), firms with higher leverage tend to possess fewer resources that can aid value creation, such as post-announcement activities, which are typically high-cost projects with potentially adverse effects that may be unacceptable under certain debt covenants. Their findings also suggest that a trading strategy that shorts acquirers with high leverage and buying the peers of those firms yields significantly positive buy-and-hold abnormal returns of over 36% over 24 months after the acquisition announcement. On the other hand, Jankowitsch and Pauer (2021) show that despite the increased risk of debt used to finance acquisitions when the acquirer is highly levered at the time of the announcement, bonds of such firms tended to significantly outperform bonds of acquirers with lower leverage, even though both returns were still negative.

With regard to market reaction to announcements, Kadiyala and Rau (2004) found over- and under-reaction patterns are not random and investors tend to underreact to corporate news announcements in general. In the case of M&As, long-run return reversals may be common, especially for stock-financed acquisitions, with such mergers being initially viewed negatively by the stock market. However, over 36 Months after the announcement, if the acquirer experiences positive news announcements, such as a positive earnings surprise, they perform in line with similar firms that announced cash-financed acquisitions. According to Chan (2000), investors tend to overreact to some news announcements, but building a portfolio that is invested in winners—firms that experienced positive reaction to news—did not yield any economically significant buy-and-hold returns past the month of the announcement. In the case of bank acquisitions, Vij (2019) found that the market tends to react positively to announcements of takeovers of failed banks, anticipating a change in liquidity and capital positions.

Thus, the extant literature, which has focused mainly on non-banks, has generally found longer-run post-acquisition returns to be negative for the acquirer, while the announcement period effects of acquirer leverage also tend to be, generally, negative. For banks, the market may react positively to announcements of takeovers of failed banks, anticipating positive changes.

We bring together the strands of literature that have separately examined banks and non-banks along with announcement period and longer-term returns, and we examine whether the market reacts positively or negatively at the time of M&A announcements based on acquirer leverage at the time of such announcements and whether such reactions were either in the right direction or they overlooked post-acquisition returns and performance. Thus, we compare and contrast market reactions to bank versus non-bank acquisition announcements based on an observable acquirer feature as at the time of announcement: its leverage or its capital ratio. This is important because a high capital ratio is not only required under the capital adequacy norms for banks, but it may also signal safety for the depositors. However, for non-banks, a lower capital ratio or a higher leverage may not only provide tax shield benefits but it may also serve to discipline management so that post-acquisition benefits are maximized. In short, it is an interesting, and to the best of our knowledge, unexplored question: What are market reactions to bank versus non-bank M&A announcements, as a function of acquirer leverage? Such research would also provide insight into investor expectations and behavior.

Using a comprehensive sample of 482 M&As announced between 2010 and 2017, for which we have all the required data (after several screens) and of which 147 are bank M&A announcements, we examine announcement period reactions (computed in different ways) for lower (lower than sample median) capitalized banks and non-banks as compared to higher capitalized banks and non-banks. After controlling for year and industry fixed

effects, we confirm our results using multivariate analyses; and, we check the associations of capital ratio with announcement period abnormal returns, longer-term performance, and certain bank-specific performance measures, such as the nonperforming asset ratio and the net interest margin, as well as non-bank specific performance, such as the net profit margin.

We find that, for banks, a lower capital ratio (lower than sample median) of acquirers at the time of the announcement of the M&A is significantly associated with negative announcement period abnormal returns. However, for these banks, the longer-run abnormal returns and performance are positive. The opposite is true for non-bank M&A announcements: higher equity ratios (lower leverage) of acquirers as at the time of announcement are significantly associated with negative announcement period abnormal returns, but for such non-banks the longer-run abnormal returns and performance are positive.

This shows that the market may misreact, on average, to both bank and non-bank M&A announcements based on the acquirer leverage at the time of announcement. Thus, investors should be careful when interpreting the announcement period stock price reaction to mergers and acquisition announcements as indicative of longer-run abnormal returns and performance. Our research can provide insights into why the misreaction occurs and it can highlight interesting implications of such misreactions, which can be addressed by future work. Market responses may be reactionary and somewhat short-term in nature, for example, the recent economic crisis wherein banks that were not adequately capitalized faced difficulties; or, the market's reaction can be behavioral, such as the expectation of a debt-equity ratio considered optimal for different industries, which can be influenced by regulatory policies that may vary from economy to economy.

The next section describes our data and the variables we use, with descriptive statistics reported in Section 3. The main analyses of returns and performance—the methodology and empirical results—are reported in Section 4 along with a discussion of these results, and Section 5 provides some concluding thoughts.

2. Data, Variables, and Methodology

2.1. Data

Our initial data of 1410 U.S. M&A announcements over the 8-year period from 2010 through 2017, comes from Refinitiv's SDC Platinum Mergers and acquisitions database, which is a publicly available database for annual subscription. Following Moeller et al. (2003), we exclude all observations where the acquirer and the target are the same company as we want to consider acquisitions where the acquiring firm does not possess a controlling stake in the target, as those transactions typically may not result in significant reactions from the market. Following the methodology in (Shroff et al. 2013), we exclude all observations where multiple M&A announcements were made in the same day by the same acquirer as this would compound the announcement period reaction. We need the acquisitions to be completed, as we examine post M&A performance. This leaves us with a sample of 819 observations. We then exclude all observations for which we do not have all the data we need for analysis, and we further remove all observations with outliers for returns and performance (winsorizing at the 90% level). Our final dataset contains 482 M&A deals of which 147 were announced by bank acquirers.

2.2. Variables

We calculate the capital ratio for banks, as the tier 1 capital of the bank (shareholders' equity and disclosed reserves) divided by its risk-weighted assets. For non-banks, the capital ratio is calculated by dividing the firm's total stockholders' equity by its total assets, as of the quarter ended before the announcement date. All firm-specific data comes from the Compustat database.

We calculate abnormal returns of different announcement periods based on various benchmark returns. These market returns are either the S&P 500 index returns or they are collected from the Center for Research in Security Prices (CRSP) to include equal-weighted and value-weighted market returns. For short-term abnormal returns, we follow Aggarwal and Rivoli (1990) and Durukan (2002) in defining short-term abnormal returns as each stock's 3-day, 7-day, and 21-day return around the M&A announcement over and above equity beta times a corresponding benchmark return. The formula is $CAR_i = R_{firm} - beta * R_{benchmark}$, where the beta coefficient is estimated by performing a linear regression of the acquirer's monthly stock returns on S&P 500 index returns, using the 3 years leading up to the month in question—up to the announcement month, or 6 and 12 months post announcement when we are computing post announcement abnormal returns. For example, equity beta_6 Month is the acquirer's equity beta 6 Months after the effective date of the acquisition, which is computed using the monthly return over the 3-year period until that month.

For long-term abnormal returns, we follow Barber and Lyon (1997) for computing cumulative abnormal return (CAR) and buy-and-hold abnormal return (BHAR). The CARs are calculated by subtracting beta times the monthly returns of a benchmark from the monthly returns of the acquirer (the monthly abnormal returns) and summing in the post announcement period, while BHARs are calculated as the buy-and-hold return, which are the product of (1 + monthly abnormal returns) in the post announcement period minus 1, as $CAR_i = \Sigma_k AR_{i,t+k}$ and $BHAR_i = (\Pi_k(1 + AR_{i,t+k}) - 1)$. That is, BHAR is calculated by subtracting beta times the monthly returns of a benchmark from the monthly returns of the acquirer (the monthly abnormal returns) and taking the product of (1+ monthly abnormal returns) in the post announcement period minus 1, over 6 Months and 12 Months post-announcement. The cumulative abnormal return is computed over 3 days, 7 days, or 21 days around the announcement date, and over 6 Months and 12 Months post-announcement, as the sum of the monthly abnormal returns. The market proxies used are the S&P 500 index return, the value-weighted CRSP index (VW) return, or the equally weighted CRSP index (EW) return.

Thus, for example, BHAR_VW_6 Month is the 6-month post-effective-date buy-and-hold abnormal monthly returns over and above the VW index; CAR_VW3, CAR_EW3, and CAR_SP3 are the 3-day acquirer cumulative abnormal returns near the announcement date over and above the VW index, the EW index, or the SP500 index; and CAR_VW_6 Month is the 6-month post-effective-date cumulative abnormal monthly returns over and above the VW index. All of the data is from the database of the Center for Research in Security Prices (CRSP).

Following Ou and Penman (1989), we compute key financial ratios. Following Carter et al. (2010), ROA is the return on assets, which is calculated by dividing the firm's net income by its total assets, using data from Compustat as of the quarter ended before the announcement and for the quarters ended 6 Months and 12 Months after the effective date of the acquisition. For example, ROA_ 12 Month is the 12-month post-effective-date return on the assets of the acquirer. The book-to-market ratio is computed as the book value of equity divided by the market value of equity, which may be regarded as a measure of the (lack of) growth options of the firm (see Mohanram (2003)). The book value of the acquirer's equity (calculated by adding the total stockholders' equity with the deferred taxes and the investment tax credit then subtracting the total book value of the preferred equity) divided by the market value of the acquirer's equity (computed as the product of the firm's stock price and the quarter-end total shares outstanding) as of the quarter ended before the announcement, as well as 6 and 12 Months after the effective date of the acquisition. For example, the Book to Market_Quarter before is the book-to-market ratio of the acquirer as at the end of the quarter before the announcement date.

We also measure the equity beta of the acquirer using rolling windows of 3 years to end on the announcement date, or to end 6 Months and 12 Months post acquisition. The difference may be construed as measure of change in the equity risk of the acquirer (e.g., see, Brealey et al. 2005). In addition, we compute nonperforming asset ratios for banks, which we computed as the total amount of substandard, delinquent, and default loans divided by total loan assets, following Erel (2009); the net interest margin for banks is computed as the difference between interest income and interest expense as a fraction of total risk-weighted assets, following Chaudron et al. (2020); and the net profit margin for non-banks is calculated as net income divided by net revenue for non-bank firms, following Uygur et al. (2014), for the quarter before the announcement, and at 6 Months and 12 months post-acquisition.

We use the following deal-specific control variables in our analyses. Prior research documents that same industry mergers are an increasing proportion of all M&A transactions (Andrade et al. 2001), perhaps due to their less severe information asymmetry problems. Same Industry is a dummy variable that is set to 1 if the acquirer and the target firms are in the same industry, by matching the 2-digit SIC codes. Economic deal complexity can be positively correlated with the size of the transaction (Servaes and Zenner 1996). Larger deals are also economically more important deals, often reflecting a bidder management's empire building motives. We use the LnValue, defined as the natural logarithm of the total transaction value of an acquisition in millions. For example, since regulatory complexities such as antitrust considerations may significantly impact the time for approval, the time to completion—measured as the number of days from the date of the announcement to the effective date—may be another measure of deal complexity (Denis and Macias 2011; Gatti 2018). The takeover premium is measured in terms of the stock price of the target firm one week before the announcement, and it can be a measure of the anticipated benefits to the acquirer or, alternatively, a measure of the desire of the acquirer to acquire the target firm (Walkling and Edmister 1985).

2.3. Methodology

We first document the year-by-year acquirer firm characteristics, including the capital ratio (or leverage), the announcement period and post-announcement abnormal returns, and performance for banks and non-banks. Next, we perform univariate tests comparing the mean announcement period abnormal returns, longer-term post-abnormal returns, and performance between lower-than-median and higher-than-median capitalized banks and non-banks. We finally corroborate our finding using regression specifications that include several deal characteristics as well as year and industry fixed effects as control variables.

In these regressions, the bank acquirer and the high capital ratio dummy variables are key explanatory variables for the announcement period and the post-announcement longer-term returns. The high capital ratio dummy variable takes the value of 1 if the firm has an equity ratio for non-banks or a capital ratio for banks that is equal or higher than the median (low leverage) and 0 otherwise (high leverage). The median equity ratio for non-banks is 40%, while the median capital ratio for banks is 12%. We also control for industry fixed effects which are dummy variables set to 1 if the acquirer is in one of the four given industries, specifically banking, services, manufacturing, and technology; the Standard Industry Classification (SIC) code and classifications as per Professor Kenneth French's website are used, as well as year fixed effects that take the value of 1 if the acquisition was announced in a given year from 2010 to 2017 and 0 otherwise.

We examine changes in acquirer performance from the quarter before the announcement to 6 Months and 1 year post-acquisition. Finally, we examine some relevant bank-specific performance measures—nonperforming asset ratio and net interest margin—as well as non-bank specific performance—net profit margin in a regression setting.

3. Descriptive Statistics

The four panels of Figure 1 compare the year-by-year descriptive statistics as at the time of the merger and acquisition announcement: average capital ratios for banks (defined as Tier 1 capital ratio) and non-banks (defined as shareholder equity over total assets); the average transaction value (in millions); the average takeover premium compared to the stock price one week before the announcement; and the average number of days from the announcement to completion of the acquisition. Plots in red are for non-banks, and those in blue are for banks. The first plot shows that the equity ratios are much lower, as expected, for banks at approximately an average of 12% (similar to the number reported by Berg and Gider 2016) as compared with non-banks, which have a sample average equity ratios of approximately 40% (similar to the number reported by Biswas et al. 2019). The second plot shows that the transaction values are much higher and they are increasing over time for non-banks, approximately 10 times those of the banks, the transaction values of which are stable over time. The third plot shows that the takeover premium for both banks and non-banks are approximately the same in the 30% range (similar to the number reported by Aboody et al. 2021). The final plot shows that the days to completion—from the date of the announcement to the date of completion—are stable over time and higher for banks, perhaps reflecting the industry's greater regulatory oversight.
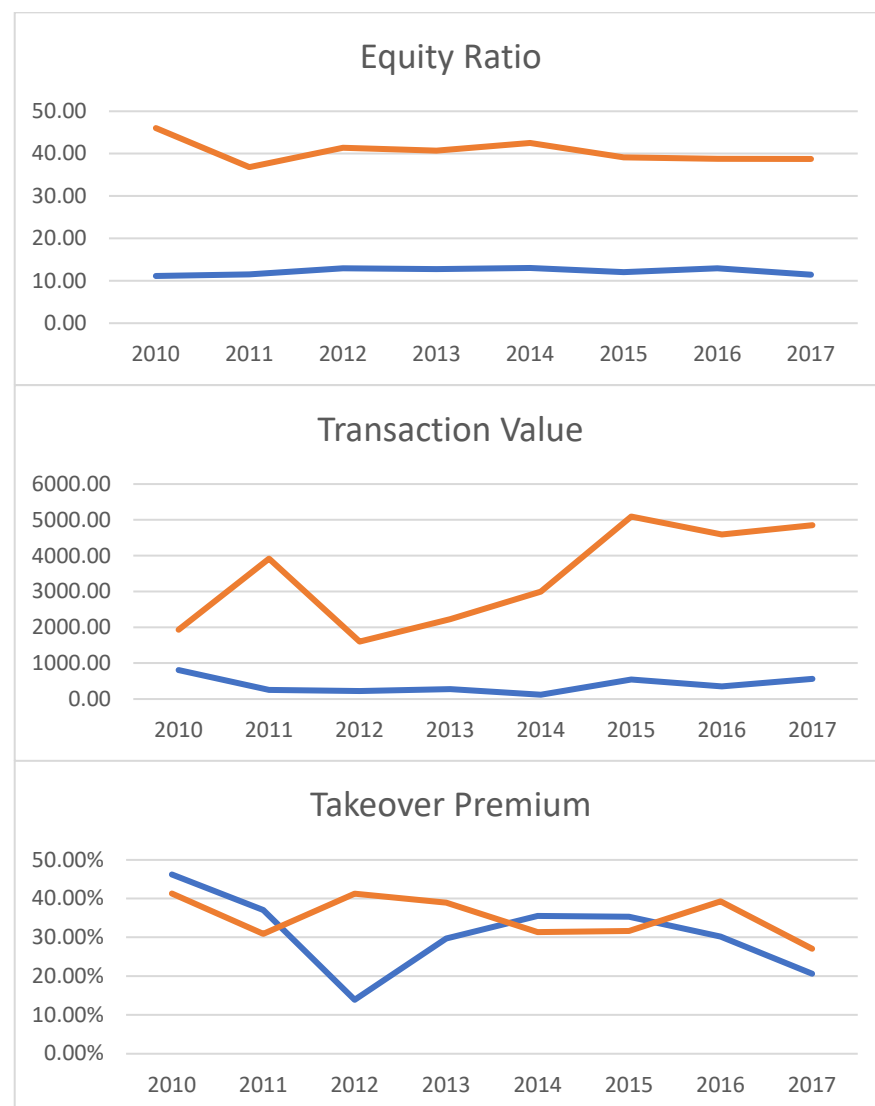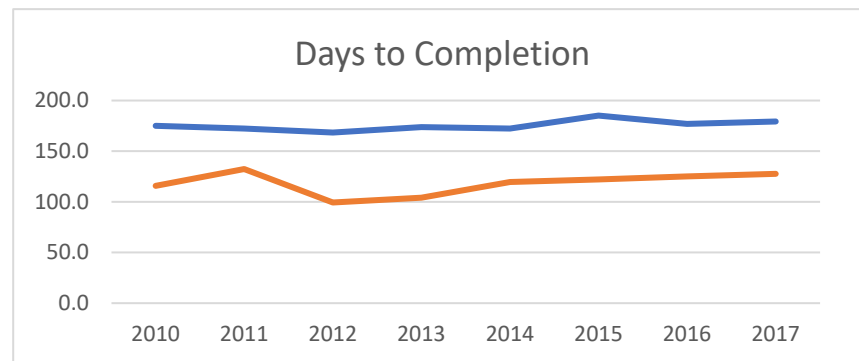

Figure 1. *Cont.*

Figure 1. Time Series of Descriptive Statistics. The four panels of this figure compare the year-by-year descriptive statistics, as at the time of the merger and acquisition announcement, of the average capital ratios for banks (defined as Tier 1 capital ratio) and non-banks (defined as shareholder equity over total assets); the average transaction value (in millions), the average takeover premium in percentage compared to the stock price one week before the announcement; and the average number of days from the announcement to completion of the acquisition. Plots in red are for non-banks, and those in blue are for banks.

For banks, these year-by-year numbers are shown in Panel A of Table 1. The average transaction value was relatively high in 2010, as was the average takeover premium (measured as the stock price paid compared to the price one week before the announcement). Since then, the transaction values, on average, dropped and then picked up in recent years. The days to completion has remained steady over the years, as has the average Tier 1 capital ratio.

Table 1. Banks: Characteristics, Returns, and Performance. The three panels of this table show the time series (year by year) of transaction and acquirer characteristics as at the time of M&A announcements, announcement period abnormal returns, and post issue abnormal returns and post issue performance, for banks. Other summary statistics include median, standard deviation, and skewness; and, they are reported for the overall sample immediately below the year-by-year averages.

Panel A: Characteristics					
Year	N	Average Capital Ratio	Average Transaction Value	Average Premium 1week	Average Time to Completion (Days)
2010	8	11.15	807.28	46.20%	175.0
2011	3	11.52	253.49	37.04%	172.3
2012	10	12.93	219.05	13.88%	168.4
2013	21	12.77	274.72	29.67%	173.8
2014	31	13.04	121.58	35.51%	172.3
2015	24	12.05	542.10	35.31%	185.2
2016	26	12.92	351.82	30.19%	176.9
2017	24	11.44	560.14	20.60%	179.3
Overall	147	12.42	371.08	30.61%	176.4
Median		12.02	102.51	29.66%	164.0
Standard Deviation		2.38	784.07	35.69%	58.1
Skewness		0.80	4.04	−1.36	0.8

Table 1. *Cont.*

		Panel B: Announcement Period Abnormal Returns				
Year	Average CAR_VW3	Average CAR_EW3	Average CAR_SP3	Average CAR_VW7	Average CAR_EW7	Average CAR_SP7
2010	−4.45%	−4.85%	−4.36%	−3.33%	−3.64%	−3.24%
2011	−0.14%	−0.07%	−0.12%	2.61%	2.96%	2.43%
2012	−5.36%	−5.33%	−5.36%	−4.31%	−4.24%	−4.31%
2013	0.64%	0.64%	0.63%	2.87%	3.01%	2.84%
2014	−0.28%	−0.27%	−0.28%	−0.10%	0.20%	−0.18%
2015	−2.12%	−1.84%	−2.14%	−0.80%	−0.60%	−0.82%
2016	−1.67%	−1.78%	−1.63%	−1.20%	−1.43%	−1.11%
2017	−0.88%	−0.77%	−0.89%	−0.85%	−0.73%	−0.86%
Overall	−1.36%	−1.34%	−1.36%	−0.51%	−0.42%	−0.52%
Median	−1.00%	−0.84%	−1.03%	−0.30%	0.16%	−0.30%
St. Dev.	4.46%	4.47%	4.45%	5.49%	5.55%	5.45%
Skewness	−0.90	−0.95	−0.89	−0.30	−0.34	−0.28

		Panel C: Post M&A Abnormal Returns and Performance				
Year	Average CAR_VW 6 Month	Average BHAR_VW 6 Month	Average CAR_VW 12 Month	Average BHAR_VW 12 Month	Average ROA_ 6 Month	Average ROA_ 12 Month
2010	13.28%	13.95%	6.35%	5.16%	1.06%	1.06%
2011	−2.97%	−3.87%	4.74%	3.18%	0.73%	0.89%
2012	11.47%	11.60%	27.79%	30.82%	0.71%	0.84%
2013	10.22%	10.08%	14.75%	14.05%	0.82%	0.91%
2014	3.26%	2.56%	11.25%	10.92%	0.78%	0.80%
2015	2.18%	1.12%	13.21%	11.53%	0.77%	0.83%
2016	12.67%	12.71%	25.39%	27.21%	0.87%	0.94%
2017	3.25%	2.66%	4.60%	3.59%	0.47%	0.51%
Overall	6.72%	6.31%	14.21%	14.03%	0.76%	0.82%
Median	5.49%	4.54%	13.49%	11.78%	0.74%	0.73%
St. Dev.	11.38%	12.29%	17.24%	19.78%	0.26%	0.25%
Skewness	0.62	0.86	0.34	0.91	−0.09	−0.30

For non-banks, these year-by-year numbers are shown in Panel A of Table 2. Again, as with the banks, although the average transaction values have increased in the later years of our sample, the average capital (equity) ratio, takeover premium, and time to completion have remained more or less steady over time. Capital ratios (at an average of 40% for non-banks as compared with 12% for banks) and transactions values (at an average of $3400 million for non-banks as compared to $371 million for banks) are significantly higher for non-banks as compared to banks.

Table 2. Non-Banks: Characteristics, Returns, and Performance. The three panels of this table show the time series (year by year) of transaction and acquirer characteristics as at the time of M&A announcements, announcement period abnormal returns, and post issue abnormal returns and post issue performance, for non-banks. Other summary statistics include median, standard deviation, and skewness; and, they are reported for the overall sample immediately below the year-by-year averages.

		Panel A: Characteristics			
Year	N	Average Capital Ratio	Average Transaction Value	Average Premium 1 Week	Average Time to Completion (Days)
2010	36	46.05	1931.86	41.31%	115.8
2011	26	36.83	3915.93	30.90%	132.4
2012	47	41.39	1604.41	41.24%	99.5

Table 2. *Cont.*

Panel A: Characteristics					
Year	N	Average Capital Ratio	Average Transaction Value	Average Premium 1 Week	Average Time to Completion (Days)
2013	40	40.68	2225.21	38.95%	104.1
2014	49	42.51	2997.15	31.33%	119.6
2015	51	39.12	5093.55	31.64%	122.1
2016	50	38.75	4592.00	39.28%	125.1
2017	36	38.73	4848.53	27.06%	127.7
Overall	335	40.59	3418.28	35.39%	117.6
Median		41.02	1335.42	30.37%	99.0
Standard Deviation		17.22	6541.14	35.40%	75.1
Skewness		0.08	5.28	2.15	1.14
Panel B: Announcement Period Abnormal Returns					
Year	Average CAR_VW3	Average CAR_EW3	Average CAR_SP3	Average CAR_VW7	Average CAR_EW7	Average CAR_SP7
2010	0.92%	0.95%	0.97%	0.90%	1.11%	0.91%
2011	−0.37%	−0.28%	−0.33%	0.22%	0.24%	0.25%
2012	−0.34%	−0.49%	−0.27%	−2.47%	−2.92%	−2.24%
2013	6.47%	6.56%	6.47%	7.34%	7.37%	7.28%
2014	3.21%	3.23%	3.18%	4.24%	4.48%	4.17%
2015	−2.61%	−2.29%	−2.64%	−0.89%	−0.18%	−1.08%
2016	−1.13%	−1.55%	−1.01%	−1.46%	−2.35%	−1.22%
2017	0.39%	0.22%	0.40%	2.55%	2.40%	2.53%
Overall	0.74%	0.71%	0.77%	1.18%	1.14%	1.21%
Median	0.15%	0.21%	0.29%	0.77%	0.86%	0.57%
St. Dev.	11.64%	11.67%	11.64%	15.07%	15.25%	15.06%
Skewness	0.99	1.01	0.99	−0.39	−0.36	−0.41
Panel C: Post M&A Abnormal Returns and Performance					
Year	Average CAR_VW 6 Month	Average BHAR_VW 6 Month	Average CAR_VW 12 Month	Average BHAR_VW 12 Month	Average ROA_6 Month	Average ROA_12 Month
2010	16.20%	17.03%	20.50%	19.10%	6.84%	6.87%
2011	−5.46%	−4.60%	2.55%	3.38%	2.96%	2.91%
2012	6.56%	6.95%	18.03%	20.21%	5.59%	5.33%
2013	15.83%	16.47%	26.43%	28.05%	5.63%	5.12%
2014	8.71%	8.85%	7.51%	6.83%	4.33%	3.85%
2015	−4.98%	−5.59%	0.20%	−2.91%	0.53%	0.54%
2016	11.84%	12.42%	23.12%	27.09%	3.57%	3.89%
2017	6.03%	5.79%	8.99%	7.81%	1.28%	1.28%
Overall	7.06%	7.33%	13.63%	13.94%	3.81%	3.69%
Median	9.36%	8.15%	14.77%	12.02%	3.00%	3.32%
St. Dev.	20.59%	12.24%	25.84%	29.14%	5.02%	8.84%
Skewness	−0.52	−0.07	−0.41	0.41	−2.38	−5.62

4. Returns and Performance

The three panels of Figure 2 compare the year-by-year announcement period abnormal returns from 3 days before the announcement to 3 days after (computed as the acquirer stock return over the 7 days near the announcement date minus beta times the value-weighted CRSP return over the same period, CAR_VW7); longer-run 6-month and 12-month post announcement abnormal returns (computed as the cumulative abnormal returns over 6 or 12 Months post-announcement over and above beta times the value-weighted CRSP return, CAR_VW_12 Month), and performance defined as the return on assets 12 Months

post acquisition (ROA_12 Month), between banks and non-banks. Plots in red are for non-banks, and those in blue are for banks. The plots show that although the announcement period abnormal returns are, on average, higher for non-banks as compared to banks, they follow similar patterns over time. The announcement period abnormal returns for banks straddle the 0% level, and they are often negative. The post-announcement 12 Month abnormal return plots fluctuate over time, but on average, they appear to be similar. The post-acquisition longer-term performance, measured in terms of ROA, seems to be much higher for non-banks as compared to banks, which is still positive on average. The numbers shown in Panels B and C of Table 1 show the year-by-year numbers for banks. On average, every year with the exception of 2013, most of the measures of the 3-day and the 7-day announcement period abnormal returns are negative for banks. However, almost all of the measures for longer-run abnormal returns and performance are positive for banks. This implies market misreaction to bank announcements as the announcement period abnormal returns for banks are often negative, as mentioned above. In contrast, the numbers shown in Panels A and B of Table 2 show that for non-banks—on average, every year—the measures of the 3-day and the 7-day announcement period abnormal returns are in some years negative and in some years positive, with the overall average being positive; and, the measures for longer-run post acquisition abnormal returns and performance are generally positive.
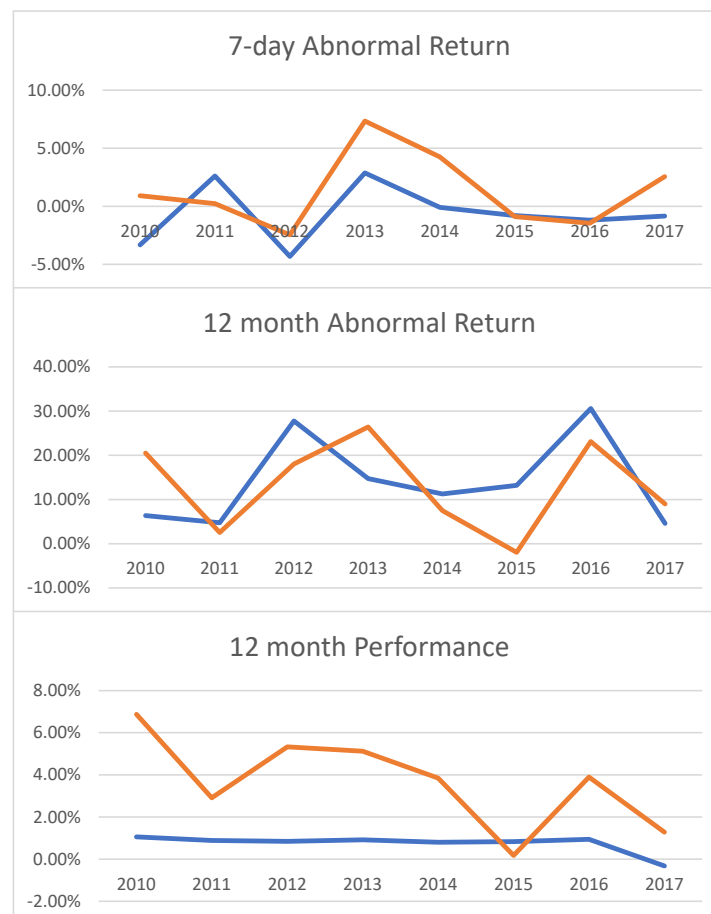

Figure 2. Time Series of Returns and Performance. The three panels of this figure compare the year-by-year announcement period abnormal acquirer stock returns from 3 days before the announcement to 3 days after (CAR_VW7), longer-run 12-month post-announcement abnormal returns (CAR_VW_12 Month), and performance defined as the return on assets (ROA) 12 Month post acquisition (ROA_12 Month), between banks and non-banks. Plots in red are for non-banks, and those in blue are for banks.

This may show that market reaction to non-bank announcements of mergers and acquisitions may be more nuanced. We next examine a cause for these differences.

Table 3 compares the mean announcement period abnormal returns, longer-term post-acquisition abnormal returns, and performance between lower-than-median capital ratio banks versus higher-than- (or equal to)-median capital ratio banks (left 2 columns), where the median is 12%. The table shows that across all measures of 3-day and 7-day announcement period abnormal returns, the announcement period reaction is significantly more negative, on average, when a lower capitalized bank makes an M&A announcement as compared to when a higher capitalized bank makes the announcement. However, the longer-run abnormal returns as well as the performance, on average, are all positive, and they are not significantly different between lower and higher capitalized banks. The implication is that the market misreacts to lower capitalized banks making merger and acquisition announcements.

Table 3. Capital Ratio, Abnormal Returns, and Performance. This table compares mean announcement period abnormal returns, longer-term post-announcement abnormal returns, and post-acquisition performance between lower-than-median capital ratio banks versus higher-than-median capital ratio banks (left 2 columns), and between lower-than-median equity ratio non-banks versus higher-than-median equity ratio non-banks (right 2 columns).

	Banks		Non-Banks	
	Low Capital Ratio	**High Capital Ratio**	**Low Capital (Equity) Ratio**	**High Capital (Equity) Ratio**
CAR_VW3	−2.24%	−0.49% **	3.19%	−1.69% ***
CAR_EW3	−2.19%	−0.49% **	3.13%	−1.69% ***
CAR_SP3	−2.23%	−0.50% **	3.21%	−1.67% ***
CAR_VW7	−1.80%	0.76% ***	4.41%	−2.03% ***
CAR_EW7	−1.74%	0.88% ***	4.35%	−2.05% ***
CAR_SP7	−1.79%	0.73% ***	4.43%	−2.00% ***
CAR_VW_ 6 Month	7.28%	6.14%	6.73%	7.38%
BHAR_VW_ 6 Month	6.74%	5.87%	6.82%	7.83%
CAR_VW_12 Month	14.88%	13.53%	14.39%	12.86%
BHAR_VW_12 Month	14.66%	13.39%	14.66%	13.20%
ROA_6 Month	0.72%	0.79%	2.11%	5.53% **
ROA_12 Month	0.78%	0.84%	2.48%	4.91% **

** and *** denote significant at the 5% and 1% level, respectively, from the other cohort.

The announcement period abnormal returns, longer-term post-acquisition abnormal returns, and performance between lower-than-median capital (equity) ratio non-banks versus higher-than- (or equal to)-median equity ratio non-banks are reported (the right 2 columns), where the median is 40%. Surprisingly, the opposite seems to be the case here. Across all measures of 3-day and 7-day announcement period abnormal returns, the announcement period reaction is significantly more negative, on average, when a higher capitalized (lower leverage) non-bank makes an M&A announcement as compared to when a lower capitalized (higher leverage) non-bank makes the announcement. Indeed, the numbers for higher capitalized non-banks are all negative, on average. However, the longer-run abnormal returns, on average, are all positive, and they are not significantly different between lower and higher capitalized non-banks. Although the longer-run performance—as measured by the ROA—is positive, it is significantly more positive for the higher equity-ratio non-banks, for which the announcement period market reaction was negative. The implication is that the market again misreacts to higher capitalized non-banks making merger and acquisition announcements, and this time it is in the opposite direction as compared to banks,.

Researchers have used different methods of separating acquirers based on leverage, including separating firms by leverage and quality (see: Bhabra et al. 2010). The difference between the studies is the examination of different time periods (before the 2008 crisis by Bhabra et al., versus post$-$2008 in our paper), and the differences in sample sizes (65 in Bhabra et al., versus 482 firms in our study, which could be why their results are not significant at a level of 5%). One study on long-run performance (Malmendier et al. 2012) found that firms that experienced significantly negative announcement period CAR (defined as losers by the authors) tended to outperform their counterparts (winners) by over 24% over the three-year post-announcement. While our paper does not find evidence that banks that tend to experience significantly negative announcement period CAR outperform non-banks in the long run, a similar pattern of initial misreaction holds. In terms of profitability, Golubov and Xiong (2019) find that ROA tends to decline for public firms after the acquisition, which is in line with the overall ROA change in our sample (0.14% decline in our sample, versus 0.77% in the Golubov-Xiong sample). We next examine this relation in a multivariate setting, controlling for other possible influences of returns.

Panel A of Table 4 reports the regression coefficients and their significance based on firm-clustered adjusted *t*-statistics of specifications explaining the announcement period abnormal returns, longer-run post-announcement abnormal returns, and longer-run post-acquisition performance, where the bank dummy variable (that takes the value of 1 for bank acquirers and 0 otherwise) and the interaction term of the bank dummy variable with a high capital ratio dummy variable (that takes the value of 1 for capital ratios equal to or above the sample median capital ratio for banks and non-banks at 12% and 40%, respectively, and 0 otherwise) are the main explanatory variables. Year and industry fixed effects are also included, using the following regression specification:

$$Y_t = \beta_1 {*} X_t + \beta_2 {*} \text{Bank dummy} + \beta_3 {*} \text{High Capital Ratio dummy} +$$
$$\beta_4 {*} \text{Bank dummy} {*} \text{High Capital Ratio dummy} + \tag{1}$$
$$\beta_5 {*} \text{Industry dummies} + \beta_6 {*} \text{Year dummies} + \varepsilon$$

where Y_t is one of either announcement period abnormal returns or longer-term post announcement abnormal returns, and X_t are the deal characteristics as at the announcement.

Table 4. Multivariate Analysis: Capital Ratio, Abnormal Returns, and Performance. This table reports the regression coefficients and their significance based on firm-clustered adjusted t-statistics, as well as the adjusted R^2 statistic of specifications explaining the announcement period abnormal returns, longer-run post-announcement abnormal returns, and longer-run post-acquisition performance, where the bank dummy variable and the interaction term of the bank dummy variable with a high capital ratio dummy variable are the main explanatory variables. Year and industry fixed effects as well as several deal-specific control variables are included. Heteroscedasticity test *p*-values, Durbin–Watson test statistics and t-statistics of error terms are reported below the adjusted R^2.

	Panel A				
	CAR_VW7	CAR_VW_ 6 Month	CAR_VW_ 12 Month	BHAR_VW 6 Month	BHAR_VW 12 Month
Ln Value	−0.01 **	−0.01	−0.01	−0.01	−0.01
Same Industry Deal	0.01	0.01	0.01	0.01	0.01
Bank	−0.08 ***	−0.03	−0.01	−0.03	−0.02
High Capital Ratio	−0.07 ***	−0.01	−0.02	−0.01	−0.02
Bank x High Capital Ratio	0.08 ***	−0.02	−0.01	−0.02	−0.01

Table 4. *Cont*.

	Panel A				
	CAR_VW7	**CAR_VW_ 6 Month**	**CAR_VW_ 12 Month**	**BHAR_VW 6 Month**	**BHAR_VW 12 Month**
Year Dummy Variables	Yes	Yes	Yes	Yes	Yes
Industry Dummy Variables	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	10.84%	11.39%	11.02%	11.99%	12.88%
White Test *p*-value	0.68	0.35	0.80	0.19	0.69
Durbin-Watson Test Stat.	2.02	1.66	1.75	1.68	1.73
Error Term t-statistic	−0.35	0.00	0.00	0.00	0.00

	Panel B				
	CAR_VW7	**CAR_VW_ 6 Month**	**CAR_VW_ 12 Month**	**BHAR_VW 6 Month**	**BHAR_VW 12 Month**
Ln Value	−0.01 **	−0.01	−0.01	−0.01	−0.01
Same Industry Deal	0.01	0.01	0.01	−0.01	0.01
Bank	−0.07 ***	−0.03	−0.01	−0.03	−0.01
High Capital Ratio	−0.07 ***	−0.02	−0.02	−0.01	−0.02
Bank x High Capital Ratio	0.08 ***	−0.02	−0.02	−0.02	−0.02
Time to Completion	−0.01	−0.01	−0.01	−0.01	−0.01
Takeover Premium	−0.01	−0.04 *	−0.01	−0.04 *	−0.02
Year Dummy Variables	Yes	Yes	Yes	Yes	Yes
Industry Dummy Variables	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	10.91%	10.92%	9.60%	11.49%	11.55%
White Test *p*-value	0.97	0.55	0.93	0.56	0.82
Durbin-Watson Test Stat.	2.05	1.74	1.81	1.75	1.78
Error Term t-statistic	−0.37	0.00	0.00	0.00	0.00

	Panel C				
	ROA_ 6 Month	**ROA_ 12 Month**	**Book to Market_ 6 Month**	**Book to Market_ 12 Month**	**Beta_ 6 Month**	**Beta_ 12 Month**
ROA_Quarter before	0.49 ***	0.33 ***				
Book to Market_Quarter before			0.41 ***	0.42 ***		
Beta_Quarter before					0.72 ***	0.51 ***
Ln Value	0.01 ***	0.01	1.98 *	2.19 ***	0.01	0.01
Same Industry Deal	−0.01	−0.01	−4.26 *	−4.53 *	−0.05	−0.15
Bank	0.01	0.01	6.31	7.17 *	−0.17	−0.12
High Capital Ratio	0.02 **	0.01 *	6.01 ***	6.00 ***	−0.01	−0.17
Bank x High Capital Ratio	−0.02	−0.01	−5.21	−5.13	0.51 **	0.49 *
Year Dummy Variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummy Variables	Yes	Yes	Yes	Yes	Yes	Yes

Table 4. *Cont.*

	Panel C				
	CAR_VW7		CAR_VW_ 6 Month	CAR_VW_ 12 Month	BHAR_VW 6 Month	BHAR_VW 12 Month
Adjusted R^2	38.33%	11.71%	70.95%	73.21%	47.03%	40.68%
White Test *p*-value	0.76	0.99	0.96	0.94	0.49	0.38
Durbin-Watson Test Stat.	2.08	2.05	1.95	1.98	1.61	1.60
Error Term t-statistic	0.00	0.00	0.00	0.00	0.00	0.00
	Panel D				
	ROA_ 6 Month	ROA_ 12 Month	Book to Market_ 6 Month	Book to Market_ 12 Month	Beta_ 6 Month	Beta_ 12 Month
ROA_Quarter before	0.46 ***	0.30 ***				
Book to Market_Quarter before			0.42 ***	0.43 ***		
Beta_Quarter before					0.77 ***	0.52 ***
Ln Value	0.01 ***	0.01	0.01	0.01	0.01	0.01
Same Industry Deal	−0.01	−0.01	−3.58	−3.76	−0.05	−0.17
Bank	0.01	0.01	0.01	0.01	−0.17	−0.05
High Capital Ratio	0.02 **	0.02 *	6.85 ***	6.61 ***	−0.05	−0.11
Bank x High Capital Ratio	−0.02	−0.02	−7.36*	−7.17 *	0.57 **	0.51 *
Time to Completion	−0.01 ***	−0.01	0.01 ***	0.01 ***	0.01	0.01
Takeover Premium	0.01	0.01	−5.09 *	−5.16 *	−0.10	−0.17
Year Dummy Variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummy Variables	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	37.34%	11.23%	73.93%	74.56%	46.77%	38.19%
White Test *p*-value	0.77	0.99	0.56	0.58	0.90	0.88
Durbin-Watson Test Stat.	2.08	2.05	1.92	1.95	1.62	1.61
Error Term t-statistic	0.00	0.00	0.00	0.00	0.00	0.00

*, **, and *** denote significant at the 10%, 5%, and 1% level, respectively.

In the first specification, X_t includes the value of the transaction (which may make the transaction more economically important and/or more complex) and whether the acquirer and target are both in the same industry (which may make the transaction less complex). The first column reports on the announcement period abnormal returns, while the next four columns report on the longer-term post-announcement abnormal returns computed using different methods over different time periods.

Panel A reports that the bank dummy variable is significantly negative for announcement period abnormal returns, corroborating the evidence in Figures 1 and 2 and Tables 1 and 2. Banks are significantly negatively associated with announcement period market reaction, but the bank dummy interaction with the high capital ratio dummy is significantly positively associated with announcement period abnormal returns, while not significantly associated with longer-term post-announcement abnormal returns (although the relation is negative), corroborating the misreaction evidence of Table 3. The high capital ratio dummy, dominated by non-banks, reflects the non-bank reaction on average, and it is significantly negative at the announcement. Among the control variables, the larger the deal, the lower the announcement period abnormal return, perhaps reflecting investor concerns.

The *p*-values for the White (1980) heteroscedasticity test for this regression were all above 0.05, suggesting no presence of heteroscedasticity in the regression model at a 5% significance level. The residuals are approximately normally distributed with the center of the distribution at 0 and all t-values being equal to or close to 0. Multicollinearity tests suggest no presence of collinearity among the regression variables, less than Kennedy's (2003) suggestion of 15 as a threshold. Lastly, the Durbin and Watson (1951) tests on all of the regression models indicate no significant presence of autocorrelation, positive or negative, among the error terms as the test statistics are close to 2, ranging from 1.67 to 2.02, with the lowest value occurring for the 6-month CAR regression. Overall, OLS regression assumptions hold for all regressions in Panel A.

In Panel B, we add two more deal variables, as a robustness check. These are the time to completion and the takeover premium. Although these two variables are not determined at the time of the deal announcement, they can reflect deal complexity. Panel B reports that the takeover premium is negatively associated with longer-term post-announcement returns—that is, the more the acquirer pays, the worse the longer-term returns, as expected. The other results are similar to those of Panel A.

The results of the robustness checks for the models in Panel B are similar to those in Panel A. None of the models exhibit heteroscedasticity according to the White test, and the errors of all the models are centered around 0 and they are normally distributed. Variables show no significant signs of collinearity. The DW tests suggest no presence of autocorrelation among the residuals, with DW test statistics ranging from 1.78 to 2.06.

Overall, the univariate and the multivariate results show that the market misreacts —significantly negatively at the announcement—to lower capitalized banks making M&A announcements. This is in contrast to non-banks where the market misreacts—significantly negatively at the announcement—to less levered non-banks making M&A announcements. There is no significant effect on the longer-term post-announcement returns of the acquirer's leverage as at the time of the announcement for both banks and non-banks.

In Panels C and D, we examine the performance and the risk factors: return on assets (ROA), the book-to-market ratio (the inverse of a proxy for growth options), and equity beta computed using the previous 3 years of monthly returns on a rolling basis. We examine changes in these numbers for the acquirers from the quarter before the announcement to 6 Months and 1 year post-acquisition using the following regression specification:

$$Y_{after} = \beta_1 * Y_{before} + \beta_2 * X_t + \beta_3 * \text{Bank dummy} + \beta_4 * \text{High Capital Ratio dummy} +$$
$$\beta_5 * \text{Bank dummy} * \text{High Capital Ratio dummy} + \quad (2)$$
$$\beta_6 * \text{Industry dummies} + \beta_7 * \text{Year dummies} + \varepsilon,$$

Panel C reports the results of the specification without the time to completion and the takeover premium included in the control variables. The first two columns show that the post-acquisition ROA is, as expected, strongly correlated with the pre-announcement ROA for the acquirer. The high capital ratio is significantly and positively associated with the post-acquisition ROA, although for non-bank deals, on average, the announcement period market reaction is negative for high capital ratio acquirers. The net two columns examine the associations with the post-acquisition book-to-market ratio, which is a proxy for the inverse of growth options for a firm, finding that the book-to market ratios are sticky—they strongly depend on the book-to-market ratio before the announcement, which is as expected. Again, high capital ratios for acquirers are associated with a higher book-to-market ratio post-acquisition, perhaps indicating that high capital ratio firms are less growth-like. Among the control variables, same industry deals are associated with growth-like features for the acquirer post-deal, but larger deals are not associated with growth features. The last two columns show that equity beta changes (pre- to post-acquisition) are positively and significantly associated with higher capitalized bank deals, implying increased equity risk.

Similar to the CAR regressions in the previous two panels, there is no evidence of heteroscedasticity or residual autocorrelation among the variables, with Durbin–Watson test statistics ranging from 1.94 to 2.08 for ROA and B/M regressions. The DW test statistics for beta, however, are 1.60 and 1.63 for 6-month and 12-month regressions, respectively, causing concern for the error terms independence. However, upon examining the residual plots, no clear pattern of residual autocorrelations was noted. The error terms are centered around 0, and they are normally distributed. Overall, of all regression models there is little concern over the OLS regression violations, with beta regressions causing some degree of concern, which can be alleviated by inspecting the residual plots.

The final panel adds 2 more control variables—the time to completion and the takeover premium—that are not exactly known at the time of the announcement, but they can be considered deal complexity proxies. A high capital ratio continues to be significantly and positively associated with changes in the acquirer's profitability and the book-to-market ratio post acquisition. Banks with high capital ratios continue to be significantly and positively associated with increases in equity beta (risk). Among the new control variables that measure deal complexity, the time to completion is negatively associated with increases in profitability and growth feature.

The OLS assumption robustness checks yield similar results as with Panel C—with the concern for autocorrelation arising in the beta sample but with no clear pattern on the residual plots. The White tests raise no concerns for heteroscedasticity, and no variable demonstrates any significant concern over collinearity. The error terms are normally distributed, with the mean of 0. In summary, regressions in all panels demonstrate a similar profile for OLS assumption robustness, with little concerns over the violations in almost all of the regressions.

We perform additional checks as detailed below.

Bank- and Non-Bank-Specific Post-Acquisition Performance

Table 5 reports the regression coefficients and their significance based on firm-clustered adjusted *t*-statistics, as well as the adjusted R^2 statistic, of specifications explaining bank-specific performance measures—the nonperforming asset ratio and the net interest margin; and non-bank specific performance—the net profit margin. The nonperforming assets ratio of a banking firm is calculated as nonperforming assets (default, doubtful loans—over 12 months of nonpayment of interest or principal—or substandard loans, which are less than 12 Months of nonpayment) divided by total loan assets, as of the quarter ended before the announcement, as well as 6 and 12 Months after the effective date of the acquisition. For example, the nonperforming assets ratio_quarter before is the ratio of the nonperforming assets of the acquirer banking firm as at the end of the quarter before the announcement date. The net interest margin is calculated as the ratio of the difference between the interest revenue and the interest expense divided by the total risk-weighted assets of banking firms as of the quarter ended before the announcement, as well as 6 and 12 Months after the effective date of the acquisition. For example, the net interest margin_12 Months before is the bank acquirer's net interest margin 12 Months after the effective date of the acquisition. The net profit margin is defined as the quotient of net income and net revenues as of the quarter ended before the announcement, as well as 6 and 12 Months after the effective date of the acquisition. For example, the net profit margin_6 Month before is the non-bank acquirer's net profit margin 6 Months after the effective date of the acquisition.

Table 5. Additional Checks: Capital Ratio and Performance. This table reports the regression coefficients and their significance based on firm-clustered adjusted t-statistics, as well as the adjusted R^2 statistic, of specifications explaining bank-specific performance measures—nonperforming assets ratio and net interest margin; and non-bank specific performance—net profit margin. Year and industry fixed effects, as appropriate, and deal specific control variables are included. Heteroscedasticity test *p*-values, Durbin–Watson test statistics, and t-statistics of error terms are reported below the adjusted R^2.

	Net Interest Margin_ 6 Month	Net Interest Margin_ 12 Month	Nonperforming Assets Ratio_ 6 Month	Nonperforming Asset Ratio_ 12 Month	Net Profit Margin_ 6 Month	Net Profit Margin_ 12 Month
Net Interest Margin_ quarter before	0.70 ***	0.63 ***				
Nonperforming assets ratio_quarter before			0.05 ***	0.04 ***		
Net Profit Margin_ quarter before					0.27 ***	0.11 **
Ln Value	0.01	0.01	−0.02 **	−0.02 **	0.01	0.01
Same Industry Deal					0.01	0.01
High Capital Ratio	−0.01	0.01	−0.01	−0.00	0.02 *	0.07 *
Time to Completion	0.00	−0.00	0.02 **	0.02 **	−0.01	−0.01
Takeover Premium	−0.01	−0.01	0.01	0.01	0.02	0.06
Year Dummy Variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummy Variables					Yes	Yes
Adjusted R^2	55.23%	65.30%	26.09%	23.42%	13.54%	6.62%
White Test *p*-value	0.44	0.71	0.79	0.73	1.00	0.97
Durbin-Watson Test Stat.	1.89	1.85	2.20	2.23	2.04	1.94
Error Term t-statistic	0.00	0.00	0.00	0.00	0.00	0.00

*, **, and *** denote significant at the 10%, 5%, and 1% level, respectively.

As appropriate, the year and industry fixed effects are also included. The OLS assumption checks reveal no heteroscedasticity presence, confirm normality of the errors distribution with the center at 0, and reveal no collinearity issues among the variables in the models or any autocorrelation concerns.

A high capital ratio is significantly and positively associated with changes in the acquirer's net profit margin 6 Months and 12 Months post acquisition, and these are the non-banks that entailed a significantly negative announcement period abnormal stock price reaction. However, high capital ratios are not significantly associated with changes in the net interest margin or in the nonperforming asset ratio post acquisition. Among the control variables, larger acquisitions are negatively associated with changes in the nonperforming assets post acquisition, perhaps because of the positive diversification effects of acquisitions, while the time to completion, a measure of deal complexity and regulatory controls, is positively associated with changes in the nonperforming assets post acquisition.

5. Discussion of Results and Conclusions

Extant papers, looking predominantly at non-bank acquirers, have analyzed abnormal returns around M&A announcement or effective dates, and at post-acquisition returns, generally finding negative abnormal acquirer returns in the longer-run post-acquisition. Some papers have also examined the announcement period returns and the post-acquisition returns for banks. In this paper, we bring the above strands of literature together, and we examine whether the market reacts positively or negatively at the time of M&A announcements based on the acquirer's leverage at the time of such announcements, comparing and contrasting such reactions between banks and non-banks. We also examine whether such reactions were in the right direction or overlooking post-acquisition returns and performance. The motivation for doing so is to analyze the importance of acquirer leverage

on how the market reacts and what happens in the longer run. This opens the door for future research to delve deeper and to examine why such reactions occur and what role regulations play.

We first document detailed descriptive statistics. We find that the capital (equity) ratios are much lower, as expected, for banks at an approximate average of 12% in our sample period, similar to results from Berg and Gider (2016), as compared with non-banks, which have a sample average of approximately 40%, similar to findings from Biswas et al. (2019). The transaction values are much higher and increasing over time for non-banks: about 10 times those of the banks. The takeover premium (computed in relation to the stock price one week before the announcement) for both banks and non-banks are roughly the same, on average in the 30% range, which is in line with findings from Aboody et al. (2021), who reported an average premium for successfully completed M&A deals was 32.76% and an average premium on deals rejected by the targets was 29.80%.

On average, every year, all of the measures of 3-day and 7-day announcement period abnormal returns, except for one year, are negative for banks. However, all of the measures for longer-run post acquisition abnormal returns and performance are generally positive. In contrast, the overall average announcement period abnormal returns is positive for non-banks, and the measures for longer-run post acquisition abnormal returns and performance are also generally positive.

Digging deeper, we find that, across all measures of 3-day and 7-day announcement period abnormal returns, the announcement period reaction is significantly more negative, on average, for lower (lower than sample median) capitalized banks as compared to when a higher capitalized banks. For example, Kalemli-Ozcan et al. (2011), found that lower-capitalized banks suffered more in the economic crisis of 2008 than their better-capitalized counterparts, which may have contributed to investors being more wary of lower capitalized banks. Duffie (2018) reported similar findings—banks hit the hardest tended to have an average leverage ratio of over 25% of total assets at the peak of the 2008 crisis. However, the longer-run abnormal returns, as well as performance, on average, are all positive and not significantly different between lower and higher capitalized banks. Indeed, shareholder risk (as measured by equity beta) appears to increase in the longer-run for the higher capital banks.

The opposite seems to be the case for non-banks. Across all measures of 3-day and 7-day announcement period abnormal returns, the announcement period reaction is significantly more negative, on average, when a higher (higher than sample median) capitalized non-bank makes an M&A announcement as compared to when a lower capitalized (higher leverage) non-bank makes the announcement. Indeed, the numbers for higher capitalized non-banks are all negative, on average. However, the longer-run abnormal returns, on average, are positive and not significantly different between lower and higher capitalized non-banks. Furthermore, performance appears to be better (as measured by the return on assets, ROA) in the longer-run for the higher capitalized (less levered) non-banks.

In multivariate analyses, after controlling for year and industry fixed effects, we find that banks are significantly negatively associated with announcement period market reaction, but the bank dummy (taking the value of 1 for bank acquirers) interacted with the high capital ratio dummy (taking the value of 1 for higher than or equal to the sample median capital ratio, computed separately for banks and non-banks) is significantly positively associated with announcement period abnormal returns, while not significantly associated with longer-term performance (although the relation is negative), corroborating the misreaction evidence.

The high capital ratio dummy variable, dominated by non-banks, reflects mainly non-bank reaction, and it is significantly negative at the announcement. However, a high capital ratio is significantly and positively associated with post-acquisition performance. Overall, the univariate and the multivariate results imply that the market misreacts to both banks and non-banks making merger and acquisition announcements based on acquirer

capital ratio (or the inverse of leverage) as at the time of the announcement, but in opposite directions (also see (Krishnan and Wu 2022), for another example of market misreaction).

In other words, we find evidence of stock price misreaction at the time of announcements based on acquirer leverage. The interesting question is why? While we leave the detailed empirical analysis of this question to future research, anecdotal evidence suggests that, for banks, low acquirer capitalization makes the market jittery when M&A announcements are made even though, in many cases, branch diversification and other resultant synergies may be beneficial. For non-banks, the market seems to react negatively to low acquirer leverage as at the time of M&A announcements because of reduced tax savings or reduced managerial discipline that may be imposed by debt, but in the longer-run more debt may prove detrimental for securing funding to grow the combined firm.

It must be noted that our work, however, does not control for other factors that may influence post-acquisition performance. These include firm-specific factors such as post-acquisition announcements that may include stock buybacks (Chen 2020) or the introduction of new product lines (Dutordoir et al. 2012), and external factors that may include changes in the country's economic conditions (Medovikov 2016). We have alluded to some reasons for investor misreaction above, but future work may also delve deeper into these reasons, which may be reactionary, for example, based on recent effects such as the economic crisis, or behavioral such as expectation of a debt-equity ratio considered optimal for different industries. There are also policy implications stemming from our research; for example, how much does the well-publicized capital adequacy ratios that banks need to follow in the U.S., or tax breaks firms get because of debt in the U.S., or indeed the literature on the managerial discipline benefits of debt publicized, impact investor behavior and returns? Indeed, a possible extension of the paper would examine the result in other countries with different capital adequacy norms for banks and different tax laws to see the extent to which regulation plays a role in conditioning investor responses.

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