# An investigation of market reaction differences between mega-deals and non-mega deals considering industry concentration

**Abstract:** This study investigates the performance of mega-deals and non-mega-deals and the role of industry concentration level. Our research finds that while non-mega-deals tend to have better short-term performance, mega-deals are more likely to perform better in the long term. In addition, a higher industry concentration plays a positive role in the short- and long-term performance of both mega-deals and non-mega-deals. However, its effect on long-term performance is not as pronounced, especially in the case of mega-deals. A lower industry concentration implies more competition, which may lead to a higher offer premium and adversely affect stockholders in the short term.

**Keywords:** M&A deals; mega-deals; deal performance; industry concentration

## 1 Introduction

Mergers and acquisitions (M&As) are among the most common and direct methods of firm investment and are often adopted by large firms. For example, Sycamore Partners acquired Staples for $6.9 billion in 2017, and Sanofi-Aventis announced its takeover of Bioverativ for $11.6 billion at the beginning of 2018. Such mega M&A deals have recently attracted extensive academic attention (e.g., Cartwright and Cooper, 2020; Chkir et al., 2020; Ahmed et al., 2020). Cartwright and Cooper (2020) examine whether M&As create value and suggest that lagged synergy can be achieved during the M&A processes. Alexandridis et al. (2017) analyzed how mega M&As perform differently from non-mega deals. Jurich and Walker (2019) find that acquiring firms' gains are positively (negatively) affected by the acquiring (target) firm's size. Hu et al. (2020) show that an acquirer's previous acquisition experience positively affects both short- and long-term abnormal stock returns. They suggest that more experienced acquirers are more likely to conduct better post-merger integration, significantly improving operating performance. Gao and Bao (2022) find that mega-deals face larger leverage and debt changes during the takeover process, and mega-deals with larger leverage changes are more likely to perform better in the short term.

While the impacts of various deals and acquirer characteristics have been explored, research on the role of industry concentration in mega-deals performance is rare. Shahrur (2005) show that the industry concentration of the takeover industry has a significantly positive role in the bidder gain. Gorton et al. (2009) find defensive acquisitions are more

common in an industry with firms of similar size and high private benefits. Choi et al. (2020) analyze the effect of M&As on industry performance. They find that M&A activities indicate whether industries have growth potential, and forward-looking investments can produce the expected positive returns. In addition, Galbraith (1952) and Snyder (1996) show that the merging firms can effectively countervail anticompetitive practices upstream with the pooled purchasing and the competition induced by the supplier industry if the supplier industry is not already competitive. Fee and Thomas (2004) investigate the upstream and downstream product-market effects of horizontal M&As and find improved productive efficiency and buying power are sources of gains to horizontal mergers.

More concentrated industries mean less competition, which can benefit shareholders (Banerjee and Eckard, 1998; Rani et al., 2020), and thus have the potential to improve the short-term performance of M&A deals. In order to test the impact of industry concentration on deal performance, particularly on mega-deal performance, this study investigates the relationship between deal performance and industry concentration. First, we compare the performance of mega-deals and non-mega deals in the short and long term. Our results show that mega-deals perform poorly compared to non–mega-deals in the short term, with only half the abnormal returns. However, the results are reversed in the long term, as mega-deals perform significantly better than non–mega-deals. Then, we further investigate the role of higher industry concentration in the performance of mega-deals and non-mega deals. We find that a high industry concentration plays a significantly positive role in the performance of both mega-deals and non-mega deals. However, its effect on long-term performance is not as significant as that on short-term performance, especially in the case of mega-deals. On the other hand, a low industry concentration implies more competition, which may lead to a higher offer premium and adversely affect stockholders in the short term. This may help explain why mega-deals underperform in the short term and outperform non-mega deals in the long term.

The remainder of the study is organized as follows. Section 2 develops the two hypotheses. Section 3 presents the univariate and multivariate results, and Section 4 concludes the paper.

# 2 Hypothesis development

Whether M&A deals create or destroy value has received considerable attention (e.g., Henry and Jespersen, 2002; Cools, 2007; Moeller et al., 2004; Alexandridis et al., 2013). However, the evidence and literature on mega-deals are limited (Hu et al., 2020). A comparison of the post-merger performance between mega-deals and non-mega deals in both the short

and long term, as well as the impact of deal characteristics, is thus necessary. Thus, the hypothesis is presented as follows:

H1: Mega-deals destroy value, and their performance is worse than non-mega deals in the short and long term.

According to Gorton et al. (2009), firms tend to have different incentives in different industry structures. For an industry with firms of similar size, defensive acquisitions are more likely when private benefits are high, thus adversely affecting the interests of the acquiring firm. In an industry with a dominant firm, firms tend to create positioning mergers to attract the dominant firm. Under such circumstances, acquisitions are profitable, regardless of whether the private benefits are high or low. For an industry with firms of similar size, both defensive and positioning acquisitions may occur. In addition, Shahrur (2005) suggests that the coefficient of the Herfindahl index of the takeover industry is positively and significantly related to bidder gains at the 1% level according to both the weighted least squares and maximum likelihood estimation models. We consider the industry structure and investigate its role in the performance of the M&A deals. The empirical results confirm that the industry structure influences market returns. Thus, the second hypothesis is proposed as below:

H2: A higher industry concentration plays a positive role in the performance of both mega-deals and non-mega deals.

# 3 Data and empirical analysis

The dataset was downloaded in the Thomson One Banker SDC database with all the acquirer firms from the United States. The firm accounting information was obtained on Compustat through Wharton Research Data Services. The sample period is between January 1, 1990, and December 31, 2016. Following that in Alexandridis et al. (2017), deals with transaction values exceeding $500 million are considered mega-deals. To better detect the differences between mega-deals and non-mega deals, we further divide the dataset into mega-deal and non-mega-deal subsamples based on deal value. Following Hou and Robinson (2006) and the U.S. Department of Justice standard, we adopt the Herfindahl–Hirschman index (HHI) to estimate the concentration of industries. A larger HHI indicates a more concentrated industry and less competition. The empirical results are given in Table 1.

Table 1. Mega-deal and non-mega-deal comparison

| | | Full sample | Mega (1) | Non-mega (2) | Difference (1)-(2) |
|---|---|---|---|---|---|
| Deal characteristics | | | | | |
| HHI | mean | 1025.02 | 1018.018 | 1027.133 | -9.114 |
| | n | 5,949 | 1,380 | 4,569 | (-0.2998) |
| Deal value ($mil) | mean | 637.96 | 2222.364 | 159.408 | 2062.956*** |
| | n | 5,949 | 1,380 | 4,569 | (30.7179) |

| | | | | | |
|---|---|---|---|---|---|
| Relative size | mean | 0.29 | 0.482 | 0.238 | 0.245*** |
| | n | 5,949 | 1,380 | 4,569 | (7.9479) |
| All stock | mean | 0.16 | 0.193 | 0.147 | 0.046*** |
| | n | 744 | 233 | 511 | (3.7306) |
| All cash | mean | 0.46 | 0.411 | 0.482 | -0.071*** |
| | n | 2,167 | 496 | 1,671 | (-4.2861) |
| Competition | mean | 0.02 | 0.036 | 0.010 | 0.027*** |
| | n | 94 | 50 | 44 | (6.9719) |
| Public Target | mean | 0.23 | 0.466 | 0.156 | 0.309*** |
| | n | 2,208 | 643 | 715 | (25.2528) |
| Hostile | mean | 0.00 | 0.012 | 0.002 | 0.009*** |
| | n | 27 | 16 | 11 | (4.4562) |
| Diversification | mean | 0.41 | 0.394 | 0.416 | -0.021 |
| | n | 2,443 | 544 | 1,899 | (-1.4178) |
| Time to Completion | mean | 70.88 | 110.547 | 58.894 | 51.653*** |
| | n | 5,949 | 1,380 | 4,569 | (21.7083) |
| Tender Offer | mean | 0.07 | 0.123 | 0.053 | 0.070*** |
| | n | 411 | 170 | 241 | (9.1041) |
| Cross Border | mean | 0.20 | 0.186 | 0.209 | -0.024* |
| | n | 1,213 | 256 | 957 | (-0.9735) |
| **Acquirer characteristics** | | | | | |
| Market Cap ($mil) | mean | 14921.32 | 30583.45 | 10190.8 | 20392.65*** |
| | n | 5,949 | 1,380 | 4,569 | (15.4231) |
| FCF-to-asset | mean | 0.08 | 0.083 | 0.074 | 0.010*** |
| | n | 5,908 | 1,380 | 4,569 | (2.6519) |
| Market-to-book | mean | 0.32 | 6.734 | 4.034 | 2.700*** |
| | n | 5,937 | 1,380 | 4,569 | (2.9817) |
| Leverage | mean | 0.321 | 0.375 | 0.304 | 0.071** |
| | n | 5,937 | 1,380 | 4,569 | (2.3175) |
| **Acquisition performance** | | | | | |
| CAR(-1,+1) | mean | 0.008 | 0.0008 | 0.0107 | -0.0099*** |
| | n | 5,949 | 1,380 | 4,569 | (-5.8282) |
| CAR(-2,+2) | mean | 0.009 | 0.0014 | 0.0110 | -0.0096*** |
| | n | 5,949 | 1,380 | 4,569 | (-4.9891) |
| BHAR(0,+12) | mean | -0.038 | -0.0319 | -0.0400 | 0.0081 |
| | n | 5,506 | 1,254 | 4,252 | (0.7163) |
| BHAR(0,+24) | mean | -0.1199 | -0.1004 | -0.1256 | 0.0252** |
| | n | 5,506 | 1,254 | 4,252 | (2.0056) |
| BHAR(0,+36) | mean | -0.194 | -0.1646 | -0.2030 | 0.0383*** |
| | n | 5,506 | 1,254 | 4,252 | (2.7762) |

The table gives a summary of Statistics of deal characteristics of full sample deals. Acquisitions with transaction value over $500 million are labeled as mega mergers, otherwise non-mega mergers. Deal characteristics include Herfindahl-Hirschman Index (HHI), deal value ($mil), target relative size, paid by fully stock or fully cash, competition, diversification dummy, target publicity (public dummy), deal attitude (hostile dummy), tender offer dummy, cross-border dummy, and time to completion. Stock takes the value of one if the deal is fully financed by stock, otherwise takes the value of zero. Cash takes the value of one if the deal is fully financed by cash, otherwise takes the value of zero. Diversification takes the value of one if target and acquirer are in different industry, otherwise takes the value of zero. Public takes the value of one if target is a public firm, otherwise takes the value of zero. Competition takes the value of one if the deal has more than one firm to compete the deal, otherwise equals zero. Hostile takes the value of one if the deal is a hostile acquisition, otherwise takes the value of zero. Time to completion equals the number of days count from announcement to effective. In this paper, all continuous variables are winsorized at the 1% and 99% levels, and significance at the 1%, 5% and 10% levels is denoted by ***, ** and *, respectively.

### 3.1 Short-term performance and industry concentration

The deals' short-term total abnormal returns (C*AR*) are adopted to represent the post-merger market performance, which is given by

$$R_{i,j} = \ln(\frac{P_j}{P_{j-1}}) \quad (1)$$

$$AR_{i,j} = R_{i,j} - R_m \quad (2)$$

$$CAR_{i,j} = \sum_{k-j}^{k+j} AR_{i,j}\,, j = 1, 2, \text{or } 5 \quad (3)$$

where $R_{i,j}$ denotes the daily return of firm $i$ on day $j$, $R_m$ denotes the value-weighted market return on day $j$, and $k$ denotes the deal announcement date. Thus, $CAR_{i,j}, j = 1, 2, \text{or } 5$ gives the 3-, 5-, and 11-day CARs, respectively. An OLS regression is adopted to investigate the impact of mega-deals on deal performance, which is given by

$$CAR_e = \alpha + \gamma \times \text{Mega} + \sum_{v=1}^{N} \beta_u \times X_v + \varepsilon_u,\ e = 3, 5, 11 \quad (4)$$

where $X_v$ is a control variable such as deal characteristics and acquirer firms' characteristics. A detailed list of all control variables is presented in Table 1.

As shown in Table 1, mega-deals have significantly lower three- and five-day CARs than non-mega deals, suggesting that mega-deals underperform non-mega deals in the short term. In Table 1, mega-deals have 30.9% more public targets than non-mega deals. Since public targets have a significantly negative effect on short-term performance at the 10% level, they may contribute significantly to mega-deals performance in the short term. Although the average size of mega-deals is 24.5% higher than that of non-mega deals and relative size plays a significantly positive role in the short-term performance, its effect is not as strong as that of public targets. However, neither public targets nor relative size significantly affects the long-term performance, which may help explain why mega-deals outperform non-mega deals in the long term. The regression results in Table 2 further confirm that mega-deals underperform non-mega deals in the short term. The mega-deal dummy has a significantly negative effect on both 3-, 5-, and 11-day CARs, regardless of whether or not the acquirer firm characteristics are controlled. Therefore, the short-term performance of mega-deals is significantly worse than that of non-mega deals, which is consistent with H1.

The industry concentration plays a significantly positive role in short-term performance. The log (HHI) has positive effects on all the 3-day, 5-day, and 11-day CARs at a 1% significant level, whether acquirers' characteristics are considered or not. From Table 2, the industry concentration is one of the most important factors with significantly postive effect. Tender offers and the relative deal size significantly and positively affect short-term performance. As for other control variables, the stock payment method negatively affects the short-term performance, which is consistent with the literature (e.g., Chang, 1998; Moeller et al., 2005).

Public targets have a negative effect on short-term performance, which supports the conclusion of Moeller et al. (2005) that deals involving public targets tend to destroy value in all respects. As for acquirer firm characteristics, only the leverage ratio has a significantly positive effect on short-term performance.

Table 2. Short-term multivariate analysis

| | CAR [-1,+1] | CAR [-1,+1] | CAR [-2,+2] | CAR [-2,+2] | CAR [-5,+5] | CAR [-5,+5] |
|---|---|---|---|---|---|---|
| Independent Variable | (1) | (2) | (3) | (4) | (5) | (6) |
| Mega Dummy | -0.710*** | -0.696*** | -0.597*** | -0.579*** | -0.479 | -0.443 |
| Stock payment | -1.473*** | -1.478*** | -1.541*** | -1.538*** | -1.526*** | -1.479*** |
| High market valuation | -0.071 | -0.137 | 0.252 | 0.175 | -0.501 | -0.587 |
| Diversification | -0.242 | -0.245 | -0.191 | -0.200 | -0.284 | -0.290 |
| Public Target | -2.005*** | -1.999*** | -2.132*** | -2.103*** | -2.054*** | -2.079*** |
| Competition | -0.442 | -0.457 | -0.885 | -0.96 | -1.159 | -1.167 |
| Hostile | 0.169 | 0.160 | 0.390 | 0.389 | -1.043 | -1.053 |
| Tender | 0.824** | 0.842** | 0.803** | 0.789* | 1.091** | 1.121** |
| Log(TimeToResolution) | 0.073 | 0.64 | 0.108 | 0.101 | 0.031 | 0.027 |
| Log(HHI) | 0.647*** | 0.653*** | 0.664*** | 0.661*** | 0.662*** | 0.661*** |
| Cross-border | -0.005 | -0.005 | -0.020 | -0.017 | 0.212 | 0.227 |
| Relative size | 0.416*** | 0.407*** | 0.394*** | 0.386*** | 0.389*** | 0.381*** |
| A_M2B | | 0.001 | | -0.000 | | -0.004 |
| A_CF2TA | | -0.686 | | -2.068 | | -0.499 |
| A_Leverage | | 0.139* | | 0.201*** | | 0.095 |
| A_ROA | | 0.496 | | 1.665 | | 0.510 |
| Constant | -2.831 | -2.822 | -2.728 | -2.598 | | -1.967 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry fixed effects | No | No | No | No | No | No |
| Observations | 4,070 | 4,070 | 4,070 | 4,070 | 4,070 | 4,070 |
| Adjusted R2 (%) | 6.18 | 6.19 | 4.66 | 4.73 | 2.56 | 2.54 |

The table OLS regression model of acquirer short-term post-acquisition market performance of full sample deals. Acquirer's 3-, 5-, and 11-day cumulative abnormal return (*CAR*) are used to evaluate the short-term post-acquisition performance, which are used as the dependent variable of the models. Independent variables include deal characteristics and acquirer characteristics.

## 3.2 Long-term performance and industry concentration

The 12-month, 24-month, and 36-month buy-and-hold abnormal returns (BHARs) are adopted to analyze performance in the long run, which are computed below

$$R_{ref,T} = \sum_{i=1}^{n} \frac{\prod_{t=0}^{T}(1+R_{i,t})-1}{n} \quad (5)$$

$$BHAR_{i,T} = \prod_{t=0}^{T}(1+R_{i,t}) - R_{ref,T} - 1 \quad (6)$$

where $R_{i,t}$ denotes the return of firm $i$ in the deal announcement month $t$, $n$ is the total number of firms at $t = 0$, and $T$ denotes the holding period. $T = 12, 24, \text{or } 36$ denotes the 12-, 24-, and 36-month BHARs, respectively. An OLS regression is given to evaluate the post-merger performance, which is given by

$$BHAR_i = \vartheta + \mu \times \text{Mega} + \sum_{v=1}^{N} \beta_\delta \times X_v + \varepsilon_i, \quad i = 12, 24, 36 \quad (7)$$

where $X_v$ denotes the control variable such as deal characteristics and acquirer firms' characteristics. A detailed list of all control variables is presented in Table 3.

From Table 1, mega-deals have significantly higher 24- and 36-month BHARs than non-mega deals do, and the regression results in Table 3 confirm that the mega-deal dummy plays a significantly positive role in long-term performance. As seen in Table 3, the mega-deal dummy significantly positively affects the 12-, 24-, and 36-month BHARs, without controlling for acquirer firm characteristics. Thus, mega-deals tend to perform better than non-mega deals in the long term, consistent with Table 1. However, when controlling for acquirer firm characteristics, the mega-deal dummy no longer significantly affects the 24- or 36-month BHAR. In summary, H1 holds for the short term but not the long term.

Industry concentration has a significantly positive effect on long-term performance. While the coefficients on the long-term performance are larger than that on the short-term performance, the effects are at a 5% significance level for the 12-month BHAR and a 10% significance level for the 24- and 36-month BHAR. In addition, acquirer firm characteristics further weaken its effect. The industry concentration only significantly affects the 12-month BHAR, while it has no significant effect on the 24- and 36-month BHAR. Thus, the significance of the industry concentration effect on the long-term performance with acquirer firm characteristics decreases for a longer period. As for other characteristics, the stock payment method, high market valuations, and high market-to-book ratio negatively affect long-term performance. In contrast, the leverage ratio has no significant effect on any of the 12-, 24- and 36-month BHAR, while the free cash flow to total assets ratio has a positive effect on the 36-month BHAR at a 10% significant level, and the return on assets ratio has a positive effect on the 12-month BHAR at 10% significant level.

Table 3. Long-term multivariate analysis

| | BHAR (0,+12) | BHAR (0,+12) | BHAR (0,+24) | BHAR (0,+24) | BHAR (0,+36) | BHAR (0,+36) |
|---|---|---|---|---|---|---|
| Independent Variable | (1) | (2) | (3) | (4) | (5) | (6) |
| Mega Dummy | 2.651** | 2.124* | 2.299* | 1.677 | 1.922* | 1.271 |
| Stock payment | -5.837*** | -4.608*** | -4.340*** | -3.085* | -5.126*** | -3.951** |
| High market valuation | -6.106* | -6.218* | -8.213** | -8.271** | -15.652*** | -15.815*** |
| Diversification | 0.434 | 0.066 | 0.377 | -0.035 | -0.084 | -0.450 |
| Public Target | -0.323 | -0.581 | -0.253 | -0.515 | -0.114 | -0.378 |
| Competition | 2.858 | 3.121 | 4.676 | 4.987 | 5.419 | 5.682 |
| Hostile | 2.406 | 2.046 | -0.885 | -1.274 | 0.694 | 0.252 |
| Tender | -0.299 | -0.489 | -0.888 | -1.115 | -1.852 | -1.958 |
| Log(TimeToResolution) | 0.281 | 0.435 | 0.285 | 0.449 | 0.250 | 0.432 |
| Log(HHI) | 1.945** | 1.827** | 1.662* | 1.542 | 1.640* | 1.542 |
| Cross-border | -1.377 | -1.398 | -1.757 | -1.796 | -1.903 | -1.948 |
| Relative size | -0.580 | -0.337 | -0.622 | -0.346 | -0.196 | 0.057 |
| A_M2B | | -0.217*** | | -0.220*** | | -0.198*** |
| A_CF2TA | | 7.523 | | 13.019 | | 19.022* |
| A_Leverage | | -0.054 | | 0.116 | | 0.094 |
| A_ROA | | 19.013* | | 17.665 | | 10.987 |
| Constant | 6.654 | 4.884 | -3.747 | -6.149 | -19.054 | -21.963 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |

| | | | | | | |
|---|---|---|---|---|---|---|
| Industry fixed effects | No | No | No | No | No | No |
| Observations | 4,070 | 4,070 | 4,070 | 4,070 | 4,070 | 4,070 |
| Adjusted R2 (%) | 3.73 | 4.68 | 12.06 | 13.05 | 26.67 | 27.52 |

The table OLS regression model of acquirer long-term post-acquisition market performance of full sample deals. Acquirer's 12-month, 24-month, 36-month BHAR are used to evaluate the long-term post-acquisition performance, which are used as the dependent variable of the models. Independent variables include deal characteristics and acquirer characteristics.

### 3.3 Does a higher industry concentration improve the performance of mega-deals?

As discussed, industry concentration has a significantly positive effect on both short- and long-term performance. The regression results show that a higher industry concentration significantly and positively affects both the short-term and the long-term performance, while its effect on the latter is not as significant as on the former. To better detect the differences between mega-deals and non-mega deals, we further divide the dataset into the following subsamples: the top 25%, middle 50%, and bottom 25% of the HHI group, based on the acquirer's industry market concentration. The results are presented in Table 4. It can be observed that the bottom HHI group has significantly lower 3- and 5-day CARs than those for the top HHI group for both mega-deals and non-mega deals. This result suggests that a higher industry concentration may produce better short-term performance for both mega-deals and non-mega deals. Furthermore, for both the top and bottom 25% HHI groups, the performance of mega-deals is significantly worse than that of non-mega-deals.

As for long-term performance, a higher industry concentration leads to better performance for non-mega deals since the bottom HHI group has significantly lower 12-, 24-, and 36-month BHARs. However, the impact of a high industry concentration on the long-term performance of mega-deals is not as significant as that on the long-term performance of non-mega deals. High industry concentration positively affects 36-month BHARs, at a significance level of 1%. Therefore, a higher industry concentration plays a significantly positive role in the short-term performance of both mega-deals and non-mega deals. However, its effect on long-term performance is not as pronounced as on short-term performance, especially in mega-deals. Thus, H2 is true. There are two possible explanations for this observation. First, within a more concentrated industry, there is less competition. As a result, the bidder can focus more on the deal than on other managerial objectives, leading to better decisions. Second, as Gorton et al. (2009) point out, more positioning mergers occur under such circumstances, bringing advantages to bidders' shareholders. Furthermore, for the top 25% HHI group, there is no significant difference in the performance between mega-deals and non-mega-deals. In contrast, for the bottom 25% HHI group, mega-deals have a significant higher 36-month BHAR than non-mega-deals, which is the same as that in the full sample case.

Table 4. Top 25% and bottom 25% HHI group comparison

| | | Full sample | Top 25% HHI | | | Middle 50% HHI | | Bottom 25% HHI | | | Difference | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Mega | Non-mega | Difference | Mega | Non-mega | Mega | Non-mega | Difference | (5)-(1) | (6)-(2) |
| | | | (1) | (2) | (1)-(2) | (3) | (4) | (5) | (6) | (5)-(6) | | |
| Deal characteristics | | | | | | | | | | | | |
| Deal value ($mil) | mean | 637.96 | 2107.54 | 158.42 | 1949.12*** | 2110.37 | 155.75 | 2511.19 | 168.20 | 2342.99*** | 403.648 | 9.781** |
| Relative size | mean | 0.29 | 0.61 | 0.25 | 0.365*** | 0.42 | 0.21 | 0.47 | 0.28 | 0.193*** | -0.144 | 0.028 |
| All stock | mean | 0.16 | 0.12 | 0.10 | 0.022 | 0.24 | 0.17 | 0.17 | 0.14 | 0.026 | 0.047* | 0.044*** |
| All cash | mean | 0.46 | 0.40 | 0.46 | -0.060* | 0.40 | 0.50 | 0.44 | 0.47 | -0.025 | 0.036 | 0.001 |
| Competition | mean | 0.02 | 0.04 | 0.01 | 0.022*** | 0.04 | 0.01 | 0.03 | 0.01 | 0.023*** | -0.007 | -0.008* |
| Public Target | mean | 0.23 | 0.42 | 0.13 | 0.292*** | 0.51 | 0.18 | 0.44 | 0.14 | 0.295*** | 0.188 | 0.159 |
| Hostile | mean | 0.00 | 0.00 | 0.00 | 0.000 | 0.01 | 0.00 | 0.02 | 0.00 | 0.015*** | 0.013* | -0.002 |
| Diversification | mean | 0.41 | 0.52 | 0.49 | 0.033 | 0.38 | 0.40 | 0.31 | 0.36 | -0.054** | -0.216*** | -0.128*** |
| Time to Completion | mean | 70.88 | 109.90 | 58.58 | 51.322*** | 115.65 | 60.12 | 102.55 | 56.61 | 45.942*** | -7.349 | -1.968 |
| Tender Offer | mean | 0.07 | 0.11 | 0.05 | 0.061*** | 0.15 | 0.06 | 0.10 | 0.04 | 0.051*** | -0.016 | -0.006 |
| Cross Border | mean | 0.20 | 0.19 | 0.21 | -0.018 | 0.19 | 0.20 | 0.18 | 0.22 | -0.045* | -0.013 | 0.014 |
| Market Cap ($mil) | mean | 14921.32 | 29941.6 | 7800.10 | 22141.5*** | 34726.45 | 13042.9 | 24196.28 | 6650.47 | 17545.8*** | -5745.31 | -1149.63 |
| Market-to-book | mean | 4.66 | 4.13 | 3.46 | 0.666 | 5.29 | 4.42 | 11.44 | 3.81 | 7.630** | 7.311 | 0.347 |
| FCF-to-asset | mean | 0.08 | 0.08 | 0.07 | 0.136 | 0.08 | 0.07 | 0.09 | 0.08 | 0.006 | 0.004 | 0.011** |
| Leverage | mean | 0.32 | 0.42 | 0.38 | 0.038** | 0.36 | 0.27 | 0.36 | 0.30 | 0.062*** | -0.054*** | -0.078*** |
| Acquisition performance | | | | | | | | | | | | |
| CAR(-1,+1) | mean | 0.008 | 0.007 | 0.015 | -0.010*** | -0.002 | 0.009 | -0.001 | 0.008 | -0.009*** | -0.008* | -0.009*** |
| CAR(-2,+2) | mean | 0.009 | 0.010 | 0.018 | -0.007** | -0.003 | 0.009 | 0.000 | 0.008 | -0.008** | -0.010** | -0.009*** |
| BHAR(0,12) | mean | -0.038 | -0.006 | -0.014 | 0.008 | -0.047 | -0.053 | -0.029 | -0.039 | 0.010 | -0.023 | -0.025* |
| BHAR(0,24) | mean | -0.120 | -0.074 | -0.100 | 0.026 | -0.105 | -0.130 | -0.116 | -0.142 | 0.264 | -0.042 | -0.042** |
| BHAR(0,36) | mean | -0.194 | -0.129 | -0.162 | 0.033 | -0.170 | -0.207 | -0.188 | -0.237 | 0.049* | -0.060* | -0.076*** |

This table presents summary Statistics of deal characteristics of full sample deals. The sample is divided into three groups (top 25%, middle 50%, and bottom 25%) based on acquirer's industry market concentration, which I use Herfindahl-Hirschman Index (HHI) to evaluate. A unique industry's HHI is calculated following Hou and Robinson's (2006) methodology, same as that of the U.S. Department of Justice, by summing the squares of market share in percentage of each single firm existing in the same industry.

### 3.4 The impact of the financial crisis

It is shown that crisis events can have significant effects on the performance of M&A deals (e.g., Alexandridis et al., 2017). To test whether role of industry concentration differs during the crisis period, we further conduct analyses to include the post-2009 dummy. Table 5 and Table 6 present the resulting regression results for short-term performance and long-term performance, respectively. It can be observed that the coefficients of Log(HHI) are significantly positive in all models. This confirms the positive role of industry concentration playing in deal performance, which is consistent with previous results. Specifically, the coefficients of Log(HHI) on the short-term total abnormal returns slightly decrease, while the coefficients of Log(HHI) on the long-term buy-and-hold abnormal returns increase. Furthermore, the post-2009 dummy has a significant and positive effect on the 3-day CAR, which is consistent with finding (Alexandridis et al., 2017).

Table 5. Short-term multivariate analysis with crisis dummy

| | CAR[-1,+1] | CAR[-1,+1] | CAR[-2,+2] | CAR[-2,+2] | CAR[-5,+5] | CAR[-5,+5] |
|---|---|---|---|---|---|---|
| Independent Variable | (1) | (2) | (3) | (4) | (5) | (6) |
| Mega Dummy | -0.824*** | -0.811*** | -0.702*** | -0.688*** | -0.591* | -0.556* |
| Post-2009 Dummy | 0.440** | 0.426** | 0.249 | 0.206 | 0.163 | 0.146 |
| Stock payment | -1.489*** | -1.502*** | -1.581*** | -1.589*** | -1.793*** | -1.751*** |
| High market valuation | -0.485** | -0.466** | -0.469** | -0.428* | -0.414 | -0.409 |
| Diversification | -0.188 | -0.201 | -0.137 | -0.158 | -0.257 | -0.275 |
| Public Target | -1.965*** | -1.947*** | -2.097*** | -2.055*** | -2.032*** | -2.050*** |
| Competition | -0.403 | -0.420 | -0.846 | -0.865 | -1.034 | -1.045 |
| Hostile | 0.107 | 0.084 | 0.289 | 0.271 | -1.142 | -1.171 |
| Tender | 0.890*** | 0.896*** | 0.855** | 0.830** | 1.014* | 1.033** |
| Log(TimeToResolution) | 0.082 | 0.974 | 0.119 | 0.112 | 0.038 | 0.036 |
| Log(HHI) | 0.592*** | 0.603*** | 0.623*** | 0.627*** | 0.649*** | 0.654*** |
| Cross-border | -0.034 | -0.041 | -0.044 | -0.046 | 0.168 | 0.179 |
| Relative size | 0.445*** | 0.436*** | 0.415*** | 0.407*** | 0.400*** | 0.392*** |
| A_M2B | | 0.001 | | -0.001 | | -0.006 |
| A_CF2TA | | -0.500 | | -1.897 | | -0.201 |
| A_Leverage | | 0.139* | | 0.202*** | | 0.089 |
| A_ROA | | 0.371 | | 1.558 | | 0.434 |
| Constant | -2.532** | -2.585** | -2.763** | -2.746** | -2.592 | -2.628 |
| Year fixed effects | No | No | No | No | No | No |
| Industry fixed effects | No | No | No | No | No | No |
| Observations | 4,070 | 4,070 | 4,070 | 4,070 | 4,070 | 4,070 |
| Adjusted R2 (%) | 5.22 | 5.22 | 4.17 | 4.21 | 2.45 | 2.43 |

The table OLS regression model of acquirer short-term post-acquisition market performance with a crisis dummy. Acquirer's 3-, 5-, and 11-day cumulative abnormal return (*CAR*) are used to evaluate the short-term post-acquisition performance, which are used as the dependent variable of the models. Independent variables include

deal characteristics and acquirer characteristics.

Table 6. Long-term multivariate analysis with crisis dummy

| | BHAR(0,+12) | BHAR(0,+12) | BHAR(0,+24) | BHAR(0,+24) | BHAR(0,+36) | BHAR(0,+36) |
|---|---|---|---|---|---|---|
| Independent Variable | (1) | (2) | (3) | (4) | (5) | (6) |
| Mega Dummy | 1.952 | 1.628 | 4.239*** | 3.85*** | 5.799*** | 5.391*** |
| Post-2009 Dummy | 1.044 | 0.756 | 1.383 | 1.137 | 2.167 | 2.039 |
| Stock payment | -8.053*** | -6.040*** | -7.933*** | -6.736*** | -10.555*** | -9.840*** |
| High market valuation | -4.641*** | -4.515*** | -6.212*** | -6.187*** | -17.742*** | -17.710*** |
| Diversification | 0.559 | 0.133 | 0.609 | 0.242 | 0.370 | 0.140 |
| Public Target | -0.312 | -0.742 | -0.123 | -0.3883 | 1.414 | 1.325 |
| Competition | 4.754 | 4.775 | 4.120 | 4.135 | 4.038 | 3.974 |
| Hostile | 3.324 | 2.778 | -5.673 | -6.120 | -8.400 | -8.839 |
| Tender | -1.118 | -1.050 | -2.268 | -2.139 | -5.484* | -5.266* |
| Log(TimeToResolution) | 0.546 | 0.649 | -0.295 | -0.196 | -1.153 | -1.066 |
| Log(HHI) | 2.242** | 2.181** | 2.878*** | 2.862*** | 4.367*** | 4.385*** |
| Cross-border | -1.650 | -1.592 | -1.247 | -1.186 | -0.281 | -0.214 |
| Relative size | -0.522 | -0.319 | -1.009 | -0.719 | -0.942 | -0.684 |
| A_M2B | | -0.264*** | | -0.141** | | -0.068*** |
| A_CF2TA | | 8.489 | | 5.704 | | 7.874 |
| A_Leverage | | -0.036 | | -0.032 | | -0.221 |
| A_ROA | | 18.541* | | 18.969* | | 11.605 |
| Constant | -22.177*** | -22.336*** | -28.948*** | -29.788*** | -40.467*** | -41.637*** |
| Year fixed effects | No | No | No | No | No | No |
| Industry fixed effects | No | No | No | No | No | No |
| Observations | 4,070 | 4,070 | 4,070 | 4,070 | 4,070 | 4,070 |
| Adjusted R2 (%) | 1.57 | 2.97 | 1.37 | 2.08 | 4.15 | 4.49 |

The table OLS regression model of acquirer long-term post-acquisition market performance of full sample deals. Acquirer's 12-month, 24-month, 36-month BHAR are used to evaluate the long-term post-acquisition performance, which are used as the dependent variable of the models. Independent variables include deal characteristics and acquirer characteristics.

# 4. Conclusion

This study investigates the role of higher industry concentration in the performance of M&A deals. Regression analyses were conducted to investigate the impact of industry concentration on short- and long-term performance. Comparisons between mega-deals and non-mega deals and between the top 25% and bottom 25% of the group of industry concentration were further analyzed.

By analyzing 5,949 takeovers during 26 years, we show that mega-deals outperformed non-mega deals because they tend to lose less in the long term. While non-mega deals tend to have better short-term performance, mega-deals are more likely to perform better in the

long term. A higher industry concentration plays a significantly positive role in the short- and long-term performance of both mega-deals and non-mega deals. While the coefficients on the long-term performance are larger than that on the short-term performance, the effect of industry concentration on long-term performance is not as pronounced, especially in the case of mega-deals. A lower industry concentration means more competition, which may lead to a higher offer premium, adversely affecting stockholders in the short term, as Bradley et al. (1988) suggest.

Statistical analyses show that mega-deals face 2.7% more competition than non-mega deals, which may be a reason for their poor performance. Mega-deal acquirers tend to have higher market-to-book ratios, leverage ratios, and free cash flow-to-asset ratios. While the market-to-book ratio has a significantly negative effect on the long-term performance (all the 12-, 24- and 36-month BHAR), the free cash flow to asset ratio positively affects the 36-BHAR. Further, public targets have a significantly negative effect only on short-term performance. More than 30% of mega-deals involve public targets, which may strongly contribute to their short-term underperformance. However, it should be noted that industry sectors play an important role in the performance of M&As and may affect the conclusion on the role of industry concentration. Therefore, future studies should be conducted to investigate the impact of different sectors.

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