Ownership, capital structure and operating loss of acquiring firms

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Abstract

Purpose – The article aims to investigate the effects of ownership and capital structure on postacquisition operating performance.

Design/methodology/approach – The article extends the ongoing literature from an operating loss perspective and provides empirical evidence on the probability of acquirers' operating loss in relation to ownership and capital structure. The operating performance of publicly listed manufacturing firms in China was tracked up to five years since the completion of the mergers and acquisitions (M&A) during 2003–2014.

Findings – The empirical results show that, in a five-year postacquisition period, state-owned enterprises (SOEs) are more likely to experience operating loss than non-SOEs. The likelihood of the operating loss is negatively associated with ownership concentration, implying that concentrated ownership may serve as an effective corporate governance mechanism in the emerging economy and improve postacquisition performance. The rise in leverage increases the likelihood of postacquisition operating loss, indicating that the costs of debt may outweigh the benefits.

Originality/value – The findings contribute to the literature on ownership, debt governance and post-M&A performance from an emerging economy perspective.

Keywords Ownership, Capital structure, Corporate governance, Postacquisition performance

Paper type Research paper

1. Introduction

Mergers and acquisitions (M&A) have been extensively studied in finance (Cartwright & Schoenberg, 2006; Haleblian, Devers, McNamara, Carpenter, & Davison, 2009). Acquisition performance is often measured in the stock returns, which convey the market expectations regarding the impacts of acquisitions on firms' future cash flow (Schoenberg, 2006). A large number of studies show how financial markets value acquisitions upon their announcements (for a review, see Datta, Pinches, & Narayanan, 1992; Agrawal & Jaffe, 2000; Capron & Pistre, 2002; King, Dalton, Daily, & Covin, 2004; Gaur, Malhotra, & Zhu, 2013). However, the stock returns are criticized for bearing little information on the actual acquisition performance (Zollo & Meier, 2008). Relatively, few studies have examined the realized postacquisition operating performance, and the implications of ownership and capital structure on postacquisition operating performance remain less explored [1]. To the best of our knowledge, no studies have explored the relationship between ultimate ownership, capital structure and the probability of postacquisition operating loss.

It is important to look into the occurrence of operating loss since it directly indicates a status that operating costs cannot be covered by operating income, and potential investments

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and debt obligations can no longer be financed internally from the ongoing business operations alone. The operating loss also signals financial distress and liquidity deterioration (Wruck, 1990; John, 1993; Platt & Platt, 2002). The operating loss measure is less sensitive to inflation, managerial discretion and accounting conventions than the "stock" measures (Megginson, Nash, & Randenborgh, 1994; Chen & Yuan, 2004; Firth, Fung, & Rui, 2006; Richard, Devinney, Yip, & Johnson, 2009). This paper has divided the sample into state-owned enterprises (SOEs) and nonstate-owned enterprises (non-SOEs). The ultimate owner of SOEs is the government or its institutions or SOEs and agencies. All firms other than the SOEs were classified as non-SOEs, including widely held firms. The paper answers the following questions: is there any difference between SOEs and non-SOEs acquiring firms in the likelihood of operating loss after acquisitions? How does ownership concentration relate to the likelihood of operating loss after acquisitions? What is the relationship between firms' financial leverage and the likelihood of operating loss after acquisitions?

Despite the importance of ownership to M&A activities (Wright, Kroll, Lado, & Van Ness, 2002; Coates & John, 2010), the literature on the impacts of ownership on postacquisition performance is limited, and the findings are largely mixed. Yen and Andre (2007) studied takeovers in the English-origin countries and found that higher levels of ownership concentration were associated with positive postacquisition performance, but the separation of ownership and voting rights was negatively related to performance. Using the Japanese M&A data, Shim and Okamuro (2011) concluded that family firms underperformed as compared with nonfamily firms regarding the operating performance of mergers. However, Adhikari and Sutton (2016) found that the postmerger performance of family firms was significantly better than that of nonfamily firms in terms of abnormal returns, based on a sample of S&P 500 firms. Caprio, Croci and Del Giudice (2011) found that family ownership and control did not affect the postacquisition cumulative abnormal returns among large Continental European firms. Using the firm-level data from India, Bhaumik and Selarka (2012) showed that ownership concentration in hands of foreign investors and firms' directors improved post-M&A performance, but ownership concentration in domestic investors and persons did not impact the M&A outcomes. Among studies in the Chinese context, the relationship between the state ownership and M&A performance has been the subject of much debate. Yang, Ru and Ren (2015) found that the post-M&A performance (as measured by the changes in Tobin's Q) of the privately owned acquiring firms was better than that of the state-owned ones in China's real estate industry. Wu, Yang, Yang and Lei (2016) found that the impacts of acquiring firms' state ownership on wealth effect (positive abnormal shareholder returns) of cross-border M&As were insignificant among Chinese publicly listed firms. By contrast, Du, Boateng and Newton (2016) showed that the state-controlled acquiring firms generated more positive long-term returns on cross-border M&As than the privately owned acquirers. Zhou, Guo, Hua and Doukas (2015) investigated the influences of the state ownership on M&A performance in China. The empirical results showed that SOE acquirers outperformed non-SOE counterparts in both long-run stock performance and operating performance. The operating returns in their research were scaled by the market value of equities plus the book value of debt. However, using the market value of equities as a part of the scaling denominator calls the operating performance measure into question because stock prices in China may not reflect fundamental values of firms [2]. Ownership concentration was not considered in Zhou *et al.* (2015). In their research, firms' financial leverage was controlled and found no significant impacts on the M&A performance among all samples.

Corporate debt and capital structure serve as important disciplining factors in corporate governance (Jensen, 1986; Hart, 1995; Claessens & Yurtoglu, 2013), yet little is known about the relationship between capital structure and postacquisition performance. Among related studies, Maloney, McCormick and Mitchell (1993) found that the relationship between

acquirers' leverage and announcement period abnormal stock returns was significantly positive using the data from firms listed in the USA. However, Loughran and Vijh (1997) found no significant relationship between acquirers' leverage and postacquisition abnormal stock returns. Hitt, Harrison, Ireland and Best (1998) indicated that debt was the most consistent determinant of whether an acquisition would be successful among the US firms, as retaining a low to moderate level of debt reduced the costs of acquisition financing and the risks of future bankruptcy. But a high level of debt outweighed the benefits. They also found that most of unsuccessful acquisitions in the sample were associated with large and extraordinary debts (Hitt *et al.*, 1998). Linn and Switzer (2001) studied how operating performance of acquirers changed giving the cash or stock as the method of payment, controlling for acquirers' leverage. Their empirical findings suggested no significant difference in postacquisition operating performance between the acquirers with above the median leverage and those with below the median leverage. Similarly, Moeller, Schlingemann and Stulz (2004) controlled for leverage in their study of the firm size and acquisition gains. They found that firm leverage was not significantly related to postacquisition abnormal returns. Shim and Okamuro (2011) and Bhaumik and Selarka (2012) also controlled for leverage in their research of postacquisition performance, and the effect of leverage was found to be negative, but not significant. Yook (2003) studied how did debt rating changes relate to acquisition announcement period returns. He found that cash deals were positively associated with higher returns because the cash deals are often financed with debt, providing an additional discipline mechanism for managers of acquiring firms (Yook, 2003). Harrison, Hart and Oler (2014) explicitly investigated the relationship between leverage and postacquisition performance. They found that announcement period stock returns were positively correlated with acquirers' leverage, in line with Maloney *et al.* (1993) and Yook, 2003's studies However, the two-year's postacquisition returns were found to be significantly decreasing with firm leverage (Harrison *et al.*, 2014). Similarly, Alhenawi and Stilwell (2017) found that firm leverage was negatively related with cumulative abnormal returns based on a sample of all the US mergers during 1998–2010. In China, the vast majority of the listed firms use cash as the only M&A related payment method (Chi, Sun, & Young, 2011). The high proportion of cash payment emphasizes the importance of debt in M&A activities in China. However, the research in the context of China is still lacking.

This paper contributes to the M&A and corporate governance literature regarding the relationship between ownership, capital structure and postacquisition operating performance in the context of transitioning China. Specifically, the contributions are mainly threefold: (1) this paper focuses on China, which is an underresearched country in terms of the relationship between capital structure and postacquisition performance. China is unique because of its distinct ownership structure (i.e. the heavy involvement of state ownership); therefore, the impact of capital structure on postacquisition performance may be different. At this point, one cannot simply deduce the Chinese context based on past studies on other countries and regions. (2) We focus on operation performance rather than financial performance. This is important for China since financial performance is easier to manipulate compared with operation performance (see, e.g. Harrison *et al.*, 2014; Alhenawi & Stilwell, 2017). This is also partly why we focus on key operation performance indicators, such as operating loss and return on assets (ROA), which are harder to fake and manipulate, rather than financial performance indicators, such as stock return, which may be more easily subject to manipulation. (3) We examine to what degree can state ownership moderate the impact of capital structure on postmerger operation performance. This is especially useful considering that there is (to the best of our knowledge) no prior literature specifically looking at this moderation effect and can be valuable to policymakers when merger is concerned in the Chinese market.

The rest of paper is organized as follows: Section 2 presents the development of hypotheses. Section 3 explains the data, variables and research methods. Section 4 presents the main empirical results. Section 5 discusses the robustness of the results. Section 6 provides the conclusion.

2. Literature and hypotheses

2.1 Ownership and postacquisition operating loss

2.1.1 Ultimate ownership. In contrast to Berle and Means' (1932) revelation about the widely dispersed ownership and the separation of ownership from control among large publicly traded firms, the recent studies on ownership structures show that concentrated ownership and existence of dominant controlling shareholder are common around the world (Shleifer & Vishny, 1997; Porta, Lopez-de Silanes, & Shleifer, 1999; Claessens & Yurtoglu, 2013). The phenomenon of control by ultimate owners is also pronounced in firms in China (Delios, Wu, & Zhou, 2006; Chen, Firth, & Xu, 2009; Fan, Wong, & Zhang, 2013).

Types of ultimate ownership affect firms' strategy and performance (Thomsen & Pedersen, 2000; Chen *et al.*, 2009). This paper traces the chain of ownership in accordance with the previous studies (Porta *et al.*, 1999; Claessens, Djankov, & Lang, 2000, 2002) and distinguishes between the state and non-state-owned firms due to these two types of ultimate ownership are subject to different regulations and have different operating objectives (Shleifer, 1998; Chen *et al.*, 2009; Cao, Pan, & Tian, 2011; Grosman, Wright, & Okhmatovskiy, 2016; Song, Wang, & Cavusgil, 2015). The state as an ultimate owner can have different objectives and motivations in business operations than its nonstate counterpart (Shleifer, 1998; Chen *et al.*, 2009; Grosman *et al.*, 2016). The government intervention significantly influences financing and investment decisions of firms (Firth, Lin, & Wong, 2008; Chen, Sun, Tang, & Wu, 2011). Zhou *et al.* (2015) argued that the government in China influences M&As to achieve political and economic goals because M&As serve as a direct means of resources reallocation and ownership transfer. SOEs may prioritize political interests over profit or shareholder value maximization goals, which inherent in private firms (Bai, Lu, & Tao, 2006; Chen & Young, 2010). For instance, in the context of China, the government often instructs those well-performing SOEs to acquire or restructure those deep-troubled firms, especially the state-owned ones, in the name of preventing loss of state assets, supporting employment and minimizing social instability (Sheng & Zhao, 2012; Zhu, 2012). As a consequence, operating performance of acquiring SOEs can be hampered.

Additionally, the operating gains from M&As depend on the extent of the postacquisition integration, which requires comparabilities between acquiring firms and targets in areas such as management styles, organizational structures and corporate culture (Datta, 1991). Comparing with non-SOEs, SOEs usually are characterized by the hierarchical structure and bureaucratic culture, with a high degree of information asymmetry within the organization (Shleifer & Vishny, 1994; Ralston, Terpstra-Tong, Terpstra, Wang, & Egri, 2006). Consequently, the ensuing conflicts can impede postacquisition operating gains for SOEs. Thus, it is hypothesized that

H1. Comparing with non-SOEs, SOEs are associated with the higher likelihood of operating loss after acquisitions.

2.1.2 Ownership concentration. Ownership concentration has two-faced implications on firm performance. On the one hand, concentrated ownership may cause the principal–principal conflicts, which heighten agency costs and lower firm performance (Su, Xu, & Phan, 2008; Young, Peng, Ahlstrom, Bruton & Jiang, 2008; Renders & Gaeremynck, 2012; Peng & Sauerwald, 2013). On the other hand, as Demsetz and Lehn (1985) pinpointed: "[. . .] the more concentrated is ownership, the greater the degree to which benefits and costs are borne by the same owner [. . .]". In order to secure the value of their own investments, large shareholders are usually well informed and active in their monitoring roles (Shleifer & Vishny, 1997; Gillan

& Starks, 2007; Schnatterly, Shaw, & Jenning, 2008). The monitoring related transaction costs tend to be low for large shareholders, and the collective action problems are also less serious (Black, 1990). This active monitoring by blockholders may overcome the short-term basis of investments and lengthen firms' planning horizon (Von Thadden, 1995). The long-term perspectives by large shareholders can overcome managerial myopia, which leads to higher investment efficiency (Anderson & Reeb, 2003; Edmans, 2009). When it comes to acquisition decisions, large shareholders are more likely to foster the investments that maximize the long-term firm value (Yen & Andre, 2007). Besides, in the weak institutional environment, concentrated ownership can be an effective corporate governance mechanism, which substitutes for the less than perfect legal protection (La Porta, Lopez-de Silanes, Shleifer, & Vishny, 2000; Coffee, 2001; Heugens, Van Essen, & van Oosterhout, 2009). Based on the data from emerging economies, Yen and Andre (2010) found that existence of controlling shareholders in acquiring firms improves long-term postacquisition operating performance. Last but not least, Demsetz and Lehn (1985) argued that ownership structure varies in ways, which are consistent with value maximization goals.

In fact, Figure 1 shows that concentrated ownership does prevail among publicly listed manufacturing firms in China over the years [3]. This prevalence of concentrated ownership would not be observed unless the counterbalancing advantages do exist. In the light of the above, it is hypothesized that

H2. The level of ownership concentration of acquiring firms is negatively associated with the likelihood of operating loss after acquisitions.

2.2 Capital structure and postacquisition operating loss

2.2.1 Leverage. Acquisitions impact on acquirers' capital structure as postacquisition leverage remains persistently higher following acquisitions (Hitt, Hoskisson, Ireland, & Harrison, 1991; Harrison *et al.*, 2014). The rise in leverage may reduce agency costs by limiting managerial opportunism and discretionary spending (Jensen & Meckling, 1976; Grossman &

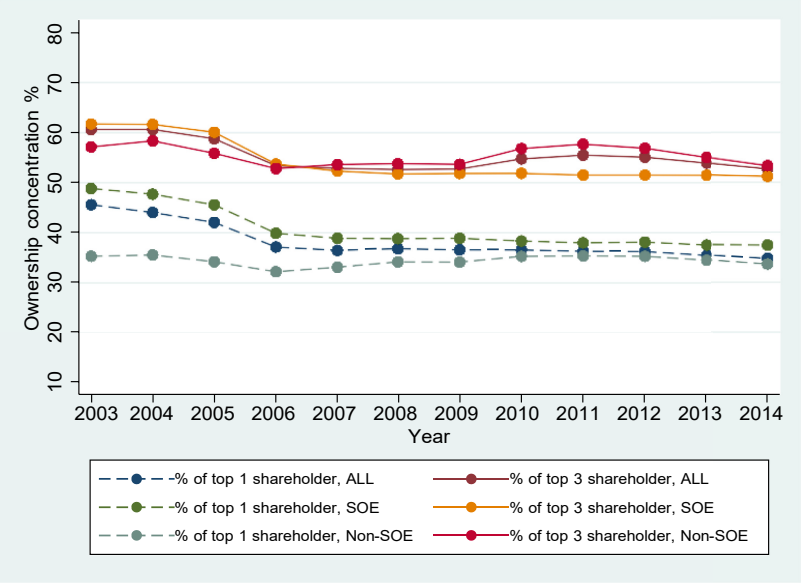

Figure 1.
Ownership concentration of listed manufacturing firms in China, 2003–2014

Hart, 1982; Harris & Raviv, 1991). But the excess debt may also escalate debt servicing costs and risks of bankruptcy (Gruber & Warner, 1977; Castanias, 1983; Hitt *et al.*, 1998). The threats of bankruptcy can feed back into investment and operating decisions of firms (Myers, 2001). Therefore, managers may pursue low-risk strategies because of increased leverage and risks incurred by acquisitions, and this risk balancing behavior may reduce the future profitable investments (Harrison *et al.*, 2014). On the other extreme, given high leverage and risks of default, managers may stake the operation of a firm on a bold move and invest in risky projects, expecting to bring the firm off the crisis (Firth & Rui, 2012).

Moreover, a considerable amount of financial and human resources are required by various integration processes after acquisitions (Shrivastava, 1986; Hitt, Hoskisson, & Ireland, 1990), but highly leveraged acquirers may have fewer resources to be allocated to acquisition-related value-generating activities because of the high interest costs and debt repayments (Harrison *et al.*, 2014).

Furthermore, acquirers may increase debt levels in order to finance acquisitive growth (Michel & Shaked, 1985). Hitt *et al.* (1998) pointed out that if firms were in a favorable debt position, it would be easier to obtain more debt financing, often at a lower interest rate. However, excess leverage can lead to the problem of "debt overhang" (Myers, 1977), making the further financing difficult, even when that the new borrowings may lead to more rapid sales and asset growth postacquisition. Overall, the current literature does not agree on how leverage might impact postmerger performance. For example, on the one hand, Jensen and Meckling (1976) in one of the earliest papers discussing this issue assert that higher leverage reduces agency costs and raise postmerger performance because managers, when faced with high leverage situation, are less likely to pursue investment opportunities that are risky and can lead to lower return. Jensen (1986) in a follow-up went further to note that leverage pressures management to consider projects with higher returns, which leads to more assured returns postmerger. Similarly, Harrison *et al.* (2014) suggest that leverage can positively impact postmerger performance because it alleviates the financial constrain faced by the stakeholders involved in the merger (e.g. legal fees, asset consolidation costs, etc). On the other hand, Lin & Chang (2012) suggest that leverage harms postmerger performance since "managers feel forced to pursue projects with lower risk, reducing the value maximization principle that they would consider if they could instead pursue projects with higher risk." Similarly, Miller & Bromiley (1990) contend that debt negatively impacts postmerger performance due to its high risk nature. In sum, it is hypothesized that

H3. Acquiring firms' leverage is positively related to the likelihood of operating loss after acquisitions.

3. Data and research design

3.1 Data

The firm-level data were collected from the China Stock Market and Accounting Research Database (CSMAR). If a manufacturing firm successfully completed at least one asset or equity (or both) acquisition in a given year during the sample period of 2003–2014, then the firm was regarded as an acquiring firm, which experienced an acquisition event in that year. Over the 12-year sample period, a total of 1,453 acquiring firms have recorded 4,014 acquisition events. The operating performance of each acquiring firm after the acquisition event was tracked up to five fiscal years [4]. The tracking stopped if a firm reported an operating loss or the period of observation ended (censored).

Although acquisitions are frequently treated as independent events, most are actually a part of broader acquisition strategies (Barkema & Schijven, 2008b). Accounting acquisitions as multiple events may reveal acquirers' gains that are often overlooked by treating the

acquisition as a "one-shot deal" (Barkema & Schijven, 2008b). In order to incorporate multiple acquisition events that a firm may experience during the sample period, the tracking clock was reset to the origin for a firm every time an acquisition event occurs. The sequential number of acquisition events was also recorded. The final sample contains 7,376 observations.

3.2 Variables

3.2.1 Dependent variable. Operating loss: operating performance of acquiring firms is measured by whether the firms recorded operating loss (negative operating profit) in the five-year period after an acquisition event. The variable is designed to grasp the actual break-even condition that operating income cannot cover operating costs. Therefore, the dependent variable is dichotomous and takes the value "1" for the occurrence of the operating loss and "0" for the nonoccurrence of the operating loss or censored observations.

Using operating profits rather than net profits is because the latter measure is prone to manipulation (Chen & Yuan, 2004; Liu & Lu, 2007). Additionally, a few previous studies show that financial markets sometimes have difficulty in predicting postacquisition performance (Agrawal & Jaffe, 2000; Schoenberg, 2006; Zollo & Meier, 2008). The precisely defined construct can be useful in measuring the different dimension of M&A performance (Haleblian *et al.*, 2009). Schoenberg (2006) appealed that future M&A research can benefit from using multiple performance measures in order to gain a holistic view of M&A outcomes. The operating loss measure in this research contributes to this purpose as well.

3.2.2 Independent variables. Ultimate owner: the types of ultimate ownership have been classified as "non-SOEs" and "SOEs."

Ownership concentration: to examine the relationship between ownership structure and operating performance of acquiring firms, we have looked into both ultimate and immediate ownership, as suggested by Claessens *et al.* (2000). Following Fan & Wang, 2021, Boubakri, Cosset, and Guedhami (2005), Guedhami and Pittman (2006) and Chen *et al.* (2009), ownership concentration is measured by the percentage of total shareholdings by the top three shareholders. An approximation of the Herfindahl index (the sum of squares of shareholding percentage by the top three shareholders) is used as the alternative proxy of ownership concentration for the robustness checks.

Leverage: we use the ratio of book value of debt to book value of total assets as the proxy for capital structure (Margaritis & Psillaki, 2010; Harrison *et al.*, 2014; Wang & Steiner, 2020; Wang, Madsen, & Steiner, 2017).

3.2.3 Control variables. Taken from the existing knowledge of M&A (Datta *et al.*, 1992; Dutta & Jog, 2009; Haleblian *et al.*, 2009; Gaur *et al.*, 2013), the following variables are controlled in this study:

Current liability ratio: the current liabilities to total liabilities ratio is included to control for the effects of debt structure and liquidity on the operating performance.

Year since acquisition event: the time since the completion of an acquisition event, measured as integer years up to 5.

Event types: a dummy variable controls for event types as acquisitions, or mergers or both M&A.

Targets: acquiring targets were classified into assets, or equities or both assets and equities.

Cash payment: a variable controls for payment methods in M&A. "1" indicates the pure cash payment for the M&A events, and "0" otherwise.

No. of acquisitions: the sequential number of acquisition events a firm experienced during the sample period. The number of acquisitions accounts for the fact that acquisitions can be multiple events. This variable also controls for potential learning effects from conducting multiple M&A events (Barkema & Schijven, 2008a).

Firm size: measured as the natural logarithm of total number of employees of a firm.

Tangible assets ratio: measured as the ratio of tangible to total assets.
Firm age: the time in years since the establishment of a firm.
Board independence: the ratio independent directors to total number of directors.
Number of directors: the effect of board size is controlled by the number of directors.
Industry median ROA: to address the potential intraindustry heterogene-ity that may influence postacquisition performance, the industry median ROA of listed manufacturing firms in the sub-industry in a year is controlled [5]. *Incentive schemes:* a dummy variable controls for whether a firm was under incentive schemes.
Year and *region* (East, Middle or West of China): the dummy variables control for the year and regional effects that may influence the occurrence of the operating loss.
Operating loss five-year before: a dummy variable controls for whether a firm experienced operating loss within five-year since the prior acquisition event. For the observations in the beginning of sample period (year 2003), it is assumed that there was no prior loss making acquisition event.

3.3 Research design

We have analyzed the data with both nonparametric and parametric methods. The analysis begins with the descriptive statistics, two-way table of frequency counts and graphs of proportion. Then the relationship between the dependent and independent variables is explored by the locally weighted scatterplot smoothing by Cleveland's two-dimensional smoother (Cleveland, Grosse, & Shyu, 1992).

Since the dependent variable is dichotomous, we use the logistic regression as the parametric method to test the Hypothesis 1–3. The logistics regression model is specified as follows:

$$\begin{aligned}\operatorname{logit}\{\Pr(y_i = 1|X_i)\} &= \ln\underbrace{\left\{\frac{\Pr(y_i = 1|X_i)}{1 - \Pr(y_i = 1|X_i)}\right\}}_{\text{Odds}(y_i=1|X_i)} \\ &= \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + \beta_4 x_{4i} + \ldots \beta_n x_{ni}\end{aligned} \tag{1}$$

where $y_i = 1$ denotes the occurrence of the operating loss, $y_i = 0$ denotes nonoccurrence of the operating loss, x_{1i} is the *ultimate ownership* dummy, and x_{2i} and x_{3i} are *ownership concentration* and *leverage,* respectively. x_{4i} to x_{ni} represent control variables. $x_i = (x_{1i}, x_{ni})^t$ is a vector containing both independent and control covariates. The fraction in the parentheses in Equation (1) represents the odds that $y_i = 1$ given x_i, the expected number of "1" (loss) responses per "0" (nonloss) response. Thus, the model is a linear regression model in the log odds that $Y = 1$ since logit(Pr) is a weighted sum of the *Xs* [6].

Taking the dependence among the observations nested in the same firm into account, we fit the model by the maximum likelihood estimation with the robust standard errors for the clustered data based on the sandwich estimator, instead of using the model-based standard errors (for reference, see Rabe-Hesketh and Skrondal (2012b, Ch 10)).

4. Results

4.1 Descriptive statistics

Table 1 shows that about 12% of the observations experienced operating loss within the five years after the completion of the M&A events; 47% (3,451) of the observations are SOEs, and 53% (3,952) are non-SOEs. In the sample, the top three shareholders on average hold 50.2% of equity shares. The average leverage of the observations is 44.4%. The current liabilities

	Mean	SD	Min	Max
Operating loss	0.12	0.32	0.00	1.00
Ultimate owner	0.47	0.50	0.00	1.00
Ownership concentration	50.19	15.00	8.88	94.67
Leverage	44.37	19.27	0.71	98.24
Current liability ratio	85.59	15.52	0.00	100.00
Year since acquisitions	1.80	1.09	1.00	5.00
Event types	1.04	0.25	1.00	3.00
Targets	1.82	0.62	1.00	3.00
Cash payment	0.89	0.31	0.00	1.00
No. of acquisitions	2.28	1.51	1.00	11.00
Firm size	7.79	1.17	2.56	11.93
Tangible asset ratio	94.60	5.58	33.24	100.00
Firm age	12.55	4.89	1.50	36.50
Board independence	35.96	6.06	0.13	66.67
Number of directors	9.07	1.80	3.00	19.00
Industry median ROA	3.78	1.84	−19.31	12.36
Incentive schemes	0.11	0.31	0.00	1.00
Year	2009.98	3.16	2003.00	2014.00
Region	1.54	0.77	1.00	3.00
Operating loss five-year prior	0.09	0.29	0.00	1.00

Source(s): CSMAR 2003–2014

Table 1. Summary statistics and all observations

account for 85.6% of total liabilities, meaning that acquiring firms primarily use short-term debt to finance their business operations. In total, 89% of the observations are associated with the pure cash paid M&A events. This ratio is surprisingly high and similar to the findings from the previous literature (Chi *et al.*, 2011). Since the cash payment is likely financed by new issuance of debt (Yook, 2003; Faccio & Masulis, 2005), the high proportion of cash payment stresses the importance of debt in M&A activities in China.

Table 2 presents the summary statistics by types of ultimate ownership. On average, the observed proportion of the operating loss is higher for SOEs. Only 9% of non-SOEs experienced operating loss within five-year postacquisition period, while the ratio is 15% for SOEs. The mean leverage is also higher among SOEs (50.9%) than non-SOEs (38.7%). Both SOEs and non-SOEs are highly concentrated in ownership. The mean firm size of SOEs is larger than that of non-SOEs, but non-SOEs acquiring firms on average are younger than SOEs. Non-SOEs seems to be more dependent on the current liabilities and cash payment for M&A activities than SOEs.

Table 3 shows the correlation matrix of the variables. The correlation between the firm size and leverage is 0.37, which is highest among all pairs of variables.

4.2 Two-way table of frequencies and plots

This study explores the relationship between the continuous variables (ownership and capital structure) and dichotomous variable (operating loss). One common method is to create intervals for the continuous independent variable and calculate the means of the dependent variable within each interval (Hosmer Jr *et al.*, 2013). Table 4 applies this method by using the ownership concentration group variable, which categorizes the ownership concentration data into four intervals. Table 4 includes, for each ownership concentration group, the frequency of the occurrence of each outcome as well as the mean (or the proportion with the occurrence of operating loss) for each group. The number at the top of each cell is the frequency count. The number listed below each frequency is the proportion (percentage) of cases that each cell

	Non-SOEs				SOEs			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Operating loss	0.09	0.28	0.00	1.00	0.15	0.35	0.00	1.00
Leverage	38.66	19.01	0.71	96.40	50.86	17.41	1.56	98.24
Current liability ratio	87.33	14.75	0.00	100.00	83.62	16.12	12.58	100.00
Year since acquisitions	1.74	1.04	1.00	5.00	1.87	1.13	1.00	5.00
Event types	1.04	0.25	1.00	3.00	1.04	0.25	1.00	3.00
Targets	1.83	0.60	1.00	3.00	1.82	0.64	1.00	3.00
Cash payment	0.92	0.28	0.00	1.00	0.86	0.34	0.00	1.00
No. of acquisitions	2.19	1.48	1.00	11.00	2.38	1.54	1.00	11.00
Firm size	7.49	1.07	2.56	11.50	8.13	1.18	2.83	11.93
Tangible asset ratio	93.77	6.16	33.24	100.00	95.55	4.66	53.34	100.00
Firm age	12.15	5.06	1.50	33.00	13.00	4.66	2.00	36.50
Board independence	36.40	5.76	0.33	66.67	35.46	6.35	0.13	66.67
Number of directors	8.63	1.51	3.00	15.00	9.56	1.97	5.00	19.00
Industry median ROA	3.87	1.77	−19.31	12.36	3.67	1.91	−7.90	10.24
Incentive schemes	0.18	0.39	0.00	1.00	0.03	0.16	0.00	1.00
Year	2010.84	2.85	2003.00	2014.00	2009.00	3.22	2003.00	2014.00
Region	1.41	0.70	1.00	3.00	1.70	0.81	1.00	3.00
Operating loss five-year prior	0.07	0.25	0.00	1.00	0.11	0.32	0.00	1.00

Table 2.
Summary statistics by ultimate ownership

represents out of its row. This proportion can be viewed as the estimated probability of the operating loss given the level of ownership concentration. Table 4 also shows the row and column sums. Moreover, in order to compare SOEs versus non-SOEs, the sample has been divided by types of ultimate ownership. The results are presented in the columns under "SOE" and "non-SOE," respectively.

Table 4 shows that as ownership concentration increases, the proportion of acquiring firms with the operating loss after acquisitions decreases. Overall, 11.5% of all sample (849 out of 7,376 observations) experienced the operating loss within the five fiscal years after acquisitions. For all sample with ownership concentration below 25%, 64 out of 337 observations (19%) experienced the operating loss. The proportion of the operating loss is lowered to 13.2% given ownership concentration between 25–50%. When ownership concentration reaches the level between 75–100%, the proportion of the operating loss drops to 8.5% for all sample. The similar relationship between ownership concentration and occurrence of the operating loss can be found in both SOE and non-SOE samples.

Figure 2 presents a visualization of Table 4, by plotting of the observations with operating loss versus the midpoint of each ownership concentration group. The trend plotted in Figure 2 provides a reasonable assessment of the relationship between the probability of the operating loss and ownership concentration.

Likewise, the two-way table of frequencies and plot is also used to evaluate the association between leverage and the operating loss. The leverage data were grouped into ten equally wide intervals and then tabulated with the outcome variable (presence or absence of the operating loss). Table 5 and Figure 3 show that, in general, the proportion of the operating loss rises as the level of leverage increases.

4.3 Locally weighted scatterplot smoothing

Lowess requires no specification of a function to fit a model, yet it is a flexible method to explore the patterns and relationship in data (Cleveland *et al.*, 1992; Cameron & Trivedi, 2005; Hamilton, 2012). Figures 4 and 5 show the lowess-smoothed curves about the operating loss

Table 3. Variables and correlation

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1 Operating loss	1.00																			
2 Ultimate owner	0.09	1.00																		
	(0.00)																			
3 Ownership concentration	−0.10	0.08	1.00																	
	(0.00)	(0.00)																		
4 Leverage	0.21	0.32	−0.05	1.00																
	(0.00)	(0.00)	(0.00)																	
5 Current liability ratio	−0.03	−0.12	−0.00	−0.18	1.00															
	(0.01)	(0.00)	(0.92)	(0.00)																
6 Year since acquisitions	−0.02	0.06	−0.07	0.01	−0.02	1.00														
	(0.03)	(0.00)	(0.00)	(0.24)	(0.05)															
7 Event types	0.02	0.00	0.04	0.00	−0.06	0.00	1.00													
	(0.08)	(0.87)	(0.00)	(0.82)	(0.00)	(0.97)														
8 Targets	0.00	−0.01	−0.03	0.12	−0.04	−0.06	0.05	1.00												
	(0.91)	(0.41)	(0.03)	(0.00)	(0.00)	(0.00)	(0.00)													
9 Cash payment	0.03	0.08	0.04	0.09	−0.05	−0.04	0.05	0.07	1.00											
	(0.03)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)												
10 No. of acquisitions	0.05	0.06	−0.18	0.20	−0.16	−0.13	0.06	0.10	0.02	1.00										
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.19)											
11 Firm size	−0.02	0.27	0.12	0.37	−0.15	0.09	0.09	0.07	0.02	0.24	1.00									
	(0.05)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.08)	(0.00)										
12 Tangible asset ratio	−0.05	0.16	0.08	0.11	0.01	0.08	0.01	−0.07	−0.11	−0.11	0.09	1.00								
	(0.00)	(0.00)	(0.00)	(0.00)	(0.33)	(0.00)	(0.30)	(0.00)	(0.00)	(0.00)	(0.00)									
13 Firm age	0.07	0.09	−0.30	0.12	−0.10	0.11	0.01	0.07	0.11	0.33	0.12	−0.08	1.00							
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.33)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)								
14 Board independence	0.02	−0.08	0.05	−0.05	−0.01	0.01	0.03	0.03	−0.04	0.02	−0.01	−0.03	0.01	1.00						
	(0.13)	(0.00)	(0.00)	(0.00)	(0.24)	(0.41)	(0.00)	(0.01)	(0.00)	(0.07)	(0.33)	(0.01)	(0.21)							
15 Number of directors	−0.02	0.26	0.01	0.19	−0.07	0.02	0.01	−0.00	0.04	−0.01	0.28	0.08	0.02	0.30	1.00					
	(0.13)	(0.00)	(0.41)	(0.00)	(0.00)	(0.15)	(0.23)	(0.78)	(0.00)	(0.40)	(0.00)	(0.00)	(0.13)	(0.00)						
16 Industry median ROA	−0.18	−0.05	−0.02	−0.15	0.03	0.03	0.03	0.02	−0.03	0.03	−0.02	−0.08	0.03	0.02	0.01	1.00				
	(0.00)	(0.00)	(0.18)	(0.00)	(0.01)	(0.00)	(0.01)	(0.15)	(0.01)	(0.00)	(0.03)	(0.00)	(0.00)	(0.19)	(0.38)					
17 Incentive schemes	−0.08	−0.25	−0.03	−0.15	0.03	−0.00	0.00	0.00	−0.05	0.02	−0.03	−0.11	−0.00	0.07	−0.10	0.05	1.00			
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.78)	(0.81)	(0.99)	(0.00)	(0.04)	(0.01)	(0.00)	(0.69)	(0.00)	(0.00)	(0.00)				
18 Year	−0.01	−0.29	−0.12	−0.22	−0.07	0.11	0.07	0.02	0.03	0.33	−0.00	−0.21	0.38	0.15	−0.19	0.08	0.23	1.00		
	(0.52)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.04)	(0.02)	(0.00)	(0.77)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
19 Region	0.06	0.19	−0.06	0.13	−0.12	−0.00	0.03	−0.01	0.10	0.06	0.05	0.00	0.03	−0.03	0.10	0.01	−0.12	−0.11	1.00	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.95)	(0.01)	(0.24)	(0.00)	(0.00)	(0.00)	(0.93)	(0.02)	(0.03)	(0.00)	(0.41)	(0.00)	(0.00)		
20 Operating loss five-year prior	0.26	0.08	−0.12	0.16	−0.00	−0.10	0.03	0.06	0.12	0.19	−0.01	−0.05	0.17	0.01	−0.02	−0.07	−0.07	0.11	0.07	1.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.90)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.40)	(0.00)	(0.00)	(0.27)	(0.13)	(0.00)	(0.00)	(0.00)	(0.00)	

Source(s): CSMAR 2003–2014

Table 4.
Frequency table of operating loss by ownership concentration

Percent	SOE			Non-SOE			All		
	No loss	Loss	Total	No loss	Loss	Total	No loss	Loss	Total
<25	107	32	139	166	32	198	273	64	337
	76.98	23.02	100.00	83.84	16.16	100.00	81.01	18.99	100.00
25–50	1186	232	1418	1645	199	1844	2831	431	3262
	83.64	16.36	100.00	89.21	10.79	100.00	86.79	13.21	100.00
50–75	1468	220	1688	1686	109	1795	3154	329	3483
	86.97	13.03	100.00	93.93	6.07	100.00	90.55	9.45	100.00
75–100	186	20	206	83	5	88	269	25	294
	90.29	9.71	100.00	94.32	5.68	100.00	91.50	8.50	100.00
Total	2947	504	3451	3580	345	3925	6527	849	7376
	85.40	14.60	100.00	91.21	8.79	100.00	88.49	11.51	100.00
N			3451			3925			7376

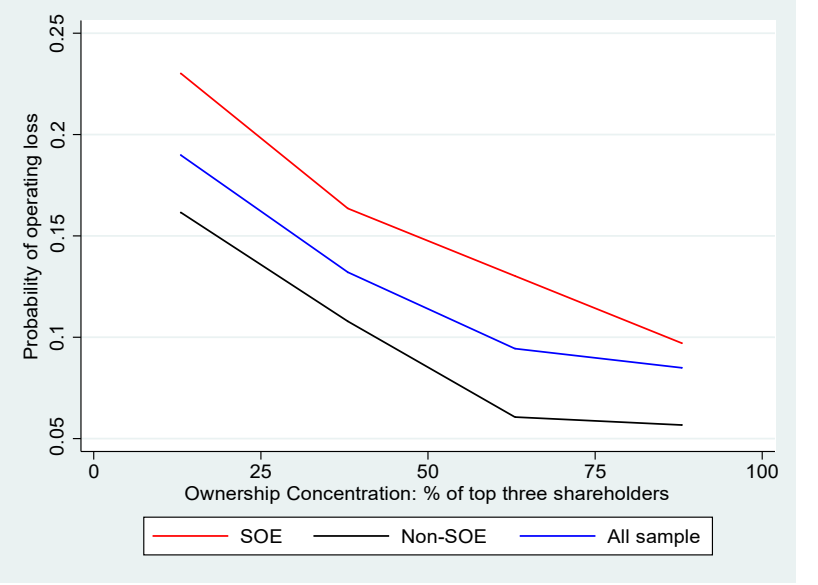

Figure 2.
Predicted operating loss probability and ownership concentration

versus ownership concentration and the operating loss versus leverage. The smoothed operating loss variable has been transformed by the logits in terms of the log of odds ratio [7]. By doing so, we can check the relationship between variables of interest and examine the linearity assumption of logistic regression, which is used in the parametric part of the analysis.

Figure 4 indicates the reasonable linearity between the natural logarithm of odds of the operating loss and ownership concentration.

In general, the odds of the operating loss decrease as the level of ownership concentration increases. As shown in Figure 5, the linear relationship between the natural logarithm of odds of the operating loss and leverage can also be spotted.

Overall, the odds of the operating loss increases with leverage of firms. However, the linearity seems rough for some data, for instance, for the non-SOE observations with ownership concentration over 80% and the SOE observations with leverage below 20%. This

Percent	SOE No loss	SOE Loss	SOE Total	Non-SOE No loss	Non-SOE Loss	Non-SOE Total	All No loss	All Loss	All Total
<10	31	4	35	234	5	239	265	9	274
	88.57	11.43	100.00	97.91	2.09	100.00	96.72	3.28	100.00
10–20	126	10	136	525	24	549	651	34	685
	92.65	7.35	100.00	95.63	4.37	100.00	95.04	4.96	100.00
20–30	263	24	287	563	27	590	826	51	877
	91.64	8.36	100.00	95.42	4.58	100.00	94.18	5.82	100.00
30–40	442	36	478	642	43	685	1084	79	1163
	92.47	7.53	100.00	93.72	6.28	100.00	93.21	6.79	100.00
40–50	576	65	641	652	64	716	1228	129	1357
	89.86	10.14	100.00	91.06	8.94	100.00	90.49	9.51	100.00
50–60	597	107	704	476	66	542	1073	173	1246
	84.80	15.20	100.00	87.82	12.18	100.00	86.12	13.88	100.00
60–70	616	114	730	358	62	420	974	176	1150
	84.38	15.62	100.00	85.24	14.76	100.00	84.70	15.30	100.00
70–80	252	85	337	107	35	142	359	120	479
	74.78	25.22	100.00	75.35	24.65	100.00	74.95	25.05	100.00
80–90	43	41	84	22	12	34	65	53	118
	51.19	48.81	100.00	64.71	35.29	100.00	55.08	44.92	100.00
90–100	1	18	19	1	7	8	2	25	27
	5.26	94.74	100.00	12.50	87.50	100.00	7.41	92.59	100.00
Total	2947	504	3451	3580	345	3925	6527	849	7376
	85.40	14.60	100.00	91.21	8.79	100.00	88.49	11.51	100.00
N	3451			3925			7376		

Table 5.
Frequency table of operating loss by leverage

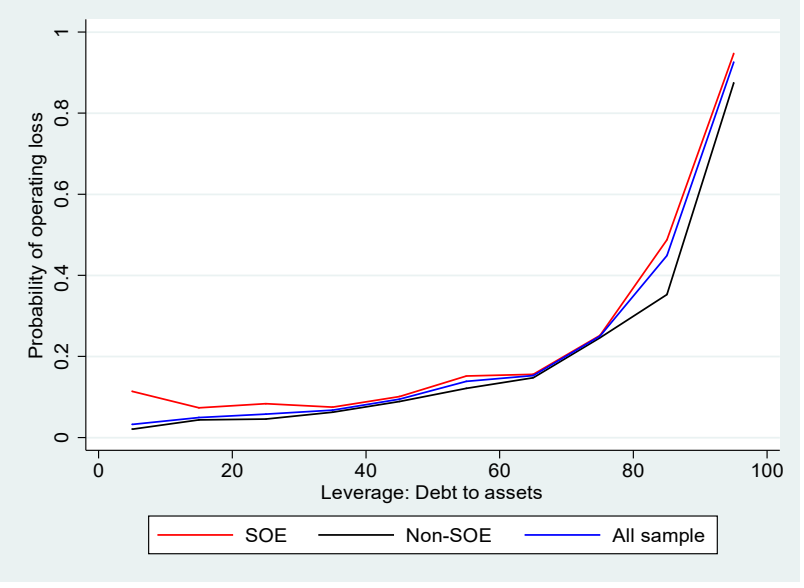

Figure 3.
Predicted operating loss probability and leverage

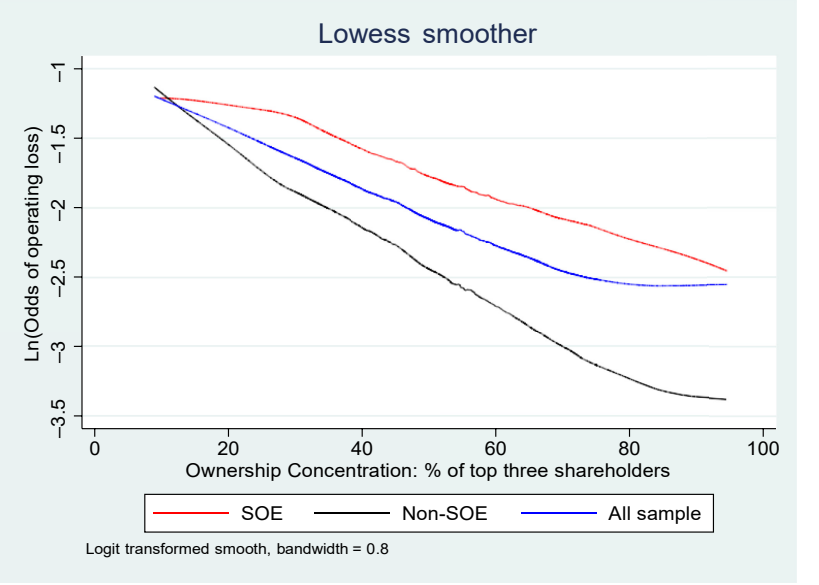

Figure 4.
Operating loss and ownership concentration by lowess regression

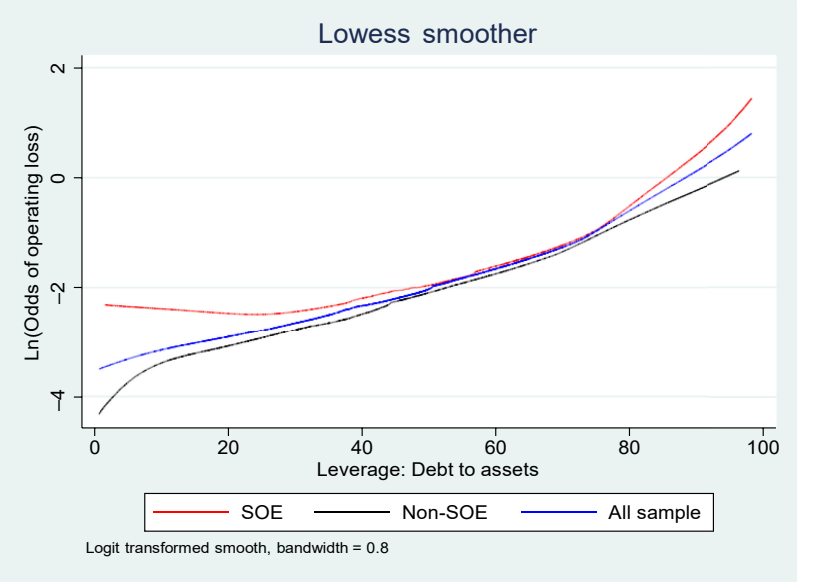

Figure 5.
Operating loss and leverage by lowess regression

rough linearity may be disregarded since the data are relatively sparse for an accurate smoothed fit (See discussions in Cameron and Trivedi (2005, p. 297) and Hamilton (2012, pp. 212–213)). As the central parts of the lowess curves in Figures 4 and 5 show the satisfactory linearity, the logistic regression model can be adequate for the further parametric analysis.

4.4 Logistic regression

Although the two-way table of frequencies and lowess regression can provide valuable insights regarding the relationship between variables of interests, these nonparametric methods require no specification of a function to fit a model and produce no explicit regression equation. However, by fitting the logistic regression model, a functional form of the relationship can be described, and the hypotheses can be statistically tested.

Table 6 presents the regression outputs in the odds ratios [8]. In the head of columns, "OL" indicates that the results are estimated by the ordinary logit regression. "ML" and "GEE" are the abbreviations for the "multilevel and longitudinal" model and "generalized estimating equation" model.

Model 1 shows the regression results of the base logistic model, which includes only the dichotomous operating loss as the dependent variable and the types of ultimate ownership, ownership concentration and leverage as the independent variables. Model 2 is the main logistic model based on equation (1). This model includes both independent and control variables.

Model 3–8 are models for the robustness checks. More details regarding Model 3–8 are discussed in Section 5.

The predominant interpretation of the coefficients in logistic regression models is in terms of odds ratios. Model 2 in Table 6 shows that the estimated regression coefficient for being SOEs is 1.481, which means that all other covariates being equal, the odds of the operating loss in a five-year postacquisition period are estimated to be 48.1% higher for being SOEs than non-SOEs [9]. This difference is significant at 0.01 level. Therefore, Hypothesis 1 is supported.

For both SOEs and non-SOE, each 1% increase in ownership concentration reduces the odds of the operating loss by 1.7% [10]. This change is not additive but exponentially multiplicative [11] while each 1% rise in leverage increases the odds of the operating loss by an estimated 3.9% [12].

The estimated regression coefficients in the odds ratios regarding ownership concentration and leverage variables are all statistically different from zero at 0.01 level. Therefore, Hypotheses 2–3 are confirmed. From Table 6, it can be concluded that compared with non-SOEs, SOEs acquiring firms are more likely to experience operating loss within the five-year postacquisition period. The likelihood of the operating loss is positively related to leverage but negatively associated with ownership concentration.

Although it is common to interpret the logistic models in terms of odds ratios, this method of interpretation also has limitations. Long and Freese (2006) pointed out that the interpretation in odds ratios conveys no information about the magnitude of the implied change in the probability of the outcome. Besides, a constant unit change in the odds does not mean a constant change in the probability. Therefore, in addition to interpreting the coefficients in the odds ratio (or log odds), it may be helpful to see how the probability of the operating loss is related to ownership concentration and leverage.

In order to understand the implications of the model and disentangle the association between the outcome and independent variables, we also adopt an alternative method of interpretation, which is based on predictions from the main model. We use the fitted model and estimated parameters to make the predictions at the values of the independent variables. More specifically, we have calculated the model implied margin effects as observed (average marginal effects [AMEs]) and graphed the predicted probabilities accordingly. The margin effects represent the estimates of the change in the probability of the outcome variable for a change in the independent variable of interest, holding all other right-hand side variables constant. As Long & Freese (2006) and Williams (2012) suggested, the graphs of predictions often effectively summarize the relationship between variables of interest.

Table 6.
Regression results

	(1) OL	(2) OL	(3) OL	(4) OL	(5) OL	(6) OL	(7) ML	(8) GEE
Main effects								
SOE	1.316***	1.481***	1.525***	1.525***	1.485***	1.648***	1.652***	1.471***
	(2.77)	(3.88)	(4.08)	(3.88)	(3.70)	(4.68)	(3.89)	(3.76)
Ownership	0.980***	0.983***		0.983***	0.981***	0.983***	0.978***	0.982***
concentration	(−6.32)	(−5.28)		(−4.25)	(−5.36)	(−4.98)	(−5.35)	(−5.33)
Leverage	1.036***	1.039***	1.039***	1.041***	1.033***	1.039***	1.050***	1.040***
	(12.19)	(13.08)	(13.22)	(12.63)	(9.31)	(12.27)	(11.42)	(13.28)
Controls								
Current		1.000	1.000	1.000	0.999	1.002	1.001	1.000
liability ratio		(−0.03)	(0.07)	(0.02)	(−0.27)	(0.67)	(0.20)	(0.10)
Year since acquisitions								
2		0.960	0.970	0.940	1.029	0.984	1.093	1.024
		(−0.39)	(−0.29)	(−0.56)	(0.25)	(−0.16)	(0.80)	(0.25)
3		1.010	1.026	1.027	1.060	1.037	1.268	1.134
		(0.07)	(0.19)	(0.18)	(0.39)	(0.26)	(1.52)	(1.00)
4		1.100	1.125	0.977	1.214		1.500**	1.283
		(0.53)	(0.65)	(−0.12)	(1.04)		(2.04)	(1.57)
5		0.790	0.810	0.763	0.799		1.097	0.972
		(−0.93)	(−0.83)	(−1.01)	(−0.83)		(0.33)	(−0.13)
Event types:		1.389	1.373	1.213	1.204	1.301	1.484	1.406
mergers		(1.05)	(1.02)	(0.55)	(0.50)	(0.75)	(1.06)	(1.12)
Mergers and		1.910*	1.821	1.993	1.697	1.814	2.789**	2.069**
acquisitions		(1.65)	(1.50)	(1.55)	(1.12)	(1.45)	(2.38)	(2.00)
Targets:		0.881	0.886	0.942	0.872	0.945	0.924	0.911
equities		(−1.30)	(−1.24)	(−0.58)	(−1.31)	(−0.55)	(−0.69)	(−0.98)
Assets and		0.742**	0.763*	0.716**	0.807	0.818	0.756	0.781*
equities		(−1.98)	(−1.81)	(−1.99)	(−1.37)	(−1.31)	(−1.61)	(−1.72)
Cash		1.228	1.250	1.319*	1.394**	1.249	1.289	1.235
payment		(1.51)	(1.63)	(1.90)	(2.16)	(1.56)	(1.59)	(1.57)

(*continued*)

Table 6.

	(1) OL	(2) OL	(3) OL	(4) OL	(5) OL	(6) OL	(7) ML	(8) GEE
No. of acquisitions		0.951 (−1.47)	0.958 (−1.25)	0.944 (−1.55)	0.964 (−1.01)	0.950 (−1.44)		
Firm size		0.775*** (−6.24)	0.772*** (−6.24)	0.755*** (−6.37)	0.775*** (−5.67)	0.777*** (−5.91)	0.705*** (−6.65)	0.763*** (−6.66)
Tangible asset ratio		0.960*** (−6.16)	0.960*** (−6.08)	0.961*** (−5.72)	0.964*** (−4.95)	0.963*** (−5.62)	0.956*** (−5.48)	0.962*** (−5.91)
Firm age		0.992 (−0.78)	0.997 (−0.30)	0.992 (−0.66)	0.988 (−1.08)	0.989 (−0.96)	0.996 (−0.34)	0.993 (−0.61)
Board independence		1.012 (1.58)	1.013 (1.60)	1.012 (1.40)	1.011 (1.33)	1.017** (2.07)	1.012 (1.37)	1.011 (1.50)
Number of directors		0.936** (−2.48)	0.933** (−2.57)	0.939** (−2.17)	0.931** (−2.49)	0.935** (−2.47)	0.922** (−2.40)	0.936** (−2.46)
Industry median ROA		0.767*** (−8.20)	0.765*** (−8.28)	0.765*** (−7.48)	0.771*** (−7.34)	0.768*** (−7.43)	0.717*** (−8.18)	0.762*** (−8.35)
Incentive schemes		0.475*** (−3.71)	0.478*** (−3.69)	0.460*** (−3.56)	0.442*** (−3.94)	0.474*** (−3.36)	0.441*** (−3.67)	0.488*** (−3.79)
Year: 2004		1.111 (0.34)	1.077 (0.24)	1.079 (0.25)	0.883 (−0.39)	1.106 (0.33)	1.097 (0.27)	1.091 (0.30)
2005		1.619 (1.57)	1.550 (1.42)	1.526 (1.34)	1.290 (0.82)	1.601 (1.53)	1.635 (1.40)	1.544 (1.48)
2006		0.818 (−0.64)	0.797 (−0.71)	0.803 (−0.68)	0.687 (−1.15)	0.855 (−0.49)	0.837 (−0.49)	0.825 (−0.64)
2007		0.689 (−1.14)	0.683 (−1.16)	0.650 (−1.26)	0.609 (−1.49)	0.769 (−0.79)	0.725 (−0.86)	0.708 (−1.12)
2008		1.398 (1.14)	1.382 (1.09)	1.338 (0.96)	1.265 (0.80)	1.457 (1.27)	1.431 (1.04)	1.331 (1.01)
2009		1.026 (0.08)	1.013 (0.04)	0.997 (−0.01)	0.859 (−0.49)	0.968 (−0.10)	1.079 (0.21)	1.005 (0.02)
2010		0.685 (−1.15)	0.679 (−1.17)	0.668 (−1.17)	0.488** (−2.10)	0.717 (−0.99)	0.732 (−0.82)	0.692 (−1.18)

(*continued*)

Table 6.

	(1) OL	(2) OL	(3) OL	(4) OL	(5) OL	(6) OL	(7) ML	(8) GEE
2011		0.963	0.944	0.831	0.829	0.962	1.051	0.948
		(−0.12)	(−0.18)	(−0.56)	(−0.59)	(−0.12)	(0.14)	(−0.18)
2012		2.142**	2.061**	2.084**	1.892**	2.089**	2.467**	2.011**
		(2.52)	(2.38)	(2.35)	(2.12)	(2.37)	(2.53)	(2.42)
2013		1.383	1.315	1.311	1.213	1.475	1.560	1.335
		(1.05)	(0.89)	(0.84)	(0.62)	(1.23)	(1.24)	(0.99)
2014		1.185	1.118	1.186	0.983	1.317	1.333	1.143
		(0.55)	(0.36)	(0.53)	(−0.06)	(0.87)	(0.80)	(0.46)
Region:		0.964	0.971	0.964	0.938	0.977	0.962	0.974
middle		(−0.32)	(−0.25)	(−0.31)	(−0.52)	(−0.20)	(−0.27)	(−0.22)
West		1.174	1.194	1.166	1.202	1.150	1.228	1.165
		(1.37)	(1.52)	(1.23)	(1.45)	(1.12)	(1.39)	(1.28)
Operating loss five-year before		4.024***	4.127***	4.337***	4.441***		2.347***	2.816***
		(10.86)	(11.08)	(10.70)	(10.49)		(5.18)	(8.08)
Herfindahl Index			0.981***					
			(−4.67)					
Operating loss three-year before						4.087***		
						(10.33)		
Observations	7376	7364	7364	6631	6629	6498	7364	7364
No. of groups							1453	1453
Pseudo *R*-sq	0.0792	0.193	0.191	0.197	0.168	0.193		
ζj sd							1.048	
ρ variance due to ζj							0.250	

Note(s): Exponentiated coefficients
*$p < 0.1$; * * $p < 0.05$; * * *$p < 0.01$
Source(s): CSMAR 2003–2014

After controlling for other variables in Model 2, Figure 6 shows the marginal effects for types of ultimate ownership. On average, the probability of the operating loss among non-SOEs is estimated to be 0.098, while among SOEs the probability is estimated to be 0.131, which is 0.033 more (or 33.6% higher). The difference between SOEs and non-SOEs in the estimated probability of the operating loss is significant as no estimated confidence intervals overlap. This difference may be because the state and nonstate owners are different in objectives and motivations of M&As (Shleifer, 1998; Chen *et al.*, 2009; Grosman *et al.*, 2016), such that the state owners may use M&As to pursue political interests over profit or shareholder value maximization goals (Bai *et al.*, 2006; Chen & Young, 2010). Besides, SOEs are more often characterized by the hierarchical structure and bureaucratic culture than non-SOEs. These characteristics may impede postacquisition integration, which in turn may harm the operating gains (Datta, 1991). The findings in this study from the operating loss perspective are contrary to Zhou *et al.* (2015) and Du *et al.* (2016)'s findings from the market abnormal return perspectives.

Based on the estimates from Model 2, the predicted probability of the operating loss is plotted over the range of ownership concentration and leverage, respectively, holding other variables at their observed values. Figures 7 and 8 present how the predicted probability of the operating loss decreases as ownership concentration increases from 0 to 100. The findings are in line with the previous literature that concentrated ownership in acquiring firms may enhance monitoring mechanisms in the emerging economies and improve postacquisition operating performance (Yen & Andre, 2007; Heugens *et al.*, 2009; Bhaumik & Selarka, 2012).

Figures 9 and 10 show that the probability of the operating loss rises as leverage changes from 0 to 100%. The positive relationship between leverage and probability of the operating loss may be due to sub-optimal managerial decisions given the high level of debt, reduced cash resources for postacquisition integration and difficulty in financing acquisitive growth. The findings correspond with Harrison *et al.* (2014) and Alhenawi and Stilwell (2017) that postacquisition performance is negatively related to firms' leverage.

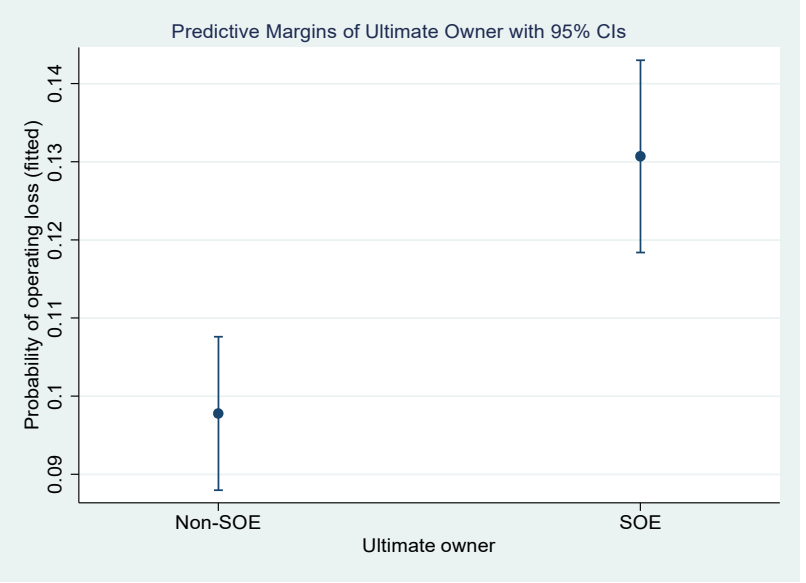

Figure 6.
Fitted probability of operating loss and ultimate ownership

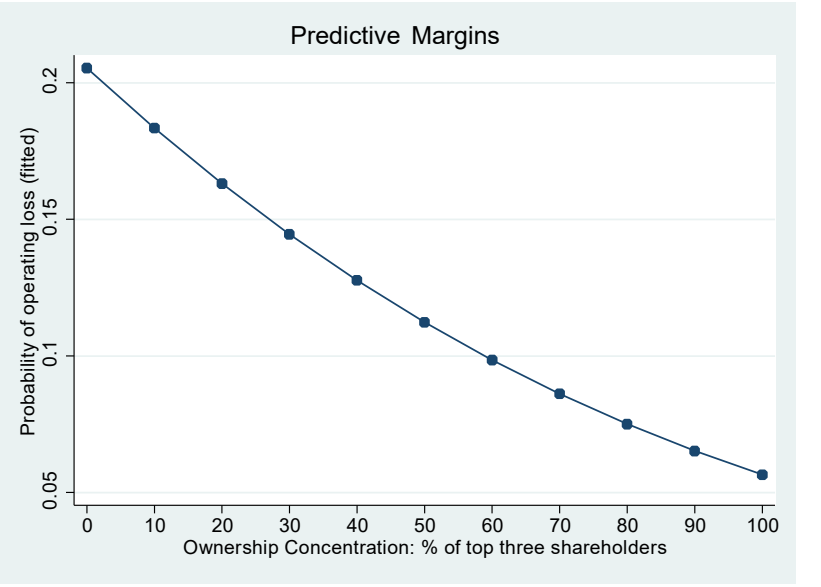

Figure 7.
Fitted probability of operating loss and ownership concentration

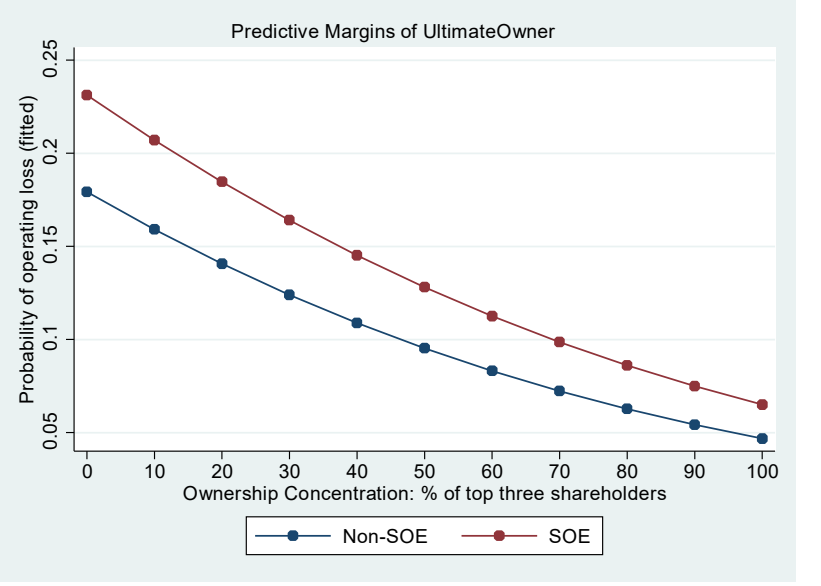

Figure 8.
Fitted probability of operating loss and ownership concentration by ultimate ownership

As shown in Table 6, some control variables also have significant implications on postacquisition operating performance. For instance, the odds of the operating loss are negatively related to the firm size and asset tangibility. The increase in the numbers of directors (board size) reduces the odds of the operating loss while the effect of board independence remains neutral. The incentive schemes significantly lower the odds of the

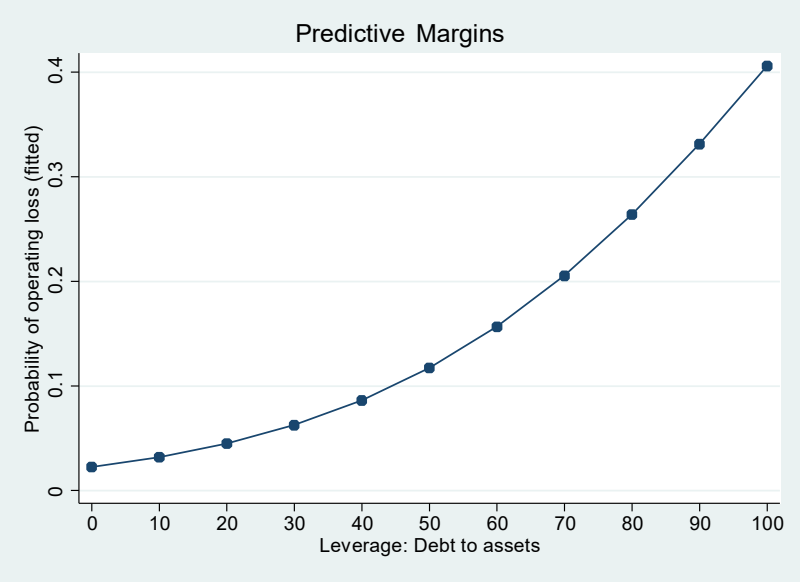

Figure 9.
Fitted probability of operating loss and leverage

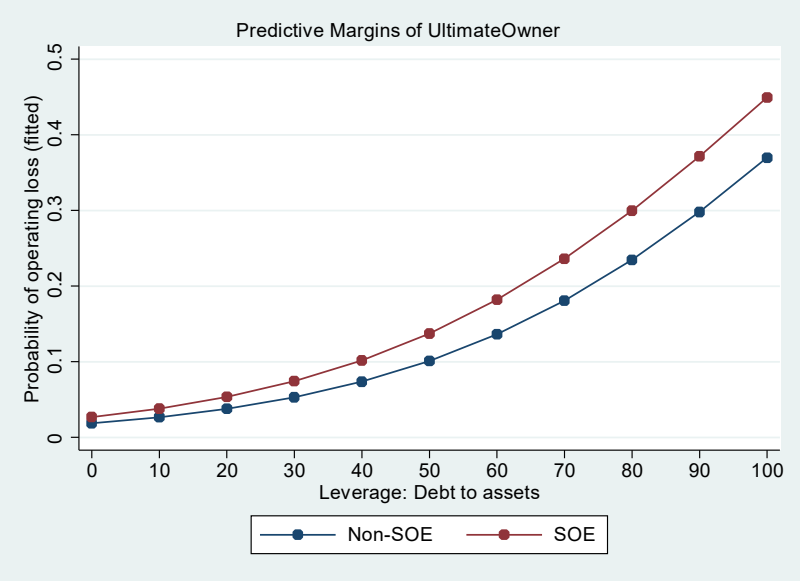

Figure 10.
Fitted probability of operating loss and leverage by ultimate ownership

operating loss. It seems that the increase in firm age and the number of acquisition events lowers the odds of the operating loss, but the relationship is not significant. However, if an acquiring firm did experience the operating loss within the five fiscal years since the previous acquisition event, then the odds of the operating loss after the current acquisition event are expected to be about 4 times as much as the odds for an acquiring firm, which did not

experience the prior loss-making acquisition event. Making the M&A at the same time is marginally associated with higher odds of the operating loss than having only the acquisitions. Regarding the targets, acquiring both assets and equities significantly lowers the odds of the operating loss than only acquiring assets. The cash payment increases the odds of the operating loss, but the relationship is not significant in the main model. The firms' current liability ratio is also not significantly related to the odds of the operating loss.

5. Robustness

5.1 The Hosmer–Lemeshow (HL) goodness of fit test

The Hosmer–Lemeshow (HL) statistic is used in order to test the goodness of fit for the logistic model. The rationale behind the HL test is to compare the predicted probabilities with observed data, contingent on the grouping of data (Hosmer Jr *et al.*, 2013). In another word, the predicted probability and observed probability should be closely matched if the model fits well. Long and Freese (2006) argued that the HL test statistic is highly dependent on the decision on the number of groups used, and the test may not be conclusively convincing. Still, the HL test provides a reference for the model's fit. A common practice is to combine the patterns formed by the independent variables into ten groups (Hosmer Jr *et al.*, 2013). The value of HL statistic for the main logistic model (Model 2) based on ten groups is 8.26, and the corresponding p-value computed from the χ^2 distribution with 8 degrees of freedom is 0.41 and thus no evidence of lack of fit.

5.2 Receiver operating characteristic (ROC) curve

The receiver operating characteristic (ROC) curve is originated from the signal detection theory and at first measures the signal discrimination capacity of a receiver (Peterson, Birdsall, & Fox, 1954). The ROC curve has been widely applied in other subjects as well (Hanley & McNeil, 1982). Figure 11 presents the ROC curve based on the logistic regression

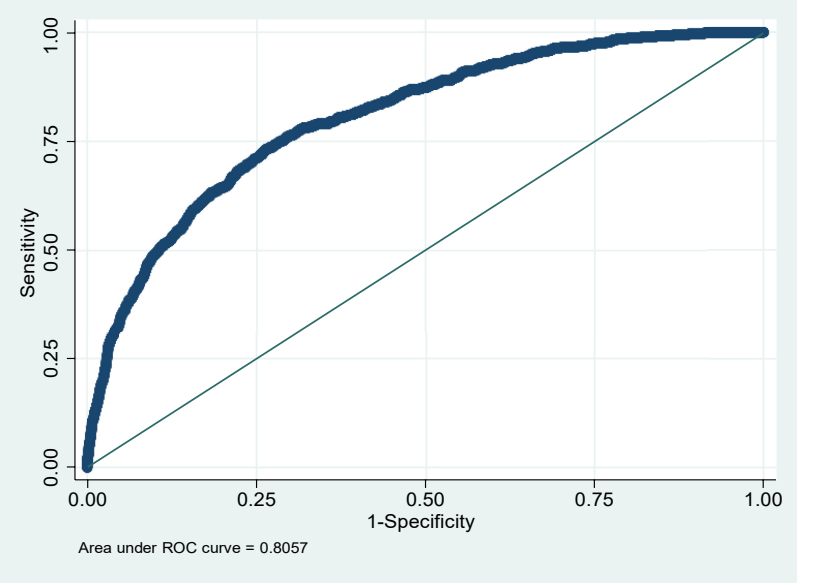

Figure 11.
Receiver operating characteristic (ROC) curve

model (Model 2). Following Hosmer Jr *et al.* (2013), the sensitivity is defined as $\Pr(\hat{y} = 1|y = 1)$, and the specificity is defined as $\Pr(\hat{y} = 0|y = 0)$, where $\hat{y}$ denotes the predicted outcome value from the model. The area under the ROC curve, over a continuous range from zero to one, measures the model's ability in discriminating between those acquiring firms which experience the operating loss versus those do not. The area under the ROC curve in Figure 11 is 0.81, which is considered reasonable and indicates the model is well specified.

5.3 Alternative ownership concentration

Model 3 in Table 6 is based on the alternative measure of ownership concentration by the Herfindahl Index. The estimated odds ratios based on the alternative measure is significant at 0.01 level and agree with the odds ratios estimated in Model 2.

5.4 Trimming samples

Trimming involves removing a fixed amount of extreme observations from each of the tails of data. Model 4 shows the logistic regression results based on the observations with ownership concentration between the 5*th* and 95*th* percentile of the data. Model 5 is based on the 5th–95th percentile of leverage. Results from the trimmed samples demonstrate that the statistical inferences derived from the main logistic model are robust to the extremes and outliers.

5.5 Operating loss in the three-year-period after acquisitions

The tracking time is altered in order to check whether the selection of the observational period changes the conclusion. Model 6 is based on the data in which acquiring firms were tracked up to three fiscal years since the completion of an acquisition event. The estimated odds ratio of the operating loss within the three-year postacquisition period for SOEs is 1.648, which means that the odds ratio of the operating loss is 64.8% higher than non-SOEs. The odds ratio of the operating loss decreases as ownership concentration increases, and this odds ratio increases when leverage rises. The conclusion drawn from Model 6 is similar to that inferred from Model 2. The estimated coefficients are same in direction and only different in the magnitude.

5.6 Random intercept logistic regression – the subject-specific probability

Although the dependence among observations for the same firm is treated as a nuisance by fitting the ordinary logistic regression model with robust standard errors for clustered data (Model 1–6), it is still useful to apply a random effects logistic regression to model the dependence and estimate the degree of dependence, instead of treating it as a nuisance, as shown in Model 7. The specification of Model 7 is presented in the Equation (A1) in Appendix. The estimated odd ratios for the random intercept logistic regression (Model 7) are more extreme comparing with Model 2. The discrepancy is due to the ordinary logistic regression fits overall population-averaged probabilities conditioning only on covariates, while random effects logistic regression fits subject-specific probabilities for the individual firms, given the subject-specific random intercept and the covariates. In fact, the estimated conditional intraclass correlation is 0.25, which is actually small for the data. Despite the differences in the magnitude of estimated odds ratios, the conclusions drawn from both Model 2 and 7 remain the same at large.

5.7 Generalized estimating equation (GEE) estimation

As indicated by Rabe-Hesketh and Skrondal (2012b), the generalized estimating equation (GEE) can be regarded as a special case of generalized methods of moments (GMM) estimation. Many researchers view the GEE as a method of estimation rather than a modeling

approach, as the GEE does not require the full specification of the statistical model. We use GEE estimation as a robustness check since the estimation is consistent even with the misspecified correlation structure (Rabe-Hesketh & Skrondal, 2012b). Besides, GEE estimation gives the population-averaged effects, as the ordinary logistic regression does, so the results by different estimation methods are comparable.

The Model 8 is based on GEE estimation, specified with the exchangeable correlation structure (same correlation for all pairs of units). The variance function follows the from Bernoulli distribution. The standard errors are robust and based on the sandwich estimator. Logit is defined as the link function. Both Model 2 and Model 8 yield the similar estimated odds ratios, yet the logistic model is simpler and more parsimonious.

5.8 Interaction and quadratic variables

We fit the logistic model with interactions between ultimate ownership and ownership concentration variables as well as ultimate ownership and leverage variables. A logistic model with quadratic ownership concentration and leverage variables is also specified. Then the models with interaction terms and quadratic variables are compared with the main model using a likelihood-ratio test. The test statistic suggests that the models with interaction and quadratic variables fit no better than the main model (Model 2).

5.9 The extent of the operating loss

Table A2 in Appendix presents the regression results by the extent of the operating loss. The amount of the operating loss was ranked and categorized into quartiles, and then the operating loss dummy variables were calculated accordingly. Model I accounts for the postacquisition "minor loss" such that the operating loss variable in Model I takes the value "1" for the losses which are larger than 25% of all the losses, and all else are recorded as "0." Similarly, Model II and III accommodate for the "moderate loss" (>median) and "heavy loss" (>3rd quartile), respectively. Model I–III are all based on the cluster robust ordinary logistic regression and same covariates as in the main model.

The regression results of Model I–III show that being SOEs increases the odds of minor, moderate and heavy operating loss by 39.4, 27.4 and 51.4%, respectively. Ownership concentration is negatively related to the odds of the operating loss across the different levels of the operating loss. The relationship between leverage and operating loss is positive and become especially pronounced when the loss is severe, as 1% rise in leverage increases the odds of heavy loss by 5.6%.

Overall, the conclusions drawn from Model I–III provide evidence that this study is robust to the extent of the operating loss.

6. Conclusion

This paper investigates postacquisition performance of acquiring firms in relation to ownership and capital structure. The effects of both ultimate and immediate ownership are studied in this paper. Numerous studies have investigated postacquisition performance from market-based perspectives by examining cumulative abnormal returns after acquisitions. However, due to the differences in market efficiency and research constructs, the findings are largely divided (Agrawal & Jaffe, 2000; Capron & Pistre, 2002; Gaur *et al.*, 2013). Much fewer studies have looked into postacquisition operating performance, and the effects of ownership and capital structure on postacquisition operating performance remain inconclusive. No prior study has ever examined the occurrence of operating loss postacquisition, despite operating loss directly indicates a fundamental status that firms' main operations become unprofitable

and signals financial distress and liquidity deterioration (Wruck, 1990; John, 1993; Platt & Platt, 2002).

As argued by Zollo and Meier (2008), M&A performance is a multifaceted construct, and there is no single overarching factor capturing all aspects of the M&A performance. This study contributes to the literature on corporate governance and post-M&A performance from a new operating loss aspect. Moreover, comparing with listed firms in developed economies, listed firms in China are characterized by common practices of the state ultimate control, highly concentrated ownership and short-term financing dominated capital structure. The implications of these distinctions on postacquisition performance are unclear. In the view of China's emerging institutional background and the distinctive characteristics of listed firms, this study also contributes to the ongoing literature by providing new empirical evidence from an emerging economy perspective.

Based on a sample of publicly listed acquiring firms in manufacturing industry in China from 2003 to 2014, this study finds that 11.5% of all sample (849 out of 7,376 observations) have experienced the operating loss within five fiscal years after acquisitions. The observed proportion of the operating loss is higher for SOE acquirers (14.6%) than that for non-SOE acquirers (8.8%). The results from the logistic regression indicate that the estimated odds ratio of the operating loss for SOEs is 48.1% higher than that for non-SOEs. Ownership concentration is found to be negatively related to the likelihood of the operating loss after acquisitions as 1% increase in ownership concentration decreases the odds of the operating loss of acquiring firms by 1.7%. The negative relationship between ownership concentration and probability of the operating loss implies that concentrated ownership among acquiring firms can serve as an effective corporate governance mechanism in the emerging economy and improve postacquisition operating performance (Yen & Andre, 2007; Heugens *et al.*, 2009; Bhaumik & Selarka, 2012). On the other side, leverage and likelihood of the operating loss are positively related as 1% rise in leverage increases the odds of operating loss by 3.9%. This relationship may be explained as that the high level of debt can lead to the suboptimal managerial decisions, reduced cash resources for postacquisition integration and difficulties in financing acquisitive growth. These findings correspond with Harrison *et al.* (2014) and Alhenawi and Stilwell (2017) that postacquisition performance is negatively related to firm leverage.

The empirical results in this study are robust to a number of tests. This includes conducting the HL goodness of fit test, plotting the ROC curve, using the alternative measure for ownership, data trimming, choosing the different observing time period, testing for the interaction and quadratic terms, and checking whether the conclusions are consistent given the different extent of the operating loss. A logistic model with random intercept and a model estimated by the GEE method are also specified. The estimates from robustness checks support the conclusions drawn from the main model. The sandwich estimator has been used in this study to produce the robust standard errors for taking the clustering into account. Therefore, the estimates of the standard errors are consistent even if the residuals are correlated within the subjects and have heteroskedastic variance (Rabe-Hesketh & Skrondal, 2012a). At last, it is also worth mentioning that the empirical results derived from the two-way tabulation of frequencies, the lowess curves and the predictive margins of the logistic regression model agree well with each other in this study.

Notes

1. See for example Smith (1990), Healy, Palepu, and Ruback (1992), Switzer (1996), Parrino and Harris (1999), Ghosh (2001), Linn and Switzer (2001), Bruner (2002), Heron and Lie (2002), Powell and Stark (2005), Yen and Andre (2007), Dutta and Jog (2009), Shim and Okamuro (2011) and Zhou *et al.* (2015).

2. Heron and Lie (2002) also concerned about scaling operating returns by market values. They argued that the market values are likely to vary given changes in operating income, therefore concealing the actual changes in performance.
3. Ownership concentration data are from the China Stock Market & Accounting Research (CSMAR) database.
4. The fiscal year ends on 31 December for all publicly listed companies in China, and incomplete year since acquisition event is reckoned as a full year.
5. The industry classification is based on the Guidelines for the Industry Classification of Listed Companies (Announcement No. 31 [2012] Revision).
6. Following Equation (1), the logit model can also be expressed as an exponential function of the odds.

$$\text{Odds}(y_i = 1|X_i) = \exp(\beta_0 + \beta_1 X_{1i} + \ldots + \beta_n X_{ni})$$

7. The plots of the smoothed operating loss without logit transformation are shown in Figures A1 and A2 in Appendix.
8. The estimated coefficients in terms of the log odds are presented in Table A1 in Appendix.
9. ((1.481 1)/1) 100% = 48.1%
10. ((0.983 1)/1) 100 = 1.7%
11. For instance, a 50-unit increase in ownership concentration would be associated with an odds ratio of 0.983^{50}, which equals to 0.42.
12. $((1.039 - 1)/1) \times 100 = 3.9\%$

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Appendix

Random intercept logistic regression model specification

Model 7 relaxes the assumption of the conditional independence among the observations for the same acquiring firm given the covariates by including a firm-specific random intercept ζ_j to obtain a random intercept logistic regression model as follows:

$$\text{logit}\{\Pr(y_{ij} = 1|\mathrm{x}_{ij})\} = \beta_0 + \beta_1 X_{1ij} + \beta_2 X_{2ij} + \beta_3 X_{3ij} + \beta_4 X_{4ij} + \ldots + \beta_n X_{nij} + \zeta_j \quad \text{(A1)}$$

The random intercepts ζ_j are assumed to be independent and identically distributed across firms j and independent of the covariates x_{ij}. The outcome y_{ij} for firm j at different occasions i are independently Bernoulli distributed, given ζ_j and X_{ij}.

Probability of the operating loss by lowess smoother

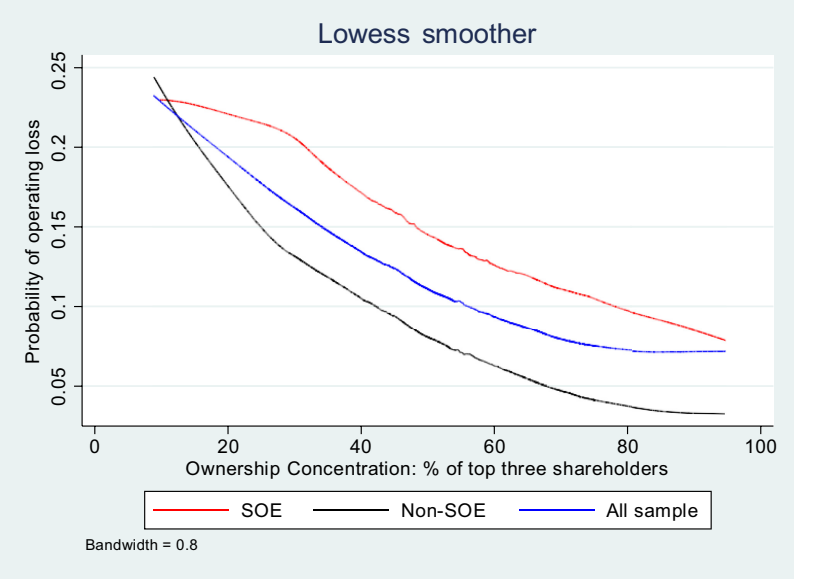
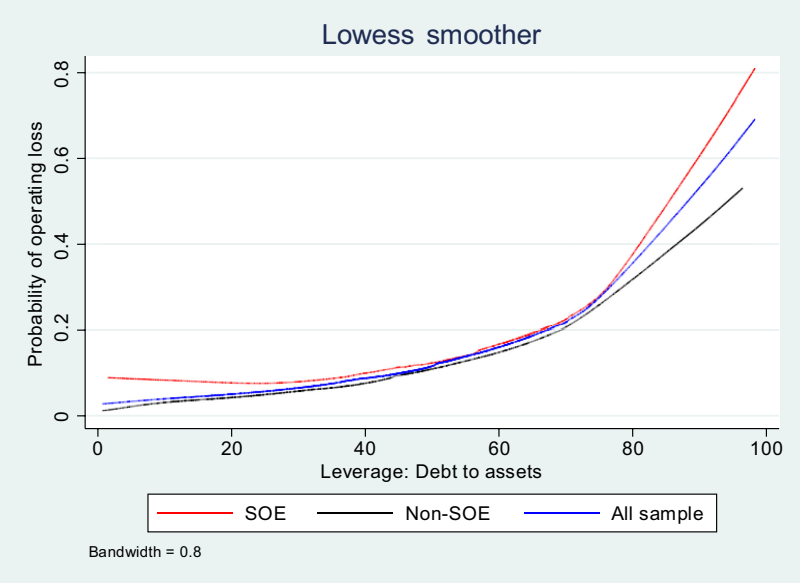


Figure A1. Probability of operating loss and ownership concentration by lowess regression

Note(s): This figure shows the negative relationship between the lowess fitted probability of the operating loss and ownership concentration. The relationship is similar across SOEs, non-SOEs and all samples. The increase in ownership concentration decreases the probability of the operating loss



Note(s): This figure shows the positive relationship between the lowess fitted probability of the operating loss and leverage. The relationship shows the consistency across SOEs, non-SOEs and all samples. The rise in leverage increases the probability of the operating loss

Figure A2.
Probability of operating loss and leverage by lowess regression

Table A1.
Regression results

	(1) OL	(2) OL	(3) OL	(4) OL	(5) OL	(6) OL	(7) ML	(8) GEE
Main effects								
SOE	0.274*** (2.77)	0.393*** (3.88)	0.422*** (4.08)	0.422*** (3.88)	0.395*** (3.70)	0.500*** (4.68)	0.502*** (3.89)	0.386*** (3.76)
Ownership concentration	−0.020*** (−6.32)	−0.017*** (−5.28)		−0.017*** (−4.25)	−0.019*** (−5.36)	−0.017*** (−4.98)	−0.022*** (−5.35)	−0.018*** (−5.33)
Leverage	0.036*** (12.19)	0.038*** (13.08)	0.039*** (13.22)	0.040*** (12.63)	0.033*** (9.31)	0.038*** (12.27)	0.049*** (11.42)	0.040*** (13.28)
Controls								
Current liability ratio		−0.000 (−0.03)	0.000 (0.07)	0.000 (0.02)	−0.001 (−0.27)	0.002 (0.67)	0.001 (0.20)	0.000 (0.10)
Year since acquisitions								
2		−0.040 (−0.39)	−0.030 (−0.29)	−0.062 (−0.56)	0.028 (0.25)	−0.016 (−0.16)	0.089 (0.80)	0.023 (0.25)
3		0.010 (0.07)	0.026 (0.19)	0.027 (0.18)	0.058 (0.39)	0.036 (0.26)	0.238 (1.52)	0.126 (1.00)
4		0.095 (0.53)	0.117 (0.65)	−0.023 (−0.12)	0.194 (1.04)		0.405** (2.04)	0.249 (1.57)
5		−0.236 (−0.93)	−0.211 (−0.83)	−0.271 (−1.01)	−0.225 (−0.83)		0.093 (0.33)	−0.028 (−0.13)
Event types: mergers		0.329 (1.05)	0.317 (1.02)	0.193 (0.55)	0.185 (0.50)	0.263 (0.75)	0.395 (1.06)	0.341 (1.12)
Mergers and acquisitions		0.647* (1.65)	0.599 (1.50)	0.690 (1.55)	0.529 (1.12)	0.596 (1.45)	1.026** (2.38)	0.727** (2.00)
Targets: equities		−0.126 (−1.30)	−0.121 (−1.24)	−0.059 (−0.58)	−0.136 (−1.31)	−0.057 (−0.55)	−0.079 (−0.69)	−0.093 (−0.98)
Assets and equities		−0.298** (−1.98)	−0.271* (−1.81)	−0.334** (−1.99)	−0.214 (−1.37)	−0.200 (−1.31)	−0.280 (−1.61)	−0.248* (−1.72)
Cash		0.205 (1.51)	0.223 (1.63)	0.277* (1.90)	0.332** (2.16)	0.222 (1.56)	0.254 (1.59)	0.211 (1.57)
No. of acquisitions		−0.050 (−1.47)	−0.043 (−1.25)	−0.057 (−1.55)	−0.037 (−1.01)	−0.051 (−1.44)		
Firm size		−0.255*** (−6.24)	−0.258*** (−6.24)	−0.281*** (−6.37)	−0.255*** (−5.67)	−0.253*** (−5.91)	−0.350*** (−6.65)	−0.271*** (−6.66)
Tangible asset ratio		−0.041*** (−6.16)	−0.040*** (−6.08)	−0.040*** (−5.72)	−0.037*** (−4.95)	−0.038*** (−5.62)	−0.045*** (−5.48)	−0.039*** (−5.91)
Firm age		−0.008 (−0.78)	−0.003 (−0.30)	−0.008 (−0.66)	−0.012 (−1.08)	−0.011 (−0.96)	−0.004 (−0.34)	−0.007 (−0.61)
Board independence		0.012 (1.58)	0.012 (1.60)	0.012 (1.40)	0.011 (1.33)	0.017** (2.07)	0.012 (1.37)	0.011 (1.50)
Number of directors		−0.066** (−2.48)	−0.070** (−2.57)	−0.063** (−2.17)	−0.072** (−2.49)	−0.067** (−2.47)	−0.081** (−2.40)	−0.067** (−2.46)
Industry median ROA		−0.266*** (−8.20)	−0.269*** (−8.28)	−0.268*** (−7.48)	−0.260*** (−7.34)	−0.264*** (−7.43)	−0.333*** (−8.18)	−0.271*** (−8.35)
Incentive schemes		−0.745*** (−3.71)	−0.738*** (−3.69)	−0.776*** (−3.56)	−0.815*** (−3.94)	−0.748*** (−3.36)	−0.818*** (−3.67)	−0.718*** (−3.79)
Year: 2004		0.105 (0.34)	0.074 (0.24)	0.076 (0.25)	−0.124 (−0.39)	0.101 (0.33)	0.093 (0.27)	0.087 (0.30)
2005		0.482 (1.57)	0.439 (1.42)	0.423 (1.34)	0.255 (0.82)	0.470 (1.53)	0.492 (1.40)	0.435 (1.48)
2006		−0.201 (−0.64)	−0.227 (−0.71)	−0.219 (−0.68)	−0.375 (−1.15)	−0.157 (−0.49)	−0.178 (−0.49)	−0.193 (−0.64)
2007		−0.372 (−1.14)	−0.381 (−1.16)	−0.430 (−1.26)	−0.497 (−1.49)	−0.263 (−0.79)	−0.321 (−0.86)	−0.345 (−1.12)
2008		0.335 (1.14)	0.323 (1.09)	0.291 (0.96)	0.235 (0.80)	0.376 (1.27)	0.358 (1.04)	0.286 (1.01)
2009		0.026 (0.08)	0.013 (0.04)	−0.003 (−0.01)	−0.152 (−0.49)	−0.033 (−0.10)	0.076 (0.21)	0.005 (0.02)
2010		−0.378 (−1.15)	−0.387 (−1.17)	−0.404 (−1.17)	−0.718** (−2.10)	−0.333 (−0.99)	−0.312 (−0.82)	−0.369 (−1.18)
2011		−0.038 (−0.12)	−0.058 (−0.18)	−0.186 (−0.56)	−0.187 (−0.59)	−0.039 (−0.12)	0.050 (0.14)	−0.053 (−0.18)
2012		0.762** (2.52)	0.723** (2.38)	0.735** (2.35)	0.638** (2.12)	0.737** (2.37)	0.903** (2.53)	0.699** (2.42)
2013		0.324 (1.05)	0.274 (0.89)	0.271 (0.84)	0.193 (0.62)	0.389 (1.23)	0.445 (1.24)	0.289 (0.99)
2014		0.170 (0.55)	0.112 (0.36)	0.170 (0.53)	−0.018 (−0.06)	0.275 (0.87)	0.287 (0.80)	0.133 (0.46)
Region: middle		−0.037 (−0.32)	−0.029 (−0.25)	−0.037 (−0.31)	−0.064 (−0.52)	−0.023 (−0.20)	−0.038 (−0.27)	−0.026 (−0.22)
West		0.160 (1.37)	0.178 (1.52)	0.153 (1.23)	0.184 (1.45)	0.140 (1.12)	0.206 (1.39)	0.153 (1.28)

(*continued*)

	(1) OL	(2) OL	(3) OL	(4) OL	(5) OL	(6) OL	(7) ML	(8) GEE
Operating loss five-year before		1.392*** (10.86)	1.417*** (11.08)	1.467*** (10.70)	1.491*** (10.49)		0.853*** (5.18)	1.035*** (8.08)
Herfindahl Index			−0.019*** (−4.67)					
Operating loss three-year before						1.408*** (10.33)		
Constant	−2.978*** (−13.53)	3.381*** (3.83)	2.730*** (3.13)	3.292*** (3.49)	3.465*** (3.52)	2.637*** (2.89)	3.838*** (3.66)	3.221*** (3.74)
lnsig2u							0.093 (0.38)	
Observations	7376	7364	7364	6631	6629	6498	7364	7364
No. of groups							1453	1453
Pseudo R-sq	0.0792	0.193	0.191	0.197	0.168	0.193		
ζj sd							1.048	
ρ variance due to ζj							0.250	

Note(s): $*p < 0.1$; $**p < 0.05$; $***p < 0.01$
Source(s): CSMAR 2003–2014

Table A1.

	(I) Loss> 1st quartile	(II) > Median	(III) > 3rd quartile
Main effects			
SOE	1.394*** (2.90)	1.274* (1.76)	1.514** (2.25)
Ownership concentration	0.984*** (−4.16)	0.983*** (−3.46)	0.973*** (−4.23)
Leverage	1.042*** (12.01)	1.048*** (10.79)	1.056*** (9.80)
Controls			
Current liability ratio	1.002 (0.73)	1.005 (1.14)	1.015** (2.54)
Year since acquisitions		Not displayed	
	(−0.24)	(−0.22)	(0.74)
Event types: mergers	1.873* (1.86)	2.783*** (2.75)	2.612* (1.85)
Mergers and acquisitions	2.390** (2.17)	1.660 (0.97)	2.165 (1.12)
Targets: equities	0.815* (−1.92)	0.774** (−2.11)	0.680** (−2.25)
Assets and equities	0.719** (−2.01)	0.711* (−1.79)	0.578** (−2.15)
Noncash	0.823 (−1.26)	0.764 (−1.50)	0.838 (−0.71)
Cash payment	1.000 (.)	1.000 (.)	1.000 (.)
No. of acquisitions	0.943 (−1.46)	0.894** (−2.02)	0.928 (−0.84)
Firm size	0.734*** (−6.47)	0.738*** (−5.32)	0.728*** (−4.50)
Tangible asset ratio	0.960*** (−6.00)	0.955*** (−5.73)	0.955*** (−4.24)
Firm age	0.990 (−0.88)	0.987 (−0.90)	0.965* (−1.69)
Board independence	1.009 (1.00)	1.009 (0.88)	1.009 (0.52)
Number of directors	0.943** (−2.02)	0.944* (−1.67)	0.874** (−2.52)
Industry median ROA	0.775*** (−7.41)	0.786*** (−6.17)	0.815*** (−3.92)
Incentive schemes	0.447*** (−3.59)	0.418*** (−3.07)	0.409* (−1.91)
Year		Not displayed	
	(−0.16)	(0.85)	(0.06)
Region: middle	0.973 (−0.21)	0.966 (−0.22)	1.091 (0.46)
West	1.115 (0.82)	1.132 (0.79)	1.091 (0.40)
Operating loss five-year before	4.398*** (10.82)	3.528*** (7.97)	3.995*** (7.15)
Observations	7364	7364	7364
No. of groups			
Pseudo *R*-sq	0.203	0.198	0.232

Table A2.
Regression results by the extent of operating loss

Note(s): Exponentiated coefficients
*$p < 0.1$; * * $p < 0.05$; * * *$p < 0.01$
Source(s): CSMAR 2003–2014

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