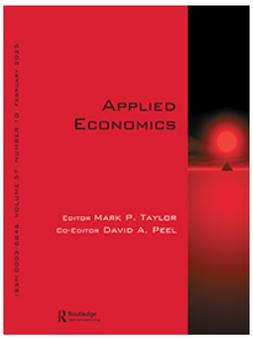

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Directors and officers liability insurance and the wealth effect of M&A announcements

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ABSTRACT

We explore the association between Directors and Officers Liability Insurance (D&O insurance) and the valuation of mergers and acquisitions (M&As) from the perspective of the monitoring hypothesis versus the moral hazard hypothesis. Examining a sample of 278 M&A announcements made by listed firms in Taiwan from 2009 to 2020, our study finds that high D&O-insured acquiring firms are associated with producing better benefits for shareholders through M&A channels than low-insured firms. Such a positive relationship is more evident for acquirers with higher agency problems, indicating that D&O insurance assists in weakening the conflict between managers and shareholders and serves as a viable substitute for traditional corporate governance, effectively taking on the role of an external monitoring channel. Further analyses reveal that D&O insurance is associated with improvement in the post-M&A operating performance. Overall, the evidence supports the monitoring hypothesis, implying that acquirers holding high-level D&O insurance are more likely to deter opportunistic managerial behaviours and enhance the corporate monitoring quality, thereby exerting a positive influence on valuation from M&A transactions.

KEYWORDS

Directors and officers liability insurance (D&O insurance); Mergers and Acquisitions (M&As); monitoring; agency problem

JEL CLASSIFICATION

G22; G34; M41

I. Introduction

D&O insurance policies provide liability coverage for corporate managers, safeguarding them against potential claims stemming from decisions and actions executed within the scope of their responsibilities. Therefore, the influence of D&O insurance on decision-making and corporate achievement has been the subject of much contemporary research attention. Prior literature has found diverse effects of D&O insurance on corporate investment and business strategies, including initial public offering (Boyer and Stern 2014; Kao, Chen, and Krishnamurti 2020); investment efficiency (L. Y. Chen, Chen, and Yang 2017; K. F. Li and Liao 2014), firm innovation (J. Wang et al. 2020), and seasoned equity offerings (Liao, Chuang, and Wang 2022). In addition, D&O insurance is also supposed to be able to affect the corporate governance system, including managerial ability (Lai and Tai 2019; F. Y. Lin et al. 2022), information environment (Chang and Chen 2018), and managerial incentives (Z. Chen, Li, and Zou 2016). Although previous research has provided insightful information on the various effects of D&O insurance on corporate facets, the wealth effect of M&A announcements has gotten relatively little attention. Therefore, this study aims to address this gap by investigating how D&O insurance impacts the outcome of M&A deals.

The diverse theoretical predictions surrounding the relation between D&O insurance and the wealth effect of M&A transactions serve as the impetus for our empirical inquiry. From an optimistic perspective, this insurance incentivizes executives to perform their duties with due diligence and good faith. It also encourages responsible and conscientious behaviour among D&Os and helps create an environment where corporate leaders are more likely to fulfil their obligations diligently (Boyer and Tennyson 2015; Holderness 1990; O'Sullivan 1997; Shi, Sun, and Lyu 2023; Zou and Adams 2008). By increasing the job security of managers, this insurance plays a pivotal role in attracting and retaining qualified directors while

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also contributing to cost savings in the recruitment process. It serves as a valuable tool for firms seeking to secure and retain talented board members (Boyer and Stern 2014; Brook and Rao 1994; Mayers and Smith 1982). Lin et al. (2013), Li et al., (2022) and Peng et al. (2022) argued that D&O insurance could yield advantages for corporations by alleviating managerial risk aversion, particularly in the context of rapidly expanding enterprises, where such modifications in managerial behaviour can yield greater benefits. These benefits encompass a reduction in litigation occurrences, diminished claim values, reduced instances of underinvestment, enhanced internal control quality, and more refined CEO compensation and turnover-performance relationships. Insurance is more pronounced within companies characterized by elevated levels of information asymmetry or susceptibility to litigation risk. By virtue of the capacity to protect directors, supervisors, and managers from managerial legal liability, firms equipped with D&O insurance exhibit an enhanced ability to withstand risk, implying that this insurance is particularly advantageous for firms with extensive investment prospects (J. Wang et al. 2020). This aspect of D&O insurance underscores its greater utility for companies with substantial investment opportunities. Hwang and Kim (2018), Chen et al. (2017), and Wang and Sun (2023) have documented that D&O insurance exerts an influence on the investment efficiency of firms with significant growth prospects, implying that it can facilitate the conversion of growth opportunities into enhanced firm value and can substantially mitigate corporate overinvestment tendencies. The sheltering effect provided by D&O liability insurance reinforcement encourages CEOs to allocate resources towards R&D initiatives and renders CEO incentive contracts more effective in promoting long-term corporate investments. From the corporate governance perspective, D&O insurers serve as external corporate monitors for insured firms and play a role in regulating their governance practices. This insurance's governance-enhancing impact establishes mechanisms that encourage internal monitoring by the insured firms. For instance, insurance firms may stipulate the adoption of more stringent governance policies as prerequisites for premium discounts or policy renewals. The existence of D&O insurance can dissuade directors from adopting excessively conservative governance practices, which may not align with the shareholders' best interests (Boyer 2014; Core 1997; O'Sullivan 1997; Otto and Weterings 2019; Woo, Rhee, and Woo 2015). Drawing upon the optimistic perspective, we propose the monitoring hypothesis, which suggests a significant positive relationship between D&O insurance and the wealth effect of M&A announcements.

Another perspective shows an inverse idea that D&O insurance may attenuate the manager's incentive in the process of making business decisions due to the transfer of litigation risk, resulting in moral hazards and reducing the company's operating performance, which is detrimental to the rights and interests of stakeholders and stock returns (Baker and Griffith 2007; Chung and Wynn 2008; Gutiérrez and Gutierrez 2003). Firms characterized by less robust corporate governance frameworks are likely to exhibit a heightened need for D&O insurance as a means to transfer the responsibility of oversight to the insurance provider. The available evidence claims that D&O insurance isolates executives from the menace of judicial proceedings and individual financial responsibility. It also weakens management incentives to perform in stockholders' best interests and creates an unintended moral hazard between leaders and shareholders (Chung and Wynn 2008; C. Lin, Officer, and Zou 2011). Such protection is more likely to lead to directors' irresponsible behaviours due to private interest, and thus, the likelihood of failure in a firm's strategies and orientations is relatively high. From the view of Baker and Griffith (2006), D&O insurers exhibit minimal proactive monitoring of the public corporations they cover, and their advice is generally not highly esteemed by public corporations. These insurers essentially allocate the litigation risk borne by the insured to the pricing structure of insurance premiums. Following this line of argument, Gillan and Panasian (2015) revealed compelling evidence that firms possessing D&O insurance coverage exhibit a higher susceptibility to legal actions. These findings align with the hypotheses of managerial opportunism or moral hazard inherent in the decision-making process surrounding insurance procurement. Drawing

upon the managerial opportunism perspective, we propose the moral hazard hypothesis, which suggests a significant negative relationship between D&O insurance and the wealth effect of M&A announcements.

To examine these two competing hypotheses, we employ a sample of 278 M&A announcements made by acquiring firms on the Taiwan Stock Exchange (TWSE) and Taipei Exchange (TPEx) over twelve years (2009–2020). We concentrate our study on this market for three key reasons. First, the Taiwanese government focuses on enhancing investor protection by ensuring investors' rights and benefits. Beginning in 2009, with the regime of class action, the directors, supervisors, and managers of public companies who make sham deals, cover up the company's true state, and mislead investors can be sued when their actions result in losses for investors.[1] Consequently, the demand for carrying D&O insurance by the TWSE/TPEx-listed firms has witnessed an augmented significance from 47% in 2009 to 100% in 2020 (Su 2023). Moreover, according to the Taiwan Financial Supervisory Commission, possessing D&O insurance has become obligatory for Taiwanese publicly listed companies, with a requirement to divulge relevant insurance-related details starting from 2018, and this information is included in the TEJ database. To effectively address the burgeoning expansion within the Taiwanese D&O insurance sector and take advantage of the available data, it is essential to conduct additional research to delineate the economic implications associated with D&O insurance in the context of Taiwan (Boyer and Stern 2014; Chang and Chen 2018; L. Y. Chen, Chen, and Yang 2017; Z. Chen, Li, and Zou 2016; Kao, Chen, and Krishnamurti 2020; Lai and Tai 2019; K. F. Li and Liao 2014; Liao, Chuang, and Wang 2022; Su 2023; J. Wang et al. 2020). This study represents a pioneering effort to evaluate whether D&O insurance favourably impacts M&A returns, specifically within the Taiwan stock market.

Second, several past critical studies have noticed the quality of corporate governance in Taiwan – a high governance risk-emerging market with greater ownership concentration and family-controlled businesses (e.g. K. F. Li and Liao 2014; K. H. Lin and Hsu 2020; Yeh 2019). Therefore, assessing the effect of D&O insurance in the Taiwanese capital market conveys information about a firm's governance quality and probability of litigation, thereby offering advantages to investors in their decision-making processes.

Third, from the standpoint of Liu et al. (2017), M&A activities in Taiwan ostensibly experienced a decline in values. Hence, the increased propensity to purchase warranty and indemnity, which looks to give a workable way for both sellers and buyers to share their individual risks in M&A negotiations, is another ongoing trend in the Taiwanese M&A market. Thus, purchasing D&O insurance protects managers from risks related to management legal liabilities. Given the lower lawsuit risks for acquirers with D&O insurance, it is indeed an empirical question whether M&A performance improves or impairs buyers who have D&O insurance. Therefore, analysing D&O insurance in Taiwan provides unique opportunities for researchers to examine an external monitoring channel via its insurance mechanism and explore their influence on the M&A wealth effect.

To empirically assess the influence of D&O insurance on the wealth effect of M&A deals, the proxy of the firm's extensive D&O insurance coverage is determined by taking the continuous variable INSUV, which is the ratio of acquirer's amount of D&O insurance coverage to year-end market value for the year prior to the date of the M&A announcement. Following the methodology outlined by Lin et al. (2011), we perform calculations and comprehensively describe the cumulative abnormal returns (CARs) spanning five days. These CARs are assessed within the event window of (−2, 2) to effectively capture the stock market's response to the M&A announcements.

The primary findings derived from our univariate and regression analyses indicate a positive and statistically significant association between D&O insurance coverage and M&A return occurring in the following year. This relationship persists even after controlling for various determinants affecting M&A valuation. Our key findings are further confirmed when we conduct a wide range of robustness checks.

[1] https://www.sfipc.org.tw/MainWeb/Article.aspx?L=2&SNO=I6M+rmmp+ncCQmZoO7Z28g==.

Specifically, the positive relationship remains steadfast and verified across these varying specifications when considering three alternative measures of D&O insurance coverage, two alternative event windows of announcement-period abnormal returns, electronics industry effects, and sub-sample periods. Overall, our results support the monitoring hypothesis, which implies that high-D&O-insured firms experience better governance mechanism. As a result, firms received stronger protection from D&O insurance are more likely to gain greater M&A shareholder valuation. Next, to tackle the endogeneity issue to ensure the robustness and reliability of our empirical findings, we consider the likelihood of our sample engaging in many acquisition deals within the observed time (name as 'serial acquirers') and conduct two-stage least squares regression analysis. Through the heterogeneity analysis, the results emphasize the persistent character of the link between D&O insurance and M&A shareholder valuation, as highlighted by our primary discovery. This association remains intact even when addressing potential influences stemming from endogeneity. In addition, we consider how well D&O insurance coverage plays a monitoring role in the context of presence of agency problems. By applying three well-known proxies for agency problems, including deviation of control right from cash flow right (DEV), managerial excess control rights (XCR), and earnings management (EM), we demonstrate that holding D&O insurance is likely to reduce the conflict between managers and shareholders, thereby enhancing M&A value. In simpler terms, D&O insurance appears to act as a practical substitute for traditional corporate governance, effectively serving as a reliable external monitoring mechanism. Our study also ponders the subsequent operating performance of the acquiring firm to verify the D&O Insurance effect by measuring the change in the acquirer's industry-median-adjusted net income scaled by the book value of equity and total asset. The presence of D&O insurance seems beneficial for the acquiring companies in the long run because the monitoring function of this insurance provider can control the risk related to managerial legal liability and create more motivations for executives in the process of making decisions.

This study offers two core contributions to the existing literature by examining the influence of D&O insurance on the efficiency of M&A strategies. First, prior research has identified various effects of D&O insurance on investment strategies, including R&D investment (L. Y. Chen, Chen, and Yang 2017; Shi, Sun, and Lyu 2023), corporate investment efficiency (Z. Chen, Li, and Zou 2016; W. Li et al. 2023); corporate governance quality, including managerial empire building (Q. S. Wang et al. 2022), managerial bias (Barrese and Scordis 2006); firm-specific characteristics such as cost of equity, firm value (Z. Chen, Li, and Zou 2016; Hwang and Kim 2018). However, limited consideration has been dedicated to the impact of D&O insurance as a supplementary supervisory instrument on the outcome of M&A events. By directing our attention towards this relatively under-investigated subject, our research endeavours to address this void in the existing body of literature.

Second, our study adds a strand of agency problem studies, showing that D&O insurance's monitoring function is more evident among firms with high-level agency problems. By providing an independent assessment, D&O insurance can considerably mitigate the manager-shareholder conflicts. Hence, bidders shielded by a higher D&O insurance are likely to obtain high shareholder returns from M&A transactions. Our study aligns with prominent research by Holderness (1990), O'Sullivan, 1997, Zou and Adams (2008), and Boyer and Tennyson (2015), underscoring the importance of carrying D&O insurance in the corporate governance framework.

Ultimately, given the distinctive context of corporate governance within the Taiwanese context, D&O insurance functions as an adjunct to extant corporate governance mechanisms, leading to a notable enhancement in the overall quality of governance and a consequential improvement in the effectiveness of firms' performance. Therefore, the acquisition of D&O insurance data can yield valuable insights for investors in evaluating the inherent risk associated with the company, appraising the quality of corporate governance, and forecasting its prospective performance. Accordingly, this phenomenon offers empirical substantiation that may inform regulatory bodies in their endeavours to refine the structure of firm oversight.

An influential study by Lin et al. (2011) is closest to our work. They found an inverse relation between D&O insurance and M&A shareholder value in the Canadian market. Accordingly, their evidence supported the moral hazard hypothesis as the provision of D&O insurance can create a protective layer for D&O against managerial legal liabilities and easily engage in opportunistic management practices. However, our empirical research indicates an alternative economic implication that D&O insurance coverage has a positive effect on the shareholder valuation of M&A deals and thus highlights the monitoring role of D&O insurance in a firm's M&A performance in Taiwan. Moreover, our research focuses on the Taiwanese market, recognized as an emerging market characterized by a significant degree of ownership concentration and family-controlled enterprises, resulting in a multitude of corporate governance challenges (K. F. Li and Liao 2014; K. H. Lin and Hsu 2020; Yeh 2019). This context differs substantially from that of a developed market, such as Canada. Accordingly, our findings offer a unique perspective to the extant literature by shedding light on the heterogeneous impact of D&O insurance within diverse contextual settings. It is noteworthy to mention that in 2009, Taiwanese investors acquired the capacity to initiate legal proceedings against the executives and officers of publicly listed corporations in cases where their actions lead to financial losses for stakeholders. This unique environment of high level of investor protection in Taiwan may be a potential driver that promotes the D&O insurance's holding to benefit from stronger external corporate governance mechanisms and enhance M&A value in the times ahead.

The rest of this paper is arranged as follows. Section II outlines the data and M&A samples from Taiwan. Section III presents the empirical results of the univariate and cross-sectional regression and robustness tests. Endogeneity and additional checks are reported in section IV and 5. The conclusions are described in section VI.

II. Data description

Sample selection

We have selected a sample of TWSE/TPEx-listed bidding firms for our study, as Taiwanese law mandates these companies to provide comprehensive disclosures regarding their purchases of D&O insurance from 2008. The initial data of D&O insurance and M&A announcements were collected from the Taiwan Economic Journal (TEJ) database from January 2009 to December 2020.[2] To obtain a suitable sample, we adopt the following three rules. Firstly, the firms announcing an M&A event must have daily stock returns information and be available to estimate by a TEJ event study model. Secondly, announcements conducted by financial firms (industrial code of TEJ: 28, 30, and 31) exclude, as more specific regulations apply to firms in finance than firms in other industries. Third, we omit overlapped data of the initial announcement date ($d = 0$) by the firm within three days before ($d = -3$) or after ($d = 3$). The final sample includes 278 M&A announcements.

Panel A of Table 1 presents the year-grouped distribution of the sample, which illustrates a relatively uniform pattern in the annual number of acquisitions from 2009 to 2020, accounting for 8.3% – 11.5% of the total number of M&A announcements in the sample window. The sudden drop in M&A deals to 5% in 2015 May have been caused by a new amendment of the Fair trade Act in Taiwan, related to the stipulation of turnover thresholds on an industry, which restricts M&A deal planning.[3] Notably, the percentage of engaging takeover transactions is the highest of all samples in 2019, at 11.5%, and decrease about 10.4% in 2020. This is due to the significant influence of the outbreak and spread of the novel coronavirus disease and the uncertain international situation.

Panel B of Table 1 presents the industry-grouped distribution of the sample. In which the M&A settings by Taiwanese firms primarily focus on the electronics industry, a core industry with more vigorous growth potential in Taiwan than other industries (61.2% of the total M&A announcements of the sample). This is because

[2]Our study's sample window begins in 2009, with intentional one-year lag in D&O insurance data relative to acquisition data to support the presumption of pre-planned D&O insurance purchases and their impact on subsequent acquisition announcements.
[3]https://www.iflr1000.com/NewsAndAnalysis/2015-Mergers-and-Acquisitions-Report- Taiwan/Index/2938.

Table 1. Sample distribution of Taiwanese M&A announcements.

Panel A: Grouped by Sample Year		
Sample Year	*N*	Percentage of *N*
2009	23	8.3
2010	20	7.2
2011	25	9.0
2012	19	6.8
2013	16	5.8
2014	24	8.6
2015	14	5.0
2016	20	7.2
2017	28	10.1
2018	28	10.1
2019	32	11.5
2020	29	10.4
2009–2020	278	100.0
Panel B: Grouped by Industry		
Industry	*N*	Percentage of *N*
Electronics	170	61.2
Biotechnology	17	6.1
Others	14	5.0
Chemical	13	4.7
Electric Machinery	12	4.3
Construction	12	4.3
Textile	8	2.9
International Trade	6	2.2
Electrical Appliance	6	2.2
Iron & Steel	4	1.4
Plastic	3	1.1
Cultural Creation	2	0.7
Cement	2	0.7
Automobile	2	0.7
Food	2	0.7
Transportation	2	0.7
Tourism	2	0.7
Papers	1	0.4
Total	278	100.0

In this table, Panel A (B) reports the annual (industry) distribution of 278 M&As announcements undertaken by TWSE/TPEx-listed bidding firms from January 1, 2009 to December 31, 2020. Data is collected from the TEJ. The industry classifications are based on the 2-digit industry codes in the TWSE. *N* represents sample size. Percentage of *N* represents percent of sample.

foreign corporations predominantly focus on Taiwanese enterprises in the high-tech industry. Notably, Taiwanese companies exhibit a high level of competitiveness within the electronics sector, which, in turn, is experiencing advantageous effects due to the ongoing pandemic. In 2019, the foremost ten transactions within the mergers and acquisitions landscape saw a notable concentration of involvement with Taiwanese companies, primarily within the electronic components industry. Additionally, some of these deals were targeted specifically at the semiconductor industry. This trend endured throughout the subsequent year of 2020.[4]

Variable definition and summary statistics

Dependent variables

Following previous studies (Malmendier and Tate 2008; Moeller, Schlingemann, and Stulz 2004; Yilmaz and Tanyeri 2016), a standard event study methodology is applied to assess the wealth effect and stock market rejoinders to M&A announcements events. In line with the traditional market model, we define day 0 as the primary announcement date (d = 0), and abnormal return is calculated as the difference between actual and expected return. The TWSE capitalization-weighted stock index (TAIEX) is used as a proxy for market returns to estimate the return throughout the 200-trading-day period from 210 to 11 days before the event date (d = −210 to d = −11). In addition, we apply the standard one-factor market model with GARCH error estimation. Following Lin et al. (2011), we conduct computations and provide a detailed account of the five-day cumulative abnormal returns (CARs) observed within the (−2, 2) event window to capture the stock market feedback on the M&A announcements.

Independent variables

In the spirit of Lin et al. (2011), we use the continuous variable *INSUV*, which is the ratio of acquirer's amount of D&O insurance coverage to year-end market value for the year prior to the date of the M&A announcement, to proxy for D&O Insurance.

Control variables

We incorporate a set of control variables for deal and bidder-specific characteristics that have been previously identified in the academic literature as potential factors affecting M&A outcomes (Z. Chen, Li, and Zou 2016; Chiang and Chang 2022; C. Lin, Officer, and Zou 2011). Regarding deal-specific characteristics, we consider the payment method with EPAY (equals one for deals at least partially financed by stock; zero otherwise), and CPAY (equals one for solely cash-financed deals; zero otherwise). The target types are impounded, such as PRIVATE (equals one when the target is a private firm; zero otherwise), and SUBS (equals one when the target is a subsidiary; zero otherwise). We also control the diversifying deals with

[4]https://uk.practicallaw.thomsonreuters.com/w-021–6140?transitionType=Default&contextData=(sc.Default)&firstPage=true.

RELATED (Equals one for deals in which the acquirer and the target have the same industry (TWSE two-digit industry code), zero otherwise). Regarding bidder-specific characteristics, we control for firm size (TA), market-to-book equity ratio (MB), total debt (DEBT), acquirer's buy-and-hold return during the [−210, −11] window (RUNUP), free cash flow (FCF), average annual industry-median-adjusted operating income growth rate (MQ), Herfindahl index (HHI), shareholding by institutional investors (IOR), shareholding by the board and top management team (InsideOR), shareholding by the top ten largest shareholders (BLOCK), board size (BSIZE), independent directors (BIND), shares pledged for loans by board members (BPLEDGE), board directors who also occupies the top manager positions (BDUALITY). The Appendix briefly describes the variables presented in the paper.

Summary statistics

Table 2 presents the descriptive statistics of each variable in our study. The sample consists of companies encompassing 278 M&A announcements – chronological data points spanning from 2009 to 2020.

For the measures of D&O insurance used in our paper (*INSUV*), the mean and median values are 5.76 and 1.64, respectively, indicating that, on average, about 5.76% of the firm market value is covered by insurance in the given sample. These results are close to 4.8% and 6.8% of the average INSU value documented by Lai and Tai (2019) and Kao *et al.* (2020). Remarkably, the standard deviation value for INSUV is 23.44, indicating that D&O insurance shows variability across different firms. This observation prompts us to conduct further analyses to better understand its effect.

In favour of proxy for M&A wealth effect, our sample's average CAR over a five-day period is 1%. Especially, a significant proportion of the target firms in our sample are privately and subsidiarily held, with a mean value of 79% and 72%, respectively.

III. Empirical results

Univariate analysis

To evaluate the influence of D&O insurance on the M&A wealth effect, we initiate the analysis by conducting a univariate examination. This subsection categorizes the sample into three groups based on INSUV, distinguishing them as high, medium, and low. Subsequently, we compute the mean value of

Table 2. Summary statistics.

	N	Mean	Median	Standard Deviation
INSUV (%)	278	5.76	1.64	23.44
CAR (−2, 2) (%)	278	1.00	0.11	4.97
ΔROE_{adj} (%)	278	−0.75	−0.38	14.24
ΔROA_{adj} (%)	278	−0.48	−0.09	5.46
DEV	278	3.38	1.14	19.97
XCR (%)	278	14.95	14.14	13.55
EM (%)	278	−0.02	−0.03	0.12
TA	278	55.30	8.98	160.69
MB	278	1.74	1.37	1.36
DEBT (%)	278	44.05	45.02	18.37
RUNUP (%)	278	−1.20	−3.75	28.52
FCF (%)	278	−0.55	2.71	16.09
MQ (%)	278	−19.92	−0.66	288.82
HHI	278	0.18	0.12	0.18
IOR (%)	278	44.73	44.91	23.23
InsiderOR (%)	278	20.71	17.35	13.79
BLOCK (%)	278	20.95	19.35	11.14
BSIZE	278	9.58	9.00	2.29
BIND	278	0.22	0.22	0.14
BPLEDGE (%)	278	11.04	0.32	19.62
BDUALITY (%)	278	21.19	18.18	15.27
EPAY	278	0.24	0.00	0.43
CPAY	278	0.16	0.00	0.37
PRIVATE	278	0.79	1.00	0.41
RELATED	278	0.75	1.00	0.43
SUBS	278	0.72	1.00	0.45

This table reports summary statistics for all variables presented in our paper. The sample contains 278 M&A announcements undertaken by TWSE/TPEx-listed bidding firms from January 1, 2009 to December 31, 2020. All variables are defined in the Appendix. All variables are obtained from the TEJ.

Table 3. Univariate analysis: M&A transactions with bidders' announcement period abnormal returns (*CAR* (−2, 2)) and D&O insurance coverage (*INSUV*).

	Whole	High	Medium	Low	High−Low
N	278	93	93	92	
Mean *INSUV* (%)	5.763	15.348	1.787	0.095	15.253
Mean *CAR* (−2, 2) (%)	1.001	1.678	0.965	0.355	1.323
[*t*-statistic]	[3.36]***	[3.19]***	[1.76]*	[0.76]	[2.88]***

This table offers the cumulative abnormal returns within five days (*CAR* (−2, 2)) surrounding the firm's announcement of the merger and acquisition (M&A) events for the whole sample, in addition to three subsamples grouped by *INSUV*. The sample contains 278 M&A announcements formed by TWSE and TPEx listed firms during the period 2009–2020. We divide the sample into three groups of high, medium, and low, according to *INSUV*. We then calculate the mean value of *CAR* (−2, 2) surrounding the announcements for the entire sample and for the three separate groups. The *t*-tests are selected to examine the hypotheses of whether the means are equal to zero. Differences in *CAR* (−2, 2) between high *INSUV* and low *INSUV* are examined, applying a *t*-test. The *t*-statistics are computed and reported in brackets. *N* represents sample size. *** and * indicate significance levels at 1% and 10%, respectively. All variables are defined in the Appendix. All variables are obtained from the TEJ.

CAR within the range of −2 to 2 surrounding the announcements for the entire sample and also for each of the three separate groups.

As shown in Table 3, a high-INSUV bidder shows a significantly positive average CAR (−2, 2) of 1.678% (with a t-statistic of 3.19), which is higher than a low-INSUV bidder offers with an insignificantly positive average CAR (−2, 2) of 0.355%. More remarkably, the CAR (−2, 2) differences between high-INSUV and low-INSUV are statistically significant positive of 1.323% (with a t-statistic of 2.88). Based on these findings, it can be inferred that D&O Insurance increases M&A announcement-period wealth gains, lending support to the monitoring hypothesis.

Cross-sectional regression analysis

This section conducts further cross-sectional regression to explore the relationship between D&O insurance and stock returns around the date of M&A announcements. We regress acquirer *CAR* (−2, 2) on the insurance indicator variable with and without other potential determinants. The primary estimating model is as follows:

$$CAR(-2,2)_i = \alpha_0 + \alpha_1 lnINSUV_i + \mathbf{A}X_i + u_i \quad (1)$$

where $INSUV_i$ is the ratio of the acquirer *i*'s amount of D&O insurance coverage to year-end market value for the year prior to the date of the M&A announcement. X_i is a series of control variables for acquirer *i* for the year prior to the date of the M&A announcement. The results of this regression analysis present in Table 4.

Model (1) of Table 4 considers INSUV as a merely explanatory variable and run the cross-sectional regression. The finding reveals a significantly positive association of D&O insurance coverage on M&A return, with the coefficient of 0.056 and a t-statistic of 4.58. In Model (2), we add into Model (1) a set of fundamental determinants of deals and acquirers, including lnTA, MB, DEBT, RUNUP, FCF, MQ, HHI, IOR, InsiderOR, BLOCK, BSIZE, BIND, BPLEDGE, BDUALITY, EPAY, CPAY, PRIVATE, RELATED and SUBS. The result confirms the significantly positive impact of INSUV on acquirer return (coefficient = 0.068, with a t-statistic of 4.97). When we replicate the regression in Model (2) of Table 4 and further control for a year and industry fixed-effect, the predictability of INSUV effect on takeover performance is shown in Model (3), which remains unchanged (coefficient = 0.077, with a t-statistic of 4.34).

This finding supports the monitoring hypothesis that firms with a high degree of D&O insurance tend to conduct superior M&A deals. Therefore, we believe that the presence of managerial legal liability coverage can strengthen D&O's incentive because D&O insurance serves to safeguard them from potential legal accountability. This is in line with the findings of Holderness (1990), Core (2000), and Zou and Adams (2008) when considering the positive control effect of D&O insurance.

Robustness analyses

To verify the relationship between D&O insurance and acquirer return and determine how well our models perform in different market conditions and economic scenarios, we conduct several robustness analyses in this section.

Table 4. Cross-sectional regression of *CAR* (−2, 2) on *INSUV*.

	(1)	(2)	(3)
Intercept	0.677	−4.270	−5.366
	[2.28]**	[−0.89]	[−1.05]
INSUV	0.056	0.068	0.077
	[4.58]***	[4.97]***	[4.34]***
lnTA		−0.266	−0.245
		[−1.90]*	[−1.56]
MB		0.156	0.270
		[0.67]	[0.97]
DEBT		−0.027	−0.036
		[−2.49]**	[−2.87]***
RUNUP		0.001	0.001
		[0.11]	[0.09]
FCF		0.021	0.025
		[1.06]	[1.10]
MQ		0.045	0.034
		[2.58]**	[2.08]**
HHI		−0.634	−0.522
		[−2.39]**	[−2.31]**
IOR		−0.020	−0.016
		[−0.85]	[−0.54]
InsiderOR		0.001	−0.008
		[0.01]	[−0.21]
BLOCK		0.064	0.060
		[2.82]***	[2.36]**
BSIZE		0.180	0.081
		[1.25]	[0.45]
BIND		1.617	0.615
		[0.70]	[0.19]
BPLEDGE		−0.002	−0.006
		[−0.10]	[−0.33]
BDUALITY		−0.012	−0.026
		[−0.59]	[−1.04]
EPAY		1.073	0.788
		[1.15]	[0.72]
CPAY		1.980	2.420
		[4.34]***	[4.54]***
PRIVATE		0.902	−0.115
		[1.03]	[−0.11]
RELATED		0.513	−0.074
		[0.73]	[−0.09]
SUBS		−0.865	−1.073
		[−1.05]	[−1.08]
Year fixed-effect	No	No	Yes
Industry fixed-effect	No	No	Yes
N	278	278	278
Adjusted R^2	7.06%	15.31%	28.79%

This table offers the results of cross-sectional regressions analyses by regressing acquirers' *CAR* (−2, 2) on D&O insurance coverage ratio (*INSUV*), based upon the following Model.

$$CAR(-2,2)_i = \alpha_0 + \alpha_1 INSUV_i + AX_i + u_i$$

where $INSUV_i$ is the ratio of acquirer *i*'s amount of D&O insurance coverage to year-end market value for the year prior to the date of the M&A announcement. X_i is a series of control variables for acquirer *i* for the year prior to the date of the M&A announcement. The sample contains 278 M&A announcements formed by TWSE and TPEx listed firms during the period 2009–2020. *N* represents sample size. The *t*-statistics in brackets are calculated with heteroskedasticity-consistent standard errors (White 1980). ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. All variables are defined in the Appendix. All variables are obtained from the TEJ.

Alternative measures of D&O insurance coverage

Following several critical studies have discussed D&O insurance (Z. Chen, Li, and Zou 2016; Kao, Chen, and Krishnamurti 2020; C. Lin, Officer, and Zou 2011; J. Wang et al. 2020), we consider three alternative measures of D&O insurance coverage from regressing acquirers' CAR (−2, 2) on D&O insurance coverage ratio measured as INSUD (equals one if the acquirers have covered by D&O insurance; zero otherwise), INSUA (the amount of

D&O insurance limits at the individual scope divided by the book value of total assets), and INSUE (the amount of D&O insurance limits at the individual scope divided by the book value of total equity), and re-run Model (3) of Table 4.

As shown in Model (1), (2), and (3) of Table 5, the estimating coefficients of INSUD, INSUA, and INSUE across three specifications are significantly positive of 2.314, 0.136, and 0.063, respectively, with 1–5% significance level, confirming a positive impact of D&O insurance and M&A profit. These results ensure the stability of our Model even when different metrics are used to measure D&O insurance coverage.

Alternative event windows of announcement-period abnormal returns

To check if our finding holds in alternative time windows, we continue to re-estimate Model (3) of Table 4 in the three-day (−1,1), seven-day (−3,3), and eleven-day (−5,5) time window. As demonstrated in Models (4), (5), (6) of Table 5, the estimated coefficients pertaining to INSUV across the three distinct timeframes exhibit a notably positive significance. Consequently, the selection of the event window of announcement-period abnormal returns exerts no influence on our principal findings.

Electronics industry effect

As per the data presented in Panel B of Table 1, it is evident that up to 61.2% of the sample events exhibit a pronounced concentration within the electronics sector; thus, it is imperative to account for the influence of this industry effect. To examine that whether this particular industry actually drives our findings, we do a robustness check, in which we simply divide the sample into electronics and non-electrics industry and re-run the regressions in these two subsamples.

As can be seen in Models (7), (8) of Table 5, the variables associated with D&O insurance consistently retain a positive and statistically significant association across all iterations of model specifications. This proves that our initial results are not driven by the electronic industry.

Sub-periods

As per the regulatory provisions outlined by the Taiwan Stock Exchange, a mandatory requirement was instituted, effective from 2018 onwards,

Table 5. Robustness analyses.

	Alternative measures of D&O insurance coverage			Alternative event widows of announcement-period abnormal returns			Electronics vs non-electronics		Before and after 2018		Non-serial M&A	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
INSUD(1/0)	2.314 [2.12]**											
INSUA		0.136 [2.57]**										
INSUE			0.063 [4.85]***									
INSUV				0.057 [4.20]***	0.102 [4.82]***	0.155 [5.51]***	0.122 [4.42]***	0.030 [1.82]*	0.142 [4.82]***	0.027 [1.76]*	0.064 [3.28]***	
Instrumented *INSUV*												0.045 [2.16]**
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed-effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	278	278	278	278	278	278	170	108	189	89	202	278
Adjusted R^2	23.62%	25.17%	30.97%	33.40%	30.34%	33.11%	42.29%	49.08%	48.43%	65.54%	46.03%	27.82%

This table offers the results of a set of robustness analyses. Models (1), (2), and (3) reports the results that consider alternative measures of D&O insurance coverage, from regressing acquirers' CAR (−2, 2) on D&O insurance coverage ratio measured as INSUD (1/0), INSUA, and INSUE, respectively. Models (4), (5), and (6) reports the results that consider alternative event widows of announcement-period abnormal returns, either from regressing acquirers' CAR (−1, 1), CAR (−3, 3), and CAR (−5, 5) on D&O insurance coverage ratio INSUV, respectively. Models (7) and (8) reports the results that considers two subsamples of electronics industry and non-electrics industry, from regressing acquirers' CAR (−2, 2) on D&O insurance coverage ratio INSUV. Models (9) and (10) reports the results that considers two subperiods before and after 2018, from regressing acquirers' CAR (−2, 2) on D&O insurance coverage ratio INSUV. Model (11) considers an alternative sample of non-serial M&A announcements by non-serial acquirers, from regressing acquirers' CAR (−2, 2) on D&O insurance coverage ratio INSUV. A serial acquirer is defined as an acquirer which has more than two deals in the sample. Model (12) conducts two-stage least squares (2SLS) regression analysis and reports the second-stage regression results from regressing acquirers' CAR (−2, 2) on instrumented INSUV. The D&O insurance coverage ratio INSUV is instrumented with fitted values from a first-stage regression on industry mean D&O insurance INSUV (denoted as INSUVIV) based on two-digit TWSE industrial codes and the control variables. Each Model in this table incorporate those control variables in Model (3) of Table 4. N represents sample size. The t-statistics in brackets are calculated with heteroskedasticity-commensurate standard errors (White 1980). ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. All variables are defined in the Appendix. All variables are obtained from the TEJ.

necessitating that all publicly listed companies procure D&O insurance. This motivates us to split the sample period into two sub-samples: before and after 2018 to proceed with the ongoing validation of our outcomes by duplicating the regression as outlined in Model (3) of Table 4 for each sub-interval.

As delineated in Models (9) and (10) featured within Table 5, the coefficients pertaining to the INSUV exhibit a consistent, statistically significant, and positive correlation with CAR (−2,2) for both the aforementioned sub-periods. Consequently, it is evident that the selection of the sample duration does not exert any influence on our principal findings.

IV. Endogeneity checks

Endogeneity appears as a significant factor in every scholarly inquiry that examines the causal relationships between governance structure and business decision-making. Therefore, in this section, we attempt to tackle this issue to ensure the robustness and reliability of our empirical findings.

Non-serial M&A

As suggested by Lin et al. (2011), it is noteworthy that some acquiring firms within the purview of our sample engage in many acquisition deals within the observed time, gaining the label of 'serial acquirers'. This behaviour raises the possibility of endogeneity in our findings. This is based on the idea that firms engaged in recurrent merger and acquisition (M&A) transactions are more vulnerable to litigation risk, which has led to a rise in demand for D&O insurance. To mitigate this particular concern, we include in Model (11) of Table 5 an alternative sample of non-serial M&A announcements by non-serial acquirers from regressing acquirers' CAR (−2, 2) on D&O insurance coverage ratio INSUV. In which, a serial acquirer is defined as an acquirer with more than two deals in the sample.

Our conclusions regarding the effects of D&O insurance on acquirer announcement returns remain unchanged in the context of this subset of non-serial acquirers. This similarity in results suggests that our results are unaffected by the possibility that serial acquirers purchase D&O insurance as a precaution against potential future lawsuits.

Two-stage least squares regression analysis

In this section, we follow the standpoint of Adams et al. (2011) and Lin et al. (2011) to address the endogeneity issue caused by encountering analogous industries and sectors of sample firms by conducting two-stage least squares (2SLS) regression analysis and only reporting the second-stage regression results from regressing acquirers' CAR (−2, 2) on instrumented INSUV. The D&O insurance coverage ratio INSUV is instrumented with fitted values from a first-stage regression on industry mean D&O insurance INSUV (denoted as $INSUV^{IV}$) based on two-digit TWSE industrial codes and the control variables.

As evidenced in Model (12) of Table 5, the regression coefficient on instrumented INSUV exhibits a statistically significant and positive association with CAR (−2,2). These findings underscore the enduring nature of the connection between D&O insurance and M&A shareholder valuation of our key finding, even when accounting for potential endogeneity influences.

V. Additional checks

Interactive effect of agency problem

Given the fact that the instinctive disagreement of interest between managers and shareholders through acquisition activities tends to exacerbate agency costs and threaten takeover outcome (Masulis, Wang, and Xie 2007). According to the evidence of Giroud and Mueller (2011) and Banerjee et al. (2016), the decline in the valuation of M&A transactions can be attributed to the presence of extant managerial agency issues, as well as manifestations of overconfidence, exemplified by overinvestment and an inclination towards excessive risk-taking. These phenomena constitute the foundational determinants of suboptimal corporate governance quality. Furthermore, the presence of deficient governance mechanisms exacerbates the occurrence of value-eroding acquisitions, leading to diminished operational efficiency, reduced

equity returns, and a decline in overall firm value (Liu, Chen, and Su 2017). Based upon our main finding, the discipline derived from D&O insurance can enhance M&A quality due to its monitoring function. Collectively, we expect that D&O insurance plays an important role in attenuating the agency conflict and enhancing the soundness of M&A transactions.

To substantiate the above implication, we re-estimated Model (3) in Table 4 for subsamples grouped by different levels of agency problem. According to the prior studies, the proxies for agency problem are considered as deviation of control right from cash flow right (DEV) in Panel A, managerial excess control rights (XCR) in Panel B, and earnings management (EM) in Panel C (Cubbin and Leech 1983; La Porta et al. 2002; Mahdavi Ardekani, Younesi, and Hashemijoo 2012). We divide the whole sample into two agency problem subsamples according to the sample median of each agency problem proxy.

As can be seen across the three panels of Table 6, it is notable that the variables related to D&O insurance consistently exhibit positive and statistically significant trends across all variations of managerial agency problems. Strikingly, the difference

Table 6. Cross-sectional regression of *CAR* (−2, 2) on *INSUV*: considering interactive effect of agency problem.

Panel A: Agency Problem Proxied by *DEV*			
	High *DEV*		Low *DEV*
INSUV	0.157		0.031
	[4.63]***		[0.44]
Difference in coefficient *INSUV*		0.126	
p-value by *F*-test		<0.01	
Controls	Yes		Yes
Year fixed-effect	Yes		Yes
Industry fixed-effect	Yes		Yes
N	139		139
Adjusted R^2	68.04%		34.77%
Panel B: Agency Problem Proxied by *XCR*			
	High *XCR*		Low *XCR*
INSUV	0.125		0.010
	[4.69]***		[0.08]
Difference in coefficient *INSUV*		0.115	
p-value by *F*-test		<0.01	
Controls	Yes		Yes
Year fixed-effect	Yes		Yes
Industry fixed-effect	Yes		Yes
N	139		139
Adjusted R^2	61.76%		51.84%
Panel C: Agency Problem Proxied by *EM*			
	High *EM*		Low *EM*
INSUV	0.140		0.043
	[4.56]***		[0.70]
Difference in coefficient *INSUV*		0.097	
p-value by *F*-test		<0.01	
Controls	Yes		Yes
Year fixed-effect	Yes		Yes
Industry fixed-effect	Yes		Yes
N	139		139
Adjusted R^2	64.57%		48.47%

This table offers the results of cross-sectional regressions of acquirers' CAR (−2, 2) at M&A announcements against INSUV, re-estimated by Model (3) in Table 4, for subsamples grouped by different levels of agency problem. The sample contains 278 M&A announcements formed by TWSE and TPEx listed firms during the period 2009–2020. The proxies for agency problem are considered as deviation of control right from cash flow right (DEV) in Panel A, managerial excess control rights (XCR) in Panel B, and earnings management (EM) in Panel C. We divide the whole sample into two agency problem subsamples according to the sample median of each agency problem proxy. For brevity, only the coefficients of INSUV are reported. The t-statistics in brackets are calculated with heteroskedasticity-consistent standard errors (White 1980). *** represents 1% significance levels. We also report the p-value of F-test that is used to assess the difference in INSUV coefficients between high and low agency problem subsamples. All variables are defined in the Appendix. All variables are obtained from the TEJ.

in INSUV coefficients between high and low agency problem subsamples through the F-test is positive and statistically significant. This proves that holding D&O insurance is more likely to weaken the conflict between managers and shareholders under insurers' oversight, hence augmenting the M&A value. In other words, D&O Insurance seems to function as a viable alternative to conventional corporate governance, assuming the role of an efficacious external monitoring mechanism.

D&O insurance and post-M&A operating performance

Up to this point, our analysis indicates that firms shielded by D&O insurance against legal liability concerning managerial actions are inclined to experience more favourable takeover outcomes than firms where their executives are either inadequately safeguarded or devoid of such insurance provisions. However, whether D&O Insurance bring long-term benefits to M&A strategy? To verify this concern, we observe the effect of post-M&A operating performance by measuring the change in the acquirer's industry-median-adjusted net income scaled by the book value of equity (total asset) – proxied by $\Delta\text{ROE}_{\text{adj}}$ and $\Delta\text{ROA}_{\text{adj}}$ as the two new dependent variables from the announcement year to the first year following the merger. We then conduct the univariate and regression analyses to explore the relation between D&O insurance and the post-M&A operating performance. The results are shown in Table 7.

In Panel A of Table 7, we divide the sample into three groups of high, medium, and low, according to INSUV. Evident from the presented table, the mean value of by $\Delta\text{ROE}_{\text{adj}}$ ($\Delta\text{ROA}_{\text{adj}}$) consistently decreases as we change from high to low-INSUV terciles. For instance, firms in the high-INSUV tercile portfolio display an average $\Delta\text{ROE}_{\text{adj}}$ ($\Delta\text{ROA}_{\text{adj}}$) of 1.654% (0.190), which is higher than the – 3.388% (−1.585) average observed for firms in the low-INSUV tercile portfolio, with 1% significant level. The differences in the mean between high versus low-INSUV are also positive and significant, confirming our monitoring hypothesis that the bidder continues to experience a rise in

Table 7. D&O insurance coverage (*INSUV*) and post-M&A operating performance.

Panel A: Univariate Analysis					
	Whole	High	Medium	Low	High−Low
N	278	93	93	92	
Mean *INSUV* (%)	5.763	15.348	1.787	0.095	15.253
Mean ΔROE_{adj} (%)	−0.747	1.654	−0.536	−3.388	5.042
[*t*-statistic]	[−0.88]	[0.97]	[−0.37]	[−2.83]***	[2.42]***
Mean ΔROA_{adj} (%)	−0.482	0.190	−0.063	−1.585	1.775
[*t*-statistic]	[−1.47]	[0.29]	[−0.13]	[−2.93]***	[2.07]**

Panel B: Regression Analysis		
Dep. variable	ΔROE_{adj}	ΔROA_{adj}
INSUV	0.126	0.074
	[2.36]**	[3.72]***
Controls	Yes	Yes
Year fixed-effect	Yes	Yes
Industry fixed-effect	Yes	Yes
N	278	278
Adjusted R^2	27.59%	33.67%

Panel A offers the post-M&A operating performance (ΔROE_{adj} and ΔROA_{adj}) for the whole sample, in addition to three subsamples grouped by *INSUV*. The sample contains 278 M&A announcements formed by TWSE and TPEx listed firms during the period 2009–2020. We divide the sample into three groups of high, medium, and low, according to *INSUV*. We then calculate the mean value of ΔROE_{adj} and ΔROA_{adj} for the entire sample and for the three separate groups. ΔROE_{adj} (ΔROA_{adj}) is the change in acquirer *i* s industry-median-adjusted net income scaled by book value of equity (total asset) from the announcement year (y +0) to the first year following the merger (y +1). The *t*-tests are selected to examine the hypotheses of whether the means are equal to zero. Differences in ΔROE_{adj} or ΔROA_{adj} between high *INSUV* and low *INSUV* are examined, applying a *t*-test. Panel B offers the results of cross-sectional regressions analyses by regressing acquirers ΔOP_i on D&O insurance coverage ratio (*INSUV*), based upon the following Model.

$$\Delta OP_i = \alpha_0 + \alpha_1 INSUV_i + AX_i + u_i$$

where ΔOP_i is the change in acquirer *i*'s industry-median-adjusted operating performance from the announcement year (y +0) to the first year following the merger (y +1), either measured by ΔROE_{adj} or ΔROA_{adj}. Other variables are identical to those in Table 4. For brevity, only the coefficients of *INSUV* are reported. *N* represents sample size. The *t*-statistics in brackets are calculated with heteroskedasticity-consistent standard errors (White 1980). *** and ** represent 1% and 5% significance levels, respectively. All variables are defined in the Appendix. All variables are obtained from the TEJ.

return after an M&A event under the cover by D&O insurance.

To reaffirm the validity of the monitoring hypothesis, we proceed to do the following cross-sectional regression model by regressing the acquirers' ΔOP_i on D&O insurance coverage ratio (INSUV), based upon the following Model:

$$\Delta OP_i = \alpha_0 + \alpha_1 INSUV_i + AX_i + u_i$$

where ΔOP_i is the change in acquirer i's industry-median-adjusted operating performance from the announcement year (y + 0) to the first year following the merger (y + 1), either measured by ΔROEadj or ΔROAadj. Other variables are identical to those in Table 4.

As discernible from the Panel B of Table 7, the engagement of D&O insurance exhibits a positive influence on ΔROE_{adj} (ΔROA_{adj}) with a regression coefficient of 0.126 (0.074) and 5% (1%) significant level. These findings are consistent with the conclusion from Panel A of Table 7, indicating that holding D&O insurance seems beneficial for the acquiring companies in the long run because the monitoring function of this insurance provider can control the risk related to managerial legal liability, as well as create more motivations for executives in the process of making decisions.

Overall, our result again supports the monitoring hypothesis that the companion of D&O insurance in M&A strategies is likely to bring more economic and statistical significance for acquirers and stakeholders.

VI. Conclusions

D&O Insurance has been a regular aspect of firm risk management in Taiwan for over 15 years. D&O Insurance provides liability coverage designed to safeguard executives who are anticipated to encounter claims from stakeholders due to decisions and actions undertaken within the scope of their responsibilities. However, the perspective of insurance acting as a shield for firm executives that bring added value to M&A transactions is still an ambiguous issue. The core value of our study addresses the above debate through testing two competitive hypotheses, namely the monitoring hypothesis and the moral hazard hypothesis.

In this study, a cross-section of publicly traded Taiwanese firm data including 278 M&A announcements over the period 2009–2020 was assessed to consider the relation between D&O insurance and M&A shareholder value. Evidence was found to be commensurate with the monitoring hypothesis, implying that acquiring firms whose managers are covered by D&O insurance experience higher cumulative abnormal announcement returns. This positive relation becomes more evident when considering an interactive effect of agency problem, which can be considerably mitigated under the control of insurers, resulting in better M&A performance. Furthermore, the contribution of D&O insurance extends beyond the augmentation of takeover value in the vicinity of the event date, encompassing enduring advantages stemming from mergers and acquisitions (M&A) transactions.

Concisely, we offer new evidence that firms carrying high-level D&O insurance appear to provide a substitute for traditional corporate governance as an effective outside monitoring force and contribute to an increase in the quality of M&A deals. This empirical result assists investors, traders, and financial institutions in making well-informed decisions that account for the potential effect of D&O insurance. An issue not discussed in the paper is whether the positive D&O insurance – M&A valuation affinity is maintained in markets with similar characteristics to Taiwan, which could be an interesting suggestion for later research.

Disclosure statement

No potential conflict of interest was reported by the author(s).

References

Adams, M., C. Lin, and H. Zou. 2011. "Chief Executive Officer Incentives, Monitoring, and Corporate Risk Management: Evidence from Insurance Use." *Journal of Risk and Insurance* 78 (3): 551–582. https://doi.org/10.1111/j.1539-6975.2011.01409.x.

Baker, T., and S. J. Griffith. 2006. "The Missing Monitor in Corporate Governance: The Directors'& (And) Officers' Liability Insurer." *SSRN Electronic Journal* 95:1795. https://doi.org/10.2139/ssrn.946309.

Baker, T., and S. J. Griffith. 2007. "Predicting Corporate Governance Risk: Evidence from the Directors & Officers Liability Insurance Market." *The University of Chicago Law Review* 74:487–544.

Banerjee, S., M. Humphery-Jenner, and V. Nanda. 2016. "Restraining Overconfident CEOs Through Improved Governance: Evidence from the Sarbanes-Oxley Act." *The Review of Financial Studies* 28 (10): 2812–2858. https://doi.org/10.1093/rfs/hhv034.

Barrese, J., and N. Scordis. 2006. "Managerial Bias in Corporate Governance and the Effect of D&O Insurance: A Literature Review and Synthesis." *International Journal of Disclosure & Governance* 3 (3): 185–196. https://doi.org/10.1057/palgrave.jdg.2040078.

Boyer, M. M. 2014. "Directors' and Officers' Insurance and Shareholder Protection." *Journal of Financial Perspectives* 2 (1). https://ssrn.com/abstract=3078746.

Boyer, M. M., and L. H. Stern. 2014. "D&O Insurance and IPO Performance: What Can We Learn from Insurers?" *Journal of Financial Intermediation* 23 (4): 504–540. https://doi.org/10.1016/j.jfi.2014.05.001.

Boyer, M. M., and S. Tennyson. 2015. "Directors' and officers' Liability Insurance, Corporate Risk and Risk Taking: New Panel Data Evidence on the Role of directors' and officers' Liability Insurance." *Journal of Risk and Insurance* 82 (4): 753–791. https://doi.org/10.1111/jori.12107.

Brook, Y., and R. K. S. Rao. 1994. "Shareholder Wealth Effects of directors' Liability Limitation Provisions." *The Journal of Financial and Quantitative Analysis* 29:481–497. https://doi.org/10.2307/2331341. 3

Chang, C. C., and C. W. Chen. 2018. "Directors' and officers' Liability Insurance and the Trade-Off Between Real and Accrual-Based Earnings Management." *Asia-Pacific Journal of Accounting & Economics* 25 (1–2): 199–217. https://doi.org/10.1080/16081625.2016.1253484.

Chen, L. Y., Y. F. Chen, and S. Y. Yang. 2017. "Managerial Incentives and R&D Investments: The Moderating Effect of the directors' and officers' Liability Insurance." *The North American Journal of Economics & Finance* 39:210–222. https://doi.org/10.1016/j.najef.2016.10.007.

Chen, Z., O. Z. Li, and H. Zou. 2016. "Directors′ and officers′ Liability Insurance and the Cost of Equity." *Journal of Accounting and Economics* 61 (1): 100–120. https://doi.org/10.1016/j.jacceco.2015.04.001.

Chiang, Y. M., and P. R. Chang. 2022. "Overinvestment, Ownership Structure, and directors' and officers' Liability Insurance." *International Review of Economics & Finance* 78:38–50. https://doi.org/10.1016/j.iref.2021.11.002.

Chung, H. H., and J. P. Wynn. 2008. "Managerial Legal Liability Coverage and Earnings Conservatism." *Journal of Accounting and Economics* 46 (1): 135–153. https://doi.org/10.1016/j.jacceco.2008.03.002.

Core, J. 1997. "On the Corporate Demand for directors' and officers' Insurance." *Journal of Risk and Insurance* 64 (1): 63. https://doi.org/10.2307/253912.

Core, J. 2000. "The directors' and officers' Insurance Premium: An Outside Assessment of the Quality of Corporate Governance." *Journal of Law, Economics, & Organization* 16:449–477. https://doi.org/10.1093/jleo/16.2.449.

Cubbin, J., and D. Leech. 1983. "The Effect of Shareholding Dispersion on the Degree of Control in British Companies: Theory and Measurement." *The Economic Journal* 93 (370): 351–369. https://doi.org/10.2307/2232797.

Gillan, S. L., and C. A. Panasian. 2015. "On Lawsuits, Corporate Governance, and driectors' and officers' Liability Insurance." *Journal of Risk and Insurance* 82 (4): 793–822. https://doi.org/10.1111/jori.12043.

Giroud, X., and H. M. Mueller. 2011. "Corporate Governance, Product Market Competition, and Equity Prices." *Journal of Finance* 66 (2): 563–600. https://doi.org/10.1111/j.1540-6261.2010.01642.x.

Gutiérrez, M., and M. Gutierrez. 2003. "An Economic Analysis of Corporate directors' Fiduciary Duties." *Rand Journal of Economics* 34 (3): 516. https://doi.org/10.2307/1593744.

Holderness, C. G. 1990. "Liability Insurers as Corporate Monitors." *International Review of Law and Economics* 10 (2): 115–129. https://doi.org/10.1016/0144-8188(90)90018-O.

Hwang, J. H., and B. Kim. 2018. "Directors' and officers' Liability Insurance and Firm Value." *Journal of Risk and Insurance* 85 (2): 447–482. https://doi.org/10.1111/jori.12136.

Kao, L., A. Chen, and C. Krishnamurti. 2020. "Outcome Model or Substitute Model of D&O Insurance on IPO Pricing without Information Asymmetry Before Issuance." *Pacific-Basin Finance Journal* 61:101300. https://doi.org/10.1016/j.pacfin.2020.101300.

Lai, Y. H., and V. W. Tai. 2019. "Managerial Overconfidence and directors' and officers' Liability Insurance." *Pacific-Basin Finance Journal* 57:101051. https://doi.org/10.1016/j.pacfin.2018.08.005.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny. 2002. "Investor Protection and Corporate Valuation." *The Journal of Finance* 57 (3): 1147–1170. https://doi.org/10.1111/1540-6261.00457.

Liao, T. L., H. L. Chuang, and J. Y. Wang. 2022. "Directors' and officers' Liability Insurance and the Pricing of Seasoned Equity Offerings." *International Review of Economics & Finance* 80:12–26. https://doi.org/10.1016/j.iref.2022.02.005.

Li, K. F., and Y. P. Liao. 2014. "Directors' and officers' Liability Insurance and Investment Efficiency: Evidence from Taiwan." *Pacific-Basin Finance Journal* 29:18–34. https://doi.org/10.1016/j.pacfin.2014.03.001.

Li, W., H. Li, X. S. Sun, and T. K. Huang. 2023. "The Impact of directors' and officers' Liability Insurance on Firm's Investment Efficiency: Evidence from China." *Pacific*

Accounting Review 35 (4): 670–697. https://doi.org/10.1108/PAR-08-2022-0130.

Lin, F. Y., L. Guan, C. L. Ho, and T. S. Wang. 2022. "Examining the D&O Insurance Effect on Managerial Ability." *Finance Research Letters* 46:102297. https://doi.org/10.1016/j.frl.2021.102297.

Lin, K. H., and T. H. Hsu. 2020. "Based on Enhance the Corporate Governance-Exploration of Directors' and Officers' (D&O) Liability Insurance Development in Taiwan." *Journal of Insurance and Financial Management* 4 (2): 43–53.

Lin, C., M. S. Officer, R. Wang, and H. Zou. 2013. "Directors' and officers' Liability Insurance and Loan Spreads." *Journal of Financial Economics* 110 (1): 37–60. https://doi.org/10.1016/j.jfineco.2013.04.005.

Lin, C., M. S. Officer, and H. Zou. 2011. "Directors' and officers' Liability Insurance and Acquisition Outcomes." *Journal of Financial Economics* 102 (3): 507–525. https://doi.org/10.1016/j.jfineco.2011.08.004.

Liu, Y. C., H. J. Chen, and M. C. Su. 2017. "Product Market Competition, Type of Mergers, and Post-Merger Performance in Taiwan." *Pacific-Basin Finance Journal* 46:292–308. https://doi.org/10.1016/j.pacfin.2017.10.001.

Li, T., T. Yang, and J. Zhu. 2022. "Directors' and officers' Liability Insurance: Evidence from Independent directors' Voting." *Journal of Banking & Finance* 138:106425. https://doi.org/10.1016/j.jbankfin.2022.106425.

Mahdavi Ardekani, A., N. Younesi, and M. Hashemijoo. 2012. "Acquisition, Earnings Management and Firm's Performance: Evidence from Malaysia." *Journal of Business Studies Quarterly* 4 (1): 91–110. https://ssrn.com/abstract=2146957.

Malmendier, U., and G. Tate. 2008. "Who Makes Acquisitions? CEO Overconfidence and the Market's Reaction." *Journal of Financial Economics* 89 (1): 20–43. https://doi.org/10.1016/j.jfineco.2007.07.002.

Masulis, R., C. Wang, and F. Xie. 2007. "Corporate governance and acquirer returns." *International Journal of Offshore and Polar Engineering* 62 (4): 1851–1889. https://doi.org/10.1111/j.1540-6261.2007.01259.x.

Mayers, D., and C. W. Smith. 1982. "On the Corporate Demand for Insurance." In *Foundations of Insurance Economics*, 190–205. Dordrecht: Springer Netherlands.

Moeller, S. B., F. P. Schlingemann, and R. M. Stulz. 2004. "Firm Size and the Gains from Acquisitions." *Journal of Financial Economics* 73 (2): 201–228. https://doi.org/10.1016/j.jfineco.2003.07.002.

O'Sullivan, N. 1997. "Insuring the Agents: The Role of directors' and officers' Insurance in Corporate Governance." *The Journal of Risk and Insurance* 64 (3): 545–556. https://doi.org/10.2307/253764.

Otto, R., and W. Weterings. 2019. "D&O Insurance and Corporate Governance: Is D&O Insurance Indicative of the Quality of Corporate Governance in a Company." *Stanford Journal of Law, Business & Finance* 24 (1): 105–136. https://doi.org/10.2139/ssrn.3170967.

Peng, C., W. Fu, X. Zhang, and H. Jiang. 2022. "The Impact of Subscribing to directors' and officers' Liability Insurance on Corporate Financialization: Evidence from China." *Frontiers in Psychology* 13:986135. https://doi.org/10.3389/fpsyg.2022.986135.

Shi, C., Y. Sun, and J. Lyu. 2023. "D&O Insurance, Technology Independent Directors, and R&D Investment." *International Review of Financial Analysis* 89:102868. https://doi.org/10.1016/j.irfa.2023.102868.

Sloan, R. G.1996. "Do Stock Prices Fully Reflect Information in Accruals and Cash Flows About Future Earnings?" *Accounting Review* 71 (3): 289–315.

Su, X. Q. 2023. "Directors' and Officers' Liability Insurance and Cross Section of Expected Stock Returns: A Mispricing Explanation." *Pacific-Basin Finance Journal* 77:101938. https://doi.org/10.1016/j.pacfin.2023.101938.

Wang, Q. S., S. Lai, S. Pi, and H. Anderson. 2022. "Does directors' and officers' Liability Insurance Induce Empire Building? Evidence from Corporate Labor Investment." *Pacific-Basin Finance Journal* 73:101753. https://doi.org/10.1016/j.pacfin.2022.101753.

Wang, M., and L. Sun. 2023. "Does Directors' and Officers' Liability Insurance Improve Corporate Governance of Chinese Listed Firms? The Moderating Role of Insider Ownership." *Finance Research Letters* 51:103361. https://doi.org/10.1016/j.frl.2022.103361.

Wang, J., J. Zhang, H. Huang, and F. Zhang. 2020. "Directors' and officers' Liability Insurance and Firm Innovation." *Economic Modelling* 89:414–426. https://doi.org/10.1016/j.econmod.2019.11.011.

White, H. 1980. "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity." *Econometrica: Journal of the Econometric Society* 48 (4): 817–838. https://doi.org/10.2307/1912934.

Woo, S., C. S. Rhee, and S. Woo. 2015. "The Effect of Directors and Officers Liability Insurance on Audit Effort." *Journal of Applied Business Research (JABR)* 31 (6): 2039–2046. https://doi.org/10.19030/jabr.v31i6.9466.

Yeh, Y. H. 2019. "Corporate Governance and Family Succession: New Evidence from Taiwan." *Pacific-Basin Finance Journal* 57:100967. https://doi.org/10.1016/j.pacfin.2017.09.011.

Yilmaz, I. S., and B. Tanyeri. 2016. "Global Merger and Acquisition (M&A) Activity: 1992-2011." *Finance Research Letters* 17:110–117. https://doi.org/10.1016/j.frl.2016.02.005.

Zou, H., and M. Adams. 2008. "Debt Capacity, Cost of Debt, and Corporate Insurance." *Journal of Financial and Quantitative Analysis* 43 (2): 433–466. https://doi.org/10.1017/S0022109000003586.

Appendix

Appendix: Definition of variables

This table details the variable definitions.

Variables	Definition
A. D&O Insurance Coverage Measurement	
INSUV	D&O insurance coverage ratio, calculated as the amount of D&O insurance limits at the individual scope divided by the year-end market value of equity for the year prior to the announcement
INSUA	D&O insurance coverage ratio, calculated as the amount of D&O insurance limits at the individual scope divided by the book value of total assets for the year prior to the announcement.
INSUE	D&O insurance coverage ratio, calculated as the amount of D&O insurance limits at the individual scope divided by the book value of total equity for the year prior to the announcement.
INSUD(1/0)	Equals one if the acquirers have covered by D&O insurance in the year prior to announcement; zero otherwise.
B. M&A events' short- and long-term performance	
CAR (−2, 2)	Cumulative abnormal returns within five days surrounding the firm's announcement of the merger and acquisition (M&A) events, calculated using a market model estimated over the period [−210, −11] relative to the announcement date (day 0).
ΔROE_{adj}	Change in acquirer *i*'s industry-median-adjusted net income scaled by book value of equity from the announcement year ($y + 0$) to the first year following the merger ($y + 1$).
ΔROA_{adj}	Change in acquirer *i*'s industry-median-adjusted net income scaled by book value of total assets from the announcement year ($y + 0$) to the first year following the merger ($y + 1$).
C. Agency Problem Proxies	
DEV	Ratio (deviation) of control rights to cash flow rights as in La Porta *et al*. (2002) for the year prior to the announcement.
XCR	Executives' excess control rights, computed based on Cubbin and Leech (1983) for the year prior to the announcement.
EM	Operating accruals, computed based on Sloan (1996) for the year prior to the announcement.
D. Other Control Variables	
TA	Firm size, computed by natural logarithm of the book value of total assets for the year prior to the announcement.
MB	Market-to-book equity ratio for the year prior to the announcement.
DEBT	Total debt scaled by total assets for the year prior to the announcement.
RUNUP	Acquirer's buy-and-hold return during the [−210, −11] window minus the buy-and-hold return for the TWSE index over the same period
FCF	Free cash flow divided by total assets for the year prior to the announcement.
MQ	Proxied by average annual industry-median-adjusted operating income (i.e. earnings before interest, tax, and depreciation) growth rate over the previous two years
HHI	Herfindahl index for industry concentration, computed based on sales for each firm-year for the year prior to the announcement.
IOR	Shareholding by institutional investors in a given sample for the year prior to the announcement.
InsiderOR	Shareholding by board and top management team in a given sample for the year prior to the announcement.
BLOCK	Shareholding by the top ten largest shareholders to the total number of shares outstanding for the year prior to the announcement.
BSIZE	Size of board in a given sample for the year prior to the announcement.
BIND	Proportion of independent directors for each sample firm for the year prior to the announcement.
BPLEDGE	Percentage of shares pledged for loans by board members over total directors' shareholdings for the year prior to the announcement.
BDUALITY	Percentage of board directors who also occupies the top manager positions to the total number of board members for the year prior to the announcement.
EPAY	Equals one for deals that are at least partially financed by stock; zero otherwise
CPAY	Equals one for solely cash-financed deals; zero otherwise
PRIVATE	Equals one when the target is a private firm; zero otherwise
RELATED	Equals one for deals in which the acquirer and the target have the same industry (TWSE two-digit industry code); zero otherwise
SUBS	Equals one when the target is a subsidiary; zero otherwise