

**PROPERTY & CASUALTY INSURERS' LOSS ACCRUAL
TRANSPARENCY AND ITS IMPACT
ON M&A VALUE**

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ABSTRACT

This paper examines the informational role a Property & Casualty (P&C) insurers' loss accrual (an estimate of expected losses) provides in a merger. This accrual is the largest liability for an insurer and an accurate evaluation of this liability is important in valuing a merger. Our focus is on one specific aspect of the loss accrual. This is the loss accrual's transparency (or how easy is it to be modeled) and used in a valuation exercise.

We propose a two-stage methodology to examine how transparency affects valuation of acquirers in mergers. In the first stage, we use an event study to measure the acquirer's cumulative abnormal stock return following the merger announcement. This is a measure of how the market values the transaction. In the second stage, we then investigate whether, and to what extent, the merger parties' loss accrual transparencies are related to the market's valuation of the acquirer.

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CHAPTER 1: INTRODUCTION AND RESEARCH MOTIVATION

Over the last decade, insurance mergers and acquisitions (M&As) have approached a record high. The volume of M&A activity in insurance more than quadrupled from 2014 to 2015 (Conning & Co, 2015). S&P *Global Market Intelligence* analysis reported 604 deal announcements and a closed deal value of \$164.19 billion in 2015. According to a later study by Conning & Co (2017), despite the relatively slower global insurer M&A activity in 2016, “pressures remain” for the property–casualty (P&C) sector of global insurers to merge or be acquired. Per S&P *Global Market Intelligence* (formerly SNL), the US domestic P&C M&A deal volume has been steady high from 2016 to 2018 (SNL, 2017). The average deal value dropped by approximately 42% from 2016 to 2017, but increased by approximately 72% from 2017 to 2018. Figure 1 illustrated that the M&A trends for P&C industry for last ten years. Further, Towers Watson (2018) predicts that the future for these mergers and acquisition is continue to be bright and there will be “a resurgence of M&As among insurers and particularly deals exceeding \$1 billion (2018) into 2019.

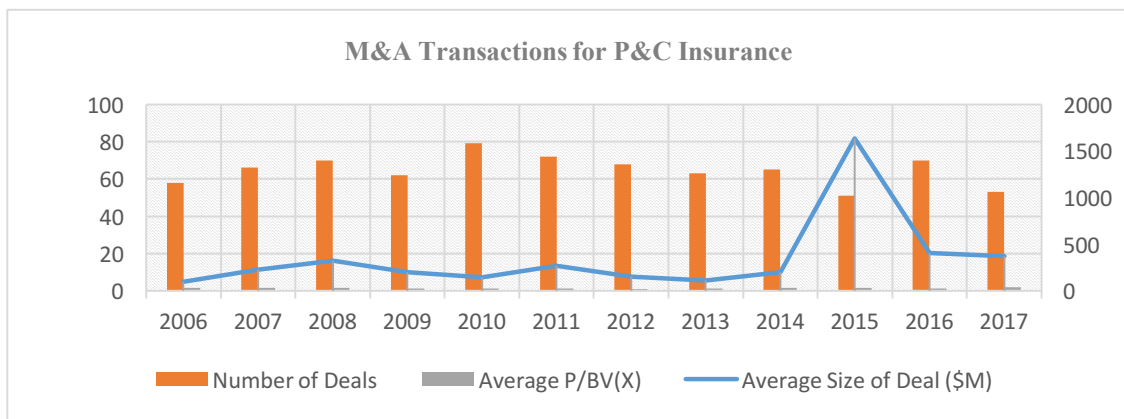


Figure 1: M&A Transaction for P&C insurers
Source: SNL M&A Market for P&C Insurers: 2017

The motivations behind these mergers vary. Insurers seek mergers (as both acquires and targets) as a means to improve operational efficiency through economies of scale (Cummins et al., 1999), to expand geographic reach and production (Amel et al., 2004), to benefit from financial synergies (Chamberlain & Tennyson, 1998), or to take control of another inefficient target (Leverty & Qian, 2010).

Additionally, significant challenges exist for value creation in mergers. According to a Boston Consulting Group study (2016), half of all M&A transactions across *all* industries do not actually create value for the acquirers. As the property and casualty (P&C) insurers ride the industry acquisition wave, it is critical for P&C insurers (acquirers) to identify and negotiate the best possible deals in order to achieve real returns from M&A activities. The identification of potential acquisitions depends upon an accurate picture of the target's assets, liabilities and cash flows. Notably, the transparency of financial reporting plays an important role in target identification, price evaluation, and negotiation in M&A transactions. Transparent financial reporting produces a more accurate value of the target firm, which allows the acquirers to “value the target with greater precision and bid more effectively and realize greater gains from the acquisition” (McNichols & Stubben, 2011). As such, the eventual value or success of an acquisition depends at least in part on the acquisition price the acquiring company pays compared with the selling company's cash flow contribution to the combined company (Rappaport, 1979).

Prior studies on the transparency of financial reporting use accounting accrual quality as a proxy for the overall transparency of accounting information (Dechow & Dichev, 2002). Specifically, McNichols and Stubben's (2011) research provided empirical evidence that higher accrual transparency of the target firm leads to better bidding decisions

and thus more profitable acquisitions.

The largest liability of a typical property-casualty insurer is its loss accrual, which typically represent more than 50% of an insurer's total liabilities. These are funds set aside for the purpose of paying the insurer's future expected losses. The problem here is that the total losses paid on a given contract, a set of contracts, or lines of business may not be known with certainty for many years. This delay could be the result from delays in reporting a loss to the insurer, delays in the realization of the final loss, or delays resulting from the resolution of a lengthy legal process. Thus, the insurer must estimate how much it should hold in reserves to account for their expected ultimate payout, and any changes in reserves accruals should reflect, in part, management's best estimates of future cash flow, as changes in loss accruals shift or adjust the recognition of cash flows over time. Prior empirical studies suggest that loss reserves accruals are correlated with an insurer's performance and characteristics (e.g., Grace, 1990; Petroni, 1992).

Because it is based on an estimate, the loss reserve is often under- or over-estimated, both of which affect insurers' financial statements differently. When over-reserved (i.e., the insurer has a higher estimated liability than actual loss payments), the insurer has a smaller reported surplus, decreasing its net profit and tax liabilities. Additionally, this may draw the IRS's attention and cause the insurer to be fined if it is materially over-reserved. Likewise, when under-reserved (i.e., the insurer has lower estimated liability than actual loss payments), the insurer enjoys a higher reported surplus and profit, increasing tax payments and risking increased regulatory scrutiny. This is because under-reserving improves important solvency ratios like those found in the Insurance Regulatory Information System (IRIS) ratios, which regulators use to monitor

insurers' solvency. Furthermore, materially under-reserved insurers are often linked to weak financials (Best, 2004). Prior empirical studies suggest that variability (over- and under-reserving) of loss reserve accuracy affects insurers' risk level and future profitability, thus decreasing their market-to book ratios (Petroni, Rayan & Wahlen, 1998).

The quality of loss reserve accrual depends on the accuracy of the estimation of the underlying liabilities and also the transparency of the loss reserve accrual. It is thus critical for investors to see through insurers' management decision process in their underlying liabilities to predict insurers' future earning and adjust valuation. Further, Anthony and Petroni's (1997) empirical study suggests that loss reserve estimation errors are negatively associated with insurer's stock market valuation decision.

In this paper, I examine the relationship between P&C acquirers' stock market returns and transparency of loss reserve accrual for the both acquirer and target during their M&A announcement. I define the transparency of the loss reserve accrual as the predictability of a P&C insurer's loss reserve (Grace and Leverty, 2011, 2018). Presumably, transparent loss accrual (TLA) reduces information asymmetry between buyers and sellers, and helps to identify management's discretion on estimating the loss accrual and the insurer's ability to estimate its loss reserve. This should be reflected in the M&A event return if it is new information. Prior research suggests that investors, at least partially identify management's discretion on loss reserve accruals and thus adjust their equity valuation of property-casualty insurers accordingly (Beaver & McNichol's, 1998). Thus, we predict that TLA plays an important role in market valuation in the M&A transactions.

Despite the wealth of research concerning M&A value creation in general, to the best of my knowledge there is no research that explicitly examines the impact of the TLA on M&A value creation in the P&C industry. Examining loss reserve accruals span a rich body of research on numerous topics, such as the characteristics and valuation of loss reserve errors (e.g., Carson & Eckles, 2015; Beaver & McNichols, 1998; Grace & Leverty, 2010), the discovery of management's motivations regarding discretionary loss reserves (e.g., Petroni, 1992; Beaver, McNichols, & Nelson, 2003; Gaver & Paterson, 2004; Grace & Leverty, 2010) and the economic consequences of discretionary and non-discretionary loss accruals (e.g., Beaver & McNichols, 2001; Carson & Eckles, 2015). However, there is no study on the value of the P&C insurers' TLA in M&A transactions.

When an M&A transaction is motivated by value maximization the accumulated stock returns immediately following the M&A announcement date should be positive. Prior research provides mixed findings on whether targets or acquirers create economic gains from M&A activities in the P&C industry. This paper provides updated empirical evidence on whether M&A activity creates value in the P&C insurance industry by including most recent data from 1989 to 2017. My empirical evidence shows that (on average) for this time period from 1989 to 2017, the accumulated stock returns (CAR) of the targets and the combined insurers are statistically significant and positive. However, we also find that the accumulated stock returns of acquirers are near zero and are not statistically significant.

The primary objective of this paper is to examine the effects of the TLA of P&C insurers in M&A value creation, and also to see how insurers' characteristics relate to the TLA of P&C insurers being targets and acquirers. I find that P&C acquirers are more

transparent compared to targets. In testing the relationship between the TLA and the cumulative stock return (CAR), the empirical evidence suggests that both acquirers and targets' TLA (and the consistency of the acquirers' TLA) have no effect on the acquirer's CAR. The evidence suggests that the market is efficient as the valuations of acquirers and targets already reflect the informational value of their TLAs. Targets with consistent TLA are more valuable, and the market rewards targets and acquirers significantly when they improve their TLA prior to the M&A activities.

The paper also examines various firm specific characteristics that affect TLA on insurers' M&A value creation. Insurers may seek M&As to achieve product and geographic location diversification in order to create M&V values. Theories suggest that diversifications in product and geographic location enhance efficiency, spread idiosyncratic risk, reduce agency costs, and with positive consequences on firm valuations. The empirical evidence suggests that the market values those mergers with higher percentage of long-tailed personal, smaller publically listed acquirers, but penalizes those acquirers focused on short-tailed personal lines of business. The market also values a target's specialty in its line of business and believes that specialization in one line of business adds value.

CHAPTER 2: LOSS RESERVES AND TRANSPARENCY

2.1 What is an insurer's Loss Reserve?

Loss reserves represent the estimate of future claims to be paid, as claims do not normally settle in the year the premium is collected or for the year the policy is issued (premium policy year). The accounting matching principle requires insurers to accrue unpaid claims in the premium policy year. As such, loss reserves represent the best estimate of an insurer's unpaid claim accruals.

The loss reserve is typically the largest liability on the balance sheet, and thus the loss reserve estimate should be calculated using management's best judgement about future claims based on an insurer's most current losses and expected future losses. When estimating claim liabilities, insurers must take into account the duration of the insurance contract, the type of insurance offered and the odds that claims will be resolved within the expected period. The IRS requires that "these losses must be stated in amounts which, based upon the facts in each case and the company's experience with similar cases, represent a fair and reasonable estimate of the amount the company will be required to pay" (IRS. 832(b)(5)). The IRS is interested in preventing insurers from over-estimating their loss reserves and thereby reducing current income.

There are two components of the loss reserve: Case reserves, and Incurred but not Reported (IBNR) reserves. Case reserves, estimated by specialists within the company called claims adjustors, are settlement amounts for claims that have been reported to the insurer. Some lines of insurance settle quickly, like property claims (i.e. auto accident car damage claims), while others are termed "long tailed" insurance lines of business, and are so-called because the claim settlement period for liability insurance can be more than a

decade (i.e., for asbestos insurance claims). This length of time to settlement is because injuries may not be evident until years after the person was injured, or perhaps due to litigation delays.

When a claim is reported to the insurer, a variety of tasks must be performed to estimate a case reserve. First, the insurer's claim adjuster needs to establish a claim value based on the claim details, the adjuster's knowledge and experience of the claim handling. Second, the insurer's actuaries apply various possible scenarios to the case (one of most important P&C related risk management tasks) by considering individual fact patterns, the volatility of the claim settlement process, inflation, judicial objectivity and attorney experience on the full claim in order to derive an expected future claim settlement amount called the case reserve. The claim representative can use the information provided by the case reserve to negotiate the settlement strategically. Case reserves are periodically revised and adjusted during the claims settlement process as circumstances change. For example, it could be that a party settles for a lower amount (which would lower reserves) or litigation progressed farther than the adjuster reasonably believed. This would, in contrast, cause the case reserve to increase.

In contrast to case reserves, IBNR is an estimate of those claims that have been incurred and have yet to be reported to the insurer. Based on historical information, an insurer knows what the general reporting pattern of both known and unknown own claims will likely be. Over the coverage period, IBNRs decrease as the estimated level of still unreported claims decreases and moves to case reserves as they become reported to the insurer. IBNR is estimated by using actuarial loss reserving methods and involves

considerable difficulties and greater subjectivity in estimating the likelihood, timing and the amount of future payments for claims that have yet to be reported.

The establishment of the total loss reserves begins with the reported claim details, an insurer's loss experience and the industry's loss experience. Actuaries then provide predictions of future loss payment and expenses based on this information, and management makes a judgement regarding the level of the actual loss reserves to be reported on the insurer's books. However, estimates and judgements based on the initial assessment of the claims and the prior loss history may not yield accurate prediction of future payments. Thus, "reserve errors" result from the difference between the actual claim payments and the prior estimations reported on the insurer's books. Reserve errors can be the result of more claim-causing events (e.g., tornados or ice-storms) or when the sizes of losses associated with such accidents differ from the expected (e.g., medical malpractice). Reserves errors can also be due to actuaries' "model errors" (when the mathematical model and its underlying assumptions are inconsistent with reality) and "parametric errors" (i.e., when model calibration on which estimations rely) (Panning, 2006; Bates and Atkins, 2007). Since insurers are required to report the actual full future claim amounts rather than discounted present values, the errors could also be the effects of macro-economic variables such as inflation, exchange rates, and recessions and expansions.

The ultimate loss reserve is subject to significant managerial discretion. The inherent predictive and subjective nature of loss reserve estimation process also provides some flexibility for management to use its discretion regarding loss reserves to manage earnings. Thus loss reserve errors could be managerial mistakes due to the uncertainty of

determining an insurer's loss reserve level (e.g., Weiss 1985, Grace, 1989) or the result of managerial bias for insolvency manipulation, tax avoidance, profit maximization, regulatory scrutiny and executive compensations (e.g., Grace and Leverty, 2010, 2012).

2.2 Measure of Transparency of Loss Reserve Accrual or TLA

The quality of an insurer's TLA depends on its actuarial capabilities and its management's judgement. This, in turn, is based on the insurer's most current available case loss development information, the insurer's industry knowledge, and the insurer's experience with similar cases for any incurred but not reported claims. As the loss accrual estimation process involves both uncertainty and managerial discretion, loss accrual errors are unavoidable, and often frequent and large.

Errors are not necessarily benign, as they can result in a material misstatement of the insurers' liabilities, surplus, profit and tax liability. Shareholders, rating agencies, analysts, regulators and the IRS all have a keen interest in knowing the loss accrual errors, as the magnitude of the error can be used as an assessment of an insurer's capital adequacy, operation efficiency, and financial strength (Petron, 1992; Gaver & Paterson, 2004, Grace & Leverty, 2011). Carson, Eastman, and Eckles's (2015) empirical research provides evidence that loss accrual errors play a significant role in the ratings of insurers' claims paying ability, and represent a critical performance variable for insurers' intended business strategies (Calandro et al., 2014). Under-reserving leads to an overstatement of the policyholder's surplus (equity), which allows the insurer to write more business than it can actually support, while under-reserving is evidence of rate inadequacy or the insurance is underpricing the risk it is covering. By using lower than actual future claims, under reserving impacts the insurer's operation efficiency and increases the probability of

insolvency. In contrast, over-reserving may help the insurer's credit rating (as there is more capital backing current and future claims), but comes at the expense of offering high-priced insurance policies (Calandro & O'Brien, 2014). Over-reserving also impairs the insurer's operation efficiency by putting more capital than necessary aside into low-risk securities. This is an opportunity cost as capital backing expected losses cannot be used to earn a higher return. This in turn lowers the insurer's efficiency and profitability.

The level of reserves also has important implications for insurer's pricing and competitive response (Grace & Leverty, 2010). The insurer not only needs to assure that it has the ability to fulfill the promises that it made to policy holders when it sold them insurance policies, but also allows the insurer to have the proper financial incentives to write new business and limit rivals' ability to compete for the same customers, thus leading to a sustainable competitive advantage (Barney, 1991). Insurers with strong reserving capabilities lead to a core competitive advantage and stronger financial performance. Research suggests that financially strong insurers have a competitive advantage in selling additional insurance (Sommer, 1996). Systematic misreporting of reserves impairs the value of the insurer, reduces the insurer's ability to pay expected liabilities and to generate profits (Grace & Leverty, 2010). Poor reserving capability diminishes insurers' core capabilities to maintain their competitive advantage. Thus, the transparency of the loss reserving process of acquirers and targets prior to M&A is a good measure of insurers' core capabilities in understanding their future liabilities and predicting their future earnings. The measure of the transparency is the predictive ability of a standard stochastic loss reserve model (described further below). Since these reserve estimates are publically reported, anyone with an interest can assess how well the firm

estimates its future losses. Transparent insurers reduce information risk and thus allow investors to replicate their reserving process and better understand their level of reserves and their expected future underlying liabilities of the insurers, and the market may then adjust their returns based on their understanding of the acquirers and targets loss accrual. Beaver and McNichols (2001) provide empirical evidence that the P&C loss accrual disclosures helps investors to better evaluate the insurer's future earning thus vary of their pricing relative to insurer's predictive ability.

Ideally, managers should make decisions that maximize profits and sustain a firm's competitive edge, but agency theory suggests that managers may act in their own best interests. For example, managers may be incentivized to engage in mis-reserving if bonuses are tied to meeting certain earnings targets and capital requirements. Insurers with high TLA allow investors and shareholders to better understand their nature of the loss reserve errors. Reserve errors (from either over- or under-reserving) are also a good way of investigating insurers' decision-making processes (Grace & Leverty, 2010), as they could be the result of a manager that puts managers' interests ahead of shareholders, thus creating agency costs (Jensen & Meckling, 1976). Under-reserving may help with short term earnings and profitability, but it can also increase the long-term cost of capital and expose pricing inadequacies which may accelerate an insurer's insolvency. Over-reserving also comes with the costs to shareholders in terms of capital not being employed to its highest value. General empirical studies on the quality of accounting accrual suggests that the quality of the accounting accrual is negatively correlated with operational (i.e., sale, cash flow and the operating cycle) and earning volatilities, thus effect the valuation of the companies (e.g., Dechow & Dichev, 2004; Anthony & Petroni,

1997). The TLA reduces the information asymmetry between the investors and the insurers thus lower the information risk, which helps investors not only to better predict the insurers' underlying liabilities and better evaluate the acquirers and targets' management discretionary in the loss reserve accrual but also their motivation in their M&A events.

CHAPTER 3: LITERATURE REVIEW

In this section, I will discuss major empirical research on insurers' loss reserves, common theories for mergers, the market valuation of the information risk and the empirical work specifically related to the P&C industry.

3.1 Research on Loss Reserves

The loss reserve is a well-researched construct. Due to its predictive and subjective nature, many studies have linked the managers' discretion over loss reserve revisions to motives on insolvency ratio manipulation, tax avoidance, profit maximization, regulatory scrutiny and executive compensation (see e.g., Weiss, 1985; Grace, 1990; Petroni, 1992; Harrington & Danzon, 1994; Gaver & Paterson, 1994; 2004; Nelson, 2000; Beaver, McNichols, & Nelson, 2003; Eckles & Halek, 2010; Eckles et al., 2011; Grace & Leverty, 2010; 2012). Petroni et al. (2000) develop a model to partition loss reserve revisions into discretionary and non-discretionary components, which enables them to find that discretionary loss reserve errors are negatively associated with future profitability, risk and market value and non-discretionary revisions are positively associated with future profitability and risk but not associated with market to book ratios.

Weiss (1985) investigates the effects of income smoothing and the external economic environment on loss reserving and finds evidence to suggest that external economic factors like inflation and interest rates affect the reserve errors. Nelson (2000) also finds that insurers in states where state made rates or rates that need prior approval reduce reserves more than other insurers in more states where companies have the freedom to set rates in order to offer rates that are more competitive. Grace's (1990) research provides empirical evidence that there is negative relation between loss reserve error and

average net income of past three years, and her research supports her theory in which an insurer maximizes discounted cash flow subject to estimation error. Aiuppa and Trieschmann's (1987) research suggests that firm size, organizational structure, and product mix also affect loss reserve accuracy. Grace and Leverty (2010) show that P&C insurers subject to stringent rate regulation inflate their loss reserves for the purpose of increasing rates.

The two most popular methods to calculate loss reserve error are the traditional error method and the Full Information Reserve Error (FIRE) method. According to the traditional error method, the reserve error is the difference between the total incurred losses in a given calendar year and a revised estimate of total losses incurred (Anderson, 1971; Petroni, 1992; Weiss, 1985; Kazenski, Feldhaus, & Schneider, 1992). The FIRE method explained by Grace & Leverty (2018) will be discussed in more detail below.

The traditional error looks at the difference between total losses incurred reported in the past (e.g., five years ago) and the current estimate of the total losses incurred. The traditional loss reserve error (TLRE) has been employed in numerous studies to assess how the reserve is related to profitability, tax liability, insolvency, pricing, and executive compensation. Grace and Leverty (2012) examine the first four relationships and find that financially weak insurers under-reserve, taxes affect reserve levels, and rate regulation is associated with under-reserving. Eckles and Haleck (2010) look at executive compensation and find that executive compensation affects reserving, and the manager has an incentive to over or under reserve depending upon the executive compensation.

A second approach, proposed by Grace and Leverty (2011, 2018), is not backward looking (i.e., examining the past five years). They propose what they call a Full

Information Reserve Error (FIRE) model to estimate loss reserve error. Their model employs a stochastic loss reserve model to create an estimate of an insurers' reserve and then calculate the difference between the predicted reserve and what the firm actually chose to reserve. The data employed in this estimation is based upon all of the losses that a firm report, not just the difference between losses five years ago and those today. Moreover, this model is forward looking, and it is closely related to processes that management likely use to set reserve levels. Actuaries and management examine their loss reserves continuously, and when they are required to disclose the reserve to the regulator, the actuary will likely present a model with a range of reasonable levels of reserves to management. Management then chooses one, which is then reported, but the reserve estimate then has to be approved by the firm's actuary. M&A events by nature are forward looking events, and managers will likely use more sophisticated actuarial model of loss reserving to determine the insurer's loss reserve. In addition, the FIRE model is a forward looking forecast, it provides an R-Squared, which can be used to tell investors how well the reserving process behaves. A loss reserving process with a higher R-Squared implies that the losses are fairly predictable, while one with a low R-Squared implies that losses are not so well understood and reserving is not predictable.

While studies have been done to examine the impact of the accrual quality in M&A market, none examine the specific relationship between the TLA and M&A value creation in the P&C industry.

3.2 Merger Theories and Value Creation in the US P&C Insurance Industry

While M&A studies exist in abundance, few have investigated value creation in the insurance industry, and only six have explicitly addressed the impact of M&A value

creation in the U.S. P&C insurance industry. Furthermore, these empirical studies have returned mixed findings as to whether the target, acquirer, and/or the combined entity enjoys the benefit of positive abnormal returns. Whether M&A transactions create value for shareholders also depends on the underlying motivation of both the acquirer and the target.

Three major theories are used to explain M&A value creation. The first is the financial synergy theory proposed by Myers and Majluf (1984) who suggest that M&A transactions create value when financially distressed insurers merge with more well-off insurers if the information asymmetry between these two insurers is smaller than that between the distressed insurer and external capital markets. Although raising capital from the external capital market can be difficult for a financially distressed company, this distressed insurer may present a good investment opportunity for an acquirer with excess cash but with limited investment opportunities if the acquiring insurers can alleviate information asymmetries and achieve financial synergies. This theory predicts that financially constrained insurers are likely to become targets.

Chamberlain and Tennyson (1998) investigate whether financial synergies motivated M&As in the U.S P&C industry from 1980 to 1990. Their study uses an accounting ratio analysis and examines whether information asymmetry and firm financing decisions are related to merger activity. Their study of U.S targets (with global acquirers) suggests that financial synergies are “a significant motivating factor” for U.S insurers after experiencing the negative, industry-wide capital shock during the period 1984 to 1985. The negative capital shock increased information asymmetries between insurers and capital markets due to the increased uncertainties of insurers’ market value;

thus, insurers were motivated by financial synergies to seek gains through M&A transactions (Chamberlain and Tennyson 1998).

Similarly, BarNiv and Hathorn (1997) examine whether financially distressed U.S P&C insurers are likely to be merger targets as viable alternatives to insolvency. Their study finds that twenty to forty-six percent of mergers targets were financial distressed in the period 1984 through 1992. The study employs an event study approach on the short term accumulated abnormal returns (CARs) of acquirers and financially distressed targets, and shows significant negative CARs for acquirers of financially distressed firms, while the financially distressed targets show higher CARs than the CARs for the acquirers of financially distressed and also CARs for the non-distressed targets.

The second common M&A theory is corporate control theory (e.g., Jensen, 1988), which suggests that M&As serve as an efficient means to replace inefficient management at a target company. If the management of an acquiring insurer is more capable than that of the target firm, the replacement management will help to improve the value of the target (Leverty & Qian, 2010). It is also possible that the acquiring insurer takes over a target because of its special knowledge in certain product lines, as this could improve their market power, improve revenue efficiency, and create value for both insurers.

Cummins and Xie (2009) use a combined efficiency analysis and event study approach to examine the relationship between market value performance (CARs) and efficiency for US P&C acquires and targets from 1997 to 2003. Their study suggests that property and liability insurance acquisitions and divestitures are value enhancing, and it provides evidences of significant positive CARs for both acquirers and targets. Their study provides the first empirical evidence on the relationship between efficiency and

market value in the P&C insurance industry. Specifically, they find that the CARs of both acquirers and targets are positively associated with efficiency but are negatively associated with efficiency for divesting insurers. These findings are consistent with corporate control theory that efficient targets are valued higher due to the market's expectation on better achieving synergies. These findings are also consistent with the third common M&A theory regarding economies of scale and scope, i.e., that efficient acquirers are rewarded by the market for potential synergies and inefficient sellers can potentially improve their efficiency through M&As.

The third main theory, economies of scale and scope, argues that M&As create an operational synergy due to increased economies of scale in the combined firm. Insurers are expected to exploit these economies by reducing average unit costs through shared use of resources such as information technology, marketing distribution channel, and expanded customer base and improved service quality. The merged firm is also able to operate more efficiently than either firm could operate independently. Further, there are efficiency gains from diversification, as the increased geographical or product line diversification may lead to higher efficiency or productivity gains (Cummins & Xie, 2008).

Most M&A studies measure the effects of M&A based on the stock market returns, Cummins and Xie (2008) examine the productivity and efficiency effects of M&A in the P&C insurance industry. They use data envelopment analysis (DEA) and Malmquist productivity indices to determine valuation effects of M&A transactions in the U.S P-L insurance industry during the period 1994 to 2001. Their study provides empirical evidence that M&As lead to synergies, and their results are consistent with

increases in efficiency. Their study also provides empirical evidence for corporate control theory that financially vulnerable are more likely to be targets, and that large insurers with relatively high returns on equity, and geographically diversified insurers are likely to be targets.

M&As can also be non-value maximizing if the transaction occurs at too high of an “agency cost” or is the result of “managerial hubris”. The agency cost comes from the conflict of interest between shareholders and managers. Managers are motivated to grow their firms beyond their optimal size through M&As for their own private benefits rather than the shareholder wealth maximization. Managers may choose their M&A to make themselves indispensable at the expense of shareholders (e.g., Jensen, 1986). These M&As would be non-value adding or may even destroy value due to high agency costs. The managerial hubris could be the result of managers’ poor decision (Roll, 1986) on M&As. Managers either overestimate their own ability in bidding for M&As or just make poor decisions which result in overpaying for the acquired firm. The empirical studies of Cummins and Xie in M&As in the US P&C insurance industry from 1994–2003 shows statistically significant and positive abnormal returns for all parties, and find no evidence to suggest that M&As in the P&C insurance industry are motivated by the agency theories or “managerial hubris”.

Additionally, two studies of “post-merger” periods show mixed findings on long-term value creation. Shim’s (2010) study examines the relationship between M&A activity, financial performance, and the effect of product line diversification on insurers’ performance in the U.S. P&L insurance industry over the period 1989–2004. Shim uses risk adjusted accounting profitability ratios such as return on assets (ROA) and return on

equity (ROE) as proxies to measure the insurers' financial performance in the first and subsequent years after an M&A. The study finds that acquirers' financial performance decline and earnings volatility increases post M&A events (Shim, 2010), and suggests that focused insurers outperform the product diversified insurers.

Boubakri et al. (2007) also use an event study methodology to focus on U.S P&C acquirers' post-merger value creation. They use a buy and hold abnormal return (BHAR) analysis. The BHAR is calculated as the difference between the realized buy and hold return and the normal buy and hold return and is based on three years of stock returns. Their results show that M&A creates value in the long term as BHARs are positive after 3 years (Boubakri et al, 2007). Their study also provides empirical evidence that frequent acquires have significant positive returns, and internal corporate governance mechanisms are significant determinants of the long term performance of bidders which is consistent with corporate control theory.

3.3 Empirical Research on the Role of Loss Reserve Quality and Valuation in the P&C Industry

Prior research has investigated whether information risk is a priced risk factor (e.g., Francis et al., 2005). These studies use accounting accrual quality as a proxy for information risk, and they argue that poor accrual quality weaken the mapping of accounting earnings into cash flows and thus exposes investors to information risk, increases the cost of debt, and also increases the cost of equity and or the market valuation (Francis et al, 2005). However, prior research also argues that information risk is not a price risk factor and shows no empirical evidence to support the association between the accounting accrual quality and the future abnormal returns (Core, Guay, and

Verdi, 2008).

There are few studies focusing specifically on the association between the P&C insurer's loss accrual quality and market valuation, and these studies concludes that investors are able to identify management's discretion on the the loss reserve accrual and adjust the insurer's valuation and market price based on the implication of loss reserve errors.

Anthony and Petroni (1997) investigate whether the disclosures of the loss reserve estimation errors (loss development) in the P&C insurers' prior earnings effect the insurers' valuation. Their study uses the stock return to measure the investors' valuation decision, and their study suggests that the disclosure of loss reserve error in the regulatory disclosures have a negative effect on the P&C insurers' valuation. The disclosure of an insurer's loss reserve error is a material accounting information, which determines the market response and or the valuation of the disclosing party. Beaver and McNichol's research in 1998 examine investors' ability to identify the management's discretion on loss reserve accrual and investors' valuation adjustment based on the revision of loss reserve (reserve development). Their empirical evidence suggests that "management exercise discretion over reported loss reserves" (p.19), and "investors are able to at least partially identify management's influence on reported loss reserves, and adjust firm values accordingly" (p.19). Beaver and McNichol's study in 2001 examines whether the P&C insurer's stock price fully reflect current loss reserve development information, other accrual and cash flows. They argue that the P&C insurer's disclosure of the loss reserve development allows investor have transparent information to estimate the insurer's valuation, their empirical evidence shows that the loss reserve development

in current year for future earnings is fully reflected in current year stock abnormal return price, and suggests that the disclosures about loss reserve accrual helps investors to understand the implication of current loss reserve development for future earnings and the valuation.

Eckles *et al.* (2013) investigates the association between loss reserve quality and the cost of insurer debt and the insurance shareholder's cost of capital. Their research uses the traditional reserve error measurements to measure the loss reserve accuracy and use it as the proxy of information risk. The quality of loss reserve accrual is based on the standard deviation of the loss reserve error (based on the traditional loss reserve error method described below). Their (Eckles *et al.*, 2013) research suggests that there are negative associations between the loss reserve accrual quality and the cost of insurer's debt, and between the loss reserve accrual quality and the the cost of insurance pricing, however, there is no empirical evidence to support the association between the loss reserve accrual quality and the cost of equity. Thus their research concludes that the loss reserve accrual quality is not a priced risk factor for the shareholders of P&C insurance companies.

The TLA is also a type of accounting information, which helps the parties in the M&A transaction and also the market to determine the transaction valuation. However, no research has done to investigate the relationship between the market valuation of TLAs of either acquirer or target in M&A activities.

CHAPTER 4: HYPOTHESIS DEVELOPMENT

I am interested in how TLA influence the creation of values for the acquirers and the targets in the P&C M&A market. As stated earlier, I define the transparency of the loss reserve accrual (TLA) as the predictability of an insurer's level of loss reserves and its expected future underlying liabilities (Grace and Leverty, 2011, 2018). I use the predictive model's R-squared described below) as a measure of transparency. Insurers with high R-squared are transparent as their loss reserving processes can be observed, replicated, and predicted by investors to better understand the insurer's underlying liabilities. Insurers with relatively low R-squared have a liability generating process that is relatively opaque and therefore harder for investors to understand and predict the insurer's underlying liabilities. The valuation of the M&A is assessed by the cumulative abnormal stock return (CAR) of the acquirer and the target following the M&A announcement. The detailed measurement of CAR will be described below.

I am also interested in how the consistency of TLA effect the market returns of M&A events. The consistency of TLA is defined as the persistent level of the TLA, and is measured by the inverse of the relative variability of the R-squared (as measured by the coefficient of variation of the R-squared) over the five years prior to the M&A announcement. The higher variability of the TLA the lower consistency of the TLA.

4.1 Hypotheses on Transparency of Targets versus Acquires

P&C insurers with the ability to accurately predict their loss reserves (higher transparency) are more easily valued. A higher loss reserve transparency also reduces the potential information asymmetries between management, shareholders and the external capital market. Acquirers with higher loss reserve transparency seeking mergers or

acquisitions may find it easier to get approvals from their shareholders, as the higher loss reserve transparency allows shareholders to determine whether acquirers' motives are value maximizing. High TLA also increases acquirers' ability of obtaining capital from the external capital market due to the reduced uncertainty in valuation. Insurers with relatively unpredictable loss reserves are less transparent and are thus riskier. This lack of transparency may allow management to make decisions costly to shareholders. Insurers with a lower TLA may also experience external capital constraints due to information asymmetries as well as the increased uncertainty regarding the counterparty's valuation. Empirical research provides evidence that financial reporting transparency is negatively related to information risk. Thus poor transparency is related to higher costs of debt and capital. Further, their ability to expand and grow will be limited due to their financial condition and poor ratings. Chamberlain and Tennyson (1998) find that obtaining financial synergies was a motive for P&C mergers following negative capital shocks for targets. They find targets with poor access to capital due to the increased uncertainty about targets' value as a result of the shock are more likely to receive a capital infusion at acquisition. Thus, according to the financial control theory, we predict transparent insurers are encouraged to engage in the M&A activities as acquirers due to their relative lower cost of capital and their availabilities of capital from external capital market to support such events, and lesser transparent insurers are likely to be targets due to the unpredictability of their underlying liabilities and their potential to be capital constrained. I then hypothesize:

Hypothesis 1. P&C acquirers have higher LTA compared to targets.

4.2 Hypotheses on Relationship between Acquirer's CAR and Transparency

P&C acquirers' ability to accurately set their loss reserves is one of their core competitive capabilities, and insurers with quality loss reserve accrual can contribute to insurer's pre- and post-merger performance. The market may see the M&A event as information about an insurer's ability to generate future cash flows. Acquirers with a high TLA allows the market to better understand their underlying liabilities and therefore better predicting their future earnings through the M&A event. In addition, the acquirer with a higher TLA would provide the target with an infusion of capital, redeployment of resources, or replacement of the target's inefficient management. Even when the target insurer has a low TLA, if the acquirer has a high TLA the market may believe the acquirer sees the target as a good buy.

Jensen and Meckling (1976) argue that managers may not necessarily act in the best interest of shareholders and to maximize shareholders' wealth due to agency conflicts, and suggest that shareholders can limit this conflict by establishing incentives and monitoring managers' activities. Transparent and quality accounting information provides a valuable tool for shareholders to monitor managers. Prior research suggests that transparency in financial reporting effects internal investment decision making by mitigating information asymmetries. The empirical evidence shows a positive association between transparent financial reporting and investment efficiency (e.g. Bushman and Smith, 2001; Verrecchia, 2001; Biddle et al. 2009) Boards of directors who act on behalf of shareholders will also need to approve the M&A transactions and their decisions are also based on transparent accounting information. Acquirers with a high TLA allow the board of directors to make a more informed decision and a high TLA mitigates the risk of management's adverse selection and moral hazard problems. Prior studies provide

empirical evidence on the importance of transparency of accounting information to shareholders in monitoring manager as part of corporate governance (e.g., Bushman and Smith 2001).

Whether M&A transaction create value for shareholders also depends on the underlying motivation of both acquirer and target. Both the target and the acquirer may seek value creation through financial and operational synergies -- thus improving productivity and efficiency, as theory predicts. Further, insurers may seek risk reduction through diversification by adding product mix or expanding geographical expansion. Acquirers' TLA allows the market to see through its motivation and expect mergers to improve its efficiency and/or minimizes its portfolio risks, and the acquirer's stock price will likely earn positive abnormal returns.

Thus, we hypothesis that acquirers with high TLA make better M&A decisions and better selections of targets in order to maximize shareholder value. Additionally, if TLA is important in understanding a firm's value, then the greater the TLA the higher will be the acquirer's market response. These arguments lead to the following hypothesis (holding others constant):

Hypothesis 2A. The Acquirer's CAR is positively associated with the acquirer's TLA.

Prior studies show that loss reserve errors resulted from managerial mistakes related to the difficulty of estimating an insurer's future claim payments (Weiss, 1985; Grace, 1990). The quality of insurers' loss reserve accrual reflects management's ability to manage and allocate resources to generate profit. Systematic misreporting of loss reserves also indicates managers' poor judgement, bias by managerial incentives, as well

as a potential lack of heterogeneity in the talents of the insurer's managers. Studies suggest that managers manipulate loss reserve levels in order to meet their earnings and profitability objectives and to meet regulatory capital requirements (e.g., Weiss, 1985; Grace, 1990; Beaver, et al., 2003). However, managers' manipulation of loss reserves comes with costs to the shareholders. Under-reserving may help with the short term earnings and profitability, but it can increase the long-run cost of capital and expose pricing inadequacies, which may accelerate the insurer's insolvency. Over-reserving also comes with the costs to the shareholders in terms of capital not being employed to its highest value. Systematic misreporting of reserves impairs the value of the insurer, reduces the insurer's ability to pay expected liabilities and to generate profits (Grace and Leverty, 2010). It is possible that insurers manipulate their loss reserve prior to the M&A event, as studies have found manager's discretion over loss reserve revisions relate to solvency ratio manipulation, tax avoidance, profit maximization, regulatory scrutiny and executive compensation (see e.g., Gaver & Paterson, 1994; 2004; Eckles & Halek, 2010; Eckles et al., 2011; Grace & Leverty, 2010; 2012). Acquirers may pocket additional reserve capital for potential cash needs in mergers, and targets may also inflate loss reserve to make themselves valuable. Further analyses of insurers' loss reserve behavior persistency would help to predict management consistent decision making abilities and discover the possibility of loss reserve manipulation in preparation for M&As. Acquirers with a consistent TLA help investors better see through their reserving behaviors and the consistency of their management decisions thus further reducing information risks. Based on the market efficiency theory, the market adjusts its returns on acquirers based on historical financial information. I hypothesize that an acquirer's consistency of TLA is

positively associated with its CARs.

Hypothesis 2B. The Acquirer's CARs is positively associated with the consistency of its TLA

4.3 Hypotheses on Relationship between Acquirer's CAR and Target's

Transparency

Target insurers with high TLA provide accounting information and good inside information about the target's past, present, and future cash flow in relate to the underlying liabilities. This, in turn, facilitates the acquirer's management approval for a merger and facilitates the selection of an appropriate valuation for the merger. Targets with a high TLA allow acquirers to bid precisely and successfully due to the reduced uncertainty in target values, which should generate higher expected returns for the acquirers. Targets with high a TLA provide better valuation thus minimize the acquirers' information risk, which transfer their bargaining power to the acquirers; targets thus lose bargaining power in negotiating the price. McNichols and Stubben's (2014) empirical study shows that targets have lower announcement returns when targets disclose transparent accounting information, and acquirers captured higher M&A gains due to their bargaining power. Thus, transparent loss reserve information reduces the information asymmetry between shareholders and management and between acquirers and targets, which leads to higher CARs for acquirers, holding all other things constant. This suggests the following hypothesis:

Hypothesis 3A. The Acquirer's CAR is positively associated with the target's TLA.

As discussed earlier, the loss reserve error could be discretionary or nondiscretionary. When a target is over-reserved, nondiscretionary loss reserve errors

may simply be due to the unpredictability of the nature of catastrophe losses, the nature of the insurers' businesses (i.e.: geographic location coverage and line of business), and external economic factors like inflation and interest rates (Weiss, 1985). Over-reserving may also stem from management's discretionary judgement, as they may be incentivized to do so for tax reporting, income smoothing or executive compensation contract reasons. The consistency of TLA helps to discover the nature of the insurer's loss errors, the discretionary of their management and make judgments on the target's consistent management efficiency. The consistency of a target's TLA allows the acquirers to reduce information asymmetry and thus further investigate the target's reserving ability and also their management efficiency. I then hypothesize the following:

Hypothesis 3B: The acquirer's CARs are positively associated with the consistency of target's TLA.

4.4 Hypotheses on the Relationship between the Target's CARs and the Target's transparency

As I argued above, the M&A value creation is determined by the acquisition price, and the acquisition price is also determined by the bargaining power of the acquirer. Targets with high TLA reduce uncertainty in their valuation, which allows the acquirers to bid accurately thus transfer the M&A price bargaining power to acquirers. I predict that a target with high TLA will be obtain lower returns due to the acquirer's certainty in the target's valuation. I then hypothesize:

Hypothesis 4A: The target's CARs is negatively associated with the target's TLA

I discussed in hypothesis 3B that the consistency of target's TLA helps to discover the nature of the insurer's loss errors and the discretion of the target's

management, and to better make judgments on the target's consistent management efficiency. The consistency of the target's TLA reduces the information asymmetry between the acquirer and the target, and allows the acquirer to further strengthen its bargaining power in the bidding and price negotiation process. The value of the target declines as the acquirer takes more bargaining power due to the transferred gain in the M&A event. I then hypothesize the following:

Hypothesis 4B: The target's CARs is negatively associated with the consistency of target's TLA

CHAPTER 5: METHODOLOGY AND ANALYSIS

The methodology used here is broken into two steps. First, we do an event study. Then we estimate the measure of loss reserve transparency.

5.1 Event Study

Event studies are widely regarded as an accurate measure of the impact of an M&A deal on the value creation (e.g., Andrade et al., 2001; Mackinley, 1997). This method is based on the assumption that capital markets are efficient and stock prices reflect all publicly available information; thus, when the M&A is announced, the market will react to this new information positively or negatively based upon its assessment of the value of the merger. As a first step, we propose to analyze insurers' abnormal returns (AR) using different estimation windows:

- one day before M&A announcement and at the M&A announcement date,
- three days before M&A announcement and three days immediately after,
- five days before M&A announcement and five days immediately after,
- ten days before M&A announcement and ten days immediately after,
- fifteen days before M&A announcement and fifteen days immediately after,

We define the M&A event value creation as the cumulative abnormal return of the acquirer. The abnormal return is the actual ex-post return of the stock price following the M&A announcement minus the expected normal return of the acquirer's. The expected normal return is defined as the expected return without conditioning on the M&A event. Following Mackinley (1997), the abnormal return for insurer i and event date t the abnormal return is:

$$AR_{it} = R_{it} - E(R_{it}|X_t) \quad (1)$$

where AR_{it} , R_{it} and $E(R_{it}|X_t)$ are the abnormal, actual, and normal returns respectively for time period i and X_t is the conditioning information for the normal return model.

We model the normal return as the market return assuming a stable linear relationship between the market return and the insurer's stock return (Mackinley, 1997). We use five different estimation periods. Insurer's stock price of one day, three days, five days and fifteen days before the M&A event will be used as the measures of the normal expected return without the event. The market return is:

$$R_{it} = \alpha + \beta R_{mt} + \varepsilon_{it}, \quad E(\varepsilon_{it}) = 0, \quad (2)$$

Where R_{it} = the rate of return on the share price of firm i on day t , ; R_{mt} = the rate of return on a market portfolio of stocks (such as Standard & Poor's 500 or a market index) on day t ; α = the intercept term; β = the systematic risk of stock i ; and ε_{it} = the error term, with $E(\varepsilon_{it}) = 0$. The cumulative abnormal return (CAR) is then the aggregated abnormal return of both the acquirer and target over the estimation period from (τ_1, τ_2) .

$$CAR_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{it} \quad (3)$$

Besides the single-factor model event study described above, the Fama-French (1993) three-factor model is another asset pricing model that expands on the capital asset pricing model by adding size and value factors to the market risk factor in CAPM, which is also used in the context of event studies. This model takes into consideration the fact that value stocks and small-cap stocks outperform market expectations on a regular basis, and adds two additional factors to adjust for their tendency to outperform the market.

$$r = R_f + \beta_1(K_m - R_f) + \beta_2 * SMB + \beta_3 * HML + e \quad (4)$$

r the portfolio's expected rate of return

- K_m simple return of the market portfolio
- R_f risk-free rate
- K_m return of market portfolio
- α regression intercept
- β the systematic risk of stock i ,
- SMB difference between the average small stock and big stock portfolio returns.
- HML is calculated as the difference between the average high book-to-market ratio and low book-to-market ratio portfolio returns.
- e Error Term

The hypothesis in the event study above is that the M&A deal announcement sends signals to the market for the valuation of insurers. We posit that the transparency of the insurer's loss reserve accrual is part of the signal which effects on the valuation of the insurers during the event estimation period. The next step of analysis is focused on testing of the relationship between the reserve transparency and the CARs. The TLA is a measure of how good an insurer predicting loss reserve. As the loss reserve reflects management estimates of future cash flows for claim payout, the quality of loss reserves depends on an insurer's actuarial capabilities and its management's best judgements based on the most current available development information, the management's industry knowledge, and its historical experiences with any incurred but yet reported claims.

5.2 Loss Reserve Transparency and Efficiency Measurement

The traditional reserve error measurement used in various studies (see e.g. Weiss, 1985) defines reserve error as the difference between total incurred losses in a given calendar year and a revised estimate of total losses incurred five calendar years in the

future. However, this measurement does not use all loss development information, as it takes information from two points in time. This measure is more focused on the balance sheet (i.e., how liabilities have changed) rather than how the firm's cash-flow changes. We believe that a cash-flow measure provides more information about how management thinks about the firm in a forward-looking sense.

This study requires a real time view of management's decision making, so we use the full information reserve error (FIRE) stochastic model proposed by Grace and Leverty (2011,2018) to measure both the acquirer and the target's loss reserve error and then the R^2 of the FIRE model. The full information reserve error measurement uses all the information in Schedule P to estimate reserves for the future, and it improves upon the traditional reserve error measurements by providing practical and real time views of reserve uncertainty. The full information loss reserve error measurement model is estimated as:

$$X_{if}(ft) = \alpha + \sum_{i=2}^{10} R \lambda_i + \sum_{j=2}^{10} C \delta_j + \varepsilon_{ij} \quad (5)$$

where $X_{(R2)}(ft)$ are the cells from the loss development triangle for a given firm (f) in a given year (t); i indexes the rows in the loss development triangle; j indexes the columns; α is an intercept term, λ_i and δ_j are the coefficients on the indices for the rows (R) and columns (C), respectively.

We forecast the next year's loss development based on the formula (4) for both the target and acquirer, and then we compare that compare to the true loss reserve in Schedule P in the next year. The difference between the actual additions to reserves in year t and the forecast additions to reserves in year t is our definition of under reserving (negative difference) and over reserving (positive difference). We then divide the reserve

error by total assets to get “normalized” error. The R-squared of the FIRE model is the measure of the transparency of loss reserve: the smaller the deviation, the better the firm was at transparently showing its reserving. Alternatively, one can think of this R^2 as how well the firm is at predicting its loss reserve.

After we estimate the R-squared of the FIRE model and the cumulative abnormal returns (CARs) from the event study for all the sample target and acquirer insurers, we then investigate the relationship between the transparency of the loss reserve, and CARs of the sample insurers, and the size of the loss reserve error scaled by the insurer’s asset and the extreme under or over reserving (described below) are counted control variables in my regression analyses.

The market signal also includes other business characteristics of the insurers, such as size of the insurer, type of business, product and geographical diversification and distributions of lines of business for both the acquirer and the target. Prior studies suggest that these characteristics of firms affect the loss reserve errors (e.g., Grace, 1990; Grace and Leverty, 2011; Petroni and Beasley, 1996). We account for these business characteristics of insurers in the testing model as control variables which are held constant during the examination in order to test the relative relationship of the dependent variable (CARs) and independent variables (the transparency of the loss reserve) on M&A transactions. Thus, the model we propose is:

$$CAR_i (Acquirer) = \alpha + \beta_1 \text{Acquirer Loss Reserve Transparency} + \beta_2 \text{Acquirer } R^2 + \mathbf{0X} + e_i \quad (6)$$

$$CAR_i (Target) = \alpha + \beta_1 \text{Target Loss Reserve Transparency} + \beta_2 \text{Target } R^2 + \mathbf{0X} + e_i \quad (7)$$

$$CAR_i (Acquirer) = \alpha + \beta_1 \text{Target Loss Reserve Transparency} + \beta_2 \text{Target } R^2 + \mathbf{0X} + e_i \quad (8)$$

where CAR_i is the stock abnormal return from the first stage event studies, and R^2 is the

transparency of the loss reserve for either acquirer or target. In each case a dummy variable will be calculated that is 0 if the firm is in one of the above categories, and is 1 if the firm is not one of the above categories. In addition, \mathbf{X} is a vector of firm characteristics and e_i is an error term.¹ Equation (5) will be estimated by OLS and bootstrapping methods to account for the fact that the CAR_i are generated from a first stage regression (Pagan, 1984).

5.3 Data Description

The sample consists of all publicly disclosed M&As across the Property & Casualty industry (NAIC and SIC code for P&C Insurers). The stock prices of both the acquirer and target firms are listed and traded on one of the four major U.S exchanges (NYSE, AMEX, NASDAQ, and OTC). A sample of M&A events announced between January 1st, 1989 to November 1st, 2017 are collected from the merger and acquisition database for the insurance industry maintained by SNL Financial (now S&P Global Market Intelligence). The SNL database provides M&A announcement dates and other terms and conditions of the agreements. These transactions cover the acquisitions of a majority interest (greater than or equal to 50%) of the target's shares outstanding, a minority stake purchase that cause the buyer's ownership percentage to reach or exceed 50% of the target's outstanding equity, or a purchase that results in ownership of 100% of the target's outstanding equity. We excluded any M&A transactions cancelled after the announcement. We also impose additional restrictions for the M&A acquisition characteristics, accounting data needed to calculate the transparency of loss reserve and the loss reserve errors, and acquirer and target stock returns around the M&A

¹ OLS results are shown in the tables below, but the regressions were also estimated with a bootstrap procedure since the CARs are estimated from a regression model. The results are nearly identical.

announcements. Further, we require that both acquirer and target to be U.S. P&C insurers, as we do not have reserving information for foreign companies. Since we are analyzing the acquirers' stock returns to the M&A announcement, we also require that acquirers to be publicly traded P&C insurers so that there is market information available.

In order to analyze the combined entity abnormal return, we extract a list of both publically traded P&C acquirers and targets. We have identified 1,056 publicly listed P&C acquirers, 477 P&C targets and 89 where both parties to the transaction are publicly listed P&C insurers. We further narrow the population to P&C companies to those where we find an available CUSIP number and NAIC Group or company numbers in order to get the stock price, and the appropriate NAIC loss reserving information. We use the Eventus Fama - French Basic (1993) Event Study web interface software from the Wharton Research Data Services to calculate the accumulated abnormal stock returns.²

Based on Statutory Accounting principles, the loss reserve is the insurer's accrued liabilities for future claim payments on all losses that incurred prior to the balance sheet date. P&C insurers are required to disclose their gradual settlement of claims overtime and also any revision of the estimated loss reserves in Schedule P. We use data from the NAIC annual statement database for all the acquirers and targets. We collect the Schedule P data of the NAIC Annual Statement from 1990 to 2017. We then estimate both the sample targets and acquires' loss reserve errors by using Grace and Leverty's (2011; 2018) full information loss reserve error (FIRE) model and then calculate the R^2 of the

² Eventus software performs event studies using data directly from CRSP stock databases. Fama-French Basic (Daily) executes an event study using the Fama-French daily factors as a benchmark. This web query uses the two-step framework where the model parameters are estimated using data from outside the event window (www.wrds.com). In the calculation, we use CRSP equally weighted as market index, and we included Fama French two step as the benchmark options, and the bench mark approach for model estimation remains ordinary least squares (OLS).

FIRE model as the measure of the loss reserve transparency.

We also control for the size of insurers, consideration of the deal, concentrations in line of business and across states and the percent of underwriting long-tailed and short-tailed lines of personal and commercial business. The size of FIRE is scaled by insurer's asset, and the size of insurer is measured by the total asset of the company. Line of business concentration is measured using the product line Herfindahl Index, which is calculated as the sum of the squared percentage of premiums earned in each of the 26 lines of P/L insurance. The average target has a product line Herfindahl of 2,371, which is equivalent to approximately four equal sized lines of businesses. The average acquirer has a line of business Herfindahl of 2,387 which is also equivalent to about four equal sized lines of businesses. Geographical diversification is gauged using the geographical Herfindahl Index, the sum of the squared percentage of business written in each of the 50 states and the District of Columbia. The target mean geographical Herfindahl is 1,491 indicating the average insurer operates in about nine states. The acquirer mean geographic Herfindahl is 1333 indicating the average acquirer operates in eight states. The acquirers have an average of 14.3% in short-tailed personal lines of business and 31.2% in short-tailed commercial lines of business, while the targets have an average of 13.8% in short-tailed personal lines of business and 32.8% in short-tailed commercial lines of business. The acquirers have an average of 16.9% of long-tailed personal lines of business and 37.6% of long-tailed commercial lines of business, while the targets have an average of 11.7% of long-tailed personal lines of business and 41.8% of long-tailed commercial lines of business. Both targets and acquirers have much higher percentage of commercial lines of business.

CHAPTER 6: RESULTS

This section shows the CAR results for multiple event windows from -15 days prior to the M&A announcement and 15 days after the M&A announcement.

6.1 Overall CARs of Acquirers, Targets, and Combination of Acquirers and Targets

Table 1 shows overall CARs for M&A events on acquirers, targets and the combined CARs (Acquirers CARs + Targets CARs). The event period is from 30 days before the announcement of a transaction to 30 days after the announcement of a transaction. The S&P Market Insight data we used contains all mergers and acquisitions in the P&C industry, but not all parties in the merger are publically traded. We have 1,056 publically traded firms that are acquirers, 477 publically traded firms that are targets, and 83 transactions with publically traded firms on both sides of the transaction.

Both acquirers and targets have statistically significant positive CARs in the event window 15 days before the announcements, which may suggest possible information leakage and rumors of the M&A events before the announcements. The 2017 Intralinks Annual M&A Leaks Report (2018) finds that 9.8% of United States M&A deals and 8.6% of worldwide deals had evidence the information was leaked in 2016. The report shows an average of an extra US\$21 million accrued to the shareholders of the targets in the worldwide deals that leaked. The CARs analysis in table 1 shows that there are possible leaked deals in the P&C industry and they also resulted in positive significant CARs.

On average for the sample periods listed in Table 1, acquirers' CARs range from near zero return (0.07%) in the window (-1, 0) to 0.9% positive returns in the window (-15, +15). However, with the exception of the window (-15, 0) and window (-15, +15), the

returns are not statistically significant. This finding for acquirers is consistent with the usual findings in the general M&A studies, which find that CARs are statistically insignificant and nearly zero or negative for acquirers.

Notably, this finding is contrary to the findings in some of the M&A literatures for P&C industry (e.g, Akhigbe & Madura, 2001; Cummins & Weiss 2008, 2009). This may due to the longer time period and more recent data are covered in my study. The most recent US P&L M&A studies (Cummins & Xie, 2009) cover up to 2003, and many events have happened in the industry since then, such as the financial crisis period from 2008 to 2010. Further, the P&C industry M&As have become a very competitive market for last ten years or more, the M&A valuation has been increased considerably. From 2011 to 2017, the forward P/E multiples has been consistently high between 14X to 18X (Figure 2: IRMI 2017). P&C acquirers' low return could be the results of acquirers' overpaying, which leads to lower CARs. This could also be an indication of possible "managerial hubris", which indicates that managers follow the industry M&A trend, overpay targets, and transfer the M&A gains to targets. Further studies need to be done to provide background and context for in depth CARs analysis.

On average for the time windows listed, M&A events have created statistically significant positive mean CARs (from 1.9% to 2.8%) for targets' shareholders. These CARs are lower than other studies (Cummins & Weiss 2004; Cummins & Xie, 2009). This may be attributed to the longer coverage period in the study, which might average out the higher CARs in some periods with the lower CARs in other periods. The CARs for targets could be higher when the M&A market is competitive and acquirers tends to over pay. However, CARs could be lower when acquisitions occur in less competitive

periods or targets have lower informational asymmetries about the value of potential targets, thus had to share the wealth creation with acquirers. The positive targets' CARs for all time period provide strong empirical evidence that P&C targets historically earn positive CARs.

For the time period listed, the combined CARs are positive and statistically significant. This is consistent with earlier M&A studies for the P&C industry (Cummins & Weiss, 2004; Cummins & Xie, 2009), which confirms that M&As P&C industry are mainly motivated by value maximizing strategies.

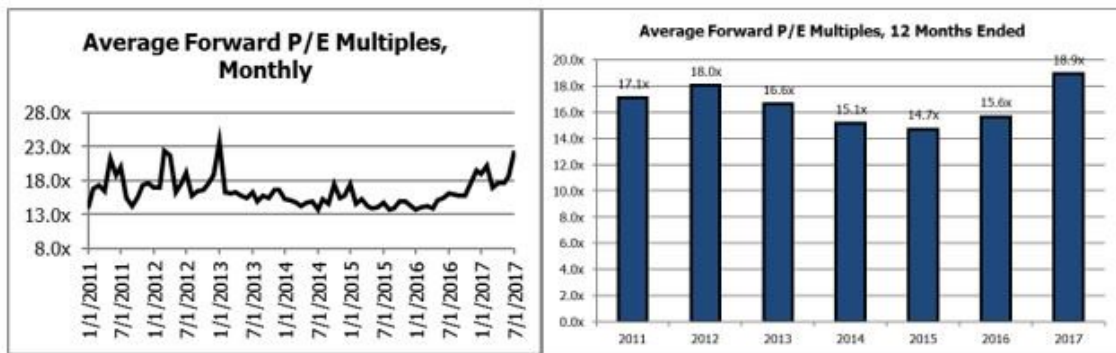


Figure 2: Average Forward P/E Multiples

Source: IRMI The M&A Market for P&C Insurers: 2017

Table 1: CARs Summary Statistics:

	Obs	Mean	Std. Dev.	Min	Max	t(car=0)	Prob T	Sig
Acquirers								
(-15, 0)	1,056	0.006	0.089	(0.400)	1.116	2.139	0.03	**
(-1, 0)	1,056	0.001	0.037	(0.314)	0.592	0.656	0.51	
(0, +1)	1,056	0.002	0.044	(0.306)	0.889	1.178	0.24	
(-1, +1)	1,056	0.002	0.045	(0.301)	0.873	1.208	0.23	
(0,+3)	1,056	0.001	0.049	(0.326)	0.846	0.731	0.47	
(-3,+3)	1,056	0.001	0.059	(0.329)	0.844	0.576	0.56	
(0,+5)	1,056	0.001	0.055	(0.336)	0.972	0.749	0.45	
(-5,+5)	1,056	0.002	0.070	(0.389)	0.937	0.914	0.36	
(-10, +10)	1,056	0.004	0.095	(0.563)	0.918	1.487	0.14	
(-15, +15)	1,056	0.009	0.129	(0.867)	1.175	2.335	0.02	**
Targets								
(-15, 0)	477	0.027	0.139	(0.607)	1.116	4.319	0.00	***
(-1, 0)	477	0.028	0.106	(0.232)	0.868	5.664	0.00	***
(0, +1)	477	0.028	0.106	(0.232)	0.868	5.664	0.00	***
(-1, +1)	477	0.026	0.111	(0.340)	0.871	5.147	0.00	***
(0,+3)	477	0.023	0.114	(0.374)	0.868	4.386	0.00	***
(-3,+3)	477	0.023	0.127	(0.565)	0.881	4.040	0.00	***
(0,+5)	477	0.020	0.127	(0.689)	0.850	3.395	0.00	***
(-5,+5)	477	0.022	0.157	(0.879)	1.115	3.052	0.00	***
(-10, +10)	477	0.021	0.183	(1.118)	1.091	2.525	0.01	***
(-15, +15)	477	0.021	0.204	(1.733)	1.137	2.290	0.02	***
Combined								
(-15, 0)	83	0.052	0.125	(0.219)	0.599	3.791	0.00	***
(-1, 0)	83	0.032	0.094	(0.178)	0.628	3.130	0.00	***
(0, +1)	83	0.042	0.112	(0.128)	0.605	3.455	0.00	***
(-1, +1)	83	0.046	0.120	(0.129)	0.674	3.507	0.00	***
(0,+3)	83	0.040	0.116	(0.173)	0.588	3.140	0.00	***
(-3,+3)	83	0.051	0.132	(0.197)	0.661	3.492	0.00	***
(0,+5)	83	0.037	0.123	(0.295)	0.595	2.761	0.01	***
(-5,+5)	83	0.051	0.139	(0.386)	0.670	3.324	0.00	***
(-10, +10)	83	0.061	0.154	(0.350)	0.646	3.610	0.00	***
(-15, +15)	83	0.063	0.176	(0.390)	0.686	3.254	0.00	***

*, **, *** Statistical Significance at the 10% ,5 % and 1% levels respectively

6.2 Overall loss reserve transparency and loss reserve errors for acquirers and targets

Table 2 shows that acquirers have slightly higher mean TLA (R^2) than targets in the event year and during the last five years (prior to the event) if we look at the average (R^2 average). The targets' TLA mean also has higher variability, as the standard deviations of R^2 and R^2 average for targets are higher. The mean of R^2 for the industry and for both targets and acquirers are high (at 95% and above). On average, acquirers are

slightly bigger in size, and both targets and acquirers have higher than average the total book asset (logarithms transformed) than the industry average.

Table 2: Overall Loss Reserve Transparency (R^2)

Variable	Mean	Observation	Std. Dev.	Min	Max
Target R^2	0.9574	603	0.0878	0.3038	1
Acquirer R^2	0.9673	936	0.0736	0.32	1
Industry R^2	0.9517	27,747	0.0871	0.1118	1
Target R^2 average	0.9643	570	0.0406	0.7546	0.9996
Acquirer R^2 average	0.9717	870	0.0351	0.7226	0.9997
Industry R^2 average	0.9543	21,015	0.0695	0.2465	1
Target Asset	22.3881	606	2.1084	15.4546	26.3742
Acquirer Asset	22.7052	925	2.2186	15.4546	26.4733
Industry Asset	17.8159	26,343	2.4123	11.4279	26.4733

Table 3 shows the results of t-test that test the differences in the mean TLA between targets and acquirers. The t-tests show that the mean difference in transparency between targets and acquirers is statistically significant. This results supports *hypothesis I*, which states that the acquirers' TLA is higher than targets' TLA. This may be predicted that transparent insurers are encouraged to engage in the M&A activities as acquirers due to their capital availabilities of capital to support such events due to reduced information risks and. Targets may be faced with capital constraints due to the uncertainty in their valuation and may have to engage in M&A as targets.

Table 3: Differences between Acquirer R² and Target R²

Two-sample t test with equal variances					
Variable	Obs	Mean	Std Error	Std Dev	Sig
Acquirer R ²	936	0.0149	0.0024	0.0734	
Target R ²	603	0.0060	0.0036	0.0878	
Mean difference		0.009	0.004	0.03	**
**Significantly different at the .05level.					
Acquirer R ² Average	870	0.0174	0.0012	0.0351	
Target R ² Average	570	0.0102	0.0017	0.0406	
Mean difference		0.007	0.002	0.0004	***
*** Significantly different at the .001 level.					

6.3 Relationships between the Loss Reserve Transparency and the Business

Characteristics of the P&C Insurers.

Table 4 shows a regression analysis to discover the relationships between TLA (R²) and the firm characteristics. The dependent variable is the TLA (R²) or its five-year average. The explanatory variables are the business characteristics of the P&C insurers. These characteristics are the product and geographical diversification and the percent of long-tailed and short-tailed lines of personal lines and commercial lines of business.

Holding everything else constant, the size of P&C insurers has a positive association with the TLA of the M&A event year as well as the last five years' average TLA. I expect that larger insurers to be more stable and have predictable loss reserving and thus, a higher TLA.

Business Herfindahl index and Geography Herfindahl index have negative association with the TLA of the M&A event year as well as the last five years' average TLA. Higher Herfindahl index implies higher risk concentration, and may positively correlated with loss reserve errors, thus a lower TLA.

The percent of short-tailed commercial and personal lines of business, and the percent of long-tailed personal lines of business have statistically significant positive associations with TLA. The reserving processes for short-tailed lines of business and long-tailed personal line of business are relatively lesser complicated and with lesser uncertainty thus lower loss reserve errors.

Table 4: Relationship between R^2 and Insurers' Size

VARIABLES	R^2	R^2 Avg
Asset Size	0.001*** (0.0003)	0.002*** (0.0002)
Product Line HHI	-0.010*** (0.0008)	-0.010*** (0.0008)
Geographic HHI	-0.001 (0.0006)	-0.001* (0.0005)
Short-tailed personal line%	0.052*** (0.0021)	0.050*** (0.0020)
Short-tailed commercial line %	0.020*** (0.0015)	0.024*** (0.0014)
Long-tailed personal line %	0.045*** (0.0027)	0.045*** (0.0025)
Constant	1.003*** (0.0118)	0.998*** (0.0109)
Observations	24,424	18,735
R-squared	0.08	0.12
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

6.4 Relationships between Acquirers' CARs and the Acquirers' Loss Reserve

Transparency

Regression analyses are conducted to investigate the relationships between CARs and TLA, and also the relationships between CARs and the consistency of TLA. The dependent variables are the CARs from the time windows from (-1, +1), (-3, +3) to (-5, +5) after an M&A announcement. The explanatory variables in the regression analysis include TLA (R^2) and the consistency of TLA (R^2). According to prior studies, control

variables should be included to account for other variables which may affect the market's reaction to the M&A announcements. The regular control variables in the P&C M&A announcement effects normally include insurer's size, deal consideration (the acquisition payment in forms of cash only, common stock only, the combination of cash and common stock, cash plus debt or plus other forms of payment, or common stock plus other forms of payment), target's public listing status, insurer's concentrations of line of business and business geographic location, the percent of long-tailed and short tailed personal lines and commercial lines of business.

The Table 5 shows OLS regression analyses to report the relationships between acquirers' CARs and acquirers' TLA for the announcement year. Table 5 shows that there is a negative association between acquirers' CARs and acquirers' R^2 at the event window (-1, +1), and as the event window extends the association becomes positive. However, this association is not statistically significant. These results suggest we cannot accept *Hypothesis 2A* which states that there is a positive relationship between acquirers' CARs and TLA. A reason for the failure to accept this hypothesis might be that in the efficient market, acquirer's TLA does not have an additional effect on acquirer's CAR. this is likely due to the fact that investors have priced the acquirer's underlying liabilities in the insurers' stock prices based on the extensive disclosures of the loss reserve development information. Thus, acquirers' TLA no longer provides (or hides) additional information to investors.

Table 5: Relationship between Acquirers' CAR and Acquirer's R²

VARIABLES	CAR(-1,+1)	CAR(-3,+3)	CAR(-5,+5)
Acquirer TLA (R ²)	-0.023 (0.0228)	0.00004 (0.0306)	0.037 (0.0482)
Common Stock	-0.016 (0.0134)	-0.032 (0.0212)	-0.034 (0.0245)
Cash and Others	0.001 (0.0066)	0.007 (0.0081)	0.012 (0.0093)
Common Stock & Others	-0.020* (0.0115)	-0.006 (0.0089)	-0.007 (0.0151)
Unclassified Consideration	-0.007* (0.0039)	-0.001 (0.0063)	0.008 (0.0087)
All Other Consideration	-0.006 (0.0035)	-0.001 (0.0056)	0.008 (0.0065)
Asset	0.0001 (0.0021)	-0.002 (0.0026)	-0.003 (0.0031)
Product Line HHI	-0.007 (0.0071)	-0.007 (0.0077)	-0.007 (0.0090)
Geographic HHI	0.012 (0.0076)	0.007 (0.0082)	0.004 (0.0093)
Short-tailed personal line%	-0.035 (0.0322)	-0.081** (0.0372)	-0.091** (0.0427)
Short-tailed commercial line%	-0.013 (0.0159)	-0.029 (0.0188)	-0.034 (0.0217)
Long-tailed personal line %	0.028 (0.0300)	0.063* (0.0357)	0.061 (0.0426)
Publically Listed Target	-0.005 (0.0046)	0.004 (0.0064)	-0.0002 (0.0073)
Constant	-0.017 (0.0626)	0.067 (0.0841)	0.103 (0.1016)
Observations	709	709	709
R-squared	0.03	0.04	0.04
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Table 6 shows that there is a negative association at the event window (-1, +1) between acquirers' CARs and acquirers' R² consistency, and the association becomes positive at event windows (-3, +3) and (-5, +5). The magnitude of the positive association is low at 0.0003 and is nearly significant (with a P value at 0.12) at the event window (-3, +3), the association for the other two event windows is not statistically significant. These

results are also inconsistent with my *hypothesis 2B*, as acquirers' LTA consistency has no statistically significant effect on acquirers' CARs. This result indicated that acquirer's TLA consistency has no valuation effect on CAR.

The results in the Table 5 and 6 show that acquirer's R^2 and acquirer's R^2 consistency have delayed positive effects on the acquirer's CAR. However, the positive effects are not statistically significant, which suggests that the market is efficient for acquirers' valuation, and acquirers' stock prices reflect all available information about acquirers' values, and acquirers' R^2 and acquirers' R^2 consistency are not priced risk factors for acquirers, and do not create or destroy values for acquirers immediately following the M&A announcements. These results are not surprising, as prior research has mixed findings on the association between information risk and cost of equity. Eckles *et al.* (2013) uses loss reserve accrual quality as a proxy for information risk and shows no empirical evidence that the accrual quality increases cost of equity. This might be the case here for the relationship between CARs and acquirers' TLA and TLA consistency.

Table 6: Relationship between Acquirer's CAR and Acquirer's R² Consistency

VARIABLES	CAR(-1,+1)	CAR(-3,+3)	CAR(-5,+5)
Acquirer TLA (R ²) Consistency	-0.002	0.0003	0.001
	(0.0020)	(0.0022)	(0.0026)
Common Stock	-0.02	-0.039*	-0.038
	(0.0149)	(0.0221)	(0.0249)
Cash and Others	0.003	0.011	0.018*
	(0.0080)	(0.0093)	(0.0105)
Common Stock & Others	-0.016	-0.003	-0.004
	(0.0121)	(0.0092)	(0.0151)
Unclassified Consideration	-0.008*	-0.001	0.008
	(0.0040)	(0.0066)	(0.0089)
All Other Consideration	-0.004	0.001	0.011
	(0.0037)	(0.0058)	(0.0067)
Asset	-0.002	-0.005	-0.007*
	(0.0032)	(0.0034)	(0.0040)
Product Line HHI	-0.01	-0.01	-0.012
	(0.0083)	(0.0087)	(0.0101)
Geographic HHI	0.012	0.005	0.001
	(0.0093)	(0.0097)	(0.0110)
Short-tailed personal line%	-0.04	-0.090**	-0.105**
	(0.0374)	(0.0424)	(0.0484)
Short-tailed commercial line%	-0.009	-0.027	-0.034
	(0.0166)	(0.0196)	(0.0231)
Long-tailed personal line %	0.052	0.094**	0.104*
	(0.0417)	(0.0456)	(0.0535)
Publically Listed Target	-0.005	0.005	0.003
	(0.0048)	(0.0068)	(0.0072)
Constant	0.048	0.164	0.236*
	(0.0890)	(0.1044)	(0.1240)
Observations	664	664	664
R-squared	0.04	0.06	0.05
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

To prepare for an eventual merger, acquirers may also improve their TLA over time in order to reduce uncertainty in their values. This improvement in TLA may help management expedite the approval process from shareholders due to the reduced information asymmetry provided by increased transparency. Acquirers may also reduce their TLA due to their loss reserving volatility level, which may lead to increase in

information risk. To examine whether the market responds to acquirers' change in TLA, I create an additional variable, which takes the TLA difference (R^2 difference) between year 1 (the M&A event year) and year 5 (5 years prior to the M&A event). I then use an OLS regression analysis to examine the relationship between acquirers' change in R^2 and acquirers' CARs. Table 7 shows that the market does reward acquirers for their improvement in R^2 and the magnitude of rewards increases as the event time extends. The effect is positive and statistically significant at the event window (-5, +5) which suggests that acquirer's change in R^2 prior to the M&A event is a priced risk factor for the market. The magnitude and the statistical significance of the risk/reward increases as the event window extends. Insurers' change in TLA is not an apparent information and it is not normally disclosed in anywhere in the public information, also acquirers' improvement in transparency is a long-term and costly investment, thus acquirers' change in transparency is a valuable information for the market to further understand acquirers' loss reserving behavior and their management's commitment.

Table 7: Relationship between Acquirer's CAR and Change in Acquirer's R²

VARIABLES	CAR(-1,+1)	CAR(-3,+3)	CAR(-5,+5)
Acquirer's TLA (R ²) change	0.010 (0.0183)	0.029 (0.0261)	0.063* (0.0383)
Common Stock	-0.021 (0.0152)	-0.039* (0.0220)	-0.039 (0.0246)
Cash and Others	0.003 (0.0077)	0.011 (0.0091)	0.018* (0.0103)
Common Stock & Others	-0.017 (0.0116)	-0.003 (0.0091)	-0.002 (0.0150)
Unclassified Consideration	-0.008* (0.0040)	-0.001 (0.0067)	0.008 (0.0090)
All Other Consideration	-0.004 (0.0038)	0.001 (0.0059)	0.01 (0.0067)
Asset	-0.002 (0.0033)	-0.005 (0.0035)	-0.007* (0.0041)
Product Line HHI	-0.011 (0.0088)	-0.01 (0.0092)	-0.01 (0.0106)
Geographic HHI	0.011 (0.0084)	0.005 (0.0089)	0.001 (0.0100)
Short-tailed personal line%	-0.042 (0.0394)	-0.088** (0.0438)	-0.101** (0.0498)
Short-tailed commercial line%	-0.010 (0.0176)	-0.025 (0.0203)	-0.029 (0.0235)
Long-tailed personal line %	0.054 (0.0441)	0.094** (0.0474)	0.103* (0.0553)
Publically Listed Target	-0.004 (0.0049)	0.005 (0.0068)	0.003 (0.0071)
Constant	0.053 (0.0932)	0.163 (0.1073)	0.232* (0.1266)
Observations	664	664	664
R-squared	0.04	0.06	0.05
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

The control variable – the size of acquirers' asset (as measured by acquirers' log of total assets) in the Table 6 and 7 shows statistically significant negative associations with the CARs at the event window (-5, +5). The sizes of acquirers are inversely related to acquirers' CARs, implying that large acquirers tend to have smaller value gains.

Cummins, Tennyson and Weiss's (1999) study of M&A in insurance industry suggests

that large insurers tend to have lesser efficiency gain than smaller firm from M&A transactions.

The market shows no preference with the concentrations of lines of business and geographic locations of business for acquirers. The results from Table 5, 6 and 7 show that there is no statistically significant association between acquirers' CAR and product line HHI and geographic HHI). The market prefers smaller publically listed acquirers and also long-tailed personal line of business focused acquirers, and dislikes short-tailed personal line of business acquirers. This leads to the prediction that the market prefers smaller publically listed long-tailed personal line acquirers seeking valuation creation through M&A events.

6.5 Relationships between Acquirers' CARs and Targets' TLA

Tables 8 and 9 are OLS regression results showing the relationship between acquirers' CARs and targets' TLA (R^2) and also target's transparency consistency. The sample consists of acquirers and targets that are publically listed P&C acquirers buying P&C targets. The sample size is much smaller and only 55 pairs to 60 pairs have all the information available to study the relationship.

Table 8 shows that there are negative associations between acquirers' CARs and targets' TLA at the event windows (-3, +3) and (-5, +5). The negative association indicates that acquirers do not gain negotiate power from transparent targets. This result is inconsistent with my *hypothesis 3A*, which states that there is a positive relationship. This result suggests that target's R^2 is not a priced factor in the M&A event. Investors may already obtain this information through the insurer's regulatory disclosures.

Table 8: Relationship between Acquirer's CAR and Target's R²

VARIABLES	CAR(-1,+1)	CAR(-3,+3)	CAR(-5,+5)
Target TLA (R ²)	0.016	-0.041	-0.017
	(0.0317)	(0.0533)	(0.0392)
Common Stock	-0.028**	-0.069***	-0.081***
	(0.0125)	(0.0182)	(0.0160)
Cash and Others	0.004	0.007	0.006
	(0.0130)	(0.0173)	(0.0199)
Common Stock & Others	-0.048***	-0.045***	-0.038**
	(0.0119)	(0.0156)	(0.0181)
Unclassified Consideration	0.011	0.003	-0.0003
	(0.0104)	(0.0168)	(0.0148)
All Other Consideration	0.019	-0.001	0.016
	(0.0119)	(0.0158)	(0.0170)
Asset	0.001	0.005	0.005
	(0.0028)	(0.0043)	(0.0055)
Product Line HHI	0.009	-0.002	0.001
	(0.0071)	(0.0106)	(0.0129)
Geographic HHI	-0.014	0.013	0.005
	(0.0102)	(0.0147)	(0.0119)
Short-tailed personal line%	0.039	0.041	0.022
	(0.0233)	(0.0345)	(0.0442)
Short-tailed commercial line%	0.054*	0.057*	0.015
	(0.0306)	(0.0317)	(0.0595)
Long-tailed personal line %	0.007	0.032	-0.03
	(0.0421)	(0.0492)	(0.0608)
Publically Listed Target	-0.002	-0.019	0.005
	(0.0132)	(0.0182)	(0.0202)
Constant	-0.033	-0.142	-0.14
	(0.1073)	(0.1774)	(0.2229)
Observations	60	60	60
R-squared	0.17	0.17	0.13
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Table 9 shows that there is a negative and statistically significant relationship between acquirers' CARs and targets' R² consistency at the event window (-3, +3). This regression result rejects my *Hypothesis 3B*, the result shows that targets' TLA consistency actually effects acquirers' CARs negatively. The results from Table 8 and 9

are inconsistent with the M&A transparency theory (McNichols & Stubben, 2014), which suggests that targets transfer their bargaining powers to acquirers when the targets disclose transparent accounting information. I speculate that this finding may be due to the competitiveness of the M&A market in the P&C industry. The P&C acquirers have to pay more in the competitiveness P&C M&A market, which is confirmed by the high average forward P/E valuation shown in Figure 2. In a competitive M&A market, acquirers' bargaining power declines and they have to bid upward for transparent and quality targets, especially when targets' R^2 consistency increases. Target's transparency consistency further reduces information asymmetries between acquirers and targets, and also between different acquirers in the market. It also reduces uncertainty about targets' value and thus reduces information risk. Consistent transparent targets are more expansive for acquirers in the P&C M&A markets.

Table 9: Relationship between Acquirer's CAR and Consistency of Target's TLA (R^2)

VARIABLES	CAR(-1,+1)	CAR(-3,+3)	CAR(-5,+5)
Target TLA (R^2) Consistency	-0.001 (0.0022)	-0.005* (0.0029)	-0.002 (0.0035)
Common Stock	-0.015 (0.0123)	-0.068*** (0.0195)	-0.082*** (0.0126)
Cash and Others	0.011 (0.0084)	0.016 (0.0131)	0.018 (0.0159)
Common Stock & Others	-0.044*** (0.0122)	-0.033* (0.0181)	-0.026 (0.0193)
Unclassified Consideration	0.017* (0.0088)	0.003 (0.0168)	-0.003 (0.0149)
All Other Consideration	0.015 (0.0125)	-0.002 (0.0151)	0.016 (0.0179)
Asset	0.002 (0.0028)	0.002 (0.0066)	-0.0002 (0.0067)
Product Line HHI	0.009 (0.0069)	-0.01 (0.0133)	-0.007 (0.0145)
Geographic HHI	-0.019* (0.0107)	0.008 (0.0151)	0.002 (0.0136)
Short-tailed personal line%	0.058** (0.0280)	0.053 (0.0379)	0.021 (0.0477)
Short-tailed commercial line%	0.041 (0.0293)	0.039 (0.0300)	-0.006 (0.0580)
Long-tailed personal line %	-0.048 (0.0408)	0.024 (0.0743)	-0.004 (0.0586)
Publically listed Target	-0.009 (0.0123)	-0.018 (0.0182)	0.019 (0.0237)
Constant	0.009 (0.1153)	0.001 (0.2315)	0.036 (0.2596)
Observations	55	55	55
R-squared	0.29	0.25	0.18
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

To prepare for their M&A activities, targets may also attempt to improve their R^2 in order to reduce uncertainty in their values, and it may help to increase their valuation due to reduced information asymmetry and reduced information risk. Targets may also decrease their TLA due to their loss reserving volatility, which may lead to acquirers' over-paying due to the uncertainty in target's value. To examine whether the market

responds to targets' change in TLA (R^2), I also create an explanatory variable for targets' change in R^2 , which takes target's R^2 difference (R^2 Difference) between year 1 (the M&A event year) and year 5 (5 years prior to the M&A event), I then use an OLS regression analysis to examine the relationship between targets' change in TLA and acquirers' CARs.

Table 10: Relationship between Acquirer's CAR and Change in Target's R^2

VARIABLES	CAR(-1,+1)	CAR(-3,+3)	CAR(-5,+5)
Target's TLA (R^2) change	0.02	-0.033	-0.008
	(0.0223)	(0.0441)	(0.0335)
Common Stock	-0.017	-0.065***	-0.081***
	(0.0109)	(0.0183)	(0.0133)
Cash and Others	0.012	0.019	0.019
	(0.0085)	(0.0133)	(0.0154)
Common Stock & Others	-0.046***	-0.039**	-0.028
	(0.0110)	(0.0161)	(0.0187)
Unclassified Consideration	0.017**	0.002	-0.003
	(0.0085)	(0.0163)	(0.0144)
All Other Consideration	0.018	-0.001	0.017
	(0.0139)	(0.0166)	(0.0183)
Asset	0.002	0.003	0.0004
	(0.0028)	(0.0060)	(0.0066)
Product Line HHI	0.009	-0.008	-0.007
	(0.0064)	(0.0123)	(0.0139)
Geographic HHI	-0.019*	0.013	0.004
	(0.0105)	(0.0165)	(0.0135)
Short-tailed personal line%	0.054**	0.039	0.016
	(0.0255)	(0.0404)	(0.0452)
Short-tailed commercial line%	0.042	0.043	-0.005
	(0.0299)	(0.0306)	(0.0577)
Long-tailed personal line %	-0.046	0.029	-0.003
	(0.0388)	(0.0733)	(0.0592)
Publically Listed Target	-0.006	-0.019	0.019
	(0.0135)	(0.0182)	(0.0240)
Constant	-0.0004	-0.104	0.0001
	(0.1092)	(0.2096)	(0.2468)
Observations	55	55	55
R-squared	0.3	0.23	0.18
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Table 10 shows that targets' change in TLA prior to M&A activities are associated negatively with acquirer's CAR (but not statistically significant). Targets' change in TLA does not transfer their negotiation power to acquirers, nor did it create or damage acquirer's CARs, as the association between the acquirers' CAR and targets' change in TLA is not statistically significant.

To summarize the findings in Table 8, 9 and 10, target's TLA and target's improvement in TLA are not priced risks for acquirers, target's TLA consistency is a priced risk factor for acquirers. However, we must be careful interpreting these results, as the sample size used in these regressions are relative small.

I also include the type of consideration in the deal as control variables. The literature suggests that cash deals are valued higher than non-cash deals. We consider a number of types of different consideration: cash, cash and other, common stock only and the combination common stock and other types of payments. Relative to cash only deals, the common stock deals (in Table 8, 9 and 10) and the combination of common stock and other types of payments deals show statistically significant negative associations with acquirers' CARs. This result is consistent with other studies, which suggest that acquirers create more value with cash only deals than the stock purchase deals due to the complications in valuing stock.

The targets' public listing status has no statistically significant association with acquirers' CARs in all 6 tables above. This is inconsistent with the generally M&A studies, which suggests a "listing effect" for the acquisition of publically traded targets (e.g. Chang, 1998; Shams et al., 2013). Research results show the acquirers of private targets have higher returns as compared to the acquirers of public targets (e.g., Chang,

1998; Fang et al., 2015) due to reduced agency cost and reduced competition for private targets. However, as indicated above, the P&C M&A market has been competitive, which may reduce or eliminate the “listing effect” for publically listed targets.

6.6 Relationships between targets’ CARs and targets’ TLA

Tables 11 and 12 are regression analyses that investigate the relationships between targets’ CARs and targets’ R^2 , and the relationship between targets’ CARs and targets’ R^2 consistency.

Table 11 shows positive but (nearly) statistically significant associations between targets’ CAR and target’s R^2 for all three event windows (p value are at 0.126, 0.152 and 0.204 respectively for three event windows). These results are inconsistent with my *Hypothesis 4A*. However, they are consistent with my comments for the regression result from Table 9, which suggests that transparent targets are actually more valuable due to the competitive nature of the P&C M&A market.

Table 11: Relationship between Target's CAR and Target's TLA (R^2)

VARIABLES	CAR(-1,+1)	CAR(-3,+3)	CAR(-3,+3)
Target TLA (R^2)	0.075 (0.0490)	0.082 (0.0571)	0.075 (0.0590)
Common Stock	0.006 (0.0124)	0.011 (0.0151)	-0.023 (0.0188)
Cash and Others	0.046 (0.0319)	0.06 (0.0371)	0.055 (0.0367)
Common Stock & Others	0.01 (0.0106)	0.004 (0.0131)	0.025 (0.0161)
Unclassified Consideration	-0.003 (0.0197)	-0.006 (0.0205)	-0.021 (0.0230)
All Other Consideration	-0.017 (0.0110)	-0.019 (0.0133)	-0.024 (0.0170)
Asset	-0.004 (0.0034)	-0.005 (0.0044)	-0.001 (0.0065)
Product Line HHI	0.019 (0.0122)	0.024* (0.0128)	0.026** (0.0131)
Geographic HHI	0.011 (0.0124)	0.005 (0.0146)	0.013 (0.0172)
Short-tailed personal line%	-0.03 (0.0383)	-0.021 (0.0463)	-0.05 (0.0556)
Short-tailed commercial line%	-0.034 (0.0468)	-0.035 (0.0484)	-0.043 (0.0481)
Long-tailed personal line %	-0.033 (0.0443)	-0.057 (0.0520)	-0.059 (0.0588)
Constant	-0.141 (0.1653)	-0.122 (0.2030)	-0.262 (0.2662)
Observations	375	375	375
R-squared	0.1	0.08	0.05
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Table 12 also shows that there is a positive association between target's CAR and target's R^2 consistency at the event window (-3, +3), however, there are negative associations at the event windows (-1, +1) and (-5, +5). These results are not statistically significant.

Table 12: Relationship between Target's CAR and Consistency of Target's TLA (R^2)

VARIABLES	CAR(-1,+1)	CAR(-3,+3)	CAR(-3,+3)
Target TLA (R^2) Consistency	-0.001 (0.0049)	0.001 (0.0054)	-0.002 (0.0062)
Common Stock	0.014 (0.0138)	0.018 (0.0169)	-0.021 (0.0217)
Cash and Others	0.045 (0.0353)	0.061 (0.0404)	0.055 (0.0401)
Common Stock & Others	0.015 (0.0111)	0.006 (0.0136)	0.028* (0.0164)
Unclassified Consideration	-0.003 (0.0165)	-0.006 (0.0182)	-0.022 (0.0205)
All Other Consideration	-0.014 (0.0110)	-0.015 (0.0136)	-0.021 (0.0174)
Asset	-0.003 (0.0034)	-0.005 (0.0046)	-0.002 (0.0068)
Product Line HHI	0.027** (0.0126)	0.026* (0.0136)	0.026* (0.0143)
Geographic HHI	0.009 (0.0136)	0.007 (0.0159)	0.016 (0.0188)
Short-tailed personal line%	-0.021 (0.0399)	-0.011 (0.0480)	-0.041 (0.0589)
Short-tailed commercial line%	-0.039 (0.0492)	-0.036 (0.0505)	-0.044 (0.0538)
Long-tailed personal line %	-0.056 (0.0460)	-0.069 (0.0550)	-0.065 (0.0631)
Constant	-0.124 (0.1391)	-0.077 (0.1812)	-0.191 (0.2507)
Observations	359	359	359
R-squared	0.1	0.08	0.05
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Table 13 shows that there are statistically significant positive associations between target's CAR and target's improvement in R^2 . The market rewards targets when targets improve their R^2 prior to the M&A events. This indicates that target's improvement in TLA is a valuable information to the market.

Table 13: Relationship between Target's CAR and Change in Target's R².

VARIABLES	CAR(-1,+1)	CAR(-3,+3)	CAR(-3,+3)
Target TLA (R ²) Change	0.125** (0.051)	0.101* (0.058)	0.113* (0.061)
Common Stock	0.01 (0.013)	0.013 (0.016)	-0.024 (0.020)
Cash and Others	0.04 (0.034)	0.056 (0.040)	0.051 (0.039)
Common Stock & Others	0.018* (0.011)	0.01 (0.013)	0.029* (0.017)
Unclassified Consideration	0.003 (0.020)	-0.001 (0.020)	-0.017 (0.023)
All Other Consideration	-0.015 (0.011)	-0.016 (0.013)	-0.022 (0.017)
Asset	-0.003 (0.003)	-0.005 (0.005)	-0.001 (0.007)
Product Line HHI	0.033** (0.013)	0.032** (0.014)	0.032** (0.015)
Geographic HHI	0.008 (0.014)	0.006 (0.016)	0.015 (0.019)
Short-tailed personal line%	-0.02 (0.039)	-0.01 (0.047)	-0.041 (0.058)
Short-tailed commercial line%	-0.02 (0.050)	-0.018 (0.053)	-0.028 (0.054)
Long-tailed personal line %	-0.051 (0.046)	-0.065 (0.055)	-0.062 (0.063)
Constant	-0.188 (0.135)	-0.126 (0.178)	-0.251 (0.245)
Observations	359	359	359
R-squared	0.110	0.090	0.050
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

To summarize the findings in Table 11, 12 and 13, targets' TLA and targets' TLA consistency are not priced risk for targets' valuation. Target's improvement in TLA has statistically significant and positive valuation effect on targets. As I described earlier, targets' improvement in TLA is not ready information for investors, this information may disclose valuable information about the target's management decision and thus, is valuable to the market.

The control variable – the concentration of product line shows significant positive associations with targets' CARs in all three tables (11, 12 and 13). This suggests that targets with specialized lines of business are more valuable. Relative to the deals with cash only, there are actually gains for targets when deals paid in a combination of common stock and others. Further analysis may need to be done in order to understand the targets' value creation by paying with common stock and other types of consideration.

CHAPTER 7: CONCLUSION

This study examines the role of P&C insurers' TLA in a merger event. We investigate whether and to what extent the merger parties' TLA is related to the market's valuation of the mergers over the sample period 1989–2017. We use a Fama-French three factor model to calculate both acquirers and targets' cumulative abnormal stock returns following the merger announcements. We then use the Full Information Reserve Error stochastic model to measure the TLA. This is the first empirical study using the FIRE model to measure the TLA, and also the first empirical study to investigate the relationship between TLA and market valuation in M&A activities.

This study also provides an updated view of the market returns of the P&C M&A activities. The empirical evidence shows that on average P&C acquirers do not create values through mergers over the sample period 1989 to 2017. While P&C targets on average earn statistically significant positive CARs. These results are consistent with general M&A studies, which suggests that acquirers do not generate positive returns following M&A announcements. However, the prior P&C studies (e.g., Cummins & Xie, 2003) also show that P&C acquirers create values following the M&A announcements. I suspect that the financial crises from 2008 to 2010 may affect targets and acquirers' CARs. Further empirical analyses would help to understand why the targets and acquirers' CARs are lower than prior years and what are the determine factors driving the lower CARs during and after financial crisis.

The empirical evidences suggest that acquirers and targets' TLAs do not increase or decrease acquirers' CARs following the M&A announcement. I speculate that the market value of TLA is not as significant for P&C acquirers and targets' CARs because

of the stringent disclosure requirements for P&C insurers. P&C insurers are required to file financial statements and loss reserve development information. External investors have access to the loss reserve accrual and the loss reserve development information. Thus, information asymmetry is lower in the P&C insurance. The valuations of both acquirers and targets have already reflected the valuation implication of TLAs. This finding is consistent with the prior studies on firm equity and market valuation implications of P&C insurers' loss accrual quality (Anthony and Petroni, 1998; Beaver and McNichol, 1998 and 2001). Beaver and McNichols (1998 and 2001) suggest that the insurer equity value and market price of P&C insurers reflect the valuation implication of the loss accrual quality (1998 and 2001), and Eckles, et al (2014) indicates that loss reserve accrual quality is not a priced factor for the shareholder of P&C insurer. My study adds to the body of growing empirical evidence indicating that the market is efficient with the valuation implication of both targets and acquirers' TLAs, and TLAs are not priced risk factors in the P&C M&A valuation.

I also investigate insurers' loss reserve characteristics to relate to the probabilities of becoming acquirers or targets. The empirical evidence shows that acquirers are more transparent (in term of their loss reserving). The study also suggests that targets with specialized line of business are valuable targets.

I also find that insurers' improvement in TLA, as measured by the change of TLA between year one (the M&A event year) and year five (five years prior to the M&A event year), creates values. Insurer's improvement in TLA is a costly and long-term process, it gives information of insurers' loss reserving behavior, and it implies management's commitment and accountability in financial reporting, which would be valuable

information for the market to speculate possible outcomes of M&A activities and also the future of the combined companies. This result raises some intriguing questions for future research about market valuation implication of TLA improvement. For example, how does an insurer's improvement in TLA impact its market valuations? do stock prices or insurers' equity values reflect the TLA improvement?

Additionally, there are two aspects of loss reserve quality: loss reserving accuracy and loss reserve transparency. In this paper, I focus on the measure of loss reserve transparency. Further study of the relationship between loss reserve error (the measure of FIRE) and M&A valuation would provide valuable insights on the market valuation on the quality of the accounting information in the P&C M&A activities.

This study contributes to the literature on the market valuation of accrual transparency. My study is first to use the stochastic model (proposed by Grace and Leverty, 2011) to measure the transparency of loss reserve accrual, the results provide further empirical evidences on the implication of market efficiency for accounting information transparency.

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