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Are earnings quality attributes reflected in financial strength ratings?

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Abstract

Purpose – The purpose of this paper is to examine whether earnings quality attributes are reflected in AM best's financial strength ratings (FSRs), a measure widely used in the insurance industry to assess financial health.

Design/methodology/approach – Using a sample of insurance companies during the period 2006-2012, the authors measure the quality of reported earnings using three accounting-based measures: earnings persistence, accrual quality, and earnings smoothness.

Findings – The authors find that better earnings persistence, higher accrual quality, and less earnings smoothing are reflected in higher FSRs for both public and private insurers, with the magnitude of the effect greater for private insurers.

Originality/value – This is the first study of which the authors are aware that seeks to understand the impact, if any, of variations in the quality of reported financial information on the perceived financial health of firms by ratings agencies in the insurance industry. The authors also include a novel research design in assessing the determinants of financial health ratings. Users of FSRs should be aware of the impact of ownership structure on ratings agencies' propensity to incorporate reported earnings attributes in their ratings.

Keywords Financial accounting, Earnings quality, Financial strength ratings, Public/private, Accrual quality, Earnings persistence, Earnings smoothness

Paper type Research paper

Introduction

Ratings agencies play an important role in financial markets. According to Partnoy (2009), "[A] primary cause of the recent credit market turmoil was overdependence on credit ratings and credit ratings agencies." Partnoy goes on to argue that without such overdependence, collateralized debt obligations (CDOs) and structured investment vehicles could not have been created and sold. This seems to imply that dependence on ratings agencies is perilous. However, a certain level of reliance on financial intermediaries, such as credit rating agencies, financial analysts, and external auditors, is critical to atomistic shareholders who would otherwise not be privy to the same level of information obtained by these intermediaries.

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Ideally, ratings should offer a strong and clear signal regarding the financial health of a firm. While some evidence suggests that assigned ratings are not entirely objective (Partnoy, 2009; Griffin and Tang, 2012), it seems reasonable to assume that credit ratings provide a significant amount of information. On the other hand, financial statement information is also intended to signal a certain level of financial health to potential investors. As with ratings, earnings quality varies among firms (Huang *et al.*, 2012; Iliev, 2010; Jorion *et al.*, 2009). Given the dependence that investors necessarily place in financial intermediaries, such as ratings agencies, it is critical to understand what information is contained in the ratings. Do the ratings properly incorporate not only reported earnings and other accounting values, but also the relative quality of such information?

The insurance industry represents a particularly relevant setting for this study. The property and casualty (P&C) insurance industry is extremely large, with the largest 25 insurers alone writing over $521 billion in premiums in 2012 (NAIC, 2012). Given the pervasive need for its products, nearly all economic entities are affected by the P&C insurance industry. In spite of its importance as a part of the financial services industry and larger economy, researchers have given the P&C insurance industry relatively little heed. Indeed, Joskow's (1973, p. 376) statement that "it seems somewhat unfortunate that such an important private sector of the US economy has not undergone more intensive study and analysis" rings true some 40 years later. Additionally, the extent to which extant and potential stakeholders may rely on ratings produced for insurers is critical information in order for markets to operate efficiently. Thus, the purpose of this study is to document the extent to which financial strength ratings (FSRs) independently assigned to insurers by A.M. Best[1] are associated with the earnings quality[2] reported by the insurer.

We build on two growing streams of research. The first stream investigates the quality and information content of assigned ratings. For example, Nayar and Rozeff (2012) find that rating downgrades are associated with abnormal negative returns. The second stream of research is the study of earnings quality attributes (e.g. Dechow *et al.*, 2010).

We find that earnings persistence, accrual quality, and less earnings smoothing are all positively related to FSRs. Our results indicate that lower accrual quality in public firms is associated with higher outlook[3] ratings, which suggests that assessors less accurately consider accrual quality in their assessments of future financial health among public firms. Overall, our findings indicate that agencies assessing insurer financial strength take into account earnings quality attributes.

The remainder of the paper proceeds as follows. First, we discuss the background and hypotheses. Next, we provide the sample and methodology for our hypothesis tests. Finally, we discuss our results and then conclude.

Background and hypothesis development

Nationally Recognized Statistical Rating Organizations (NRSRO) ratings

Insurers are subject to a high level of scrutiny. A variety of regulators, investors, and creditors pay careful attention to insurer financial reports in an attempt to accurately assess their financial health. An accurate assessment of insurer financial strength is essential for resource allocation decisions. A variety of measures exist; however, one important measure is A.M. Best's FSR, which represents an independent opinion of insurer financial health. According to A.M. Best, their FSR is "recognized worldwide as the benchmark for assessing and comparing insurers' financial strength" (A.M. Best, 2012).

The impact of ratings produced by a NRSRO, such as A.M. Best, is potentially very powerful. Ratings agencies have played a critical role in capital markets for decades. Since Moody's began rating bonds in 1909 (Cantor and Packer, 1997), their influence in capital allocation decisions has increased significantly. Indeed, according to *New York Times* columnist and Pulitzer Prize-winning author, Thomas L. Friedman (1996), "There are two superpowers in the world today in my opinion. There's the United States and there's Moody's Bond Rating Service. The United States can destroy you by dropping bombs, and Moody's can destroy you by downgrading your bonds. And believe me, it's not clear sometimes who's more powerful."

Firms have strong incentives to avoid downgrades because of the adverse financial impact. For example, Nayar and Rozeff (2012) find that in the context of commercial paper, rating upgrades have no effect, while rating downgrades are associated with abnormal negative returns. In spite of the significant impact of credit ratings, credit rating quality has often been called into question. For example, Sinclair (1994) describes ratings agencies as "governance without government." Partnoy (1999) asserts that many rating assessments are too high, and are only downgraded after the firm itself has chosen to disclose information representing a significant increase in risk.

Differences between ratings agencies may not always be universally recognized or accepted. Cantor and Packer (1997) point out that regulations utilizing private sector ratings assume that different agencies have equivalent scales; however, some agencies systematically assign higher ratings to firms. Following the financial crisis of 2008-2009, scrutiny surrounding credit ratings intensified. Partnoy (2009) asserts that over time rating agencies ceased to be information intermediaries and instead became issuers of regulatory licenses. He concludes that investors should not rely on mnemonic ratings.

Griffin and Tang (2012) examine the impact of subjectivity in credit ratings for CDOs. CDOs have been largely blamed for the damage caused to the banking sector during the financial crisis of 2008-2009. In an analysis of 916 firms between 1997 and 2007, they find that a credit rating agency frequently made adjustments based on non-quantitative factors. They conclude that these adjustments resulted in ratings that were relatively higher than they otherwise would have been. For example, they specifically mention that, on average, AAA rated tranches had BBB rated support-level structures.

Perhaps most relevant to our study, Jorion *et al.* (2009) reexamine the prior research contention that although ratings are inflated, the reason for the steady decline in credit ratings for US firms over the past two decades is due to agencies tightening their credit standards. They illustrate that this steady decline in ratings is not due to tightening credit standards, but is primarily due to a decrease in accounting quality.

Jorion *et al.* (2009) discuss the role of the quality of accounting information and standard and poor's (S&P's) process of setting credit ratings for US-listed firms. They indicate that accounting quality plays a crucial role in this process, and that since the accounting scandals in the early 2000s, S&P has made publicly available their methods in making adjustments to arrive at "core earnings."

One of the primary reasons S&P initiated this process is that financial statements, in general, have become less comparable across firms and less useful to investors and analysts. Moreover, several studies suggest that earnings quality declined and various forms of earnings management steadily increased from around 1960 to 2000 (e.g. Brown *et al.*, 1999; Cohen *et al.*, 2005; Rajgopal and Venkatachalam, 2008). Graham *et al.* (2005)

survey top financial executives who indicate that they attempt to meet various earnings benchmarks for many reasons, including achieving or maintaining a certain credit rating. This is especially true for large firms with high credit ratings.

Earnings persistence

An important assumption in the resource allocation decisions of regulators, investors, and creditors is high earnings quality. Users of financial statements need to be able to rely on the quality of reported earnings to make the best possible decisions. A substantial amount of accounting research examines earnings quality. For example, Singer and You (2011) study the impact of section 404 of the Sarbanes-Oxley Act (SOX) on the quality of reported earnings. They find that firms required to comply with SOX during the first two years of its implementation improved their earnings reliability. Furthermore, the value relevance of these improved-quality earnings also increased. Iliev (2010), also examining the impact of SOX, finds that SOX compliance is positively associated with conservative earnings (i.e. higher quality).

Furthermore, Penman and Zhang (2002) indicate that sustainable earnings (i.e. where current earnings is a good predictor of future earnings) is considered to reflect high quality. Moreover, Sloan (1996) suggests that persistent earnings represents higher quality earnings and the cash component of earnings is more persistent than the accruals component of earnings. However, prior earnings quality studies have primarily focussed on non-financial industries. We argue that insurer earnings persistence can affect FSR levels.

We also contend that organizational structure is likely to have an impact on the association between earnings persistence and FSRs. A variety of studies exist that document the attributes of firms with various levels of earnings quality. For example, Ball and Shivakumar (2005) find, in a sample of public and private UK companies, that private firms produce lower quality financial reports than corresponding public companies. Their results hold after controlling for size, leverage, industry, auditor size, and endogenous listing decision. Therefore, we expect the persistence of earnings for public insurers, compared to private insurers, to dominate. Thus, the previous arguments lead to our first set of hypotheses, stated in the alternative form:

H1a. Insurer earnings persistence is positively associated with stronger financial health assessments.

H1b. The association between insurer earnings persistence and positive financial health assessments is incrementally stronger among public insurers compared to private insurers.

Accrual quality

Prior research has also used accruals quality as a proxy for earnings quality. For example, Demirkan *et al.* (2012) examine the discretionary accruals quality of firms that have multiple segments vs firms that have just a single segment. In a sample of over 35,000 firm-year observations from 1984 to 2003, they find that discretionary accruals quality is lower for multiple-segment firms than for single-segment firms. They also find that agency problems may be more severe in multiple-segment firms. As a result, accruals quality models (e.g. Dechow and Dichev, 2002) have also been developed to generate expected accruals based upon the strength of the relation between past, current, and future cash flows.

Research that involves the determinants of earnings quality in the insurance industry revolves around management of the loss reserve accrual. A foundational paper in this area is Petroni (1992). She finds that financially weaker insurers understate their loss reserves compared to financially stronger insurers, and that insurers closer to receiving regulatory attention understate their loss reserves by an even greater amount.

Beaver *et al.* (2003) investigate insurer loss reserve management and the distribution of earnings and find more income-increasing loss reserve accruals for insurers with small earnings and more income-decreasing loss reserve accruals for insurers, with the highest levels of earnings. They also find that public insurers manage loss reserves to avoid losses, but that private insurers do not. Relatedly, Gaver and Paterson (2001) find that the understatement of loss reserves by financially weaker insurers goes away when insurers employ Big Six auditor-actuary pairs and that non-Big Six actuaries have less of an effect on insurers understating loss reserves.

While the previous body of work focusses on management of loss reserves, our study is distinct in that we determine the impact that three accounting-based earnings quality measures (i.e. earnings persistence, accrual quality, and earnings smoothness) have on A.M. Best's FSRs for insurers.

We argue that accrual quality can affect FSR levels and that financially weaker insurers (i.e. those with lower FSRs) may have an incentive to achieve higher FSRs by utilizing accounting methods that decrease earnings quality. In contrast, financially stronger insurers (i.e. those with higher FSRs) do not have those same incentives. If credit ratings agencies are aware of such manipulations, we expect firms with lower accrual quality to have lower FSRs *Ceteris paribus*.

We also expect that organizational structure has an impact on the association between accrual quality and FSRs. Givoly *et al.* (2010) study earnings quality in the context of firms with public and private equity. They find that firms with privately owned equity report lower quality earnings. However, they also find that among firms with privately owned equity, the accruals portion of reported earnings is of higher quality, and that these private firms have a lower propensity to manage earnings. We expect the public insurer propensity to manage earnings through accruals (which would result in lower accrual quality) in order to achieve higher financial strength assessments to dominate. These arguments lead to our next set of hypotheses, stated in the alternative form:

H2a. Insurer accrual quality is positively associated with stronger financial health assessments.

H2b. The association between insurer accrual quality and positive financial health assessments is incrementally weaker among public insurers compared to private insurers.

Earnings smoothing

Furthermore, prior research identifies earnings smoothing as an earnings quality measure, whereby the effects of real economic shocks on performance are concealed by either accelerating the recognition of revenue or deferring the recognition of costs (e.g. Leuz *et al.*, 2003). Similar to our arguments related to accrual quality, we expect that financially weaker insurers (i.e. those with lower FSRs) may have an incentive to achieve higher FSRs by smoothing earnings. In contrast, financially stronger insurers

(i.e. those with higher financial strength ratings) do not have those same incentives. For example, in an examination of Brazilian firms, Martinez and Castro (2011) find that there is a connection between bond ratings and earnings quality. Specifically, they find that firms that smooth their earnings benefit from better ratings in bond issuances. This result is robust across several rating agencies. If credit ratings agencies are aware of such manipulations, then we expect firms that smooth earnings (i.e. have lower earnings quality) to have lower FSRs *Ceteris paribus*.

We also contend that organizational structure has an impact on the association between accrual quality and FSRs, and predict that the public insurer propensity to smooth earnings in order to achieve higher financial strength assessments will dominate. The previous arguments lead to our final set of hypotheses, stated in the alternative form:

H3a. Less earnings smoothing is positively associated with stronger financial health assessments.

H3b. The positive association between lower levels of earnings smoothing and positive financial health assessments is incrementally weaker among public insurers compared to private insurers.

Methodology

Sample

We use A.M. Best ratings data and financial information for P&C insurers from the A.M. Best database. We obtain auditor data from the SNL database. We report the sample selection process in Table I. There were 35,689 P&C insurer year observations from 2002 to 2011. To be included in this study, we also require FSRs. We exclude 13,656 observations required to develop variance computations necessary for our earnings persistence measure, 10,224 observations with E, F, or NR (failing or non-existent) ratings, and 6,737 missing data or data lost due to lagged variables. This process results in a sample of 5,072 P&C observations used in the main regression models. Furthermore, we lose 11 more observations due to lagged variables required for the change models, resulting in a sample of 5,061.

Base model

We model the FSRs of P&C insurers using logistic regression models. We use two A.M. Best ratings measures, financial strength current ratings (Ratings) and financial strength outlook (Outlook) as dependent variables for these models. As the Ratings variable uses ordinal data, we use an ordered logistic regression to model FSRs.

	Total obs.	Change analysis
A.M. Best data set (2002-2011)	35,689	
Less		
1st four years financial data needed for variance computations	−13,656	
E, F, and NR Financial strength ratings	−10,224	
Other missing A.M. Best data and data lost due to lagged variables	−6,737	
Observations used in regressions	5,072	5,072
Less: change data missing		−11
Observations used in change regressions		5,061

Table I.
Sample selection summary

However, we use a binary logit regression model when Outlook is the dependent variable. We are unaware of any previous study that has modeled the determinants of FSRs. However, A.M. Best provides insight into their methodology used to rate insurers (A.M. Best, 2012). Based on A.M. Best's methodology, our main financial strength levels models used to test our hypotheses follows:

$$FSR_t = \alpha + \beta_1 ResidEarnings_t + \beta_2 ResidAccruals_t + \beta_3 CorrNI + \beta_4 Public + \beta_5 ROR + \beta_6 Lev + \beta_7 Liquidity + \beta_8 LossLaePhs + \beta_9 Size + \beta_{10} trend + \varepsilon_t \quad (1)$$

$$FSR_t = \alpha + \beta_1 ResidEarnings_t + \beta_2 ResidAccruals_t + \beta_3 CorrNI + \beta_4 Public + \beta_5 ResidEarnings_t * Public + \beta_6 ResidAccruals_t * Public + \beta_7 CorrNI * Public + \beta_8 ROR + \beta_9 Lev + \beta_{10} Liquidity + \beta_{11} LossLaePhs + \beta_{12} Size + \beta_{13} trend + \varepsilon_t \quad (2)$$

where FSR is the A.M. Best FSRs measure. We use two proxies for A.M. Best FSRs as follows.

Ratings is a discrete number from 1 to 14 based on a process similar to one used by Petroni (1992). It is computed by taking A.M. Best FSRs *−1 and adding 14 to create positive ratings. Ratings are as follows: A + + = 13; A + = 12; A = 11; A− = 10; B + + = 9; B + = 8; B = 7; B − = 6; C + + = 5; C + = 4; C = 3; C − = 2; and D = 1. See our discussion of dependent variables on p. 8 for further information.

Outlook is an indicator variable takings the value 1 if the current outlook is not a negative outlook and 0 otherwise. See our discussion of dependent variables on p. 8 for further information.

ResidEarnings is the regression residual from an earnings persistence model of $Earnings_{t+1}$ on $Earnings_t$ (following Sloan, 1996), where Earnings is net income divided by beginning total assets. See our discussion of explanatory variables on pp. 8-9 for further information.

ResidAccruals is a transformation of the regression residual from an accruals quality model of $AvgAccruals_t$ on CFA_{t-1}, CFA_t, and CFA_{t+1} (based on Dechow and Dichev, 2002), where AvgAccruals is net income minus operating cash flows divided by average assets and CFA is operating cash flows scaled by average assets. See our discussion of explanatory variables on pp. 8-9 for further information.

CorrNI is a smoothing ratio calculated as the variance in net earnings divided by the variance in operating cash flows (see Leuz *et al.*, 2003). See our discussion of explanatory variables on pp. 8-9 for further information.

Public is an indicator variable taking the value of 1 if the insurer is a publicly traded company and 0 otherwise. We classify any company listed on the SNL database with a ticker as a publicly traded company. See our discussion of control variables on p. 9 for further information.

ROR represents pretax return on revenue (ROR) calculated as pretax operating income divided by net premiums earned. See our discussion of control variables on p. 9 for further information.

Lev is A.M. Best's net leverage ratio divided by 100. See our discussion of control variables on p. 9 for further information.

Liquidity is reported by A.M. Best as overall liquidity. Overall liquidity is calculated by taking total assets divided by (total liabilities less conditional reserves). We use the natural log of this measure in the model. See our discussion of control variables on p. 9 for further information.

LossLaePhs is the loss and loss adjustment expense (LAE) reserves to policyholder surplus. This is calculated by taking loss and LAE reserves divided by policyholder surplus. See our discussion of control variables on p. 9 for further information.

Size is the natural log of A.M. Best's size measure. See our discussion of control variables on p. 9 for further information.

Trend represents the FSRs annual trend. See our discussion of control variables on p. 9 for further information.

Change model

For our change models, we use the change in FSRs (ΔRating) as our dependent variable. As the Ratings variable uses ordinal data, we use an ordered logistic regression to model change in financial strength. The financial strength change models used to test our hypotheses follows:

$$\begin{aligned}\Delta FSR_t =& \alpha + \beta_1 ResidEarnings_t + \beta_2 ResidAccruals_t + \beta_3 CorrNI \\ &+ \beta_4 Public + \beta_5 \Delta ROR + \beta_6 \Delta Lev + \beta_7 \Delta Liquidity \\ &+ \beta_8 \Delta LossLaePhs + \beta_9 \Delta Size + \varepsilon_t\end{aligned} \tag{3}$$

$$\begin{aligned}\Delta FSR_t =& \alpha + \beta_1 ResidEarnings_t + \beta_2 ResidAccruals_t + \beta_3 CorrNI \\ &+ \beta_4 Public + \beta_5 ResidEarnings_t * Public + \beta_6 ResidAccruals_t * Public \\ &+ \beta_7 CorrNI * Public + \beta_8 \Delta ROR + \beta_9 \Delta Lev + \beta_{10} \Delta Liquidity \\ &+ \beta_{11} \Delta LossLaePhs + \beta_{12} \Delta Size + \varepsilon_t\end{aligned} \tag{4}$$

where ΔFSR is the change in FSRs as defined in Equation (1).

ΔROR represents change in pretax ROR. See our discussion of control variables on p. 9 for further information.

ΔLev is change in A.M. Best's net leverage ratio divided by 100. See our discussion of control variables on p. 9 for further information.

ΔLiquidity is change in A.M. Best's overall liquidity. See our discussion of control variables on p. 9 for further information.

ΔLossLaePhs is change in the loss and LAE reserves to policyholder surplus. See our discussion of control variables on p. 9 for further information.

ΔSize is change in the natural log of A.M. Best's size measure. See our discussion of control variables on p. 9 for further information.

All other variables were previously defined.

Dependent variables

We use the FSRs (Ratings[4]) as the main dependent variable in the FSRs model. Using a process similar to Petroni (1992), higher ratings represent insurers with stronger financial strength. We also use A.M. Best financial strength outlook (Outlook) as an alternative financial strength proxy, because it is a forward-looking measure. In Table VII, we use Ratings and Outlook in the following financial year (period $t + 1$) as our dependent variables to investigate whether ratings change as a response to earnings quality. For our change models, we use change in Ratings for our dependent variable.

Explanatory variables

Following Sloan (1996), we base our first explanatory variable (ResidEarnings) on the error term from our earnings persistence model (Equation (5)) as follows:

$$Earnings_{t+1} = \alpha + \beta_1 Earnings_t + \varepsilon_t \quad (5)$$

where Earnings is net income divided by beginning total assets.

All other variables were previously defined.

We use the error term from Equation (5) as our proxy for earnings persistence. Larger values of this variable indicate more persistent earnings and higher earnings quality. Thus, a positive association between this variable and the FSRs proxy suggests insurers with more persistent earnings have better FSRs.

Following Dechow and Dichev (2002)[5], we base our second explanatory variable (ResidAccruals) on the error term from the accrual quality model (Equation (6)) as follows:

$$AvgAccruals_t = \alpha + \beta_1 CFA_{t-1} + \beta_2 CFA_t + \beta_3 CFA_{t+1} + \varepsilon_t \quad (6)$$

where AvgAccruals = NI-CFO divided by average assets.

CFA is operating cash flows scaled by average assets.

All other variables were previously defined.

Equation (6) uses operating cash flows, lagged operating cash flows, and operating cash flows in the next period to explain changes in working capital. Larger error terms show unexpected accruals, which suggest lower quality accruals. Thus, we take the absolute value of the error term and use 1 minus the absolute value of the error term as the dependent variable so that larger values of the dependent variable indicate higher accrual quality. A positive association between this variable and the financial health ratings proxy suggests insurers with higher accrual quality (and therefore higher earnings quality) have better financial health ratings.

Our third explanatory variable (CorrNI) is a smoothing ratio calculated as the variance in net earnings divided by the variance in operating cash flows. A lower smoothing ratio indicates greater smoothing which may be perceived as greater earnings management and may lead to less timely and less informative earnings (lower quality earnings). However, Dechow *et al.* (2010) demonstrate the contradictions within the smoothing ratio. The authors note that smoothing transitory cash flows may be a signal of higher earnings quality, because it can improve earnings persistence and earnings informativeness.

Control variables

Our first control variable is publicly traded insurers (Public). We use an indicator variable to represent publicly traded insurers in this model. We expect public companies will be more financially sound and therefore have better ratings. Our other control variables are based on determinants of A.M. Best FSRs. A.M. Best outlines several tests used as part of their analytical techniques in their P&C insurer ratings process (A.M. Best, 2012). These are the profitability tests, leverage tests, liquidity tests, and loss reserve tests. Following A.M. Best's process, we use pre-tax ROR and change in ROR (ΔROR) to proxy for profitability. We expect a positive association between ROR (ΔROR) and the FSRs (change in ratings), because more profitable insurers should have better ratings.

We use net leverage (Lev) and change in Lev (ΔLev) as our proxies for leverage. We expect highly leveraged insurers to have lower ratings, and therefore we predict a negative coefficient. We use overall liquidity (Liquidity) and change in overall liquidity (ΔLiquidity) as proxies for liquidity. We expect insurers with greater liquidity to be more financially sound, and therefore predict a positive coefficient.

We use loss and LAE Reserves to policyholder surplus (LossLaePhs) and change in LossLaePhs (ΔLossLaePhs) as our proxies for quality of loss reserves. LossLaePhs measures the trend and magnitude of a company's total loss reserves to policyholder surplus. We expect higher levels of this measure reveals greater business risk; thus, we predict a negative association between this measure and FSRs. Finally, we add size and trend (and change in size) as control variables in the models and do not make a sign prediction.

Results

Descriptive statistics and correlations

Table II provides a short description of all the variables used in this study, and Table III provides descriptive statistics for our variables of interest and control variables. As described earlier in the paper, we transform rating based on the Petroni process by multiplying by −1 and adding 14 so that higher rating values represent stronger financial health[6]. After this variable transformation, the mean Rating for firms with strong (weak)[7] financial strength is 10.6 (4.4).

As expected, our variable for the A.M. Best database rating code (FSRC) and Outlook are significantly different when comparing strong and weak firms. ROR and Liquidity are both higher for financially strong firms, and net leverage (Lev) is higher for firms with low financial strength.

Over half of the financially weak firms incurred net losses, while only 17 percent of financially strong firms incurred net losses. Only 4 percent of the firms with low financial strength employed Big 4 auditors, while 72 percent of financially strong firms employed Big 4 auditors. None of the 25 firms with weak financial strength are public; however, 39 percent of the firms that are financially strong are public. Moreover, firms with greater financial strength are significantly larger than firms with lower financial strength.

Table IV provides Pearson and Spearman correlation coefficients for variables in our various empirical models. In general, variable correlations are in expected directions. Rating is positively and significantly correlated with the residual from the earnings persistence model (ResidEarnings), the residual from the accrual quality model (ResidAccruals), ROR, Liquidity, Size, and Public. Rating is negatively correlated with our measure of earnings smoothing (CorrNI) in the Spearman specification, which may indicate that firms with higher FSRs have smoother earnings.

Multivariate analyses

Table V provides results for our base logistic regression model, which tests whether our earnings quality measures (i.e. earnings persistence, accrual quality, and earnings smoothness) are determinants of insurer financial strength. When we use Ratings (i.e. the primary output of the process) as the dependent variable, ResidEarnings (our measure of earnings persistence), ResidAccruals (our measure of accrual quality), and CorrNI (our measure of earnings smoothness) are all positive and highly significant at the 1 percent level.

These results provide evidence in support of *H1a* and suggest that earnings persistence is positively associated with stronger ratings. The results also provide

Variable	Description
Accruals	Total accruals measured as NI-CFO
Ratings	FSR based on Petroni process. Ratings are as follows: A + + = 13; A + = 12; A = 11; A− = 10; B + + = 9; B + = 8; B = 7; B − = 6; C + + = 5; C + = 4; C = 3; C − = 2; and D = 1
FSRC	FSR based on A.M. Best database rating code
Fniba	NI $t+1$ divided by beginning assets
Niba	NI divided by beginning assets
Cfoba	CFO divided by beginning assets
Accrualsba	Accruals divided by beginning assets
Avgaccruals	Accruals divided by average assets
Favgcfo	CFO $t+1$ divided by average assets
Lavgcfo	CFO $t-1$ divided by average assets
Avgcfo	CFO divided by average assets
Nivar	σ (NI divided by beginning assets). Variance based on 5 years of NI
Cfovar	σ (CFO divided by beginning assets). Variance based on 5 years of cash flows
CorrNI	σ NI/σ CFO. See our discussion on p. 9 for further information
Outlook	Indicator variable taking the value 1 if the current outlook is not negative and 0 otherwise
Lnta	Natural log of total assets
Growth	% growth in NPW
Lev	Net leverage based on A.M. Best net leverage ratio divided by 100
Loss	Indicator variable = 1 if NI < 0 and 0 otherwise
ResidEarnings	Residual of an earnings persistence model (following Sloan, 1996). See our discussion on p. 8 for further information
ResidAccruals	Transformation of the residual from the Dechow and Dichev (2002) accruals quality model. See our discussion on p. 8 for further information
Public	Indicator variable taking the value of 1 if the insurer is a publicly traded company and 0 otherwise. We classify any company listed on the SNL database with a ticker as a publicly traded company
ROR	Pretax return on revenue calculated as pretax operating income divided by net premiums earned
Liquidity	Overall liquidated calculated by taking Total Assets divided by (Total Liabilities less Conditional Reserves). We use the natural log of this measure in the model
LossLaePhs	Loss and Loss Adjustment Expense (LAE) reserves to policyholder surplus; calculated by taking the loss and LAE reserves divided by policyholder surplus
Size	Natural log of A.M. Best size measure
Trend	Trend variable representing the change in year
ΔRating	Change in FSR rating (based on Petroni process)
WeakD	Indicator variable = 1 if FSR is lower than a B− and 0 otherwise

Note: [a]See the methodology section for a more detailed description of variables

Table II.
Variable definitions providing a short description of variables used in this study[a]

support for *H2a* and *H3a* and suggest that accrual quality and less earnings smoothing are positively related to higher FSRs[8]. Similarly, when we utilize Outlook (i.e. the secondary, forward-looking output of the ratings process) as the dependent variable (Model 1), ResidEarnings, CorrNI, and ResidAccruals are positive and significant.

Consistent with *H1b*, the association between insurer earnings persistence and stronger financial health assessments appears to be incrementally stronger among public insurers using Ratings as the dependent variable (Model 2). However, our tests of *H2b* and *H3b* (by interacting ResidAccruals and CorrNI) are both insignificant when we use Rating as the dependent variable. Furthermore, when we include interactions

Variable	Mean weak FS	Mean strong FS	Pooled diff *t*-test	Median weak FS	Median strong FS	Lower quartile	Upper quartile
$n = 25$ (5,049) for weak FS (strong FS) observations							
$Rating_{t+1}$	4.400	10.647	***	4.000	11.000	10.000	11.000
FSRC[c]	31.360	13.188	***	31.000	12.000	12.000	13.000
Outlook	0.135	0.840	***	1.000	–	–	–
ResidEarnings	(0.009)	(0.002)		(0.017)	(0.001)	(0.014)	0.013
ResidAccruals	0.943	0.974	***	0.946	0.983	0.966	0.993
CorrNI	1.739	0.877	*	0.778	0.213	0.045	0.709
ROR	(0.005)	0.272		(0.021)	0.084	–	0.225
Lev	0.057	0.020		0.059	0.018	0.008	0.029
Liquidity	4.942	5.466	***	4.859	5.218	5.030	5.647
LossLaePhs	1.958	0.637	***	1.873	0.475	0.093	0.994
Size	1.390	2.224	***	1.386	2.197	1.946	2.708
Public	–	0.391	***	–	–	–	1.000
ROE	(0.052)	0.051	**	(0.033)	0.049	0.015	0.110
LNTA	10.241	11.686	**	9.996	11.549	10.340	12.801
Loss	0.560	0.174	**	1.000	–	–	–
Aud4	0.040	0.717	**	–	1.000	–	1.000
ΔRating	0.440	0.005	***	–	–	–	–
ΔFSRC	2.680	(0.035)	***	–	–	–	–
ΔROR	0.025	(0.037)		0.018	–	(0.073)	0.025
ΔLev	0.001	(0.000)		(0.002)	–	(0.002)	0.001
ΔLiquidity	(0.010)	0.013		0.008	0.006	(0.033)	0.058
ΔLossLaePhs	0.054	(0.009)		0.036	–	(0.065)	0.026
ΔSize	(0.001)	0.020		(0.023)	0.019	(0.034)	0.067

Table III.
Descriptive statistics[a] and comparison of insurers with weak (strong) A.M. Best FS ratings[b] – winsorized at 1 percent levels

Notes: [a]See Table II for variable definitions and the methodology section for a more detailed discussion of the variables. [b]Weak FS ratings are defined as FSR lower than a B−; strong FS ratings are defined as FSR equal to or greater than B−. [c]FSRC has not been transformed. Higher levels of FSRC are associated with weaker financial strength ratings. *,**,***Statistical significant at the 10, 5 and 1 percent level, respectively

with Public in the Outlook model (Model 2), ResidEarnings is insignificant at standard levels, while ResidAccruals and CorrNI are both negative and significant at the 1 percent level.

These results indicate that the positive association between earnings persistence and FSRs is incrementally stronger among publicly owned insurers, consistent with *H1b*. Moreover, accruals quality and unsmoothed earnings are incrementally less rewarded in the Outlook scores of public insurers than private insurers (in support of *H2b* and *H3b*). An alternative explanation might be that public insurers are incrementally less punished for reporting low-quality accruals and for smoothing earnings. Then, our results support the notion that public firms more successfully manipulate earnings via accruals and income smoothing than private firms without equal ratings repercussions.

Overall, results in Table V suggest that greater earnings quality is associated with better insurer FSRs. Specifically, our measure of earnings persistence is consistently positive and highly significantly related to FSRs in all models. Additionally, there is some indication that public insurers with more persistent earnings receive incrementally greater financial health outlook scores than privately owned insurers. In general, our control variables in Table V have the expected signs, with the exception of

Table IV. Bivariate correlations for main variables[a] used in the main models

Pearson/Spearman correlation coefficients (Pearson below the diagonal; Spearman above)
$n = 5{,}074$ for most variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. $Rating_{t+1}$	*1.000*	0.086***	0.135***	−0.067***	0.162***	−0.102***	0.045***	−0.090***	0.685***	0.359***
2. ResidEarnings	0.137***	*1.000*	−0.084***	0.058***	0.138***	−0.002	0.012	0.037***	0.032**	0.107***
3. ResidAccruals	0.157***	−0.097***	*1.000*	−0.129***	0.133***	−0.171***	0.138***	−0.116***	0.134***	0.031**
4. CorrNI	0.033**	0.037***	−0.087***	*1.000*	−0.020	−0.024*	0.085***	0.074***	−0.159***	−0.061***
5. ROR	0.034**	0.031**	0.009	−0.014	*1.000*	−0.030**	−0.006	0.157***	−0.012	0.124***
6. Leverage	−0.154***	0.027*	−0.123***	−0.073***	−0.113***	*1.000*	−0.951***	0.758***	−0.043***	−0.011
7. Liquidity	0.094***	0.012	0.109***	0.092***	0.127***	−0.743***	*1.000*	−0.761***	−0.048***	−0.046***
8. LossLaePhs	−0.127***	0.052***	−0.061***	−0.032**	−0.025*	0.661***	−0.589***	*1.000*	−0.035**	0.037*
9. Size	0.656***	0.077***	0.148***	−0.008	0.008	−0.007	0.049***	0.026*	*1.000*	0.426***
10. Public	0.309***	0.101***	0.010	−0.002	0.064***	−0.001	0.042***	0.080***	0.424***	*1.000*

Notes: *,**,***Statistical significant at the 10, 5 and 1 percent level, respectively. [a]See Table II for variable definitions and the methodology section for a more detailed discussion of the variables

Table V.
Regression tests of effect of earnings quality on A.M. Best financial strength ratings

Dependent variable		Model 1 Rating		Model 1 Outlook		Model 2 Rating		Model 2 Outlook	
Variable	Pred	Coef. est.	Pr > |t|	Coef. est.	Pr > |t|	Coef. est.	Pr > |t|	Coef. est.	Pr > |t|
ResidEarnings	*H1a* +	4.755	<0.0001	8.533	<0.0001	3.951	<0.0001	8.134	<0.0001
ResidAccruals	*H2a* +	4.643	<0.0001	7.895	<0.0001	5.276	<0.0001	11.034	<0.0001
CorrNI	*H3a* +	0.052	<0.0001	0.049	0.018	0.063	<0.0001	0.121	0.000
Public	+	0.339	<0.0001	0.797	<0.0001	1.657	0.177	8.585	0.001
ResidEarnings * Public	*H1b* +					2.745	0.044	2.378	0.181
ResidAccruals * Public	*H2b*−					−1.331	0.233	−7.885	0.003
CorrNI * Public	*H3b*−					−0.029	0.115	−0.151	0.000
ROR	+	0.064	0.004	0.226	0.001	0.062	0.005	0.215	0.002
Lev	−	−17.256	<0.0001	−11.789	0.001	−17.313	<0.0001	−11.294	0.001
Liquidity	+	−0.477	<0.0001	−0.344	0.000	−0.473	<0.0001	−0.341	0.000
LossLaePhs	−	−0.513	<0.0001	−0.250	0.001	−0.509	<0.0001	−0.262	0.001
Size	?	4.070	<0.0001	−0.661	<0.0001	4.077	<0.0001	−0.651	<0.0001
trend	?	0.033	0.321	0.113	0.029	0.032	0.328	0.111	0.032
Intercepts included				−2.833	0.037			−5.969	0.000
% concordant		81.3		67.7		81.4		68.4	
Log likelihood		−6,462.77		−1,930.50		−6,460.40		−1,921.48	
n		5,072		5,072		5,072		5,072	
Pseudo R^2 (%)		48.89		4.13		48.94		4.47	

$$FSR_t = \alpha + \beta_1 ResidEarnings_t + \beta_2 ResidAccruals_t + \beta_3 CorrNI + \beta_4 Public + \beta_5 ROR_t + \beta_6 Lev_t + \beta_7 Liquidity_t + \beta_8 LossLaePhs_t + \beta_9 Size_t + \beta_{10} trend + \varepsilon_t \quad (1)$$

$$FSR_t = \alpha + \beta_1 ResidEarnings_t + \beta_2 ResidAccruals_t + \beta_3 CorrNI_t + \beta_4 Public + \beta_5 ResidEarnings_t * Public + \beta_6 ResidAccruals_t * Public + \beta_7 CorrNI_t * Public + \beta_8 ROR_t + \beta_9 Lev_t + \beta_{10} Liquidity_t + \beta_{11} LossLaePhs_t + \beta_{12} Size_t + \beta_{13} trend + \varepsilon_t \quad (2)$$

Note: See Table II for Variable definitions and the methodology section for more detailed discussion of the variables

Liquidity, which is negative and significant in all models. This unexpected result suggests insurers that are less liquid have better financial strength scores. This may be due to the effect of struggling firms having difficulty attracting financing or having poor cash management.

Table VI shows our results from a change in FSRs model (using Rating only as the dependent variable) from t to $t+1$. Again, earnings persistence (ResidEarnings) is positively and highly significantly related to changes in FSRs from year t to $t+1$. Our measure of accrual quality (ResidAccruals) is also positive and highly significant. Earnings smoothness (CorrNI) is not significantly related to changes in FSRs in the absence of a public indicator variable; however, it is positively significant at the 10 percent level in Model 2.

In Model 2, we are also able to test *H1b* and *H2b* by interacting our measures of earnings quality with our public indicator variable. Here, the association between a change in FSRs and earnings persistence is incrementally weaker among public insurers, contrary to expectation (*H1b*). However, consistent with expectation, the association between a change in FSRs and accrual quality is incrementally weaker among public insurers (*H2b*). Our test of *H3b*, that the association between FSRs and

Dependent variable		Model 1 ΔRating		Model 2 ΔRating	
Variable	Pred	Coef. est.	Pr > |t|	Coef. est.	Pr > |t|
ResidEarnings	*H1a* +	11.962	<0.0001	16.049	<0.0001
ResidAccruals	*H2a* +	5.012	0.002	10.117	<0.0001
CorrNI	*H3a* +	0.004	0.426	0.036	0.096
Public	+	0.384	0.000	13.730	<0.0001
ResidEarnings * Public	*H1b* +			−16.665	<0.0001
ResidAccruals * Public	*H2b*−			−13.622	<0.0001
CorrNI * Public	*H3b*−			−0.065	0.086
ΔROR	+	−0.073	0.043	−0.077	0.039
ΔLev	−	−13.922	0.123	−12.946	0.139
ΔLiquidity	+	0.349	0.113	0.321	0.130
ΔLossLaePhs	−	−0.053	0.426	−0.068	0.404
ΔSize	?	0.866	0.016	0.791	0.026
Intercepts included					
Percentage concordant		13.2		13.7	
Log likelihood		−1,720.35		−1,697.85	
n		5,061		5,061	
Pseudo R^2 (%)		2.20		3.07	

$$\Delta FSR_{(t,t+1)} = \alpha + \beta_1 ResidEarnings_t + \beta_2 ResidAccruals_t + \beta_3 CorrNI_t + \beta_4 Public + \beta_5 \Delta ROR + \beta_6 \Delta Lev + \beta_7 \Delta Liquidity + \beta_8 \Delta LossLaePhs + \beta_9 \Delta Size + \varepsilon_t \quad (1)$$

$$\Delta FSR_{(t,t+1)} = \alpha + \beta_1 ResidEarnings_t + \beta_2 ResidAccruals_t + \beta_3 CorrNI + \beta_4 Public + \beta_5 ResidEarnings_t * Public + \beta_6 ResidAccruals_t * Public + \beta_7 CorrNI_t * Public + \beta_8 \Delta ROR + \beta_9 \Delta Lev + \beta_{10} \Delta Liquidity + \beta_{11} \Delta LossLaePhs + \beta_{12} \Delta Size + \varepsilon_t \quad (2)$$

Note: See Table II for variable definitions and the methodology section for more detailed discussion of the variables

Table VI. Regression tests of effect of earnings quality on change in A.M. Best financial strength ratings

Table VII.
Regression tests of effect of earnings quality on future A.M. Best financial strength ratings

Dependent variable		Model 1 Rating $t+1$		Model 1 Outlook $t+1$		Model 2 Rating $t+1$		Model 2 Outlook $t+1$	
Variable	Pred	Coef. est.	Pr> |t|	Coef. est.	Pr> |t|	Coef. est.	Pr> |t|	Coef. est.	Pr> |t|
ResidEarnings	*H1a* +	6.195	<0.0001	11.162	<0.0001	5.783	<0.0001	10.624	<0.0001
ResidAccruals	*H2a* +	4.975	<0.0001	7.320	<0.0001	6.722	<0.0001	9.279	<0.0001
CorrNI	*H3a* +	0.052	<0.0001	0.055	0.014	0.071	<0.0001	0.051	0.033
Public	+					3.622	0.022	3.480	0.105
ResidEarnings * Public	*H1b* +					0.439	0.393	1.403	0.308
ResidAccruals * Public	*H2b*−					−3.220	0.040	−2.510	0.189
CorrNI * Public	*H3b*−					−0.043	0.037	0.067	0.194
ROR	+	0.084	0.000	0.219	0.002	0.070	0.002	0.183	0.006
Lev	−	−17.908	<0.0001	−16.284	<0.0001	−17.392	<0.0001	−15.166	<0.0001
Liquidity	+	−0.470	<0.0001	−0.170	0.056	−0.493	<0.0001	−0.240	0.014
LossLaePhs	−	−0.462	<0.0001	0.093	0.136	−0.510	<0.0001	−0.014	0.435
Size	?	4.267	<0.0001	0.206	0.040	4.082	<0.0001	−0.210	0.051
trend	?	−0.007	0.822	0.222	<0.0001	−0.009	0.792	0.227	<0.0001
Intercepts included				−5.343	0.000			−6.242	0.000
Percentage concordant		81.6		67.1		81.9		70.9	
Log likelihood		−6,425.13		−1,854.46		−6,396.62		−1,801.90	
n		5,072		5,072		5,072		5,072	
Pseudo R^2 (%)		49.10		3.90		49.67		5.87	

$$FSR_{t+1} = \alpha + \beta_1 ResidEarnings_t + \beta_2 ResidAccruals_t + \beta_3 CorrNI_t + \beta_4 Public + \beta_5 ROR_t + \beta_6 Lev_t + \beta_7 Liquidity_t + \beta_8 LossLaePhs_t + \beta_9 Size_t + \beta_{10} trend + \varepsilon_t \quad (1)$$

$$FSR_{t+1} = \alpha + \beta_1 ResidEarnings_t + \beta_2 ResidAccruals_t + \beta_3 CorrNI_t + \beta_4 Public_t + \beta_5 ResidEarnings_t * Public + \beta_6 ResidAccruals_t * Public + \beta_7 CorrNI_t * Public + \beta_8 ROR_t + \beta_9 Lev_t + \beta_{10} Liquidity_t + \beta_{11} LossLaePhs_t + \beta_{12} Size_t + \beta_{13} trend + \varepsilon_t \quad (2)$$

Note: See Table II for variable definitions and the methodology section for more detailed discussion of the variables

earnings smoothness is incrementally weaker among public firms, is significant at the 10 percent level. As with Table V, a possible explanation of these results is that publicly owned insurers are incrementally less punished for lower quality accruals and smoothed earnings compared to private insurers.

In Table VII, we run similar models to those in Table V, except we use our financial strength dependent variables (Ratings and Outlook) as of year $t+1$ instead of t. We employ this dependent variable because various earnings quality measures may be more fully reflected in FSRs in the following year. In Model 1, using Ratings as our dependent variable, ResidEarnings, ResidAccruals, and CorrNI are positively significant at 1 percent levels.

In Model 2, with Ratings still the dependent variable, *H1b* is not supported. However, *H2b* is supported in this specification. Specifically, the association between subsequently assessed FSRs and accrual quality is weaker among public insurers than among private insurers. In support of *H3b*, the association between less earnings smoothing and subsequent forward-looking FSRs for public insurers is negative and significant at the 5 percent level. Again, this suggests that smoothed earnings are not punished as strongly for public insurers.

Using Outlook as our dependent variable in Model 1, all three of our variables of interest are positively associated with financial strength. In hypothesis tests using the second model, *H1b*, *H2b*, and *H3b* are not supported. The results in Table VII (Model 2), using Ratings from $t+1$ as the dependent variable, are qualitatively similar to results reported in Table V (Model 2) using Outlook from period t as a dependent variable. Overall, the results again suggest that earnings quality is positively associated with financial health ratings, although public firms are rewarded and punished differently than private firms.

Conclusion

In this study, we analyze FSRs of firms in the P&C Insurance industry to determine if three measures of earnings quality (earnings persistence, accrual quality, and earnings smoothing) are associated with insurer FSRs. We consistently find that more persistent earnings are related to better insurer FSRs in our various tests. Accrual quality is associated with higher FSRs, although the effect is significantly weaker for public insurers. Earnings smoothness appears to be an attribute that is negatively viewed, although this effect is significantly weaker among public insurers.

Taken together, these results are consistent with the notion that financial health assessors consider accounting quality in their ratings, although they appear to consider accounting quality differently among publicly owned insurers compared to privately owned insurers. To the extent that accruals quality and earnings smoothing are indicators of earnings management, it appears that ratings may penalize public insurers less severely than their private insurer counterparts.

Notes

1. A.M. Best Company Inc. is one of ten Nationally Recognized Statistical Rating Organizations (NRSRO) recognized by the SEC (2014).
2. Earnings quality refers to preferred attributes of the earnings reported in the financial statements.
3. Outlook is an alternative financial strength proxy we use in our primary analyses. We define Outlook on p. 6.

4. We substitute Ratings for Outlook in the "model 2" specification of our models. Outlook is a forward-looking indicator of financial strength, and may be more likely to incorporate the current period's earnings quality. We expect similar results whether we use Ratings or Outlook in our regression models.
5. Dechow and Dichev use change in working capital as their dependent variable and use nonfinancial companies only in their sample. Because our sample consists of insurance companies, we use total accruals as our dependent variable, as total accruals is more widely used in accounting research to test accruals quality.
6. After this transformation, the scale runs from 13 (strongest rating) to 1 (weakest rating).
7. Weak financial strength is defined as a rating lower than a B−.
8. As a robustness check, we test model 1 (using ratings as the dependent variable) for the possibility of endogeneity using several specifications of a 2SLS model. We find that our variables of interest remain statistically significant to standard levels (results not tabulated) which suggests endogeneity does not drive these findings.

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Further reading

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