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The Role of Holding Company Financial Information in the Insurer-Rating Process: Evidence From the Property-Liability Industry

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Abstract

We examine data for the year ended December 31, 1997 for 80 publicly traded property-liability insurers that have Best financial strength ratings of their consolidated insurance-operating subsidiaries. These firms employ a holding company structure, in which a parent owns the stock of multiple insurance-operating subsidiaries. The operating subsidiaries prepare a consolidated annual report using the Statutory Accounting Principles (SAP), and an analogous set of financial statements based on the Generally Accepted Accounting Principles (GAAP) is released by the parent. We find that the financial characteristics important in determining ratings at the individual firm level—capitalization, liquidity, profitability, and size—are also important at the group level. Further, financial ratios from holding company statements are incrementally useful in the ratings' process, after group-level ratios have been taken into account. Robustness tests based on a subsample of holding companies with minimal investment outside of the property-liability industry reinforce our conclusion that parent company statements influence consolidated group ratings. However, our data do not allow us to separate the relative contribution of the GAAP model and underlying transactions to the ratings decision.

Introduction

Virtually, all publicly traded insurance firms have a holding company structure, with a parent company owning the stock of multiple insurance-operating subsidiaries. Each subsidiary files a statutory annual report with the National Association of Insurance Commissioners (NAIC) once a year. The property-liability subsidiaries of a common parent submit a consolidated annual report as well.[1] The group entity is relevant, not

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[1] A single insurance subsidiary will write either property-liability *or* life-health insurance. Although both types of firms can be held by a common parent, the NAIC does not require consolidation of life-health subsidiaries for external reporting purposes.

only for statutory reporting, but also in the ratings' process. A. M. Best, the dominant provider of financial strength ratings for insurers, assigns ratings both to individual companies and to consolidated groups of property-liability firms. These ratings are important because they influence the price insurers can charge for their policies (Doherty and Tinic, 1981; Berger, Cummins, and Tennyson, 1992). Thus, an understanding of the ratings' process is important to insurance firms, as well as to their regulators, stockholders, and consumers.

Initial work by Pottier (1997) and Pottier and Sommer (1999) examines the determinants of Best ratings of *individual* firms in the life-health and the property-liability insurance industries, respectively. To our knowledge, no study has addressed the determination of property-liability ratings at the consolidated *group* level. This is a notable gap in the literature, because nearly 40 percent of individual insurance subsidiaries are not rated as stand-alone companies. Thus, the only rating available for these firms is the group rating. Compared to individual company ratings, group ratings are more complex because synergies among group members and the influence of the parent company must be taken into account (Weberson, 1997; Buckley, Burke, and Patrino, 1998). Our article extends previous work on individual ratings by analyzing the financial characteristics associated with Best group ratings. In particular, we examine the extent to which parent company financial data influences the financial strength assessment of the consolidated group.

We draw upon prior academic research (Lamm-Tennant, Starks, and Stokes, 1996; Pottier and Sommer, 1999) and stated procedures by Best to develop a comprehensive set of variables that potentially explain insurer insolvency risk, and ultimately, the insurer financial strength rating. A similar strategy is employed in studies of individual ratings. However, our initial data source is the consolidated group annual report, whereas prior research uses the annual reports of individual insurers. We then ask whether financial data derived from the *holding company* financial statement is useful to the rating agents. Financial ratios from the holding company financial statement differ from those in the consolidated group annual report in two fundamental ways. First, holding company financial statements incorporate the effects of certain transactions that do not flow from the consolidated group. These generally consist of investments made by the parent in unconsolidated subsidiaries outside of the property-liability industry and long-term debt incurred by the parent. Second, different accounting models are used for group and holding company reports. Specifically, statutory accounting principles (SAP) are used by the group to report to the state insurance commissioner; generally accepted accounting principles (GAAP) are followed by the parent for reporting to shareholders and to the Securities and Exchange Commission (SEC).[2]

Our sample consists of 80 publicly traded property-liability insurers that received financial strength ratings of their consolidated insurance-operating subsidiaries from the A. M. Best Company for the year ended December 31, 1997. Analysis of

[2] All publicly traded stock insurers prepare financial statements according to GAAP. This includes publicly traded stock insurers that are majority-owned by mutuals. There are relatively few mutual-owned stock firms. In our sample of 80 stock companies, there is only one firm, Harleysville Group, that is majority-owned by a mutual.

consolidated group annual reports indicates that the financial characteristics important in determining ratings at the individual level—capitalization, liquidity, profitability, and size—are also important at the group level. Further, financial ratios from holding company financial statements are incrementally useful in the ratings' process, after group-level ratios have been taken into account. Robustness tests based on a subsample of holding companies with minimal investment outside of the property-liability industry reinforce our conclusion that parent company financial statements influence consolidated group ratings. However, our data do not allow us to separate the relative contribution of the GAAP model and underlying transactions to the ratings decision.

The remainder of the article is organized as follows. The following section identifies financial characteristics that prior research and the stated practices of Best suggest are associated with insurers' insolvency risk. The section "Differences Between Holding Company and Consolidated Group Financial Ratios" distinguishes group and holding company reports, elaborating on differences between GAAP and SAP accounting, and identifying holding company level transactions that are not in the group report. The sections "Sample and Data" and "Results" describe the data and the results, respectively. The final section offers concluding remarks.

DETERMINANTS OF INSURER FINANCIAL STRENGTH RATINGS

Financial strength ratings are summary measures of insolvency risk (Pottier and Sommer, 2002). Prior research on individual insurers suggests that the likelihood of insolvency is related to several key attributes: capitalization (Kahane et al., 1986; Cummins, 1988; Doherty, 1989); liquidity (Kahane, Tapiero, and Jacques, 1986); asset risk (Kahane et al., 1986; Cummins, 1988; Berger et al., 1992); profitability (Kahane et al., 1986); and size (Cummins, Harrington, and Niehaus, 1995; Cummins and Sommer, 1996). We expect these characteristics also to be important determinants of the insolvency risk of consolidated groups of insurers. In order to test this proposition, however, financial characteristics must be translated into measurable variables. We rely on two sources of guidance to identify relevant financial ratios. First, we look to prior work, both on insurer financial strength ratings and bond ratings, for candidate variables.[3] Second, we consider explicit statements made by Best concerning the financial information that they use in the insurer-rating process. To ensure that we adequately capture each financial construct, we compute multiple candidate ratios in each category.[4] The remainder of this section describes the list of financial ratios that serve as independent variables in our subsequent analysis of group ratings.

[3] For an example of a bond-rating study, please see Ederington and Yawitz (1987). The principal difference between insurer financial strength ratings and corporate bond ratings is that a bond rating applies to a particular debt issue, whereas an insurer rating applies to the entity itself and assesses the overall claims-paying ability of the insurer. The fact that many insurers with rated debt still choose to obtain a financial strength rating implies that bond ratings and financial strength ratings do not measure precisely the same risk. Buckley (1997) and Moody's (1998) describe the relationship between bond ratings and insurer financial strength ratings from the perspective of the rating agencies.

[4] This approach has considerable precedent in the literature. See, for example, Hammerlink (1973), BarNiv (1990), and Pottier and Sommer (1999).

Capitalization

Insurers with relatively high levels of capital are expected, all else equal, to have a lower risk of insolvency and a higher financial strength rating. We use three ratios to gauge insurer capitalization. The first is the ratio of equity capital to total assets (*Equity/Assets*), where equity capital consists of the insurer's preferred and common stock and retained earnings.[5] The second variable is the ratio of debt to equity capital (*Debt/Equity*). Debt includes both short- and long-term obligations to creditors, and excludes the insurer's loss reserve liability. The third capitalization measure is the ratio of property-liability loss reserves to total assets (*PLL-Reserves/Assets*). Higher levels of *Equity/Assets* and lower levels of *Debt/Equity* are expected to be associated with higher financial strength ratings. The association between financial strength ratings and the *PLL-Reserves/Assets* ratio is less clear. On the one hand, loss reserves represent a liability of the insurer, which suggests a negative relation. On the other hand, there is evidence that financially struggling firms tend to underreserve (Petroni, 1992), which is consistent with a positive relation between the loss reserve ratio and the financial strength rating.[6]

Liquidity

Insurers with a high degree of liquidity are also expected to have a lower risk of insolvency and a higher financial strength rating. We use two ratios to assess liquidity. The first is the ratio of cash and short-term investments to the sum of cash and total investments (*Cash/Investments*). This ratio measures the liquidity of the firm's investment portfolio. The second variable is the ratio of net operating cash flows to total assets (*Cash Flows/Assets*), which gauges the level of the firm's cash flows. Both liquidity ratios are expected to be positively associated with the insurer's financial strength rating.

Asset Risk

Other aspects of the insurer's investment portfolio also influence insolvency risk. For example, compared to fixed income securities, common stock is a relatively high-risk investment asset (Lee, Mayers, and Smith, 1997; Ibbotson Associates, 1999). Accordingly, we compute the ratio of investments in equity securities to cash and total investments (*Stock/Investments*), as a measure of asset risk. The credit risk associated with reinsurance recoverables also contributes to the risk of the asset portfolio (Best, 1998a; Moody's, 1998). We use the ratio of reinsurance recoverable to assets (*Reinsurance/Assets*) to gauge the percentage of the total asset portfolio that is attributable to these claims. Both asset risk ratios are expected to be positively related to the likelihood of insolvency, and negatively related to the financial strength rating.

Profitability

In general, the more profitable the insurer, the lower the risk of insolvency, and the higher the financial strength rating. We use four variables to gauge insurer profitability.

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[5] Retained earnings in GAAP is called policyholders' surplus in the SAP reports. For simplicity we use GAAP terminology in the body of the text, and footnote the SAP equivalent if there is a difference.

[6] *PLL-Reserves/Assets* is not the only ratio influenced by reserve understatement. Both *Equity/Assets* and *Debt/Equity* will be similarly affected.

The first is a simple ROA measure, the ratio of pretax operating income to average assets (*Income/Assets*).[7] The second variable, the ratio of dividend income and interest earned to cash and total investments (*Investment Income/Investments*), gauges investment returns. The third variable, the ratio of underwriting expenses and losses to net premiums earned (*Losses & Expenses/Premiums*), measures charges to income. The last profitability measure is the ratio of dividends to net income (*Dividends/Income*). We view the dividend payout ratio as a signal of managers' expectations of future profits, with higher ratios associated with more positive expectations (Aharony and Swary, 1980).[8] With the exception of the *Losses & Expenses/Premiums* ratio, all profitability measures are expected to be negatively related to insolvency risk, and positively related to the financial strength rating.

Size

Finally, we recognize that insurer size is a potentially important determinant of insolvency risk and thus the financial strength rating. Historically, the insolvency rate among small insurers has been higher than the rate for large insurers. An explanation is that economies of scale and scope and other operating efficiencies accrue to larger firms. Firm size is also a potentially important proxy for other firm characteristics, such as access to capital and managerial labor markets. We measure firm size as the log of total assets (*LnAssets*). All else equal, larger insurers are expected to have a lower risk of insolvency and higher ratings.

Table 1 summarizes the ratios that are discussed in this section, and indicates their expected relation to the financial strength rating. In the analysis to follow, we construct two sets of ratios. One set is based on the statutory data reported in the Annual Statement released by the consolidated group of insurance subsidiaries for regulatory reporting purposes; the second set is constructed from the GAAP financial statements prepared by the parent company for dissemination to shareholders and the SEC. The key differences between these ratios are discussed in the section "Differences Between Holding Company and Consolidated Group Financial Ratios."

DIFFERENCES BETWEEN HOLDING COMPANY AND CONSOLIDATED GROUP FINANCIAL RATIOS

Transactions Unique to the Holding Company

One source of difference between holding company and group financial ratios is that assets and liabilities incurred by the parent do not appear on the consolidated group financial reports. Parent-level assets are typically investments in unconsolidated subsidiaries outside of the property-liability industry. These can be life-health firms, or companies not in the insurance business. Parent-level liabilities involve short- and

[7] GAAP pretax operating income is net income before income taxes and capital gains and losses in the SAP report.

[8] As noted in the section "Transactions Unique to the Holding Company," the recipients of parent company and consolidated subsidiary dividends are not the same group. The consolidated property-liability subsidiaries pay dividends to the *parent company*. The parent company pays dividends to its *shareholders*.

TABLE 1
Variables Identified as Potential Determinants of the Financial Strength Rating

Ratio Type	Ratio Definition[a]	Variable Name	Expected Relation to Financial Strength Rating[a]
Capitalization	Equity capital to assets	*Equity/Assets*	+
	Debt to equity capital	*Debt/Equity*	−
	Property-liability loss reserves to assets	*PLL-Reserves/Assets*	?
Liquidity	Cash and short-term investments to cash and total investments	*Cash/Investments*	+
	Net operating cash flows to assets	*Cash Flows/Assets*	+
Asset risk	Investments in equity securities to cash and total investments	*Stock/Investments*	−
	Reinsurance recoverables to assets	*Reinsurance/Assets*	−
Profitability	Pretax operating income[b] to average assets	*Income/Assets*	+
	Net investment income to cash and total investments	*Investment income/ Investments*	+
	Underwriting expenses and losses to net premiums earned	*Losses & Expenses/ Premiums*	−
	Stockholder dividends to net income	*Dividends/Income*	+
Size	Log of assets	*LnAssets*	+

Note: Higher financial strength ratings indicate lower risk of insolvency.
[a]Unless otherwise stated, all balance sheet items are measured at year-end; income statement items and shareholder dividends are for the fiscal year.
[b]GAAP pretax operating income is net income before income taxes and capital gains and losses in the SAP reports.

long-term borrowing.[9] The notion of dividends also differs between the parent company and its subsidiary group. The consolidated property-liability subsidiaries pay dividends to the *parent company*. The parent company pays dividends to its *shareholders*. Although parent borrowings, investments, and dividend payments do not appear on the group annual report, they can affect group financial stability if subsidiaries face financial demands from parent company debt and dividend policies, or derive financial support from the cash flows of sister companies from diversified

[9] Liabilities at the group level, in contrast, mainly consist of policy reserves. In our sample (described in the section "Sample and Data"), only 10 of the 80 holding companies had a P-L subsidiary that engaged in any short- or long-term borrowing. Individual insurance firms find it difficult to borrow because policyholder obligations at the individual firm level take priority over creditor claims. Indeed, whereas the median debt/equity ratio among our parent companies is 10.9 percent, the 75th percentile of the debt/equity ratio from the consolidated group statements is 0 (reported in Table 4, Panels A and B).

industries.[10] This suggests that Best analysts will incorporate holding company data in their ratings decision.

GAAP Versus SAP Accounting

The second distinction between group and parent company financial ratios is that the annual statement of the consolidated group is prepared according to statutory principles, whereas holding company financial statements follow GAAP. Although prior researchers have asked which accounting model is more informative for solvency assessment, the empirical evidence to date has been inconclusive. For example, Harmelink (1973) finds no significant difference between GAAP and SAP financial ratios for predicting ratings downgrades, whereas BarNiv (1990) reports that SAP ratios actually outperform GAAP equivalents for bankruptcy prediction. These mixed results might be explained by the fact that these studies do not use actual GAAP financial statements in their analyses, and instead rely on selected adjustments to the SAP annual reports to approximate a GAAP approach.[11] We address this gap in our study by collecting data directly from the GAAP financial statements of the parent companies.

GAAP and SAP differ primarily in terms of expense recognition and asset valuation.[12] Regarding expense recognition, SAP accounting tends to emphasize cash flows, whereas GAAP takes an accrual approach. For example, SAP requires that policy acquisition costs, such as agents' commissions, be charged to current operations as they are incurred. Under GAAP, these costs are capitalized, with expenses recognized in the period in which the premium is earned. Similarly, GAAP recognizes deferred tax assets and liabilities related to unearned premiums, policy acquisition costs, loss reserve discounting, and other temporary differences between taxable and financial reporting. Deferred taxes do not appear in the statutory statements, however, because SAP accounts for taxes on the cash basis.

Valuations under SAP tend to be more conservative than the corresponding GAAP amounts. For example, certain GAAP assets, such as furniture and equipment, are not

[10] Although holding companies can extract capital contributions from their subsidiaries, the parent is not usually obligated to provide any downward capital infusion to members of the consolidated group (Buckley, 1997; Buckley et al., 1998). However, if creditors can show that improper transfers have taken place between the subsidiary and the parent, then they may have financial recourse to the parent. For example, the Holding Company System Regulatory Act restricts the diversion of insurance assets (in the form of dividends) to the holding company. Transactions within a holding company system, such as expense allocation among subsidiaries, are also subject to a reasonableness standard. If holding companies violate these standards, creditors may successfully "pierce the corporate veil" and gain access to holding company resources.

[11] Harmelink (1973) makes just one adjustment to the SAP-based annual reports, converting investments in stocks from statutory to GAAP accounting. BarNiv (1990) adjusts multiple accounts in the SAP reports to approximate GAAP amounts, but like Hammerlink does not directly examine GAAP statements.

[12] Please see Ke, Petroni, and Safieddine, (1999) for a related discussion. The interested reader is also referred to Insurance Accounting and Systems Association, Inc. (1998) and Insurance Services Office, Inc. (1998).

recognized in equity under statutory rules. These nonadmitted assets are excluded because they do not make an appreciable contribution to the liquidation value of the firm, which is the central focus of SAP reporting. As an another example, all investments in bonds are reported in the SAP balance sheet at amortized cost. Under GAAP, bonds that managers do not intend to hold to maturity are reported at a fair market value. Unrealized gains and losses on such bonds are recognized in the GAAP financial statements, either in the insurers' net income or as a component of other comprehensive income. A third example concerns reinsurance recoverables, which are a type of receivable. Reinsurance is a transaction where an insurer pays another company (known as a reinsurer) to assume the risk of a policy or group of policies. When a loss occurs, the original insurer pays the policyholder, and then seeks reimbursement from the reinsurer. Under SAP, the recoverable is not recorded until the primary insurer has paid the claim and is waiting for reimbursement. Under GAAP, reinsurance recoverables are recognized for both paid and unpaid claims. Finally, regulatory penalties related to insufficient loss reserves or potentially uncollectible reinsurance are recognized as a liability in the SAP reports, but not in the GAAP statements.[13]

Table 2 summarizes the major differences between SAP and GAAP reporting models. The express purpose of statutory accounting procedures is to aid regulators in assessing the insolvency risk of insurers. Thus, statutory statements are likely to be useful to Best analysts. On the other hand, a stated principle of Best is to evaluate insurers as ongoing enterprises, which is an underlying assumption of GAAP (Best, 1998a; Puccia and Schlanger, 1999). This suggests that aspects of the GAAP approach will be incrementally useful in the rating decision.

SAMPLE AND DATA

To construct our sample, we begin with the 122 publicly traded property-liability insurers listed in the *Best's Holding Company Guide*, 1998 edition (Best, 1998b). In order to be retained for analysis, GAAP financial statements for the holding company and SAP annual reports for its consolidated property-liability subsidiaries must be available for the year ended December 31, 1997. GAAP financial data for the holding company are taken from the *Best's Holding Company Guide*, and statutory financial data for the consolidated insurance-operating subsidiaries are obtained from the NAIC Property-Casualty Annual Statement database.[14,15] These requirements reduce the sample to 97 holding company-consolidated subsidiary pairs. From this group, we delete four firms that are majority-owned by another publicly traded property-liability insurer, and 11 firms that do not focus on the property-liability industry.[16] This leaves 82 holding companies in the sample. Group financial strength ratings from the A.M. Best

[13] Under SAP, the excess of statutory reserves over the insurer's estimate of loss reserves (known as statement reserves) is recorded as a liability. Statutory loss reserves are determined by state-imposed formulas.

[14] The information in the *Best's Holding Company Guide* is primarily taken from SEC Form 10-K and Annual Reports to Stockholders.

[15] Property-liability insurers are also known as property-casualty insurers.

[16] We define firms that do not focus on the property-liability industry as those with consolidated statutory shareholders' equity from property-liability operating subsidiaries that is less than 50 percent of consolidated statutory shareholders' equity for the holding company.

TABLE 2
Major Differences Between Statutory (SAP) and Generally Accepted (GAAP) Accounting Principles

Financial Statement Item	SAP Requirements	GAAP Requirements
Assets	Some assets are excluded from the balance sheet.[a]	All assets are recorded.
Policy acquisition costs	Expensed as incurred.	Capitalized and recognized in period when associated premium is earned.
Taxes	Tax expense is the amount paid for each period (cash approach).	Deferred tax assets and liabilities are recognized due to temporary differences in taxable and financial reporting income (accrual approach).
Investments in bonds	Recorded at amortized cost.	Recorded at fair value.
Unrealized capital gains and losses on investments	Reported in equity.	Reported in either income or equity, depending on portfolio classification.
Reinsurance recoverables	Recorded when claim is paid.	Recorded for both paid and unpaid claims.
Regulatory penalties	Recorded as a liability.	Not recognized.

Note: See Murphy (2001) for a discussion of several changes in statutory accounting principles subsequent to our sample period.
[a]Items that are not readily converted to cash are considered illiquid, and not recognized in the statutory balance sheet. These "nonadmitted" assets include furniture, fixtures, equipment, supplies, automobiles, uncollected premiums over 90 days due, overdue reinsurance, and loans or advances to company personnel (Troxel and Bouchie, 1995).

Company are available for the consolidated subsidiaries of 80 of these firms (Best, 1998a), which comprise our final sample. The sample selection process is outlined in Table 3, and sample firms are listed in the Appendix.

Although all 80 firms in the sample focus primarily on the property-liability (PL) industry, there are some holding companies that also have investments in life-health insurers or firms outside of the insurance industry. This makes it more difficult to compare group and holding company reports, because non-PL investments are included in the holding company statements, but are not part of the consolidated group report. In most cases, non-PL investments are not extensive. For example, our sample includes only 22 holding companies where life reserves exceed 10 percent of total loss reserves, or where noninsurance revenues comprise more than 10 percent of total revenues. However, it is sometimes instructive to focus the analysis on holding companies that have minimal investment outside of the property-liability industry. We refer to this group of 58 firms as the "pure PL sample" in subsequent analysis.

We use consolidated *statutory* shareholders' equity for both the holding company and the consolidated property-casualty subsidiaries for computing this screen. Consolidated statutory shareholders' equity for the holding company is reported either in SEC form 10-K or the Annual Report to Stockholders.

TABLE 3
Description of the Sample Selection Process and Certain Sample Attributes of 80 Publicly Traded Insurance Holding Companies With Best Financial Strength Ratings in 1997

Sample Selection Criteria	Number of Holding Companies
Initial sample[a]	122
Less	
Firms not on NAIC tapes	6
Firms with incomplete financial statement data[b]	19
Firms majority-owned by another publicly traded property-liability insurer	4
Firms that do not focus on the property-liability market[c]	11
Firms not rated	2
Final sample	80

Analysis of Sample Firms			
Firm Type	Number of Firms	Rating[f]	Number of Firms
Pure property-liability firms[d]	58	A++	8
Heterogeneous firms[e]	22	A+	22
		A	25
Total	80	A−	17
		B++ and B+	4
		B and below	4
		Total	80

[a]The initial sample consists of all publicly traded insurance holding companies listed in the property-liability section of the *Best's Holding Company Guide* (Best, 1998b).
[b]Firms are eliminated unless GAAP statements are available for the holding company and matching SAP statements are available for the consolidated insurance subsidiaries for the year ended December 31, 1997.
[c]Firms are eliminated unless consolidated statutory shareholders' equity for the property-liability operating subsidiaries represents at least 50 percent of consolidated statutory shareholders' equity reported by the holding company.
[d]The insurance operating subsidiaries of these holding companies are almost exclusively engaged in the property-liability market.
[e]These holding companies engage in business activities outside of the property-liability industry (such as life-health insurance and/or noninsurance firms). However, property-liability activities constitute the principal focus of the firm.
[f]Best ratings are summary measures of insolvency risk (see Pottier and Sommer, 2002). Firms with A++ ratings are judged to have the lowest risk of insolvency, with lower grades indicating greater risk. The ratings pertain to the consolidated operating subsidiaries of the holding company, and not to the holding company itself.

Best ratings are divided into two broad categories: secure and vulnerable (Best, 1998a). All of the holding companies in the 80-firm sample are large, publicly traded firms. Not surprisingly, the overwhelming majority of these firms (76 of 80) have consolidated subsidiaries that are categorized as secure by Best. Within the secure grouping, however, there are gradations in assessed financial strength. The highest ratings (A++ and A+, which are described by Best as "superior" grades) are assigned to groups

that are perceived as having the greatest ability to meet their ongoing obligations to policyholders. The financial strength of consolidated groups rated as A and A− (excellent) is somewhat lower than the top ratings, but still high. Groups with B++ and B+ ratings (very good) are likely to meet their obligations, but the risk of failure is greater than for consolidated subsidiaries with higher-ratings designations. Finally, groups with ratings of B and lower face a real risk of insolvency, and are referred to as "financially vulnerable" by Best. In our sample, the consolidated operating subsidiaries of 8 holding companies received an A++ rating; 22 were rated as A+; 25 were assigned an A; 17 an A−; 4 received B++ or B+ ratings; and 4 consolidated groups were rated B or below. This information is included in Table 3.

Panels A and B of Table 4 provide descriptive statistics for variables that are identified in the section "Determinants of Insurer Financial Strength Ratings" as potential determinants of the financial strength rating. Panel A presents results using GAAP-based variables from the holding company statements. Panel B reports analogous findings for the SAP-based consolidated annual report. Panel A shows that sample holding companies are large: the median log of assets from the parent statements is 21.080, which translates into a dollar value of $1,428,656,030. Consolidated property-liability subsidiaries (Panel B) show a median log of assets of 20.580, or $866,523,684.[17] Examination of the equity-to-assets ratio and the property-liability reserves-to-assets ratio in Panel A indicates that holding companies are financed with roughly 30 percent equity, 35 percent property-liability reserves, and the remaining 35 percent from other liabilities, such as short- and long-term borrowing and unearned premium reserves. In contrast, Panel B shows that less than 25 percent of consolidated group financing comes from other liabilities. This extra borrowing on the balance sheet of the holding company creates a transactional difference between parent and subsidiary financial statements that is not attributable to differences in the GAAP–SAP accounting models.

The reported values of the cash-to-investments ratio and the stock-to-investments ratio in Panel A show that the investment portfolios of parent firms are dominated by bonds. The median sample firm has only 6 percent of their investment portfolio in cash and short-term investments, and another 6 percent devoted to stocks. A similar pattern is apparent for the consolidated subsidiaries, reported in Panel B. Sample holding companies are profitable, with a median return on assets of around 3.5 percent in 1997, and a median return on investments of just under 6 percent. Consolidated P-L subsidiaries have an even higher ROA of about 4.5 percent. Finally, the loss-to-premiums ratio indicates that losses and expenses are about equal to premiums earned, both at the holding company and at the consolidated group level. This is typical in the property-liability insurance industry, where profits tend to be derived from investing, rather than underwriting activities.

The usefulness of financial ratios from the holding company reports are diluted if the parent engages in significant transactions that are separate from the activities of the consolidated property-liability subsidiaries. Panel C of Table 4 reports descriptive statistics for three variables designed to gauge the effects of assets and liabilities at

[17] Parent and subsidiary amounts are not directly comparable, of course, because the GAAP assets reported by the parent company include nonadmitted assets that are excluded from the SAP reports of the subsidiaries, as well as assets from non-PL businesses.

TABLE 4
Descriptive Statistics for Potential Determinants of the Best Financial Strength Rating of 80 Publicly Traded Insurance Holding Companies for the Year Ended December 31, 1997

Variable[a]	Mean	Std. Dev.	25th Percentile	Median	75th Percentile	Range
Panel A: Financial Variables Derived From the GAAP Statements of the Sample Insurance Holding Companies						
Equity/Assets	29.872	12.080	21.232	28.870	37.414	53.700
Debt/Equity	18.263	21.601	0.000	10.870	27.633	112.600
PLL-Reserves/Assets	35.745	16.590	23.099	36.716	49.398	67.833
Cash/Investments	10.211	10.651	2.85	6.00	12.25	44.700
Cash Flows/Assets	3.847	4.596	0.808	3.649	6.548	23.300
Stock/Investments	11.974	15.550	1.60	6.35	16.20	76.200
Reinsurance/Assets	9.468	9.204	2.308	7.430	14.398	41.400
Income/Assets	3.821	3.001	2.35	3.40	4.95	21.100
Investment Income/Investments	5.705	1.042	5.05	5.80	6.45	5.300
Losses & Expenses/Premiums	114.242	30.661	100.445	105.636	114.200	165.697
Dividends/Income	18.154	20.318	3.35	14.25	23.45	81.700
LnAssets	21.002	1.921	19.521	21.080	22.174	9.388
Panel B: Financial Variables Derived From the SAP Statements of the Sample Insurance Holding Companies						
Equity/Assets	35.666	12.885	27.550	33.854	41.409	60.332
Debt/Equity	0.203	1.131	0.000	0.000	0.000	7.681
PLL-Reserves/Assets	40.086	14.725	30.047	42.623	52.056	60.602
Cash/Investments	7.366	7.743	2.665	4.262	8.544	32.660
Cash Flows/Assets	5.023	6.806	1.629	5.125	9.467	42.500
Stock/Investments	16.272	17.143	4.384	11.506	22.662	67.990
Reinsurance/Assets	1.343	2.053	0.204	0.666	1.672	12.678
Income/Assets	4.976	4.357	3.126	4.612	7.174	25.468
Investment Income/Investments	5.512	1.124	4.797	5.567	6.096	6.400
Losses & Expenses/Premiums	101.060	9.180	96.361	101.141	105.545	43.997
Dividends/Income	48.685	59.804	2.041	33.530	62.080	321.847
LnAssets	20.540	1.797	19.300	20.580	21.734	7.534
Panel C: Variables That Proxy for Transactions That Are Unique to the Holding Company						
Life-Health reserves/Total reserves	8.373	19.774	0.000	0.000	0.385	85.289
Noninsurance revenue/total revenue	4.773	11.865	0.000	0.000	0.995	60.797
Parent debt/Sub equity	28.388	60.398	0.000	14.136	33.517	487.600

Variable[a]	Median (Parent Ratio)	Median (Group Ratio)	*p*-Value, Median Test
Panel D: Tests for Differences in Medians Between Analogous Ratios Derived From Holding Company and Consolidated Group Financial Reports			
Equity/Assets	28.870	33.854	0.001
Debt/Equity	10.870	0.000	0.001
PLL-Reserves/Assets	36.716	42.623	0.098
Cash/Investments	6.00	4.262	0.068
Cash Flows/Assets	3.649	5.125	0.119
Stock/Investments	6.35	11.506	0.032
Reinsurance/Assets	7.430	0.666	0.001
Income/Assets	3.40	4.612	0.016
Investment Income/Investments	5.80	5.567	0.189
Losses & Expenses/Premiums	105.636	101.141	0.001
Dividends/Income	14.25	33.530	0.001
LnAssets	21.080	20.580	0.139

Note: The sample consists of 80 publicly traded insurance holding companies with Best financial strength ratings of their consolidated group of operating subsidiaries for the year ended December 31, 1997.
[a]For variable definitions, please see Table 1. All variables (except *LnAssets*) are expressed in percentage form.

the holding company level that do not appear on the consolidated group report. The first two assess parent investments in non-PL subsidiaries. Variable one, *Life-health reserves/Total reserves*, gauges the parent's investments in insurance businesses outside of the property-liability market. The second variable, *Non-insurance revenue/Total revenue*, indicates the extent to which the parent's interests extend beyond the insurance industry. The third ratio, *Parent debt/Sub equity*, scales borrowings that are unique to the parent by equity reported on the balance sheet of the consolidated property-liability subsidiaries.[18] Median values of the two ratios that measure the parent-specific investments (*Life-health reserves/Total reserves* and *Non-insurance revenue/total revenue*) are zero. However, *Parent debt/Sub equity* has a median of 14.1 percent. This means that, for our sample, parent borrowings are the principle transactional difference between holding company and consolidated group financial reports.

Panel D of Table 4 reports differences in the median values of financial ratios calculated using parent and group reports. Significant ($p < 0.05$) differences are observed for 7 of the 12 ratios. Most differences in the ratios can be traced to disparities between GAAP and SAP accounting. For example, the GAAP-reported assets of the parent include items that are nonadmitted under the statutory rules followed by the group. This would account for the significantly higher equity-to-assets ratio and income-to-assets ratio for the group compared to the parent data. On the other hand, the parent reinsurance-to-assets ratio is significantly higher than the group version, despite the larger GAAP asset base for the parent. This is because under GAAP, reinsurance recoverables are recognized for both paid and unpaid claims. Under SAP, the amount is restricted to amounts that have been paid by the primary insurer. Another example is the stocks-to-investments ratio, which is higher in the group-SAP statements than it is in the parent-GAAP reports. An explanation is that bonds, the principal component of the investment portfolio, are valued at amortized cost under SAP and fair value under GAAP. If fair values exceed cost, investments under GAAP ratio will exceed the corresponding SAP amount.

Not all of the significant differences in the group and parent company ratios are due to accounting rules. For example, the group equity-to-assets ratio exceeds the parent equivalent because debt unique to the holding company reduces the numerator of the parent ratio, whereas assets from non-PL subsidiaries increase the denominator of the parent ratio. Parent-specific debt also makes the debt-to-equity ratio significantly higher in the parent statements than it is in the consolidated group reports. Likewise, the losses and expenses to premiums ratio is higher in the parent company's statements than it is in the reports of the consolidated property-liability subsidiaries. The likely reason is that the some holding companies have life-health subsidiaries, which tend to have a much higher ratio of expenses and losses relative to premiums than the property-liability insurers in the consolidated group.[19] Another case in point is the significant difference between the group and parent company ratio of dividends to income. This difference is attributable, not to accounting conventions, but to the fact that group dividends are paid by the group to the parent, and parent dividends are

[18] The presence of debt at the holding company level that is not on the consolidated subsidiaries' balance sheet indicates the extent to which the investment in subsidiaries is funded by debt. This phenomenon is known as double leverage.

[19] Consistent with this view, the median difference between group and parent losses and expenses-to-premiums ratio is not significant in the pure PL sample.

paid by the parent company to external shareholders. Roughly, one-third of group-level income is paid out as dividends to the parent. The significantly lower payout ratio of the parent indicates that much of the group dividend is retained rather than paid out to shareholders.

Pairwise Spearman correlations among the financial statement variables are presented in Table 5. Panel A reports correlations among the parent-level ratios, and Panel B focuses on the analogous group measures. In both panels, correlations that are significant at the 0.05 level or better are shown in bold type. A similar pattern emerges from both parent and group-level data sets.[20] Larger insurers tend to use more financial leverage, hold less cash, have a higher return on investments, and have a higher dividend payout ratio than smaller firms. More profitable firms, as measured by the income-to-assets ratio, have lower property-liability reserves, higher cash flows, and make less use of reinsurance transactions than less profitable insurers. Firms with higher equity-to-assets ratios have lower property-liability reserves, higher cash flows, and a greater proportion of stocks in their investment portfolio than more highly levered firms. These firms also use less reinsurance, report higher returns on assets, lower returns on the investment portfolio, and tend to be smaller than firms with lower equity-to-assets ratios.

Initial evidence on the extent to which A. M. Best relies on financial statement data from the group and parent reports is presented in Panel C of Table 5, which reports correlations between the financial statement items and the financial strength rating. There is some overlap in the sets of variables from the group and parent statements that are significantly correlated with the rating. As predicted, firm size and the dividend payout ratio are significantly positively correlated with higher financial strength ratings. This is true whether the variable is taken from the group or the parent statements. On the other hand, the losses and expenses to premiums ratio in the group statement is negatively correlated with ratings, but the holding company counterpart is not. Likewise, the group ratio of reinsurance recoverables to assets is significantly negatively related to ratings (as predicted), whereas the parent ratio does not attain significance. One explanation for these discrepancies is that holding company financial statements incorporate information about life-health and noninsurance subsidiaries that limit the usefulness of parent-level ratios for evaluating the property-liability group. An alternative view is that the GAAP accounting model used by the parent is less informative

[20] Indeed, correlations between analogous ratios at the parent and group level are high, with most exceeding 0.50 (untabulated). The lowest correlations are observed in cases where the group and parent ratios reflect differing transactions. For example, the correlation between the group and parent debt-to-equity ratios is low ($\rho = 0.18$) because the parent ratio includes debt that is not reported in the statements of the consolidated groups. Similarly, the parent losses and expenses-to-premiums ratio ($\rho = 0.38$) includes expenses related to the parent company's investment in life-health companies that are not reflected in the statement of the consolidated property-liability subsidiaries. Correlations between parent and group-level ratios in the pure PL sample generally exceed those in the full sample. In particular, the correlation between the parent and group losses and expenses to premiums ratio increases from 0.38 in the full sample to 0.63 in the pure PL sample. However, the correlation between parent and group debt-to-equity ratios remains low (0.18 in the full sample and 0.14 in the pure PL sample). This is because debt at the holding company level is present in both samples.

TABLE 5

Pairwise Spearman Correlations Among Potential Determinants of the Best Financial Strength Rating of 80 Publicly Traded Insurance Holding Companies for the Year Ended December 31, 1997

	E/A	*D/E*	*PLLR/A*	*C/I*	*CF/A*	*S/I*	*R/A*	*I/A*	*II/I*	*L&E/P*	*D/I*	*LnA*
Panel A: Financial Variables Derived From the GAAP Statements of the Sample Insurance Holding Companies[a]												
Equity/Assets	**1.000**											
Debt/Equity	**−0.538**	**1.000**										
PLL-Reserves/Assets	**−0.314**	−0.136	**1.000**									
Cash/Investments	0.069	0.109	−0.101	**1.000**								
Cash Flows/Assets	**0.309**	−0.082	−0.189	−0.125	**1.000**							
Stock/Investments	**0.336**	−0.117	−0.211	−0.095	**0.234**	**1.000**						
Reinsurance/Assets	**−0.527**	0.200	**0.612**	0.172	**−0.513**	**−0.269**	**1.000**					
Income/Assets	**0.283**	0.037	**−0.24**	0.001	**0.517**	0.092	**−0.390**	**1.000**				
Investment Income/Investments	**−0.396**	**0.228**	**0.234**	**−0.23**	−0.191	**−0.423**	0.199	−0.144	**1.000**			
Losses & Expenses/Premiums	−0.172	0.094	−0.113	0.166	**−0.422**	**−0.233**	0.071	**−0.453**	0.212	**1.000**		
Dividends/Income	−0.023	0.036	−0.076	**−0.235**	−0.079	**0.303**	−0.023	−0.047	0.070	0.011	**1.000**	
LnAssets	**−0.549**	**0.369**	0.133	**−0.375**	−0.125	0.056	0.144	−0.145	**0.402**	0.069	0.202	**1.000**
Panel B: Financial Variables Derived From the SAP Statements of the Consolidated Operating Subsidiaries of Sample Insurance Holding Companies[a]												
Equity/Assets	**1.000**											
Debt/Equity	0.008	**1.000**										
PLL-Reserves/Assets	**−0.695**	−0.036	**1.000**									
Cash/Investments	0.023	0.063	**−0.223**	**1.000**								
Cash Flows/Assets	**0.324**	−0.009	−0.216	−0.057	**1.000**							
Stock/Investments	**0.342**	**0.246**	−0.180	−0.213	0.138	**1.000**						
Reinsurance/Assets	**−0.276**	−0.089	0.191	0.169	**−0.350**	**−0.351**	**1.000**					
Income/Assets	**0.244**	0.142	−0.143	**−0.226**	**0.479**	−0.022	−0.160	**1.000**				
Investment Income/Investments	**−0.420**	−0.007	**0.428**	−0.072	**−0.317**	**−0.349**	**0.273**	0.121	**1.000**			
Losses & Expenses/Premiums	**−0.356**	−0.128	**0.265**	**0.254**	**−0.363**	−0.013	**0.246**	**−0.806**	0.132	**1.000**		
Dividends/Income	0.064	0.176	0.021	−0.090	−0.144	**0.367**	−0.056	−0.054	0.152	0.032	**1.000**	
LnAssets	**−0.375**	**0.267**	**0.438**	**−0.362**	−0.106	**0.324**	0.002	0.095	**0.302**	−0.071	**0.311**	**1.000**

(continued)

TABLE 5
(Continued)

Group Variable	Correlation With Rating	Parent Variable	Correlation With Rating
Panel C: Spearman Correlations Between the Best Rating and Financial Statement Items Derived From Group and Parent Financial Statements[a]			
Equity/Assets	0.142	*Equity/Assets*	−0.007
Debt/Equity	0.103	*Debt/Equity*	0.038
PLL-Reserves/Assets	0.058	*PLL-Reserves/Assets*	0.044
Cash/Investments	**−0.338**	*Cash/Investments*	**−0.382**
Cash Flows/Assets	0.202	*Cash Flows/Assets*	**0.285**
Stock/Investments	**0.412**	*Stock/Investments*	**0.369**
Reinsurance/Assets	**−0.256**	*Reinsurance/Assets*	−0.181
Income/Assets	**0.223**	*Income/Assets*	0.202
Investment Income/Investments	−0.097	*Investment Income/Investments*	−0.035
Losses & Expenses/Premiums	**−0.338**	*Losses & Expenses/Premiums*	−0.190
Dividends/Income	**0.309**	*Dividends/Income*	**0.299**
LnAssets	**0.583**	*LnAssets*	**0.536**

Notes: The sample consists of 80 publicly traded insurance holding companies with Best financial strength ratings of their consolidated group of operating subsidiaries for the year ended December 31, 1997. Correlations above 0.22 are significant at the 0.05 level or better and are shown in bold type.

[a]Please see Table 1 for variable definitions.

than the SAP model used by the P-L subsidiaries. The ratio of cash flows to assets is positively related to ratings (as expected), although in this case only the holding company variable is significant. Using either report, the ratio of cash to investments is negatively related to ratings, whereas the ratio of stock to investments is positively related to ratings.

RESULTS

Our goal is to investigate the financial determinants of Best financial strength ratings of consolidated groups of property-liability insurers. We begin by conducting an ordered probit regression (see Greene, 1997), where the dependent variable is the six-category Best financial strength rating, and the independent variables are drawn from the consolidated group financial statements.[21] We view the group annual reports as the primary data source for the rating decision because they provide a one-to-one correspondence with the rated entity. The dependent variable takes on the value of 0 if the firm is assigned a Best rating of B or lower; 1 if the rating is B++ or B+; 2 when the firm is rated A−; 3 when an A rating is achieved; 4 when the rating is A+; and 5 when the rating is A++. Positive estimated slope coefficients in this setting indicate that increasing values of the independent variables are associated with lower insolvency risk, and higher financial strength ratings.[22]

An important caveat to our results is that loss reserves—the dominant liability on both parent and group balance sheets—are subject to estimation error. Prior research suggests that financially struggling firms tend to understate the reserve (Petroni, 1992), which can have a pervasive effect on financial ratios extending beyond explicit consideration of loss reserve levels. As sophisticated users of financial information, it is likely that Best analysts factor this effect into their rating decisions. In the context of our article, this would work against finding significant associations between specific ratios (particularly the ratio of property-liability loss reserves to assets) and the Best rating.

The results of this analysis are reported in Table 6. Panel A presents results for our 80 holding company sample; Panel B reports analogous findings for the pure PL sample of 58 firms that focus almost exclusively on the property-liability industry. To conserve space, coefficients and p-values are only reported for variables that are significant at the 0.10 level or better. In column 5 of Panel A, the Best rating is regressed on variables from the consolidated group reports for the 80 firm sample. The model has a pseudo R^2 of 0.35 and is highly significant ($p < 0.0001$). As predicted, higher ratings are associated with increased capitalization (*Equity/Assets*), liquidity (*Cash Flows/Assets*), profitability (*Dividends/Income*), and size (*LnAssets*). Ratings decrease with the firm's expense ratio (*Losses & Expenses/Premiums*). The general implication of these results is that financial characteristics found to be important in individual firm ratings also apply to consolidated group ratings. Our study is the first to supply evidence on this issue.

[21] The ordered probit model is more appropriate than an ordinary least squares (OLS) regression in a rating determinants model because of the ordinal nature of the dependent variable (see Ederington, 1985; Greene, 1997).

[22] As a check on our results, we also employ a stepwise approach, where all variables have an equal chance of entering the model, and are retained when p-values are less than 0.10. Our findings are qualitatively identical to those reported in Table 6.

TABLE 6
Results of Ordered Probit Regressions of Best Financial Strength Ratings of Publicly Traded Insurance Holding Companies on Financial Statement Variables From Group and Holding Company Financial Reports

$$\text{Model: Best Rating} = \beta_0 + \Sigma\beta_m(\text{independent variable}_m) + \varepsilon_{it}$$

1 Variable Name[a]	2 Variable Category[b]	3 Data Source[c]	4 Expected Sign	5 Group Ratios Only[d]	6 Group Ratios and HC Residuals[e]
Panel A: Results for the Sample of 80 Publicly Traded Insurance Holding Companies With Best Financial Strength Ratings of Their Consolidated Group of Operating Subsidiaries for the Year Ended December 31, 1997					
Equity/Assets	Capitalization	Group	+	0.086	0.087
				(0.017)	(0.052)
Cash Flows/ Assets	Liquidity	Group	+	0.086	0.114
				(0.077)	(0.064)
Losses & Expenses/ Premiums	Profitability	Group	−	−0.152	−0.234
				(0.002)	(0.004)
Dividends/ Income	Profitability	Group	+	0.013	0.014
				(0.006)	(0.013)
Income/Assets	Profitability	Group	+		−0.325
					(0.074)
LnAssets	Size	Group	+	1.324	2.256
				(0.000)	(0.000)
Debt/Equity	Capitalization	HC	−		0.164
					(0.012)
Stock/ Investments	Asset risk	HC	−		−0.169
					(0.020)
Dividends/ Income	Profitability	HC	+		0.041
					(0.022)
Income/Assets	Profitability	HC	+		−0.793
					(0.077)
−2 Log likelihood				163.3	129.3
Pseudo R^2				0.35	0.49
p-value for full/reduced F-test[f]					0.01
Panel B: Results for the Sample of 58 Publicly Traded Insurance Holding Companies With Best Financial Strength Ratings of Their Consolidated Group of Operating Subsidiaries for the Year Ended December 31, 1997, Life Reserves That Represent Less Than 10 Percent of Total Loss Reserves, and Noninsurance Revenues That Are Less Than 10 Percent of Total Revenues					
Equity/Assets	Capitalization	Group	+	0.093	0.131
				(0.037)	(0.038)
Debt/Equity	Capitalization	Group	−	−0.705	
				(0.043)	
Cash/ Investments	Liquidity	Group	+	−0.085	−0.140
				(0.092)	(0.062)
Cash Flows/ Assets	Liquidity	Group	+		0.290
					(0.039)
Reinsurance/ Assets	Asset risk	Group	−	−0.335	
				(0.070)	

(continued)

TABLE 6
(Continued)

1 Variable Name[a]	2 Variable Category[b]	3 Data Source[c]	4 Expected Sign	5 Group Ratios Only[d]	6 Group Ratios and HC Residuals[e]
Losses & Expenses/ Premiums	Profitability	Group	−	−0.173 (0.013)	−0.415 (0.004)
Dividends/ Income	Profitability	Group	+	0.027 (0.001)	0.018 (0.065)
Investment Income/ Investments	Profitability	Group	+	−1.036 (0.049)	−1.167 (0.067)
Income/Assets	Profitability	Group	+		−0.847 (0.018)
LnAssets	Size	Group	+	1.626 (0.000)	2.989 (0.000)
Equity/Assets	Capitalization	HC	+		0.217 (0.092)
Cash Flows/Assets	Liquidity	HC	+		0.156 (0.105)
Dividends/ Income	Profitability	HC	+		0.069 (0.012)
−2 Log likelihood				107.0	81.6
Pseudo R^2				0.41	0.55
p-value for full/reduced *F*-test[f]					0.025

Notes: The dependent variable takes on the value of 0 if the firm is assigned a Best rating of B or lower; 1 if the rating is B++ or B+; 2 when the firm is rated A−; 3 when an A rating is achieved; 4 when the rating is A+; and 5 when the rating is A++. The model in columns 5 (panels A and B) includes 12 independent variables. The model in column 6 (panels A and B) has 24 independent variables. To conserve space, results are reported only for variables that attain significance at the 0.10 level or better, and model intercepts are not reported. Estimated coefficients for the independent variables are indicated in the body of the table, with *p*-values in parentheses. Positive estimated slope coefficients indicate that increasing values of the independent variables are associated with lower insolvency risk, and higher financial strength ratings.

[a]Please see Table 1 for variable definitions.

[b]Variables are categorized according to key attributes that indicate the likelihood of insolvency. These attributes, and their expected relation to the Best group rating, are described in the section "Determination of Insurer Financial Strength Ratings."

[c]Statutory financial data for the consolidated insurance operating subsidiaries are obtained from the National Association of Insurance Commissioners (NAIC) Property-Casualty Annual Statement database (denoted as "Group"), and GAAP financial data for the holding company are taken from the *Best's Holding Company Guide* (denoted as "HC"). The information in *Best's Holding Company Guide* is primarily taken from SEC Form 10-K and Annual Reports to Stockholders.

[d]Qualitatively identical results are obtained with a stepwise regression approach.

[e]The independent variables in this model consist of group-level ratios and holding company residuals. Holding company residuals are obtained by regressing each holding company financial variable on its group level equivalent amount. Qualitatively identical results are obtained with a stepwise regression approach.

[f]The full/reduced *F*-test indicates whether the holding company residuals, considered as a group, contribute to the explanatory power model beyond what is provided by the group-level ratios.

Our next step is to assess the role—if any—played by holding company variables in the group-rating process. To begin, we regress each holding company financial variable on its group-level equivalent amount. The residual from each regression gauges aspects of the parent company variable that are not captured in the analogous group ratio, including transactional differences as well as variations in the GAAP and SAP accounting models. We employ this approach to avoid problems with multicollinearity that could arise when analogous parent- and group-level ratios simultaneously enter the ratings regression. The mean R^2 in these simple regressions is 0.45, and ranges from 0.0001 for the *LnAssets* regression to 0.95 for the *Losses & Expenses/Premiums* regression. We then estimate an expanded ratings model, with regressors that include, not only the group variables (as in Panel A, column 5), but also all of the holding company residuals. The results are reported in Panel A, column 6, and support the view that parent company financial data are used by Best analysts when assigning group ratings. In particular, the null hypothesis that the coefficients on the holding company residuals are jointly zero is rejected at the 0.01 level ($\chi^2 = 34.0$, 12 df). Further, addition of the parent variable residuals increases the explanatory power of the model from 0.35 (column 5) to 0.49 (column 6).[23]

Estimated coefficients and p-values for the expanded model (Panel A, column 6) indicate that relevant group-level measures are essentially unchanged from Panel A, column 5.[24] Again, higher ratings are associated with increased capitalization (*Equity/Assets*), liquidity (*Cash Flows/Assets*), profitability (*Dividends/Income, Income/Assets*), and firm size (*LnAssets*). Ratings decrease with the firm's expense ratio (*Losses & Expenses/Premiums*).[25] Best analysts apparently look to the parent company reports to parent borrowing (*Debt/Equity*), asset risk (*Stock/Investments*), and dividend payments to shareholders (*Dividends/Income*). The set of parent company variables selected for the ratings model is consistent with the view that financing, investing, and dividend decisions at the parent company level influence the financial stability of the consolidated subsidiaries.[26]

[23] Another way to assess whether parent company information is used in the group-rating decision is to directly regress the Best ratings on holding company financial ratios. We performed this analysis, and found some parallels between the sets of variables selected from the group and parent company reports. In both regressions, *Dividend/Income* and *LnAssets* are significantly positively related to group ratings. However, in the parent company regression *Debt/Equity* also achieves (negative) significance, which it does not in the group-level analysis. The distinction is that the parent variable includes information about parent company debt that is not available from the consolidated group statements. Another difference between the two variable sets is that the parent company regression includes a liquidity variable (*Cash Flows/Assets*) that is only marginally significant in the group-level regression. Similarly, the profitability measures, *Income/Assets* and *Investment Income/Investments*, are significant in the parent company regressions, but not at the group level. On the other hand, *Losses & Expenses/Premiums* is included in the group-level model, but is not selected for the parent model.

[24] As in column 5, results are only reported for variables that attain significance at the 0.10 level or better.

[25] A fifth group ratio, pretax operating income to average total assets (Income/Assets) is negatively related to ratings, which is contrary to prediction. However, this variable is only marginally significant ($p = 0.077$).

[26] The positive sign on *Debt/Equity* is contrary to predictions, and indicates that consolidated P-L groups with more highly levered parents receive higher Best ratings. This makes sense,

There are two potential (and nonmutually exclusive) explanations for the finding that Best analysts use parent company financial data to rate subsidiary firms. One explanation is that transactions at the holding company level affect the financial health of the subsidiaries. The other explanation is that differences in GAAP and SAP accounting make the parent company financial data incrementally useful for rating subsidiary firms. An ideal way to separate the effects of accounting and transactional influences would be to obtain SAP statements for the holding company. This way, a direct measure of the financial statement effects of holding company transactions could be extracted from a comparison of group and holding company ratios, all measured on a SAP basis. Likewise, the contrast of holding company ratios from GAAP versus SAP statements would directly captures the effect of the accounting model. Unfortunately, this strategy is not viable because SAP-based statements are not prepared at the holding company level.

Another method of controlling for the effects of parent company transactions is to restrict the sample to firms without any non-PL subsidiaries or additional parent-level debt. For this subsample of firms, transaction sets are virtually identical at group and holding company levels, and any incremental contribution of holding company variables can be attributed to differences in the accounting model. Although the holding companies in our sample infrequently hold non-PL subsidiaries, parent-level debt is observed in roughly three-quarters of our firms. As a result, the resulting sample would be too small for meaningful inferences. A second-best solution, which we employ below, is to discard holding companies with material non-PL investments, and allow firms with parent-level debt to remain in the sample (whereas controlling for this debt in our regressions). Thus, as described in the section "Sample and Data," we apply an additional sampling screen to the data, omitting holding companies when life reserves represent more than 10 percent of total loss reserves, *or* when noninsurance revenues comprise more than 10 percent of total revenues. This results in the pure PL sample of 58 companies that focus almost exclusively on the property-liability industry.[27]

Columns 5 and 6 of Panel B of Table 6 report results for the pure PL sample that are analogous to those in columns 5 and 6 of Panel A for the full sample. Column 5 reports results for the base regression of Best group ratings on group ratios. As in the

however, if greater financial stability at the parent level is associated with greater debt capacity. Supporting this, the correlations reported in Table 5 indicate that the largest (and presumably most secure) holding companies also use the most debt financing. Holding companies that invest in life-health subsidiaries—in addition to property-liability firms—also use more debt than less diversified firms. Table 4 (Panel A) reveals that the mean debt–equity ratio in the full sample is 18.3. This compares to a mean debt–equity ratio of 16.0 in the pure PL sample. The fact that the debt–equity ratio tends to correlate positively with holding company size and diversification suggests that more highly levered parents can offer greater financial security to their subsidiaries.

[27] In the pure PL sample, the median values of the two ratios that measure parent-specific investments (*Life-health reserves/Total reserves* and *Non-insurance revenue/total revenue*) are zero; *Parent debt/Sub equity* has a median of 11.9 percent. Similar medians are noted for the full sample (Table 4, Panel C). This means that parent borrowings are the principle transactional difference between holding company and consolidated group financial reports in both samples. However, extreme values of all three transaction variables are lower in the pure sample than they are in the full sample. This is reflected in lower mean values, lower values at the 75th percentile, and a greatly reduced variable range (untabulated).

80 firm full sample, ratings increase with capitalization (*Equity/Assets*), profitability (*Dividends/Income*), and firm size (*LnAssets*), and decrease with the firm's expense ratio (*Losses & Expenses/Premiums*). Ratings also decrease with investment yield and financial leverage (*Investment income/Investments* and *Debt/Equity*, respectively).[28] With the exception of the investment yield, all variables have the predicted sign.[29] The explanatory power of the model increases from 0.35 for the full sample (column 5, Panel A) to 0.41 for the pure PL sample (column 5, Panel B).

Column 6 of Panel B of Table 6 presents pure PL sample results for the expanded model, which includes both group ratios and holding company residuals. These findings are analogous to column 6, Panel A for the full sample. As in Panel A, there is evidence that Best analysts use parent company statements to decide group ratings. The null hypothesis that the coefficients on the holding company residuals are jointly zero is rejected at the 0.025 level ($\chi^2 = 25.4$, 12 df). Further, moving from the base regression in column 5 to the expanded regression in column 6 results in an increase in explanatory power from 0.41 to 0.55. Inspection of significance levels of individual coefficients indicates that parent capitalization (*Equity/Assets)*, liquidity *(Cash Flows/Assets*), and dividend policy (*Dividends/Income*) are considered by Best analysts when rating the consolidated group. Although results from both samples suggest that aspects of parent-level financing and dividend policy influence group-level ratings, the operational measures of these constructs are sample specific. Thus, whereas we can safely say that parent-level data are *collectively* useful in the ratings decision, our data do not allow us identify the *specific* ratios that important.

CONCLUSION

Our article extends the ratings literature by analyzing the financial characteristics associated with A. M. Best ratings of consolidated groups of property-liability insurers. To our knowledge, we are the first to study group-level ratings and also the first to examine the role of the holding company financial statements in the rating process. Our sample consists of 80 publicly traded property-liability insurers that received financial strength ratings of their consolidated insurance-operating subsidiaries from the A. M. Best Company for the year ended December 31, 1997. Analysis of consolidated group statements indicates that the financial characteristics important in determining of ratings at the individual level—capitalization, liquidity, asset risk, profitability, and size—are also important at the group level. Further, financial ratios from holding company statements are incrementally useful in the ratings process, after group-level ratios have been taken into account. The fact that holding company data is incrementally useful in assessing group-level solvency risk has two nonmutually exclusive explanations: real transactions at the holding company impact group solvency, and/or the GAAP accounting model adds important insights beyond SAP numbers. We attempt to isolate these explanations by conducting robustness tests on

[28] Two additional variables from the group reports are also marginally related to the group rating: *Cash/Investments* ($p = 0.09$) and *Reinsurance/Assets* ($p = 0.07$).

[29] The negative sign on investment yield is puzzling, since profits in the property-liability industry are almost exclusively derived from investing activities (most often investments in bonds). It supports the counterintuitive view that more profitable firms are viewed as *less* secure by Best raters. We regard this result with some skepticism, however, since it is not observed in the full sample. Even in the pure PL sample, the pairwise correlation between investment yield and Best rating is not significant.

a subset of holding companies that focus almost exclusively on property-liability investments. Even in this subsample, holding company ratios contribute incrementally to our ratings model.

Statutory accounting procedures were developed to aid state regulators in their solvency assessments of insurers licensed to operate in their state. However, certain aspects of SAP have been criticized for creating an unrealistic picture of the insurer's true financial position (Klein, 1995). For example, SAP requires that investments in bonds be carried at amortized cost, rather than market value. Proponents of market valuation (the GAAP approach) argue that it provides regulators, policyholders, and others with a more accurate picture of the true risk and net worth of an insurer (Cummins et al., 1995). The AICPA industry audit guide suggests the need to supplement SAP statements with schedules that reconcile it with GAAP (AICPA 1982, chapter 9). Since this imposes costs on insurance firms, it is important to document compensating benefits. Although we cannot completely rule out transactional differences as an alternative explanation, our findings indicate that GAAP data are used by one important (and sophisticated) group of property-liability insurance reports users: Best analysts.[30] This raises the possibility that solvency monitoring by state regulators might be enhanced if GAAP statements were required for all insurers—not just publicly traded holding companies—and analysis of GAAP data were made an explicit part of solvency assessment.

There are several possible extensions to our research. First, we conduct a cross-sectional analysis for a single year. Future research could extend the analysis to a more recent period to assess the generalizability of our results.[31] Second, we study the influence of holding company characteristics on the Best rating of a subsidiary group. An unanswered question is how *individual* property-liability ratings are related to aspects of the group and holding company in which the firm is embedded. Third, we focus on the decisions of one consumer of insurer external reports, the Best rating agency. Future research could examine a different decision context where the GAAP perspective might be more useful, such as stock valuation.[32] Alford et al. (1993) note that it is unlikely that one reporting model is optimal in all settings, considering the heterogeneity among investors and capital markets, and the differing uses to which the accounting information is put. Our findings suggest that a single reporting model is not necessarily optimal, even for a single decision maker in a well-specified decision context.

[30] We do not wish to imply that analysts prefer the GAAP *accounting model* over the SAP approach. Analysts might be using parent data despite the shortcomings of GAAP simply because the underlying transactions at the parent level have important implications for group financial strength. Our results simply show that parent data are important to analysts. This could be due to parent-level transactions, accounting conventions, or some combination of the two.

[31] We reestimated our tests for the 45 holding companies that met the sample criteria for the year ended December 31, 2000. Although the tenor of our results persists in this later period, we hesitate to put much emphasis on these findings due to the small sample size.

[32] Relevant prior research includes Foster (1975) and Petroni and Wahlen (1995). Foster (1975) finds no evidence that the choice between GAAP and SAP models impacts the market assessment of insurer value. Petroni and Wahlen (1995) find that the market valuations of investment securities required by GAAP are value-relevant only when the investment securities are traded in highly liquid markets.

APPENDIX A: SAMPLE FIRMS

Eighty Publicly Traded Insurance Holding Companies With Best Financial Strength Ratings of Their Consolidated Group of Operating Subsidiaries for the Year Ended December 31, 1997

No.	Holding Company Name	Best Rating	No.	Holding Company Name	Best Rating
1.	20th Century Industries	A−	41.	Markel Corporation	A−
2.	ACCEL International Corporation	B	42.	McM Corporation	C
3.	ALLIED Group, Inc.	A+	43.	Meadowbrook Insurance Group, Inc.	A−
4.	Allmerica Financial Corporation	A	44.	Medical Assurance, Inc.	A
5.	Allstate Corporation	A+	45.	Mercury General Corporation	A+
6.	AmerInst Insurance Group, Inc.	A−	46.	Meridian Insurance Group, Inc.	A
7.	American Bankers Insurance Group, Inc.	A−	47.	The Midland Company	A
8.	American Financial Group, Inc.	A	48.	Mobile America Corporation	C+
9.	American Re Corporation	A++	49.	Mutual Risk Management Ltd.	A
10.	Amwest Insurance Group, Inc.	A−	50.	NAC Re Corp.	A+
11.	Argonaut Group, Inc.	A+	51.	NYMAGIC, Inc.	A+
12.	Baldwin & Lyons, Inc.	A+	52.	National Insurance Group	A
13.	Bancinsurance Corporation	A−	53.	The National Security Group, Inc.	A−
14.	Berkshire Hathaway, Inc.	A++	54.	The Navigators Group, Inc.	A
15.	Capitol Transamerica Corporation	A+	55.	North East Insurance Company	B−
16.	The Centris Group, Inc.	A	56.	Ohio Casualty Corporation	A+
17.	Chandler Insurance Company, Ltd.	A−	57.	Old Guard Group, Inc.	A−

18.	Chartwell Re Corporation	A	58.	Omni Insurance Group, Inc.	A−
19.	The Chubb Corporation	A++	59.	Orion Capital Corporation	A
20.	Cincinnati Financial Corporation	A++	60.	Philadelphia Consolidated Holding Corporation	A+
21.	The Commerce Group, Inc.	A	61.	The Progressive Corporation	A++
22.	Danielson Holding Corporation	B++	62.	RLI Corp.	A
23.	Everest Reinsurance Holdings, Inc.	A+	63.	RTW, Inc.	B++
24.	Executive Risk, Inc.	A	64.	Reliance Group Holdings, Inc.	A−
25.	Farm Family Holdings, Inc.	A	65.	Risk Capital Holdings, Inc.	A
26.	Foremost Corporation of America	A+	66.	SCPIE Holdings, Inc.	A
27.	Fremont General Corporation	A−	67.	Selective Insurance Group, Inc.	A+
28.	Frontier Insurance Group, Inc.	A−	68.	The St. Paul Companies, Inc.	A+
29.	GAINSCO, Inc.	A+	69.	TIG Holdings, Inc.	A
30.	General Re Corporation	A++	70.	Transatlantic Holdings, Inc.	A++
31.	HCC Insurance Holdings, Inc.	A+	71.	Travelers Group, Inc.	A
32.	HSB Group, Inc.	A+	72.	Trenwick Group, Inc.	A+
33.	Harleysville Group, Inc.	A	73.	USF&G Corporation	A
34.	Hartford Financial Services Group, Inc.	A+	74.	Unico American Corporation	A−
35.	Highlands Insurance Group, Inc.	B++	75.	United Fire & Casualty Company	A
36.	Horace Mann Educators Corporation	A+	76.	Unitrin, Inc.	A++
37.	Intercargo Corporation	A−	77.	Vesta Insurance Group, Inc.	A
38.	Kaye Group, Inc.	A−	78.	W.R. Berkley Corporation	A+
39.	Leucadia National Corporation	B++	79.	Walshire Assurance Company	A
40.	MMI Companies, Inc.	A	80.	Zenith National Insurance Corp.	A+

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