A Comprehensive Examination of Insurer Financial Strength Ratings
A Comprehensive Examination of Insurer Financial Strength Ratings (Executive Summary)

Cassandra R. Cole, PhD
Associate Professor and
Waters Fellow in Risk Management and Insurance
College of Business
Florida State University

Enya He, PhD and FCII
Assistant Professor
College of Business
University of North Texas

Kathleen A. McCullough, PhD
Associate Professor and
State Farm Insurance Professor in Risk Management/Insurance
Florida State University

This examination was a comparison of Demotech ratings to those issued by Standard & Poor's, Moody's, Fitch, A. M. Best and Demotech. Drs. Cole and McCullough are two of the most prolific researchers of insurance issues. Dr. He has become an employee of Lloyd's.

The study and executive summary as well as a summary of the expertise of the authors follows. Conclusions excerpted from the examination or executive summary include:

1. Demotech serves the need of another unique group of insurers, namely those that are geographically focused.

2. Comparisons of Demotech ratings to other agencies show relative consistency in the factors that drive Demotech ratings compared to agencies such as A. M. Best, Moody's, Standard and Poor's, and Fitch.

3. There is also general consistency in the firms that each agency would categorize as financially secure.

4. These results have important public policy implications for insurers, regulators and consumers as they work to better understand the ratings process. Of particular importance to most is the comparability of Demotech ratings to other agencies.

5. Given that [sic] third parties often have requirements related to the use of rated insurers and some states require ratings to operate in a state, the results suggest that Demotech serves an important service within the ratings community and plays a very important role in the insurance market.

A Comprehensive Examination of Insurer Financial Strength Ratings

Cassandra R. Cole, PhD*
Associate Professor and
Waters Fellow in Risk Management and Insurance
College of Business
Florida State University
Phone: 850-644-9283
Email: ccole@cob.fsu.edu

Enya He, PhD and FCII
Assistant Professor
College of Business
University of North Texas
Phone: 940-565-3060
Email: enyahe@unt.edu

Kathleen A. McCullough, PhD
Associate Professor and
State Farm Insurance Professor in Risk Management/Insurance
Florida State University
Phone: 850-644-8358
Email: kmccullough@cob.fsu.edu

July 2011

*Contact Author

A Comprehensive Examination of Insurer Financial Strength Ratings

Abstract

While unsolicited financial strength ratings have been studied in the banking literature, these sometimes controversial ratings have not been studied in insurance. Utilizing data from multiple sources including a proprietary dataset, we provide the most comprehensive examination of insurer financial strength ratings to date and the first analysis of unsolicited ratings for US property-liability insurers. Similar to bank ratings, we find that insurers' unsolicited ratings tend to be lower than solicited ratings. We also find some consistency in the importance of organizational and key financial characteristics when comparing the results for unsolicited and solicited ratings across the agencies.

Key Words: Financial Strength Ratings, Selection-Bias, Unsolicited Ratings, Demotech, A. M. Best

Introduction

Financial strength ratings are an important tool for firms, investors, consumers, and regulators. As a result, they have been the subject of extensive academic, regulatory, and industry scrutiny.[1] Research has focused on a wide variety of topics including the determinants of ratings, differences across rating agencies, reasons to obtain ratings, and the impacts of ratings on business. One particular area of investigation has been on the topic of unsolicited ratings. While most financial strength ratings are based on publicly available information as well as proprietary information provided by the firms being rated, unsolicited ratings are based solely on public information. Existing research in the banking literature has shown that unsolicited ratings, sometimes called shadow ratings, are lower than solicited ratings (e.g., Poon, 2003; Poon and Firth, 2005; Poon, Lee, and Gup, 2009).[2] Differences in solicited and unsolicited ratings may be partially due to the fact that banks with unsolicited ratings are typically smaller and have weaker financial profiles than banks with solicited ratings (Poon and Firth, 2005). Given that ratings can have a considerable impact on a firm's business, this is a significant issue.

A major problem unwinding the differences between solicited and unsolicited ratings often relates to the limited data available for unsolicited ratings. Utilizing data from multiple sources including a proprietary dataset, we are able to provide a comprehensive study of both unsolicited and solicited ratings of multiple agencies for the very first time. More specifically, our sample includes solicited ratings from five rating agencies (i.e., A. M. Best, S&P, Moody's, Fitch, and Demotech) as well as unsolicited ratings from three agencies (S&P, Fitch, and Demotech) over a nine-year time period for property-liability insurers. Our sample of unsolicited ratings includes Demotech provisional ratings which are quite similar to the

[1] The importance of ratings is highlighted in the case of AIG before the government bailout. As reported in Wall Street Journal (September 16, 2008), AIG had to "post $14.5 billion in collateral to bolster its credit rating" as well as "additional collateral to investment banks and others it trades with" after its credit downgrades.

[2] Poon (2003), Poon and Firth (2005), and Poon, Lee and Gup (2009) study solicited and unsolicited bank ratings across different countries.

unsolicited ratings of the other rating agencies in the sense that these ratings are based on publicly available information only and initiated by the rating agency.[3] However, unlike traditional unsolicited ratings, provisional ratings are generally assigned to all insurers with available data in a given year. Additionally, it is important to note that these ratings are not publicly available.[4] Inclusion of provisional ratings provides several advantages in the study of unsolicited ratings. First, it allows us to track a large sample of insurers rated with a process similar to traditional unsolicited ratings. Second, the fact that Demotech does not release the provisional ratings to the public provides an interesting contrast to the rating practices of S&P and Fitch, both of which do make public their unsolicited ratings without consent of insurers. To our knowledge, this type of comparison has not been possible in prior ratings studies. Lastly, given that all insurers with available data are generally assigned a provisional rating by Demotech, this also helps to reduce the problems associated with sample selection that are often present in other studies of unsolicited ratings. Similar to prior literature, for both solicited and unsolicited ratings samples, we also use the extensive financial data available for insurers in an effort to control for the potential selection bias (i.e., Cantor and Packer, 1997; and Pottier and Sommer, 1999). This is critical when one realizes that not all firms receive unsolicited and solicited ratings from all of the agencies due to firm characteristics such as firm age, size, and/or geographic focus as well as internal decisions made by the rating agencies.

In summary, our study accomplishes several goals. First, based on the structure of the data and analysis, we are able to examine the distribution of ratings across the various rating agencies. Second, we contrast the types of firms with published ratings from the various

[3] To our knowledge this is the first time the provisional ratings have been studies in the rating literature.

[4] The provisional ratings are proprietary and made available for this study by Demotech. Demotech generally creates a provisional rating based on publicly available data for all insurers each year and provides that information to the firm. If the insurer elects to finalize this rating, then a fee is paid and the rating is made public. While the insurer is given the opportunity to provide additional information, the finalized rating is still based largely on publicly available information.

agencies (solicited and unsolicited) as well as the characteristics that have the most influence on ratings. Our initial presentation of summary statistics allows the reader to better understand which insurers possess various types of unsolicited and solicited ratings as well as the differences in the distribution of these financial strength ratings. Next, we provide an analysis of the characteristics impacting the ratings as well as the relative importance of these characteristics across ratings agencies. This builds on the prior studies in the area of insurance which have considered both the determinants of financial strength ratings as well as differences in the rating methodologies of these agencies (e.g., Harmelink, 1974; Pottier and Sommer, 1999; and Gaver and Pottier, 2005).[5] Finally, the inclusion of Demotech provisional ratings allows for a comprehensive study of unsolicited insurer financial strength ratings for the very first time and provides some insight as to whether differences are observed between unsolicited ratings that are made available to the public and those that are not. A better understanding of these issues for property-liability insurers not only helps to better understand different types of ratings but also has key public policy implications for the regulators, consumers, and investors relying on these ratings as well as the insurers rated by the agencies.

The remainder of the paper is organized as follows. First, we examine some background information related to the financial ratings literature. This is followed by a discussion of the data and methodology. Finally, a discussion of the results as well as conclusions and public policy implications is presented.

Background Information

A variety of studies have examined the determinants of insurer financial strength ratings from various rating agencies. Similar to prior studies examining bank financial ratings (Poon, 2003;

[5] Other studies have examined the similarities and differences of financial ratings across different firms and industries (e.g., Cantor and Packer, 1997; Van Roy, 2006; and Poon, Lee and Gup, 2009).

and Poon and Firth, 2005), studies related to insurers generally find that financial characteristics including capitalization, liquidity, profitability, and firm size are important in determining insurer ratings (e.g., Harmelink, 1974; Pottier and Sommer, 1999; and Gaver and Pottier, 2005).[6] We draw on the variables considered in prior literature to identify the factors important in determining financial strength ratings.

While the studies generally find that financial and operational traits are important determinants of ratings, they also find that there are differences across rating agencies (e.g., Cantor and Packer, 1997; Pottier and Sommer, 1999; Van Roy, 2006; and Poon, Lee and Gup, 2009). For example, in a study of property-liability insurers, Pottier and Sommer (1999) indicate that rating agencies exhibit systematic differences in the relative importance given to the different factors they consider. Authors have tested whether these are real differences or merely the artifacts of selection bias, given that different agencies rate different insurers. Given the mixed results of prior literature, we control for potential selection bias in the current study.[7]

Studies examining unsolicited ratings are limited to the banking literature. Examples include Poon (2003), Poon and Firth (2005), and Poon, Lee and Gup (2009). The general conclusion from these studies is that banks' unsolicited ratings tend to be lower than solicited ratings, even after controlling for self-selection bias. One limitation of these studies is that each studies the unsolicited ratings from one particular rating agency only (i.e., S&P, Fitch, and S&P, respectively) and no research has examined the unsolicited ratings across multiple rating agencies. To the best of our knowledge, no prior studies in the insurance literature have investigated unsolicited insurer ratings. It is our hope that by taking advantage of unsolicited

[6] More specifically, Gaver and Pottier (2005) find that all of these variables are important determinants of insurer ratings while Pottier and Sommer (1999) find that firm size and investment in junk bonds are significant determinants for all three of the rating agencies examined.

[7] Cantor and Packer (1997) find that sample selection bias does not explain the average rating differences and that observed differences in average ratings rather reflect differences in rating models. While Pottier and Sommer (1999) find some evidence of selection bias in the rating determinants model for A. M. Best, none of their rating differences models show evidence of sample selection (Pottier and Sommer, 1999, p. 639).

ratings from multiple agencies as well as a proprietary dataset from Demotech, our study will help fill both voids in the literature.

While issues related to the determinants of ratings as well as the potential impact from selection bias and unsolicited ratings are important from an academic standpoint, research has found that the existence of ratings significantly impacts a variety of stakeholders. As indicated by Pottier and Sommer (1999), "insurer financial strength ratings are heavily relied upon by insurance agents, brokers, and consumers, are used by insurers in their advertising, provide a tool for regulators to assess insurer risk, and are often used in academic research as measurers of insolvency risk" (p. 622).[8] Evidence of this impact is found in Doherty and Phillips (2002) which documents an increase in rating stringency and concludes that the dramatic capital buildup in the insurance industry can be explained by the pressure experienced by insurers to maintain existing ratings.[9]

Data

The dataset is comprised of data from several sources for the period of 2000 to 2008. Insurers' demographic and financial information is from the National Association of Insurance Commissioners' ("NAIC") Database.[10] Insurers without required financial information are deleted. Demotech ratings (both provisional and finalized) are obtained from Demotech, Inc., and A. M. Best's ratings are obtained from A. M. Best Company. Finally, Fitch, Moody's, and S&P ratings are obtained from the SNL Database. Similar to Pottier and Sommer (1999), we

[8] Ratings also have been used in insolvency prediction (e.g., Ambrose and Seward, 1988; Singh and Power, 1992; Ambrose and Carroll, 1994; and Pottier, 1998).

[9] In addition, Epermanis and Harrington (2006) find that an insurer's A. M. Best rating decline is followed by significant premium declines both in the same year and in the following year.

[10] All continuous variables are winsorized at one percent level to minimize the impact of outliers.

condense the ratings into five categories using the descriptions provided by the agencies to facilitate comparison across the ratings agencies.[11]

We consider both unsolicited and solicited ratings in our analysis. Due to data limitations, the unsolicited ratings analysis is restricted to the ratings of Demotech, S&P, and Fitch.[12] As noted earlier, Demotech unsolicited ratings are different from the unsolicited ratings of both S&P and Fitch in two important ways: (1) the ratings are generally assigned to all insurers every year rather than a limited group; and (2) the ratings are not made available to the public unless the insurer pays for the rating to be finalized and released.[13] However, like traditional unsolicited ratings, Demotech provisional ratings are still initiated by the rating agency. To distinguish Demotech provisional ratings from the more traditional unsolicited ratings provided by S&P and Fitch, we refer to these as provisional ratings throughout the remainder of the paper.[14]

In the analysis of solicited ratings, or those initiated by the insurers, we consider the ratings of the four traditional rating agencies (i.e., A. M. Best, S&P, Moody's and Fitch) as well as Demotech. The inclusion of Demotech ratings provides an interesting contrast to traditional solicited ratings given the difference in the rating processes. Unlike traditional agencies, Demotech provides insurers with their provisional ratings and insurers decide whether to make

[11] A detailed description of each of the rating agencies and the rating categories is provided in Appendix A. In addition, while we condense the ratings into five categories, there are no finalized Demotech ratings in the lowest category and very few observations in this category for the other rating agencies. This information also is summarized in a chart presented in Appendix A.

[12] Table 1 provides information related to unsolicited ratings. Data related to unsolicited financial strength ratings of insurers is somewhat limited. The agencies have generally discontinued this practice or limited the types of insurers to which it assigns these ratings. For example, in a press release in early 2009, Fitch announced that it will no longer issue unsolicited ratings, called 'q' ratings, though it noted it may issue 'q' scores (similar to 'q' ratings in the sense that it utilizes historical financial information) in the future if demanded by the market (Fitch, 2009). Additionally, recently an A. M. Best document indicates that it only assigns unsolicited ratings, called 'pd' or public data ratings, to "Canadian property/casualty insurers and HMOs and health insurers (United States)" for which the company does not currently provide traditional solicited ratings (A. M. Best, 2009). Other than Demotech, only S&P and Fitch offered unsolicited ratings for some part of the sample period. For S&P, a majority of these ratings were only available through 2003 when there was a significant decline in the unsolicited ratings issued. For Fitch, the unsolicited ratings were only available since 2006.

[13] More information on the process of finalizing a rating is provided below.

[14] Provisional rating is the term used by Demotech. For more details regarding Demotech ratings, see Appendix A.

the ratings public. If an insurer elects to finalize the rating, some additional information may be requested that could impact the final rating released to the public; however, for the reduced sample of insurers which elect to finalize their ratings, , the provisional rating provided to the insurer is typically the same as the final rating released to the public. To distinguish these ratings from the more traditional solicited ratings, we refer to these as finalized ratings.

Table 1 provides a summary of the number of insurers rated by each of the rating agencies for the years of our sample.[15] Given that Demotech generally provides its provisional ratings to all insurers with the needed publicly available financial information, it is not surprising that Demotech has the highest number of provisional (unsolicited) ratings. S&P and Fitch have provided approximately the same number of unsolicited ratings; however, the time periods over which these ratings have been provided differ. As shown in the table, while S&P provided a number of unsolicited ratings through 2003, this number dropped significantly in subsequent years. In addition, we do not have any Fitch unsolicited ratings prior to 2006. In terms of solicited ratings, the major two rating agencies in the sample are A. M. Best and S&P with 4,274 and 3,144 firm-year observations respectively. This is followed by Fitch, Demotech, and Moody's.

Next, for the agencies for which we have both unsolicited (or provisional) and solicited (or finalized) ratings, we compare the percentage of ratings in each of the categories. This information is summarized in Table 2. First, we contrast the Demotech provisional and finalized ratings. It appears that there is approximately the same percentage of insurers with ratings in the top two categories. However, we find that there is a much larger percentage of insurers with ratings in the good/strong finalized category than the good/strong provisional category (50

[15] Note the total across the rating agencies exceeds the total number of insurer-year observations indicated earlier since insurers are rated by multiple agencies in a given year.

Table 1 – Number of Ratings in Sample by Year[16]

Panel A: Provisional and Unsolicited Ratings

Year	Demotech (Provisional)	S&P	Fitch
2000	1829	218	N/A
2001	1712	258	N/A
2002	1591	247	N/A
2003	1731	355	N/A
2004	806	119	N/A
2005	1452	72	3
2006	1604	36	426
2007	1575	26	446
2008	1605	N/A	500
Total	13905	1331	1375

Panel B: Finalized and Solicited Ratings

Year	Demotech (finalized)	A. M. Best	S&P	Moody's	Fitch
2000	195	200	351	146	73
2001	181	548	366	177	196
2002	185	515	363	174	186
2003	177	518	379	214	212
2004	175	516	350	211	248
2005	190	493	365	211	264
2006	207	496	367	198	279
2007	221	498	324	200	307
2008	235	490	279	144	317
Total	1766	4274	3144	1675	2082

percent compared to 32 percent). We also find that while no insurer with a finalized rating receives a rating less than fair/adequate rating, 11 percent of provisional ratings fall in this category. More extreme differences are observed when comparing the unsolicited and solicited ratings of S&P and Fitch. With S&P, for insurers soliciting ratings, 46 percent receive ratings in the top two categories. However, for unsolicited ratings, only 12 percent of insurers receive ratings in these categories. Also, while only 1 percent of insurers soliciting ratings receive a less

[16] Note that the number of observations is low for A. M. Best in 2000 and Demotech in 2004. This is due to data limitations. To ensure this is not influencing the results obtained, these two models are repeated excluding these data years from the sample. The unreported results are generally consistent with those presented in the following section.

60

Table 2 – Unsolicited and Solicited Ratings Comparison

	Demotech				S&P				Fitch			
	Provisional		Finalized		Unsolicited		Solicited		Unsolicited		Solicited	
	#	%	#	%	#	%	#	%	#	%	#	%
Superior/Extremely Strong/Exceptional	2956	21%	348	20%	10	1%	354	11%	0	0%	194	9%
Excellent/Very Strong	4052	29%	518	29%	140	11%	1085	35%	0	0%	1121	54%
Good/Strong	4486	32%	889	50%	273	21%	1470	47%	546	40%	653	31%
Fair/Adequate	934	7%	11	1%	585	44%	198	6%	699	51%	90	4%
Less than Fair/Adequate	1477	11%	0	0%	323	24%	37	1%	130	9%	24	1%
	13905		1766		1331		3144		1375		2082	

than fair/adequate rating, 24 percent of insurers fall into this category when considering unsolicited ratings. Finally, for Fitch, we find that only 5 percent of insurers seeking ratings receive a rating in the bottom two categories, and 60 percent of insurers receive unsolicited ratings in these categories. To determine if the differences in the distributions are econometrically significant, we conduct a Wilcoxon rank-sum test for the ratings of each of the three agencies. Using the full distribution of ratings provided by the agencies, we reject the null hypothesis that the provisional (unsolicited) and finalized (solicited) ratings have identical distributions. This result is similar to the findings in the banking literature which suggest unsolicited ratings tend to be lower (i.e., Poon 2003).

For finalized and solicited ratings, we examine the number of insurers with multiple ratings. As shown in Table 3, the majority of insurers elect to only be rated by a single agency. This is not surprising given that the rating process can be costly for insurers. However, we do find that more than 30 percent of insurers seek multiple ratings.[17] Given the volume of insurers with multiple ratings, we control for the existence of another rating in our model. This is discussed in more detail in the following section.

Table 3 – Ratings Summary

Year	1 Rating	2 Ratings	3 Ratings	4 Ratings
2000	518	144	53	
2001	717	206	93	15
2002	690	210	103	1
2003	700	217	118	3
2004	702	209	124	2
2005	662	213	141	3
2006	698	209	141	2
2007	732	228	118	2
2008	760	209	93	2
Total	6179	1845	984	30

[17] These statistics are calculated on an insurer-year observation basis.

Finally, for insurers with multiple ratings, we compare those with secure ratings across the agencies.[18] As shown in Table 4, there appears to be strong consistency in the evaluation of the insurers by the agencies. More specifically, for all comparisons but Demotech and A. M. Best, we find in excess of 90 percent agreement (insurers receiving secure ratings by both agencies). For Demotech and A. M. Best, the percentage of agreement is less (i.e., 81 percent). This finding of such consistency in the evaluation of insurers makes it even more important to control for the existence of other rating(s) in the modeling.

Table 4 – Comparison of Secure Ratings among the Rating Agencies

Comparison Groups	Secure Rating by Both	Total Rated by Both	% Secure by Both
Demotech & A. M. Best	387	479	81%
Demotech & S&P	102	102	100%
Demotech & Moody's	46	46	100%
Demotech & Fitch	32	32	100%
A. M. Best & S&P	184	188	98%
A. M. Best & Moody's	30	30	100%
A. M. Best & Fitch	58	62	94%
S&P & Moody's	1328	1344	99%
S&P & Fitch	1487	1503	99%
Moody's & Fitch	1175	1191	99%

Methodology and Variable Descriptions

Methodology

Next we turn to our examination of the characteristics that influence the different types of ratings. We examine both the factors that impact the rating as well as whether these factors vary across agencies. We first consider Demotech provisional ratings and the unsolicited ratings of

[18] An insurer is considered to have a secure rating if it has a rating in one of the top two categories.

S&P and Fitch. Then, we consider Demotech finalized ratings and the solicited ratings of A. M. Best, S&P, Fitch, and Moody's.

For the Demotech provisional ratings, we use ordered probit modeling. Given that Demotech generally provides provisional ratings for the population of insurers, this modeling approach is most appropriate. However, for all other models (the unsolicited S&P and Fitch ratings, the finalized Demotech ratings, and the solicited ratings of the other four agencies), we use an estimation procedure that controls for potential selection bias.[19] This is necessary given that only some insurers are selected to receive unsolicited ratings by S&P and Fitch and only some insurers elect to be rated by each of the agencies. More specifically, we use a joint approach that models both the insurer's rating and the decision to rate insurer (or the decision by insurer *i* to be rated).[20] Given that the variable of interest (i.e., insurer rating) is only observed if a selection condition is met, the following system of equations is used:

$$y*_i = \mathrm{x}'_i \beta + \lambda \varepsilon_i + \tau_i \qquad \text{Eq. (1)}$$

$$S*_i = \mathrm{z}'_i \gamma + \varepsilon_i + \zeta_i \qquad \text{Eq. (2)}$$

Equation 1 is fitted using an ordinal probit regression model where y takes on a value of 1 through 5 based on the rating assigned to the insurer. Equation 2 is the endogenous decision model. This approach produces consistent estimators of β.[21]

For comparison purposes, we consider the same set of firm characteristics as potential determinants of financial ratings for each ratings series (i.e., provisional Demotech ratings, unsolicited ratings, Demotech finalized ratings, and solicited ratings models).[22] These

[19] It should be noted that for both the S&P and Fitch models, the sample period is limited to the period for which data is available as shown in Table 1.

[20] The modeling technique used is ssm in STATA. The summary of the modeling description was obtained from Miranda and Rabe-Hesketh (2006). See this article for additional details.

[21] We control for heteroskedasticity. There is no evidence of multicollinearity or autocorrelation.

[22] There is some variation in the variables included in the decision model. The discussion related to these variables and the results of these models can be found in Appendix B.

characteristics are divided into four categories: organizational characteristics; business mix; business risk; and financial strength and flexibility.

Variable Descriptions

With respect to the determinants of financial strength ratings models, we use a set of variables similar to those used in prior insurance literature (i.e., Pottier and Sommer, 1999). We divide the variables into four categories similar to those identified in the banking (i.e., Poon, 2003).

Organizational Characteristics. Prior literature has shown that different organizational forms are associated with systematically different levels of risk in terms of business written and investments (i.e., Lamm-Tennant and Starks, 1993; Downs and Sommer, 1999; Cole, He, McCullough, and Sommer, 2009). Our size measure is *Direct Premiums Written*.[23] We also include proxies to capture differences in organizational forms (*Mutual Indicator* and *Other Organization Type Indicator* with stock being the omitted category), group membership (*Group Indicator*), and insurer age (*Established Age*).

Business Mix. First, we include the *Line-of-Business Herfindahl* and the *Number of States Licensed* as measures of concentration. The measures are relatively standard measures of concentration and business mix in the insurance literature. To the extent that diversification reduces firm risk, more diversified firms are expected to have higher ratings. However, if diversification leads to a lack of efficiency in operations that adversely impact profitability, the opposite result may exist. We also include two variables to measure specific business focus as this may impact various aspects of the firm and therefore insurers' ratings: the *Percentage in Long-Tail Lines* and the *Percentage in Personal Lines*.[24]

[23] It should be noted that since larger firms are typically expected to have lower levels of insolvency risk (Cummin and Danzon, 1997; Cummins and Sommer, 1996), the size measure also can be considered a business risk measure.
[24] In general, long-tailed lines of business relate to liability, environmental, and bodily injury claims. With these types of claims, it typically takes a longer period from the time of the occurrence of the injury to final settlement of

Business Risk. We include *Stock to Cash and Invested Assets* as a measure of investment risk as varying levels of stock investment will correlate with varying levels of firm risk. We also include *2-Year Loss Development* as it is an important part of the assessment of an insurer's risk. According to A. M. Best, more than two thirds of an insurer's gross capital requirement usually is generated from its loss reserve and net premiums written components (A. M. Best, 2003). This measure allows for us to determine whether the insurer has been understating or overstating loss reserve estimates in recent periods. *Catastrophe Exposure* is proxied by the percentage of the insurer's premiums written in property insurance in states along the Gulf Coast and the Atlantic Seaboard. An insurer's exposure to catastrophic events creates greater uncertainty and thus is likely to be associated with lower financial strength ratings. Finally, two measures related to reinsurance are included: *Reinsurance Ceded* and *Recoverables to Surplus*. The extent of reinsurance use has a potentially conflicting impact on an insurer's business uncertainty (Borch, 1974; Berger, Cummins, and Tennyson, 1992). Given that reinsurance transfers part of the risk to a reinsurer, greater use of reinsurance may be associated with reduced uncertainty of the primary insurer's business. Alternatively, greater use of reinsurance can have several adverse effects for the primary insurer: it may make it "more susceptible to short-term dislocations in the overall market"; it ties its financial stability to that of the reinsurer; and it exposes it to potential uncertainty in payments if a claim dispute occurs (Doherty and Phillips, 2002, p. 62). In this respect, the use of reinsurance may complicate the assessment of the insurer's risk, which increases the information asymmetry and uncertainty regarding the company. The *Recoverables to Surplus* is another measure related to reinsurance. Higher levels of recoverables are likely related to a greater probability of insolvency. As discussed in prior research, we would expect this variable to be negatively related to the insurer's rating (i.e., Gaver and Pottier, 2005).

---

the loss. This can lead to more error in loss reserving as well as more volatility of losses in general. Typically, due to their standardized nature, personal lines converages are considered less volatile than commercial coverages. It should be noted that both of these measures may also capture varying levels of business risk.

Financial Strength and Flexibility. Previous studies have established that insurers which are more profitable and well capitalized are associated with higher ratings (i.e., Kahane, Tapiero, and Jacques, 1986**;** MacMinn and Witt, 1987; Cummins, 1988; Doherty, 1989; Pottier and Sommer, 1999; Doherty and Phillips, 2002; Gaver and Pottier, 2005). *Capital to Assets* serves as a proxy for an insurer's capitalization while *Net Income to Assets* measures an insurer's profitability. We also include *Cash to Invested Assets* given that prior studies have found that the insurer's levels of liquidity also is likely to impact ratings (Kahane et al., 1986; Pottier and Sommer, 1999). An insurer with higher levels of investment in cash is expected to be associated with relatively lower uncertainty and likely higher ratings because cash is much easier to value and less risky than bonds and stocks. Finally, prior research has indicated that growth is important in determining insurer insolvency risk (Harrington and Danzon, 1994; Pottier and Sommer, 1999). We proxy growth with *Change in NPW*. The impact of growth on firm's uncertainty and potential impact on ratings is ambiguous as strong premium growth may indicate that policyholders' are confidence in the financial health of the insurer and thus indicate lower uncertainty; or, on the other hand, may be a result of a property-liability insurer's lowering underwriting standards or under-pricing (Harrington and Danzon, 1994).

Results

Summary Statistics. Table 5 provides summary statistics for the entire sample and separately for insurers with unsolicited and solicited ratings. It appears that insurers that solicit ratings tend to be larger and more diverse in terms of business mix and geographic operation. In addition, these insurers have smaller loss development factors.

Provisional and Unsolicited Ratings. We now turn to an analysis of whether the determinants of unsolicited financial ratings are consistent across the agencies. This includes an

analysis of the Demotech provisional ratings as well as the S&P and Fitch unsolicited ratings. As shown in Table 6,[25] it appears that organizational characteristics have less of an impact on the ratings assigned to insurers in comparison to the other categories. More specifically, four (*Stock to Cash & Invested Assets*, *2 year Loss Development,* and both reinsurance variables) of the five

Table 5: Summary Statistics[26]

	All	Unsol.	Sol.
Organizational Characteristics			
Direct Premiums Written	10.1733	10.3186	10.6565
Mutual Indicator	0.2021	0.2087	0.1847
Other Organization Type Indicator	0.1001	0.0664	0.0590
Group Affiliation	0.6521	0.6904	0.6617
Established Age	42.7033	44.8859	45.1690
Business Mix			
Line-of-Business Herfindahl	0.5173	0.4909	0.4702
Percentage in Long-Tail Lines	0.6980	0.6904	0.6963
Percentage in Personal Lines	0.3739	0.4009	0.3930
Number of States Licensed	16.0049	16.5506	19.5425
Business Risk			
Stock to Cash & Invested Assets	0.1143	0.1178	0.1122
2 Year Loss Development	-0.8428	-1.1127	-0.3846
Catastrophe Exposure	6.6966	6.6989	7.1536
Reinsurance Ceded	0.5319	0.5458	0.5519
Recoverables to Surplus	49.5773	48.3800	49.2293
Financial Strength and Flexibility			
Capital to Assets	0.4272	0.4306	0.4144
Net Income to Assets	0.0232	0.0231	0.0262
Cash to Invested Assets	0.1958	0.1679	0.1575
Change in NPW	19.9881	17.1664	17.0099

[25] It should be noted that for of the second-stage models, the likelihood ratio test for $\rho = 0$ rejects the null hypothesis at a significance level of .05 or better for S&P, but not for Fitch.

[26] Prior research has considered whether the financial profiles are statistically different between solicited and unsolicited samples using t-tests. Given the uniqueness of our sample (have data from multiple rating agencies), there are some firms that appear in both the unsolicited and solicited sub-samples so a complete comparison of these two sub-samples is not possible. However, t-tests conducted including the insurers that appear in only one sub-set show significant differences for all but one of the variables at the five percent level. For that variable (*Catastrophe Exposure*), the t-test shows significant differences at the 10 percent level. It should be noted that the Demotech provisional ratings are included in the unsolicited group and Demotech finalized ratings are included in the solicited group.

business risk measures are significant for all three agencies while this is only the case for two (*Direct Premiums Written* and *Group Affiliation*) of the five organizational characteristics. The mutual variable also is significant in the Demotech model. Additionally, all of the financial strength measures are significant for S&P and Demotech and three of the four for Fitch. Finally, as it relates to business mix, while only one of the variables, *Line-of-Business Herfindahl*, is significant for S&P, all of these variables are significant for Demotech and three of the four for Fitch.

An examination of the sign and size of the coefficients provides some information as to the magnitude of the impact of the firm characteristics across the various agencies. Examining first the organizational characteristics, we find that size and group affiliation are associated which greater probabilities of being assigned a higher rating for S&P and Fitch in comparison to Demotech. In terms of business mix, we find that firms that are more concentrated in terms of business are over two times more likely to receive a lower rating from Fitch and three times more likely to receive a lower rating from S&P than from Demotech. In addition, while larger percentages of business in long-tail lines are associated with greater probabilities of being assigned higher ratings for Demotech and Fitch, larger percentages of business in personal lines are associated with greater probabilities of being assigned lower ratings by these agencies. The results for the business risk measures generally support the hypotheses that greater uncertainty is associated with the probability of being assigned a lower rating. The only exception is the *Reinsurance Ceded* variable which is positive for both S&P and Fitch. This suggests that these agencies may consider that insurers that cede more business are reducing their risk. While both capitalization and profitability are associated with the probability of being assigned a higher rating, the importance of these factors appears greater for Fitch. Interestingly, the measure of liquidity is associated with probability of receiving a lower rating. The impact of this variable is

Table 6: Determinants of Provisional and Unsolicited Financial Ratings

		Demotech (provisional)	S&P	Fitch
Organizational Characteristics				
	Direct Premiums Written	0.116***	0.348***	0.444***
		(0.00602)	(0.0359)	(0.0349)
	Mutual Indicator	0.0749**	-0.00519	0.206
		(0.0293)	(0.0840)	(0.163)
	Other Organization Type Indicator	-0.0407	-0.0146	0.154
		(0.0385)	(0.114)	(0.162)
	Group Affiliation	0.172***	0.591***	0.544***
		(0.0238)	(0.0744)	(0.103)
	Established Age	0.000131	-0.000455	0.000980
		(0.000284)	(0.000873)	(0.000984)
Business Mix				
	Line-of-Business Herfindahl	-0.480***	-0.646***	-1.472***
		(0.0377)	(0.134)	(0.153)
	Percentage in Long-Tail Lines	0.322***	0.145	0.768***
		(0.0333)	(0.152)	(0.211)
	Percentage in Personal Lines	-0.318***	0.126	-1.424***
		(0.0256)	(0.0995)	(0.174)
	Number of States Licensed	0.00129**	0.00128	-0.00282
		(0.000587)	(0.00220)	(0.00243)
Business Risk				
	Stock to Cash & Invested Assets	-0.140**	-1.540***	-1.369***
		(0.0637)	(0.241)	(0.301)
	2 Year Loss Development	-0.0112***	-0.00593***	-0.0101***
		(0.000522)	(0.00199)	(0.00266)
	Catastrophe Exposure	-5.51e-05	0.00312**	0.000322
		(0.000500)	(0.00158)	(0.00210)
	Reinsurance Ceded	-0.0712***	0.623***	0.686***
		(0.0201)	(0.0699)	(0.0998)
	Recoverables to Surplus	-0.00181***	-0.00307***	-0.00649***
		(0.000110)	(0.000640)	(0.000925)
Financial Strength and Flexibility				
	Capital to Assets	1.757***	1.529***	2.447***
		(0.0611)	(0.294)	(0.489)
	Net Income to Assets	3.120***	3.124***	6.897***
		(0.184)	(0.811)	(1.193)
	Cash to Invested Assets	-0.641***	-1.823***	-0.996**
		(0.0446)	(0.398)	(0.471)
	Change in NPW	0.000430***	0.00159**	-0.000899
		(0.000134)	(0.000723)	(0.00132)
	Observations	13905	1331	1375

Year indicator variables included in all models; standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Determinants of Solicited Financial Ratings

	Demotech (finalized)	A. M. Best	S&P	Moody's	Fitch
Organizational Characteristics					
Direct Premiums Written	0.145***	0.354***	0.0703***	0.0311*	0.109***
	(0.0262)	(0.0202)	(0.0204)	(0.0185)	(0.0195)
Mutual Indicator	0.199**	0.334***	-0.349***	0.264***	-0.399***
	(0.0810)	(0.0555)	(0.103)	(0.102)	(0.120)
Other Organization Type Indicator	-0.324**	0.190***	0.160	-0.0344	0.309
	(0.143)	(0.0700)	(0.111)	(0.358)	(0.202)
Group Affiliation	0.323***	0.185**	0.427**	-0.771***	-0.330
	(0.0750)	(0.0730)	(0.201)	(0.295)	(0.372)
Established Age	0.00201**	0.000850	-0.00257***	-0.00182*	-0.00187**
	(0.000803)	(0.000610)	(0.000611)	(0.00109)	(0.000807)
Business Mix					
Line-of-Business Herfindahl	-0.732***	-0.455***	0.571***	-0.0888	0.681***
	(0.122)	(0.0793)	(0.119)	(0.110)	(0.150)
Percentage in Long-Tail Lines	0.612***	0.441***	-0.640***	-1.011***	-0.691***
	(0.149)	(0.0670)	(0.102)	(0.150)	(0.157)
Percentage in Personal Lines	-0.157	-0.838***	0.320***	0.0425	0.183**
	(0.100)	(0.0582)	(0.0732)	(0.132)	(0.0796)
Number of States Licensed	0.00718***	0.0201***	0.000157	-0.00174	-0.00653***
	(0.00224)	(0.00151)	(0.00110)	(0.00118)	(0.00144)
Business Risk					
Stock to Cash & Invested Assets	-0.806***	0.418***	1.020***	-0.506	1.589***
	(0.189)	(0.144)	(0.163)	(0.655)	(0.238)
2 Year Loss Development	-0.00769***	-0.00685***	-0.000737	-0.00262	-0.000358
	(0.00175)	(0.00109)	(0.00135)	(0.00182)	(0.00182)
Catastrophe Exposure	0.00335*	0.000596	0.00933***	0.0117***	0.0140***
	(0.00196)	(0.000900)	(0.00165)	(0.00185)	(0.00213)
Reinsurance Ceded	0.441***	0.0797	0.140***	0.0581	0.287***
	(0.0691)	(0.0842)	(0.0378)	(0.143)	(0.0472)
Recoverables to Surplus	-0.00430***	-0.00356***	-0.00163***	-0.000899**	-0.00303***
	(0.000438)	(0.000317)	(0.000246)	(0.000428)	(0.000417)
Financial Strength and Flexibility					
Capital to Assets	1.303***	3.139***	0.531***	0.552	0.389**
	(0.231)	(0.170)	(0.136)	(0.379)	(0.168)
Net Income to Assets	1.319**	1.653***	2.782***	2.087**	2.936***
	(0.528)	(0.374)	(0.612)	(0.867)	(0.842)
Cash to Invested Assets	-0.564***	-0.149	0.750***	0.0793	0.0492
	(0.120)	(0.0988)	(0.158)	(0.425)	(0.268)
Change in NPW	0.000978***	0.000322	0.00156***	0.00121*	0.00125**
	(0.000370)	(0.000329)	(0.000381)	(0.000664)	(0.000619)
Observations	16859	16859	16859	16859	16859

Year indicator variables included in all models; standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

twice as high for S&P than the other two agencies. Finally, growth is associated with being assigned a higher rating for both Demotech and S&P with the impact being much greater for S&P.

Solicited Ratings. The results for solicited ratings are presented in Table 7.[27] The results of the solicited models show some differences when compared to the results for the unsolicited models. First, more of the organizational characteristics are significant though the impact varies across the agencies. For example, the size measure is uniformly associated with the probability of being assigned a higher rating. However, mutual form is associated with the probability of receiving a higher rating for Demotech, A. M. Best, and Moody's but lower ratings for S&P and Fitch. In addition, age is associated with the probability of being assigned a higher rating for Demotech but a lower rating for S&P, Moody's, and Fitch. Second, while many of the same variables in the other categories that were found to significantly impact unsolicited ratings also are found to impact solicited ratings, the magnitude of the impact varies. In comparing the significance and signs of rating determinants for the three agencies providing both provisional (unsolicited) and finalized (solicited ratings), there are fewer differences between the models for Demotech ratings in comparison to S&P and Fitch. The result for Demotech is not surprising given the consistency in the provisional and finalized ratings noted earlier. Additionally, these differences observed for S&P and Fitch may be due, in part, to the incorporation of proprietary information into the rating process. It should be noted that certain organizational characteristics and key business risk and financial strength and flexibility measures are consistent in their impact on ratings.

[27] It should be noted that for of the second-stage models, the likelihood ratio test for $\rho = 0$ rejects the null hypothesis at a significance level of .05 or better for all of the ratings models except A. M. Best, generally indicating the presence of selection bias with the decision to be rated. This supports the use of a two-stage framework in modeling ratings.

Conclusions

In the area of insurance, prior studies have considered the determinants of financial strength ratings as well as differences in the rating methodologies of the various agencies. Unlike the banking literature, little attention has been paid to unsolicited ratings in the insurance area. In the banking literature, despite several studies examining unsolicited ratings, no prior studies have investigated unsolicited ratings across multiple rating agencies. Utilizing a proprietary dataset from Demotech that includes a large sample of provisional ratings combined with a limited sample of unsolicited S&P and Fitch ratings, we are able to perform a fairly comprehensive examination of insurer financial strength ratings. Moreover, the inclusion of both traditional solicited and unsolicited ratings combined with the provisional and finalized Demotech ratings provide us the opportunity to extend both the general rating literature as well as the insurance literature.

Consistent with the banking literature, our examination of the distributions of provisional (unsolicited) and finalized (solicited) ratings provides some evidence that ratings initiated by agencies tend to be lower than ratings initiated by insurers. We also find that there are statistically significant differences in the characteristics of insurers with provisional (solicited) and those with finalized (unsolicited) ratings. In addition, examining the sub-set of insurers that are rated by multiple agencies, we find that the insurers rated secure by one agency generally are considered secure by the other agencies.

We also find that after controlling for sample-selection bias, there is some variation in the factors influencing the determinants of ratings across agencies. However, when comparing the results for unsolicited (provisional) and solicited (finalized) ratings, we find there is some consistency in the importance of certain organizational and key financial characteristics. Also, when comparing results for which both ratings initiated by agencies and ratings initiated by

insurers are available, we find the greatest consistency in the results for Demotech in comparison to S&P and Fitch. Recall that the biggest difference between Demotech's unsolicited ratings and those of S&P and Fitch is that Demotech does not disclose unsolicited (provisional) ratings to the public, while the latter two agencies do. While such a difference in disclosure policy offers one possible explanation for the difference in ratings consistency, future research is warranted to explore the consistency/inconsistency between solicited and unsolicited ratings.

Our findings are of particular importance given that serious concerns have been raised regarding the accuracy of unsolicited ratings by both policymakers (e.g., U. S. Department of Justice, 1998) and researchers (e.g., Baker and Mansi, 2002). For example, the Department of Justice argues that unsolicited ratings may not be as accurate as solicited ratings because unsolicited ratings are not based on the same type of information as solicited ratings. Baker and Mansi (2002) express similar concerns that unsolicited ratings are less accurate than solicited ratings because the agencies do not have access to important private information obtained in the solicited ratings process. Our findings provide some evidence that though the distributions of unsolicited and solicited ratings differ, unsolicited insurer ratings may be as accurate as solicited ratings.

References

A. M. Best Company. 2003. Understanding BCAR: A. M. Best's Capital Adequacy Ratio for Property/Casualty Insurers and Its Implications for Ratings.

A. M. Best Company. 2009. An Explanation of Best's Credit Rating System and Procedures.

Baker, H. K. and S. A. M. Mansi (2002). Assessing Credit Rating Agencies by Bond Issuers and Institutional Investors. *Journal of Business Finance and Accounting* **29**: 1367-1398.

Berger, L. A., J. D. Cummins and S. Tennyson (1992). Reinsurance and the liability insurance crisis. *Journal of Risk and Uncertainty* **5**(3): 253-272.

Best Wire. 2009. Fitch Updates Market on Q-IFS Scores, Accessed online http://www.thefreelibrary.com/Fitch+Updates+Market+on+Q-IFS+Scores.-a019 6144284.

Blankmeyer, Eric. 2006. How robust is linear regression with dummy variables? Faculty Publications-Finance and Economics.

Borch, K. 1974. Capital markets and the supervision of insurance companies. *Journal of Risk and Insurance* 41:397-405.

Cantor, Richard, and Frank Packer. 1997. Differences of Opinion and Selection Bias in the Credit Rating Industry. *Journal of Banking and Finance* 21:1395-1417.

Cole, Cassandra R. , Enya He, Kathleen A. McCullough, and D. W. Sommer. 2009. Separation of ownership and management: implications for risk-taking behavior. *Risk Management and Insurance Review* forthcoming.

Cummins, J. D., and D. W. Sommer. 1996. Capital and risk in property-liability insurance markets. *Journal of Banking and Finance* 20:1069-1092.

Cummins, J. D. , and P. N. Danzon. 1997. Price, Financial Quality, and Capital Flows in Insurance Markets. *Journal of Financial Intermediation* 6:3-38.

Cummins, J. David. 1988. Risk-Based Premiums for Insurance Guaranty Funds. *The Journal of Finance* 43 (4):823-839.

Doherty, N., 1989, On the capital structure of insurance firms, in: J. D. Cummins and R. A. Derrig, eds., *Financial Models of Insurer Insolvency* (Norwell, MA: Kluwer Academic Publishers).

Doherty, Neil, and Richard Phillips. 2002. Keeping up with the Joneses: changing rating standards and the buildup of capital by U.S. property-liability insurers. *Journal of Financial Services Research* 21 (55-78).

Downs, David H., and David W. Sommer. 1999. Monitoring, Ownership, and Risk-Taking: The Impact of Guaranty Funds. *The Journal of Risk and Insurance* 66 (3):477-497.

Epermanis, Karen, and Scott Harrington. 2006. Market discipline in property/casualty insurance: evidence from premium growth surrounding changes in financial strength ratings. *Journal of Money, Credit and Banking* 38:1515-1544.

Fung, H. G., G. C. Lai, G. A. Patterson, and R. C. Witt. 1998. Underwriting cycles in property and liability insurance: an empirical analysis of industry and by-line data. *Journal of Risk and Insurance* 65:539-561.

Gaver, Jenny, and Steven Pottier. 2005. The role of holding company financial information in the insurer-rating process: evidence from the property-liability industry. *Journal of Risk and Insurance* 72 (1):77-103.

Halek, M., and D. L. Eckles. 2010. Effects of Analysts' Ratings on Insurer Stock Returns: Evidence of Asymmetric Responses. *Journal of Risk and Insurance* Forthcoming.

Harmelink, Philip. 1974. Predicition of Best's general policyholders' ratings. *Journal of Risk and Insurance* 41:621-632.

Harrington, Scott, and P. M. Danzon. 1994. Price cutting in liability insurance markets. *Journal of Business* 67:511-538.

Kahane, Y., C. S. Tapiero, and L. Jacques, 1986. Concepts and trends in the study of insurer's solvency, in: J. D. Cummins and R. A. Derrig, eds., *Financial Models of Insurer Insolvency* (Norwell, MA: Kluwer Academic Publishers).

Lamm-Tennant, Joan, and Laura T. Starks. 1993. Stock Versus Mutual Ownership Structures: The Risk Implications. *Journal of Business* 66 (1):29-46.

MacMinn, R. D., and R. C. Witt. 1987. A financial theory of the insurance firm under uncertainty and regulatory constraints. *Geneva Papers on Risk and Insurance* 12:3-20.

Mili, L., and Coakley, C. W. 1996. Robust Estimation in Structured Linear Regression. *Annals of Statistics* 24: 2593-2607.

Miranda, A. and S. Rabe-hesketh. 2006. Maximum likelihood estimation of endogenous switching and sample selection models for binary, ordinal, and count variables. *Stata Journal* 6:285-308.

Berg, Jeffrey, 2008. Moody's Global Rating Methodology for Property and Casualty Insurers. Moody's Investors Service, July.

Poon, W. P. H., J. Lee, and B. E. Gup. 2009. Do Solicitations Matter in Bank Credit Ratings? Results from a Study of 72 Countries. *Journal of Money, Credit and Banking* 41 (2-3):285-314.

Poon, Winnie P. H. 2003. Are Unsolicited Credit Ratings Biased Downward. *Journal of Banking and Finance* 27:593-614.

Poon, Winnie P. H., and Michael Firth. 2005. Are Unsolicited Credit Ratings Lower? International Evidence from Bank Ratings. *Journal of Business Finance and Accounting* 32 (1741-1771).

Pottier, Steven W., and David W. Sommer. 1999. Property-liability insurer financial strength ratings: Differences across rating agencies. *Journal of Risk and Insurance* 66 (4):621-642.

Singh, Ajai K., and Mark Power. 1992. The effects of Best's rating changes on insurance company stock prices. *Journal of Risk and Insurance* 59:310-317.

Sommer, David W. 1996. The Impact of Firm Risk on Property-Liability Insurance Prices. *Journal of Risk and Insurance* 63 (3):501-514.

U. S. Department of Justice, 1998. DOJ Urges SEC to Increase Competition for Securities Ratings Agencies. *Press Release*, March 6, 1998.

Van Roy, Patrick. 2006. Is There a Difference between Solicited and Unsolicited Bank Ratings and If So, Why? *National Bank of Belgium Working Paper* No. 79.

Appendix A – Rating Agency Information

Primer on Rating Agencies

The primary insurer rating agency is A. M. Best. The major source of information used by A. M. Best in rating insurers' financial strength is each insurer's publicly available annual and quarterly financial statements filed with state regulators. This is then supplemented by other publicly available documents[28] as well as proprietary information including confidential documents provided by company management, Best's proprietary Background and Supplemental Rating Questionnaires, and insurer's annual business plans (A. M. Best, 2009). A. M. Best claims that the Financial Strength Rating (FSR) is an "independent opinion of an insurer's financial strength and ability to meet its ongoing insurance policy and contract obligations" based on "a comprehensive quantitative and qualitative evaluation of a company's balance sheet strength, operating performance and business profile" (A. M. Best, 2009). Financial Strength Ratings from A. M. Best are summarized in a wide spectrum of categories ranging from A++ to F.[29]

Standard and Poor' provides the second largest set of insurer ratings. Unlike A. M. Best, S&P rates both insurers and non-insurers. Like A. M. Best, the agency's ratings are based on a mix of publicly available information and proprietary data.[30] S&P only provides Financial Strength Ratings (FSRs) to insurers upon their fee-based request. The ratings represent S&P's opinion of the financial security characteristics of an insurance organization with respect to its ability to fulfill its obligation under its insurance policies and contracts in accordance with policy

[28] These documents include information such as SEC filings and GAAP financial statements, audit reports prepared by certified public accountants/actuaries, and loss reserve reports prepared by loss reserve specialists.

[29] Specifically, A. M. Best's ratings range from A++ and A+ (Superior), A and A- (Excellent), B++ and B+ (Good), B and B- (Fair), C++ and C+ (Marginal), C and C- (Weak), D (Poor), E (Under Regulatory Supervision), to F (In Liquidation), the lowest rating assigned. Certain insurers are assigned S (Rating Suspended), if Best cannot assign a rating due to sudden and significant events occurring to these insurers.

[30] According to the Rating Process published on S&P's website, sources of such information includes interim and annual earnings releases, regulatory and SEC filings, and press releases, as well as an one-day meeting between S&P analysts and senior management team of the insurer.

terms. The major factors considered in S&P's rating FSR process include the following: industry risk, business position, management and corporate strategy, enterprise risk management evaluation, operating performance, investments, capitalization, liquidity and financial flexibility. S&P ratings range from AAA to CC, while firms under regulatory actions are given a rating of R.[31]

Moody's and Fitch, while garnering a much smaller market share than A. M. Best and S&P, are the final two major insurer rating agencies. Like S&P, both agencies also rate both insurers as well as other types of firms and securities. Moody's approach to rating property and casualty insurers focuses on both qualitative and quantitative characteristics of insurers in the following seven areas: market position; brand and distribution; product risk and diversification; asset quality; capital adequacy; profitability; reserve adequacy; and financial flexibility. The first two factors are referred to as "business profile factors" and the remaining five are referred to as "financial profile factors". According to Moody's Global Rating Methodology for Property and Casualty Insurers (2008), the rating process also incorporates the use of proprietary and non-public data. Generally speaking, business profile factors represent about one-third of the overall rating determination and financial profile factors represent the remaining two-thirds. Moody's offers two types of financial strength ratings to insurers: Long-Term Insurer Financial Strength (IFS) Ratings and Short-Term Insurer Financial Strength (IFS) Ratings. The focus of this study

[31] S&P's FSRs range from AAA (Extremely Strong), AA (Very Strong), A (Strong), BBB (Good), BB (Marginal), B (Weak), CCC (Very Weak), to CC (Extremely Weak), the lowest rating category. Finally, NR is assigned to insurers not rated by S&P, implying that S&P has no opinion about such insurer's financial security. An insurer with a S&P ratings of 'BB' or lower is considered as having vulnerable characteristics that may outweigh its strengths. In that range, 'BB' indicates the least degree of vulnerability while 'CC' indicates the highest degree of vulnerability.

with respect to Moody's is the Long-Term IFS Rating which measures an insurer's ability to meet its senior policyholder claims and obligations and ranges from Aaa to C.[32]

Finally, like other agencies, Fitch's rating methodology relies on both quantitative and qualitative factors. In addition to the use of publicly available information in the rating process, Fitch also may conduct in-depth discussions with senior management of the insurers. Fitch's rating methodology focuses on the following six areas of analysis: industry review, organizational review, operational review, management review, corporate governance review, and financial review. Fitch's financial strength ratings on insurers range from AAA to C.[33]

The methodology of these rating agencies is in contrast to the Demotech process. As mentioned previously, Demotech is a relative newcomer in the insurer ratings market. Having rated property and casualty (P&C) insurers since 1989, Demotech did not begin to provide Financial Stability Ratings (FSRs) for newly incorporated P&C insurance companies until 1996. Demotech's Financial Stability Analysis (FSA) Model utilizes three sources of information: insurer's statutory annual and quarterly statements in the past five years; insurer's most recent actuarial opinion and report; and the most recent discussion and analysis from the insurer's management. Under the FSA Model, major financial factors considered include the following: changes in the composition of insurer's assets and liabilities; change in insurer's working capital, leverage ratios, operating ratios, and mix of business ratios; as well as consistency in insurer

[32] Specifically, the Long-term IFS rating range from Aaa (Exceptional Financial Security), Aa (Excellent Financial Security), A (Good Financial Security), Baa (Adequate Financial Security), Ba (Questionable Financial Security), B (Poor Financial Security), Caa (Very Poor Financial Security), Ca (Extremely Poor Financial Security), to C (Extremely Poor Prospects of Ever Offering Financial Security), the lowest rating. The Short-Term IFS Rating reflects Moody's opinion of the insurer's ability to repay punctually its short-term (i.e., within one year or less) senior policyholder claims and obligations. Such ratings range from P-1 (Superior), P-2 (Strong), P-3 (Acceptable), and NP (All Other Cases). These are not as comparable to the other agencies' financial strength ratings and thus are not the focus of our analysis.

[33] Specifically, the ratings categories include: AAA (Exceptionally Strong), AA (Very Strong), A (Strong), BBB (Good), BB (Moderately Weak), B (Weak), CCC (Very Weak), CC (Average or Below Average), and C (Below Average or Poor).

operations. Based on its strictly quantitative model, Demotech assigns a Preliminary Financial Stability Rating (PFSR) to each P&C insurer and notifies the insurer of its rating. If an insurer agrees with the PFSR, then Demotech asks the insurer to finalize the rating. Only finalized ratings are made available to the general public, However, Demotech has released both preliminary and finalized ratings to us for this study. The full range of Demotech ratings includes A′′ (Unsurpassed), followed by A′ (Unsurpassed), A (Exceptional), S (Substantial), M (Moderate), and L (Licensed).

The differences in the rating scales and factors related to ratings provide some challenges in comparing ratings across firms. However, prior literature does provide some guidance in this area. Further, based on the different factors considered by each agency, it is apparent that differences across agencies are expected. Understanding these differences is important to those stakeholders who rely on the ratings.

Differences Between Demotech and Other Rating Agencies

The major rating agencies such as A. M. Best, S&P, Moody's, and Fitch rely on a combination of both publicly and privately available information to create their ratings. While much of the public data is quantitative in nature, some of the private information is qualitative and largely based on subjective managerial input from the insurers. With the exception of the provisional ratings of Demotech, all of the ratings rely at least in part on information provided by the management of the insurer. Due to the potential influence of the managers, the use of managerial input in ratings can pose difficulty in creating an unbiased picture of insurers. Additionally, for larger firms with more resources to use in the ratings process, this can create an informational advantage.

Also related to information asymmetries, most rating firms require insurers to meet certain size and/or age requirements to be eligible for rating. In contrast, Demotech does not require insurers to be of a minimum size and/or have a certain number of years in business to obtain a rating. This is evidenced by our sample of insurers. Specifically, we find a larger portion of Demotech-rated insurers have been established five years or less, close to 15 percent compared to less than two percent for the other agencies. Moreover, approximately 30 percent of Demotech-rated insurers have been in business 10 years or less, compared to less than 10 percent for the other agencies. Such differences make Demotech ratings particularly important in the Florida property insurance market, where a large number of newly established insurers make up a significant fraction of the market.[34] For example, in Florida, over 70 percent of the homeowners insurance written by private insurers is written by companies incorporated after Hurricane Andrew.[35] While these new entrants are not commonly rated by some of the established rating agencies, they are typically rated by Demotech.

Additionally, Demotech rates a large number of single state insurers. As such, Demotech serves the need of another unique group of insurers, namely those that are geographically focused.[36] The ability of new entrants and geographically focused insurers to obtain ratings is extremely important in product lines such as homeowners insurance where mortgage companies require that consumers hold homeowners insurance from a rated insurer, and insureds rely on ratings to help discern which firms will be able to pay future claims, especially after a catastrophe.

[34] For more information on the Florida market, including the role of start-up property insurers see Cole, Macpherson, Maroney, McCullough, Newman, and Nyce (2009), Grace and Klien (2009), and Marlett (2009).
[35] This ratio is based on premium information obtained from the National Association of Insurance Commissioners Database.
[36] Note there is some overlap in these categories with approximately 18 percent of the insurers rated by Demotech being young (established 10 years or less) and geographically focused.

Lastly, Demotech offers both provisional and finalized ratings. Provisional ratings are provided for most insurers through an initial rating process which involves the use of only quantitative and publicly available data.[37] Insurers then have the option to finalize or not finalize their Demotech ratings. If insurers choose to finalize their ratings, the ratings are made available to the public. With other insurer rating agencies, access to preliminary ratings, if there are any, has not been available to researchers and thus no research has been conducted previously regarding preliminary ratings.[38]

[37] This is in contrast to other rating agencies that use both quantitative and qualitative data in their original assessment of insurers. Further, other rating agencies do not provide a preliminary rating to all firms with available financial information as Demotech does.

[38] Prior research in the area of bank rating has analyzed potential differences in solicited and unsolicited ratings. This provides an basis to study potential differences in preliminary ratings created for all insurers with available data and finalized ratings only prepared for a group requesting finalization of ratings. For example, Van Roy (2006) investigates whether and why differences exist between Fitch's solicited and unsolicited bank ratings. Although he finds no evidence that Fitch assigns different weights across solicited and unsolicited groups to bank characteristics, he does find that unsolicited bank ratings are significantly lower than solicited ones after controlling for observable bank characteristics. Also focused on solicited and unsolicited bank ratings, Poon et al. (2009) examine 460 commercial banks in 72 countries excluding the United States. Their results show that observed differences between solicited and unsolicited ratings are determined by the solicitation status (i.e., whether the rating is solicited), in addition to financial profile of the banks.

83

Summary of Data by Rating Agency and Rating Categories

	Demotech			A. M. Best			S&P			Moody			Fitch		
	Rating	**#**	**%**	**Rating**	**#**	**%**	**Rating**	**#**	**%**	**Rating**	**#**	**%**	**Rating**	**#**	**%**
Superior/Extremely Strong/Exceptional	A"	348	19.7%	A++	8	0.2%	AAA	354	11.3%	Aaa	120	6.6%	AAA	194	9.3%
				A+	143	3.3%									
Excellent/Very Strong	A'	518	29.3%	A	885	20.7%	AA+	239	7.6%	Aa1	26	1.4%	AA+	313	15.0%
				A-	1421	33.2%	AA	398	12.7%	Aa2	296	16.3%	AA	453	21.8%
							AA-	448	14.2%	Aa3	469	25.8%	AA-	355	17.1%
Good/Strong	A	889	50.3%	B++	714	16.7%	A+	589	18.7%	A1	127	7.0%	A+	213	10.2%
				B+	575	13.5%	A	649	20.6%	A2	431	23.7%	A	226	10.9%
							A-	232	7.4%	A3	237	13.0%	A-	214	10.3%
Fair/Adequate	S	11	0.6%	B	274	6.4%	BBB+	84	2.7%	Baa1	46	2.5%	BBB+	35	1.7%
				B-	124	2.9%	BBB	85	2.7%	Baa2	13	0.7%	BBB	20	1.0%
							BBB-	29	0.9%	Baa3	31	1.7%	BBB-	35	1.7%
									0.0%						
Less than Fair/Adequate	M	0	0.0%	C++	71	1.7%	BB+	15	0.5%	Ba1	11	0.6%	BB+	9	0.4%
	L	0	0.0%	C+	31	0.7%	BB	8	0.3%	Ba2	4	0.2%	BB	1	0.0%
				C	16	0.4%	BB-	6	0.2%	Ba3	5	0.3%	BB-	12	0.6%
				C-	6	0.1%	B+	2	0.1%	B1	1	0.1%	B+	0	0.0%
				D	6	0.1%	B	1	0.0%	B2	1	0.1%	B	0	0.0%
							B-	0	0.0%	B3	3	0.2%	B-	1	0.0%
							CCC	5	0.2%				CCC	0	0.0%
							CC	0	0.0%				CC	1	0.0%
													C	0	0.0%
		1766			4274			3144			1821			2082	

Appendix B – Decision Models

Factors Considered in Decision to Be Rated Models

Prior literature provides some guidance with respect to the types of firms that will solicit ratings; however, the literature does not always differentiate with respect to which type of agency the insurer will select. In our framework, we contrast potential differences in the selection process between traditional rating agencies, which can have fairly significant barriers to entry (related to costs and/or managerial input), with Demotech's solicited ratings, which have lower barriers. We do so by focusing on several factors that are anecdotally thought to impact a firm's selection of a rating agency (i.e., whether the insurer is rated by others, its age, and its business focus). We also control for other traditional factors know to impact the rating decision.

Since ratings are costly for insurers, the majority of insurers in our sample (i.e., ranging from 65 percent to 72 percent in a given year, as shown in Table 3) elect to be rated by only one agency. As such, we include *Rated by Others*, an indicator variable equal to one if the insurer is rated by at least another rating agency, and zero otherwise.[39] We expect that insurers with existing rating(s) will be less likely to elect to be rated by another agency.

Second, new insurers often have difficulty obtaining ratings due to barriers related to costs and/or minimum firm age requirements. Given the low levels of managerial data required and the lower cost structure, these barriers are lower for Demotech solicited ratings compared to other agencies. For this reason, it is predicted that younger insurers will be more likely to seek ratings from Demotech and less likely to seek ratings from traditional agencies. To test this hypothesis, we include *Age Under 10*, an indicator variable equal to one if the insurer has been established for less than 10 years, or zero otherwise.

[39] In alternate specifications of the model we include (1) a variable representing the number of other agency ratings the firm holds in a given year; and (2) individual indicator variables identifying which rating agency the insurer currently holds a rating from in a given year. The results were statistically similar

An initial review of the data suggests that Demotech rates a significantly larger percentage of mono-state insurers than all other agencies under our consideration.[40] This may be due to the fact that mono-state insurers face some barriers to being rated by the traditional rating agencies. Thus, we include a *Mono-State Indicator* as a measure of whether or not the insurer is geographically restricted to a single state. We include further controls related to business mix including measures to control for catastrophe exposure, line-of-business concentration, and the percentage of long-tailed lines written as well as the percentage of personal lines business.

We also include other variables in the model to control for issues related to size, risk, financial strength, organizational form, and organizational/operational characteristics. Specifically, *Direct Premiums Written* is the measure of size; *Capital to Assets* and *Net Income to Assets* are measures of financial risk; *Mutual Indicator* and *Other Organization Type Indicator* are measures of organizational form with the omitted category being stocks; and *Group Affiliation*, *Cash to Invested Assets*, *Change in NPW*, and *2-Year Loss Development* are measures of organizational/operational characteristics.

[40] More specifically, nearly 47 percent of the insurers that solicit Demotech ratings are mono-state insurers. While close to 38 percent of A. M. Best-rated insurers are mono-state insurers, the percentages for the other agencies are much lower, ranging between 8 percent and 13.5 percent.

Results of the Decision to Be Rated Models

Decision to Be Rated Model Results – Unsolicited Models

	S&P	Fitch
Constant	-2.058***	-1.533***
	(0.159)	(0.202)
Organizational Characteristics		
Direct Premiums Written	0.0805***	0.0729***
	(0.0113)	(0.0128)
Mutual Indicator	0.0861**	0.823***
	(0.0421)	(0.0549)
Other Organization Type Indicator	0.155**	0.00466
	(0.0682)	(0.0852)
Group Affilation	0.145***	0.284***
	(0.0469)	(0.0598)
Age Under 10	-0.500***	-0.431***
	(0.0623)	(0.0789)
Business Mix		
Line-of-Business Herfindahl	0.0901	0.0393
	(0.0645)	(0.0817)
Percentage in Long-Tail Lines	0.138**	0.547***
	(0.0647)	(0.0839)
Percentage in Personal Lines	0.397***	0.333***
	(0.0433)	(0.0561)
Mono-State Indicator	-0.214***	-0.390***
	(0.0424)	(0.0547)
Business Risk		
Catastrophe Exposure	-0.00328***	-0.000966
	(0.000906)	(0.00123)
2 Year Loss Development	0.00202**	-0.00209*
	(0.000850)	(0.00126)
Financial Strength and Flexibility		
Capital to Assets	-0.449***	-0.907***
	(0.102)	(0.139)
Net Income to Assets	0.757**	0.270
	(0.329)	(0.434)
Cash to Invested Assets	-0.611***	-1.512***
	(0.103)	(0.164)
Change in NPW	-0.000539*	-0.00185***
	(0.000290)	(0.000471)
Observations	14898	5798

Year indicator variables included in all models; standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Decision to Be Rated Model Results – Finalized and Solicited Models

	Demotech	A. M. Best	S&P	Moody's	Fitch
Constant	-1.211***	-0.892***	-3.934***	-4.099***	-5.023***
	(0.127)	(0.117)	(0.170)	(0.290)	(0.214)
Multiple Ratings Indicator					
Rated by Others	-0.304***	-0.518***	0.577***	1.405***	0.960***
	(0.0301)	(0.0291)	(0.0290)	(0.0558)	(0.0375)
Organizational Characteristics					
Direct Premiums Written	-0.0356***	0.0435***	0.227***	0.141***	0.175***
	(0.00827)	(0.00734)	(0.0102)	(0.0171)	(0.0116)
Mutual Indicator	0.0351	-0.144***	-0.862***	-0.500***	-0.709***
	(0.0366)	(0.0290)	(0.0510)	(0.0654)	(0.0577)
Other Organization Type Indicator	-0.501***	-0.529***	-0.129*	0.0822	-0.482***
	(0.0573)	(0.0444)	(0.0741)	(0.126)	(0.108)
Group Affiliation	-0.120***	-1.070***	1.260***	1.611***	1.484***
	(0.0371)	(0.0302)	(0.0614)	(0.136)	(0.0970)
Age Under 10	0.0605	-0.536***	-0.264***	0.183**	0.0274
	(0.0381)	(0.0409)	(0.0541)	(0.0774)	(0.0645)
Business Mix					
Line-of-Business Herfindahl	-0.0709	0.313***	-1.009***	-1.445***	-0.782***
	(0.0575)	(0.0454)	(0.0608)	(0.0875)	(0.0684)
Percentage in Long-Tail Lines	0.515***	-0.109***	-0.0225	-0.363***	-0.179***
	(0.0652)	(0.0409)	(0.0568)	(0.0768)	(0.0668)
Percentage in Personal Lines	0.636***	0.140***	-0.626***	-0.228***	-0.186***
	(0.0365)	(0.0326)	(0.0383)	(0.0552)	(0.0437)
Mono-State Indicator	0.175***	-0.112***	-0.115***	-0.476***	-0.0468
	(0.0312)	(0.0292)	(0.0381)	(0.0569)	(0.0459)
Business Risk					
Catastrophe Exposure	-0.00334***	0.00186***	0.000394	-0.00359***	0.00222**
	(0.000789)	(0.000587)	(0.000780)	(0.00139)	(0.000993)
2 Year Loss Development	-0.00127**	-0.00211***	0.00280***	0.00555***	0.00524***
	(0.000643)	(0.000634)	(0.000895)	(0.00117)	(0.000954)
Financial Strength and Flexibility					
Capital to Assets	-0.434***	0.197***	0.476***	-0.402**	-0.168
	(0.0835)	(0.0717)	(0.101)	(0.170)	(0.126)
Net Income to Assets	-0.358	0.451*	1.061***	0.565	2.312***
	(0.269)	(0.231)	(0.333)	(0.456)	(0.393)
Cash to Invested Assets	-0.00571	-0.627***	-0.00506	-1.228***	-0.828***
	(0.0549)	(0.0565)	(0.0848)	(0.222)	(0.137)
Change in NPW	0.000379**	-0.000146	-0.000290	-0.00132***	-0.000138
	(0.000161)	(0.000168)	(0.000249)	(0.000431)	(0.000308)
Observations	16859	16859	16859	16859	16859

Year indicator variables included in all models; standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

THE FLORIDA STATE UNIVERSITY
COLLEGE OF BUSINESS
The Florida Catastrophic Storm Risk Management Center

A Comprehensive Examination of Insurer Financial Strength Ratings

Executive Summary

Authors:

Cassandra R. Cole, Ph.D.
Associate Professor and Waters Fellow in Risk Management and Insurance
Florida State University
ccole@cob.fsu.edu

Kathleen A. McCullough, Ph.D.
Associate Professor and State Farm Professor of Risk Management/Insurance
College of Business
Florida State University
kmccullough@cob.fsu.edu

Purpose and Key Findings:

In this study, we explore the potential similarities and differences across insurer financial strength ratings, with a particular focus on Demotech. Demotech differs from the traditional rating agencies in several key ways. First, it provides a provisional (unsolicited) rating to all firms with available financial data each year. If firms choose to finalize the rating, the rating becomes available to the public. Second, Demotech uses less non-publically available information in the construction of its ratings than other agencies. Finally, there are significantly fewer barriers to obtaining a Demotech rating. As a result, it is easier for smaller, newer, and/or mono-state firms to obtain a Demotech rating than ratings from other agencies. Comparisons of Demotech ratings to other agencies show relative consistency in the factors that drive Demotech ratings compared to agencies such as A. M. Best, Moody's, Standard & Poor's, and Fitch. There also is general consistency in the firms that each agency would categorize as financially secure/stable.

Executive Summary:

Insurer financial strength ratings have been studied by a variety of academic and industry sources. Generally, these studies have found that financial characteristics including capitalization, liquidity, profitability, and firm size are important in determining insurer ratings (e.g., Harmelink, 1974; Pottier and Sommer, 1999; and Gaver and Pottier, 2005). While there is general consistency in the factors found to impact ratings, authors do note some variation across the agencies (e.g., Cantor and Packer, 1997; Pottier and Sommer, 1999; Van Roy, 2006; and Poon, Lee and Gup, 2009). We build on this literature by expanding the work to include a comparison of Demotech ratings to the other more traditional ratings provided by A. M. Best, Moody's, Standard & Poor's (S&P), and Fitch.

The use of Demotech ratings also allows some insight into the potential issues surrounding unsolicited ratings. Much of the prior research in the banking area has suggested that unsolicited ratings are lower than solicited ratings (e.g., Poon, 2003; Poon and Firth, 2005; Poon, Lee, and Gup, 2009). This has not been tested in the insurance area, largely do to the limited use of unsolicited ratings. While the provisional Demotech ratings are not released to the public, they do have many of the characteristics of unsolicited ratings in that they are initiated by the rating agency rather than the insurer and they are based solely on publically available data.

We use a data set of ratings assigned during the period 2000 to 2008 compiled from SNL Financial Database, Demotech, and A. M. Best. We also use operational and financial data on the insurers taken from the National Association of Insurance Commissioners Database. Following Pottier and Sommer (1999), we condense the ratings into five categories using the descriptions provided by the agencies to facilitate comparison across the ratings agencies.

Table 1 provides a summary of the number of insurers rated by each of the rating agencies for the years of our sample.[1] As expected, the most common rating is the Demotech provisional rating as it is compiled for all insurers. A. M. Best and S&P are the most common among the traditional rating agencies.

Table 1 – Number of Ratings in Sample by Year[2]

Year	Demotech (provisional)	Demotech (final)	AM Best	S&P	Moody's	Fitch
2000	1829	195	200	351	146	73
2001	1712	181	548	366	177	196
2002	1591	185	515	363	174	186
2003	1731	177	518	379	214	212
2004	806	175	516	350	211	248
2005	1452	190	493	365	211	264
2006	1604	207	496	367	198	279
2007	1575	221	498	324	200	307
2008	1605	235	490	279	144	317
Total	13905	1766	4274	3144	1675	2082

[1] Note the total across the rating agencies exceeds the total number of insurer-year observations indicated earlier since insurers are rated by multiple agencies in a given year.

[2] Note that the number of observations is low for A. M. Best in 2000 and Demotech in 2004. This is due to data limitations. To ensure this is not influencing the results obtained, these two models are repeated excluding these data years from the sample. The unreported results are generally consistent with those presented in the paper.

Based on our sample, about 30 percent of the firms are rated by multiple agencies. A. M. Best has the largest overlap with 27 percent of Demotech-rated insurers also being rated by A. M. Best. The second highest percentage overlap is with S&P at six percent. We further analyzed the subset of 152 firms which held both Demotech (finalized) ratings and A. M. Best ratings during the period. We found that 49 percent held Demotech ratings first while 30 percent held A. M. Best ratings first. Just over two thirds of the firms held both Demotech (finalized) ratings and A. M. Best ratings for multiple years in the sample.

Table 2 provides a summary of the overlap of secure ratings for the firms with Demotech ratings compared to other solicited and unsolicited rating agencies. In general, there is a high degree of overlap across the agencies in what is considered a financial secure insurer.

Table 2 – Overlap of Secure Ratings by Rating Firms*

	Not Secure	Secure	% Agree w/Demotech (Finalized)
AM Best	91	387	81%
S&P	10	92	90%
Moody's	4	42	91%
Fitch	1	31	97%
Unsolicited Ratings			
S&P	21	82	80%
Fitch	27	163	86%

	Not Secure	Secure	% Agree w/Demotech (Provisional)
AM Best	229	2898	93%
S&P	17	2275	99%
Moody's	6	1524	100%
Fitch	12	1212	99%
Unsolicited Ratings			
S&P	173	843	83%
Fitch	74	1122	94%

* The percentages represent the number of secure-rated Demotech insurers that also have a secure rating with the other agency.

Next, we consider the number of firms with Demotech's provisional rating that elect to finalize those ratings. Table 3 shows that almost all of the insurers that elect to finalize their provisional ratings are A-rated or above.

Table 3

	Provisional	Finalized	% Finalized
A"	2,956	348	12%
A'	4,052	518	13%
A	4,486	889	20%
S	934	11	1%
M	638	0	0%
L	839	0	0%
Total	13,905	1,766	

In the next step of our analysis, we empirically investigate the potential differences in the types of firms that elect to be rated by the different agencies. We consider a variety of factors including whether the firm was rated by other agencies, if the firm is a mono-state insurer, the insurer's business mix, catastrophe exposure, line-of-business concentration, size, financial risk, organizational form, group membership, growth rate, reserving practices, and liquidity.

Given that Demotech's provisional ratings are generally assigned to all firms with available financial information, the comparison of firms with provisional ratings to those electing to finalize ratings is essentially a comparison of Demotech-rated insurers and the industry. Compared to all insurers provided with a provisional rating, insurers that finalize their ratings have lower capital to assets levels as well as a lower level of reinsurance ceded relative to direct premiums written and reinsurance assumed. They also are less profitable and more liquid. Insurers with finalized Demotech ratings also tend to be smaller, younger (based on the *Age Under 10* variable), more geographically and line-of-business focused, and have higher percentages of business in long-tail and personal lines.[3] There also appears to be some differences between the characteristics of insurers rated by the different agencies. For example, it appears that a larger percentage of insurers rated by Demotech are mono-state insurers. In addition, these insurers tend to be younger and are generally smaller than insurers rated by the other agencies. This reinforces the expectation that it is likely we will observe some variation in the results obtained when we empirically examine insurers rated by the various agencies. The

[3] T-tests indicate differences are statistically significant at the five percent level. For tables of complete results as well as details on the specifications of the models see http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1706318.

results also underscore the importance of using a methodology to compare ratings that controls for the fact that each agency is rating different firms.

To compare the factors important across rating agencies, we use a two-step process known as a Heckman model. We create a set of models for each of the rating agencies. The first stage is a Probit model that identifies whether the insurer was rated by a given agency. The second stage incorporates this information as it models the factors important in developing the financial strength ratings.[4]

First we discuss the results of the probit models that assess what insurers are likely to be rated by a given agency. We find that insurers rated by other agencies are less likely to obtain ratings from Demotech or A. M. Best. This implies that firms with Demotech and A. M. Best ratings are more likely to have a single financial strength rating compared to other agencies. In both cases, there are institutional factors that make this likely. The lower barriers to gaining a Demotech rating may attract insurers that would not otherwise obtain a rating from the other agencies. A. M. Best has traditionally been considered the primary insurer rating agency, and its ratings are well recognized and accepted. Thus, firms with A. M. Best ratings may not have the same motivation to hold multiple ratings as firms with ratings from other agencies. The fact that two of the traditional rating agencies (A. M. Best and S&P) appear to be less likely to rate young insurers serves as further evidence of potential barriers. This variable is not significant for Demotech or Fitch but is significant and positive for Moody's. Combined, this provides initial evidence that the rating requirements and costs may discourage or prevent younger firms from obtaining ratings from the two most common rating agencies.

We also find that insurers that are smaller and those operating in a confined geographic area are more likely to elect to be rated by Demotech than the traditional rating agencies. In addition, the results suggest that Demotech-rated insurers are more likely to be fast-growing and associated with greater level of uncertainty in their lines of operations based on the premium growth and percentage of business written in long-tail lines.

When comparing the results across all of the models, we find that, while there are differences, there does seem to be some consistency in the results. For example, both Demotech and A. M. Best are more likely to rate firms in groups as well as firms with higher loss development ratios compared to S&P and Moody's. Also, with the exception of Demotech, the rating agencies are less apt to rate mutual firms (relative to stocks).

Based on the information in the first stage, we are able to econometrically correct for bias that might arise from different firms being rated by different agencies in our examination of the determinants of financial strength ratings. We consider an array of financial and operational

[4] Given that all firms with available financial data are given provisional (unsolicited) ratings, there is no need to control for selection bias for Demotech's provisional ratings.

characteristics that are found in prior literature to impact financial ratings. Like prior studies, we find a certain level of variation across firms, however several important patterns emerge. First, as expected, the results are consistent between the provisional and finalized ratings for Demotech for 14 of the 18 factors examined. Thus, the key determinants of ratings are relatively consistent between Demotech's provisional and finalized ratings even though only higher rated firms finalize their ratings and finalized ratings can incorporate additional information from insurers. There also is some consistency between the results of the Demotech provisional ratings model and those of the other rating agencies. Specifically, we find the greatest consistency in the results for A. M. Best which has equivalent results for 12 of the 18 factors when compared to Demotech's finalized (solicited) ratings. Equivalent results for the other models ranged from a low of five for Fitch to a high of seven for S&P. When comparing the solicited ratings of all agencies, insurers with higher ratings are typically associated with stronger capital to asset ratios, higher net income to assets ratios, lower recoverables to surplus ratios, higher reinsurance ceded percentages, larger firm size, faster growth, and greater catastrophe exposure.

These results have important public policy implications for insurers, regulators, and consumers as they work to better understand the ratings process. Of particular importance to most is the comparability of Demotech ratings to those from other agencies. For this reason, both the results related to the degree of overlap between secure Demotech provisional ratings and those of other agencies as well as the consistency of factors impacting the determination of financial ratings is important. For example, with respect to Demotech, we find that generally, only insurers with secure ratings elect to finalize their ratings. Given that lenders often have requirements related to the use of rated insurers and some states require ratings in order for insurers to operate in the state, the results suggest that Demotech provides an important service within the rating community and plays a very important role in the insurance market. This is especially true in markets where relatively young and/or geographically focused insurers are active participants.