



Sustainable Insurance Firms in Unsustainable Economic Times: Do Sustainable Corporate Policies Matter in Times of Financial Crisis?

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Abstract: This paper examines whether insurance companies pursuing sustainable goals are better able to manage economic risks during times of financial crisis. Using a unique set of survey results for 63 international insurance companies, we find that firms with high and low sustainability rankings exhibit little difference in value and performance measures. However, bond ratings suggest that greater sustainability measures lower default risk, and subsequent to the financial crises, many of the firms that no longer exist as independent, publicly traded firms originally had low sustainability scores. Taken as a whole, the results suggest that there are good reasons to incorporate detailed risk management plans as part of an insurance company's sustainability effort, although these measures may not necessarily be a panacea in times of financial crisis.

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1. Introduction

Sustainable activities meet “the needs of the present without compromising the ability of future generations to meet their own needs.”¹ At a minimum, corporate sustainability embraces socially responsible principles that are environmentally friendly. Sustainable practices also emphasize transparent corporate governance and include policies aimed at minimizing the fallout from environmental and economic disasters. Ultimately, the intent of sustainable strategies is to ensure the survivability of the firm, so that a firm's enterprise risk management (ERM) program likely forms the core of any sustainable initiative.

¹ This early definition of sustainability first appears in a United Nations report on the economic interdependence of nations (Brundtland, 1987).

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From a conceptual standpoint, Innovest Strategic Advisors (2008) state that firms able to identify and effectively manage environmental, social and governance risk should lead to superior financial results.² Empirical studies tend to support this proposition and find that sustainable policies add to firm value or increase financial performance (e.g., Lo and Sheu, 2007, and Knoepfel, 2001). Crutchley and Swidler (2008) point out that any policy, including a sustainability initiative, should be pursued by corporate boards if they are in the best interest of shareholders.³ While this body of work generally addresses the effect of corporate sustainability on firm value, to date there has been little discussion of whether sustainability and corresponding risk management programs provide an additional safety net during times of environmental or economic disasters.

The recent sub-prime mortgage meltdown resulting in the seizure of credit markets, bank failures and a global recession affords a unique opportunity to examine whether sustainable practices insulate firms from economic disasters. In one related study, Baxter, et al (2011) find that before and during the financial crisis there is no correlation between enterprise risk management quality and returns for U.S. financial firms. On the other hand, as the stock market rebounded, firms with higher ERM quality performed better, *ceteris paribus*.

Sustainability encompasses more than ERM programs, however, and of interest in this paper is whether insurance companies pursuing sustainable goals are better able to manage economic risks during times of financial crisis. Insurance companies provide an interesting case study of sustainability since they manage not only the risks on their own balance sheet, but also those of their customers. In short, insurance companies are in the business of managing risk so that one might hypothesize sustainable practices should necessarily add value to firms in this industry.⁴ Moreover, during times of economic distress, insurance companies pursuing sustainable policies should fare better than those firms with few sustainable initiatives.

While previous, related work has focused on U.S. insurance companies, it is important to remember that sustainability grew out of concerns for global economic well being. Thus it is best to implement any sustainability study in an international setting. The next section describes a unique, international data set that we use to examine the effect of sustainability on insurance firm value and performance around the financial crisis.

² Jensen (2001) says that company value maximization should be the only objective of the firm, and if spending money on sustainability is costly with few benefits, firms might elect not to pursue these initiatives.

³ In a similar vein, Anderson and Anderson (2009) believe that sustainability risk management affects financial performance through the triple bottom line. Specifically, they posit that the triple bottom line equals financial performance minus the risk costs of environmental performance and social responsibility performance, and therefore, reducing the risks will necessarily increase financial performance.

⁴ Evidence of a positive correlation between ERM programs and insurance company value is mixed. Examining 117 publicly traded U.S. insurers between 1998 and 2005, Hoyt and Liebenberg (2011) determine that there is a 16.5% “ERM premium” (as it relates to Tobin’s Q) that is statistically and economically significant. However, Pagach and Warr (2011) find that while ERM-adopting firms decrease their earnings volatility, this decrease in volatility is not necessarily value enhancing. Lin, et al (2010) also find that markets respond negatively, and both Tobin’s Q and ROA fall when U.S. property and casualty firms adopt ERM programs.

2. Data on Sustainable Insurance Companies

To test whether sustainable practices add to a firm's ability to withstand an economic crisis, we examine a unique data set that ranks a company according to both general sustainability criteria and industry specific criteria. Each year, Dow Jones along with the Sustainable Asset Management (SAM) group in Switzerland solicit more than 2500 firms regarding their sustainability programs. They then select firms in the top 10 percent of an industry to be included in the Dow Jones Global Sustainability Index (DJGSI).⁵ The announcement of firms for the DJGSI occurs on an annual basis every first week of September. Whereas previous studies have only analyzed firms selected for the index, we have obtained rankings for all firms with completed surveys. Thus, we are able to examine whether there is a systematic relationship between sustainability and firm performance and value.

Participating firms register and complete the survey by the beginning of June. In the event that a company elects not to participate in the survey, SAM attempts to record survey answers based on publicly available information. A company's sustainability score is then based on points awarded for responses given in the survey (either company assessed responses or SAM assessed responses).

A list of insurance companies with sustainability scores appears in the Appendix. For these firms, 43% of the sustainability assessment score is based on general criteria (questions given to companies from all industries) and 57% is based on criteria specific to the insurance industry. Both general and industry scores measure factors along three major dimensions (the triple bottom line): economic, environmental, and social.

Within the economic section are risk and crisis management, corporate governance, and codes of conduct. An example of a question within the insurance industry's economic section is "Does your company integrate environmental/social/ethical aspects to your underwriting/business policies?" Another question asks about the products available that were "developed to address environmental/social/ethical risks and/or opportunities." In addition, there is a set of risk and crisis management questions that asks for details about the company's policies on the transfer of risk, sensitivity analysis, risk analysis framework, and the role of the chief risk officer, among others. Topics addressed in the social and environmental sections include the treatment of employees, corporate philanthropy, and environmental activities and reporting.⁶

Since the central question of interest is how insurance companies have performed during the recent economic crisis, the main time period of analysis is September 2007 through mid-2009.

⁵ For further information about the Dow Jones Global Sustainability Index and SAM survey, see Dow Jones (2007, 2008) and SAM (2008).

⁶ The assessment factors parallel the reform principles advocated in a recent G-20 summit including financial transparency, codes of conduct and corporate governance, incentives for risk taking and compensation practices, and enterprise risk management. We would like to thank John O'Keefe for pointing this out.

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The Fall of 2007 marks the beginning of global economic disruption and mid-2009 marks the nadir of the stock market's value during this upheaval. We then follow this analysis with a brief description of events following the depths of the economic crisis.

Table 1 reports descriptive statistics of the insurance company scores for 2007. Of the 63 insurance companies in the sample, 26 filled out the assessment survey (company assessed) and 37 were assessed solely by SAM (SAM assessed). A company choosing not to complete the survey is likely attributed to one of two reasons. First, there may be companies that are not significantly committed to sustainability (as measured by SAM) and do not expect to score well on the survey. Consequently, these companies are unlikely to be included in one of the sustainability indexes and simply do not see the benefit in committing time and resources to fill out the survey.⁷ Alternatively, there may be companies that are committed to sustainability, but simply do not value their potential inclusion in the index enough to justify committing resources to documenting their commitment.

The results in Table 1, Panel A reveal that the mean total sustainability score is significantly higher for company assessed firms compared to those assessed by SAM, 61.9 versus 32.4. The same holds for median sustainability scores, 61.8 vs. 31.3. The higher mean and median company assessed scores occur for virtually every sustainability category including economic, environmental, social and risk management. The one exception is in corporate governance where the median company assessed score of 75.7 is not significantly different from the SAM assessed score, 72.6.

That company assessed scores tend to be higher than SAM assessed scores likely reflects two phenomena. First, for many categories other than corporate governance, survey answers may not always appear in public documents and thus leads to lower SAM scores. Additionally, selectivity bias suggests that companies that would score well will fill out the survey whereas those that won't will decline and leave Sam to complete the review.

⁷ Robinson, Kleffner, and Bertels (2009) report an estimate of 30 person days to complete the survey. Spending money on social or environmental initiatives may be costly and reduce company value.

TABLE 1 Sustainability Measures in 2007 for Insurers

PANEL A: All Companies						
Sustainability Measure	Total		Company Assessed		SAM Assessed	
	Mean	Median	Mean	Median	Mean	Median
Total Score	44.6	38.8	61.9**	61.8**	32.4	31.3
Economic	67.3	67.8	76.9**	79.0**	60.6	62.6
Corporate Governance	71.8	73.9	76.0**	75.7	68.8	72.6
Risk Management	68.3	68.1	82.9**	85.0**	58.1	56.5
Environmental	26.7	14.0	49.9**	50.6**	10.3	2.8
Social	41.5	38.3	61.7**	61.8**	27.3	26.4
Observations	63		26		37	
PANEL B: By World Region						
Sustainability Measure	United States		Europe		Other	
	Mean	Median	Mean	Median	Mean	Median
Total Score	32.6**	31.0**	49.5**	53.9	54.2	48.1**
Economic	64.5	63.4**	68.0	72.5*	69.8	70.2
Corporate Governance	74.7	73.9	70.0	74.3	71.6	72.1
Risk Management	57.0**	55.5**	74.6**	80.5**	70.3	69.1
Environmental	2.2**	0.0**	39.3**	38.2**	32.7	9.9*
Social	28.5**	26.4**	45.0	55.3	51.5**	52.6**
Obs. (Co. Assessed)	19 (2)		30 (15)		14 (9)	

Table 1 reports sustainability measures in September 2007 for the 63 global insurance companies in the sample. Company Assessed denotes the company filled out the survey sent by SAM. The maximum score possible is 100 and the minimum is 0. The Economic, Environmental and Social factors are the three scores that make up the general score, which combined with the industry score, comprise the total score. Both Corporate Governance and Risk Management are elements within the Economic score.

In Panel B, "Other" includes Canadian, Japanese, Australian and South African companies.

* and ** denote significant differences in mean or median between Company Assessed and SAM Assessed or companies in a world region versus all other companies at the 10% and 5% levels, respectively.

Panel B shows that sustainability measures also differ by region. U.S. insurance firms tend to have lower sustainability scores compared to the rest of the world. Nevertheless, U.S. firms fare well in terms of corporate governance and their scores are not statistically different from insurance companies from the rest of the world. The geographic results are similar to the

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findings in Panel A and are likely a function of regional assessment differences. Only 2 of the 19 U.S. firms were company assessed whereas 24 of 34 firms from the rest of the world chose to complete the sustainability survey.

While Table 1 presents sustainability measures for multinational insurance firms, the next section examines whether sustainability affects firm performance and value. The analysis uses traditional statistics including return on assets, Jensen's alpha and Tobin's Q. Again, the period of interest is the same, from 2007 to the depths of the financial crisis in 2009.

3. Sustainability and Insurance Firm Performance and Value

The analysis begins by again splitting the sample between company assessed and SAM assessed firms. In Table 2 the average size of insurers in the sample is \$222 billion at the end of 2007; however, company assessed firms are significantly larger than SAM assessed. That company assessed firms tend to be larger may reflect superior resources available for the task of gathering and documenting the requested survey data. It may also be that larger insurance companies have more to gain on the margin, relative to fixed costs incurred, from the goodwill generated by their publicly implied commitment to sustainability.

In terms of accounting measures of performance, the 2007 mean return on assets (ROA) for company assessed firms equals 1.3% and is significantly lower than the mean ROA of 2.9% for SAM assessed firms. However, statistical differences vanish in 2008, a year after the survey. If company assessment is a signal of greater sustainability, ROA results provide no evidence that sustainability leads to better accounting performance.

To measure financial performance, the analysis estimates a stock return's alpha for each insurance firm. Given the international sample, the analysis follows Dominguez and Tesar (2001) to estimate a market model that controls for both market risk and exchange rates. Using monthly returns from 2007 through March 2009, the model takes the form:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \gamma_i R_{fx,t} + \varepsilon_{i,t}$$

where, $R_{i,t}$ is company i 's return in month t , $R_{m,t}$ is the return on the Dow Jones Global Index in month t and $R_{fx,t}$ is the foreign exchange rate return in month t . Alpha (α_i) represents company i 's return adjusted for systematic and foreign exchange rate risk, beta (β_i) represents the firm's sensitivity to market risk and Gamma (γ_i) is the sensitivity to exchange rate fluctuations (and equals zero for U.S. firms.)

The financial performance results in Table 2 mirror the earlier accounting performance findings. In 2007, financial performance as measured by alpha is lower for company assessed firms compared to SAM assessed companies. In 2008, the statistical significance disappears. Again, if company assessment signals a commitment towards sustainability, the alpha results provide no evidence that sustainability leads to better financial performance.

Turning from performance to firm value, Table 2 also reports Tobin's Q.⁸ SAM assessed firms tend to have a higher mean and median Tobin's Q than company assessed firms, although the differences are not significant. This is true for 2007, 2008 and the first half of 2009. Again, given that company assessed firms generally have higher sustainability scores than SAM assessed firms, it does not appear that sustainability efforts add to an insurance company's value.

TABLE 2 Firm Value and Performance of Insurers by Assessment Type

Variable	Total		Company Assessed		SAM Assessed	
	Mean	Median	Mean	Median	Mean	Median
Assets (millions US\$)	220,665	58,441	383,227**	119,650**	104,548	37,127
Return on Assets 07	2.2%	1.2%	1.3%**	0.9%	2.9%	1.9%
Return on Assets 08	0.4%	0.2%	-0.1%	0.1%	0.7%	0.3%
Alpha 07	-1.3%	-1.3%	-1.7%	-1.9%	-1.0%	-0.4%
Beta 07	0.87	0.89	1.05*	1.08	0.73	0.86
Alpha 08	0.9%	0.7%	0.8%	1.0%	1.1%	0.4%
Beta 08	1.19	1.03	1.30	1.24	1.10	0.91
Tobin's Q 07	1.11	1.02	1.06	1.02	1.14	1.04
Tobin's Q 08	1.06	1.01	1.02	1.00	1.09	1.01
Tobin's Q Mar 09	1.06	0.99	1.00	0.99	1.09	0.99
Observations	60		25		35	

* and ** denote significant differences in mean or median between Company Assessed and SAM Assessed firms at the 10% and 5% levels, respectively.

Table 3 introduces a set of more direct tests of sustainability effects on performance and firm value. We divide the sample into three equal groups according to their total sustainability measure. In Panel A, performance and value mean and median statistics appear for the 21 highest and lowest sustainability firms. The first observation is that firms with high sustainability scores are significantly larger than insurance companies with low sustainability scores. However, return on assets in 2007 are smaller and the difference is statistically significant for the high sustainability group. ROA in 2008 is also smaller for the high sustainability group, although it is not statistically different from the low sustainability firms.⁹

⁸ Tobin's Q equals the ratio of the market value of equity plus debt divided by a firm's asset. See Chung and Pruitt (1994) for a simplified measure of Q.

⁹ It is sometimes found that for financial institutions, ROA is a function of size. However, it should be remembered that all companies in the sample are large, multinational insurance firms. Moreover, size should not affect the alpha or Tobin's Q.

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Looking at the alpha measures, similar results obtain for financial returns; the high sustainability firms generally have lower financial performance in both 2007 and 2008. With respect to firm value, firms with higher sustainability scores tend to have lower value as measured by Tobin's Q. Thus the results in Table 3A do not give support to the hypothesis that higher sustainability measures lead to greater performance or value.

To see whether the previous results reflect who fills out the sustainability survey, Table 3, Panel B considers only those firms that are company assessed. The sample is divided roughly in half. Once more, firms with higher sustainability measures tend to be larger insurance companies. In fact, the results in panel B are qualitatively the same as in Panel A. Performance and Value measures tend to be lower for the firms with greater sustainability scores. There is, however, one result that suggests sustainability efforts matter in times of financial crisis. Tobin's Q declined for both the high and low sustainability sub-samples, but the fall was smaller for the firms with higher scores. Thus, there is at least one reason to believe that sustainability efforts matter in a crisis.

TABLE 3 A Performance Measures for Insurers by Total Sustainability Score

Variable	High Sustainability Score		Low Sustainability Score	
	Mean	Median	Mean	Median
Assets (millions US\$)	442,110**	271,239**	81,539	17,416
Return on Assets 07	1.1%**	0.8%**	3.3%	2.6%
Return on Assets 08	-0.4%	0.1%	1.2%	0.7%
Alpha	-0.2%	0.0%	0.5%	0.0%
Beta	1.28*	1.21**	0.79	0.65
Tobin's Q 07	1.04	1.02	1.19	1.02
Tobin's Q 08	1.01	1.00	1.16	1.01
Tobin's Q Mar 09	1.00	0.99	1.12	0.99
Change in Q 07-09	-.07	-.05	-.19	-.07
Observations		21		21

Note: For most variables, the sample size is 21, but for the Low Sustainability Score companies, three disappear before the end of 2008, so Tobin's Q in 2008 and 2009 and Return on Assets 2008 for the Low Sustainability Score companies are calculated using a sample size of 18.

* and ** denote significant differences in mean or median between high and low sustainability firms at the 10% and 5% levels, respectively.

TABLE 3 B Performance Measures for Company Assessed Insurers by Total Sustainability Score

Variable	High Sustainability Score		Low Sustainability Score	
	Mean	Median	Mean	Median
Assets (millions US\$)	457,111	351,109	331,308	82,719
Return on Assets 07	1.0%	0.9%	1.6%	1.0%
Return on Assets 08	-0.1%	-0.3%	0.1%	0.7%
Alpha	-0.1%	0.0%	0.3%	0.1%
Beta	1.17*	1.32	1.37	1.05
Tobin's Q 07	1.05	1.02***	1.10	1.08
Tobin's Q 08	1.00	1.00	1.04	1.01
Tobin's Q Mar 09	0.99	0.99	1.01	0.99
Change in Q 07-09	-.06	-.04	-.10	-.08
Observations		12		12

Note: For most variables, the sample size is 12 for each group, but two Low Sustainability Score companies and one High Sustainability Score companies disappear before the end of 2008, so Tobin's Q in 2008 and 2009 and Return on Assets 2008 companies are calculated using a sample size of 11 and 10.

* and ** denote significant differences in mean or median between high and low sustainability firms at the 10% and 5% levels, respectively.

4. Sustainability and Survivability

At the core of sustainability is survivability of the firm. Survivability is directly related to credit risk or default risk, although the relation between survivability and firm value is less clear. The reason for the disconnection between survivability and firm value is twofold. First, bondholders may already be compensated for higher default risk through higher promised interest payments. Second, risky projects that increase the probability of bankruptcy may actually increase the value of equity. Given that equity shares represent claims to the residual assets of the firm, a risky project's upside potential will be captured in the company's stock price. Thus, if sustainable firms are also expected to be the firms most likely to survive periods of economic crisis, it is important to look beyond measures of firm value such as Tobin's Q.

One way to gauge a firm's likelihood of surviving an economic crisis is to examine corporate bond ratings. As Moody's notes (2002, page 5), ratings seek "to predict the credit performance of bonds, other financial instruments, or firms across a range of plausible economic scenarios, some of which will include credit stress." The higher the bond rating, the more creditworthy is the firm and the lower the probability of default. Thus, the subsequent analysis investigates whether sustainable firms also have higher bond ratings following the economic

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crisis, and therefore, are thought to be more likely to continue in their current organizational form.

To date there have been few studies linking measured sustainability and the bond market. Menz (2009) considers whether the corporate bond market rewards social responsibility, and finds that firms classified as sustainable by the SAM Group have *higher* risk premiums, *ceteris paribus*, than non-sustainable firms. However, the differences are statistically insignificant in most model specifications, and he concludes that corporate social responsibility is not priced in the bond market.

Whereas Menz (2009) investigates the relation between measured sustainability and bond risk premiums, we examine bond credit ratings to see whether sustainable insurance companies have higher credit ratings and therefore lower default probabilities. The link between credit ratings and default probabilities holds both conceptually and empirically. For example, Moody's (2002) finds that five year cumulative default rates formed between 1970 and 1997 are very low for investment grade bonds (Aaa, Aa, A and Baa), but dramatically rise for speculative securities (Ba – C). Thus, to examine the effect of the economic crisis on insurance firm default probabilities, we need only look at the correlation between a company's sustainability index and its bond rating.

Our sample of Moody's senior unsecured debt ratings includes 49 of the 63 insurance companies that have sustainability ratings in 2007. The 49 insurers with Moody's bond ratings are noted in the Appendix. To see whether a sample bias exists, we look at firms with and without bond ratings and test whether there is a difference in means of their total sustainability scores. While firms with bond ratings have a higher mean sustainability score (45.3 vs. 41.9), a t-statistic of .6787 implies that the difference is not significant. Thus, we should be able to infer whether higher measured sustainability leads to lower default probabilities based on the smaller sub-sample of 49 insurance firms.

The specific question of interest is whether insurance firms with high sustainability scores have lower probability of default after the recent economic crisis. Put another way, do the risk management programs and corporate governance policies that lead to a high sustainability rating make it more likely that a firm will survive the recent economic turmoil? To answer this question, we examine the Moody's senior unsecured bond ratings of the 49 insurance companies as of June 2009 and see whether these ratings are correlated with different sustainability measures.

The relation between bond ratings and probability of default is non-linear. For investment grade bonds (Aaa to Baa) the mean default rates within five years go from .1% to 1.9% (Moody's 2002). Moving to the speculative investment category, Ba bonds have a mean default rate of 11.5% while B and C bond default rates are 30.8% and 56.6% respectively. Moody's states (2002, pg. 10) that one reason for this non-linearity is that "(E)conomic events have a greater impact on lower-rated firms due to their greater vulnerability to shocks."

Non-linearity of default rates suggests that instead of appealing to parametric tests, it would be more appropriate to employ a non-parametric test based on the rank order of bond ratings. Assigning a 1 to the firm with the highest credit rating (lowest default risk), 2 to the next

highest bond rating, etc., enables us to see whether high bond ratings are associated with high sustainability scores. We use the Mann-Whitney test to test the null hypothesis that the bond ratings distribution of insurance firms with high sustainability scores equals the bond ratings distribution of insurance companies with low sustainability scores. The analysis tests the null hypothesis under different methods of segmenting firms into high and low sustainability categories.

Results for bond ratings and measured sustainability appear in Table 4. Panel A reports statistics using long term unsecured bond ratings as of June 2009. The first test divides the sample between those insurance companies in one of the sustainability indexes (World, North American or Stoxx), and therefore considered the high sustainability sub-sample, and those firms not in a SAM-Dow Jones sustainability index (equals low sustainability sub-sample). The mean order ranking of the high sustainability group equals 19.4 and is statistically different from the low sustainability mean of 28.2. Since the company with the highest bond rating is assigned a 1, this result implies that firms in a sustainability index have higher credit ratings than firms not in an index and thus are less likely to default.

An alternative method of dividing the sample is to assume that company assessed firms are likely to be more sustainable. If firms are divided in this manner, company assessed firms have a lower mean ranking than SAM assessed companies. Again the implication is sustainable firms are less likely to default.

The next three tests look at the firms that score in the top third of a sustainability index (top 16 firms equal high sustainability) versus the bottom third in scoring (bottom 16 firms equal low sustainability). The sustainability measures include total sustainability score, risk management score and the corporate governance score. In the first two cases, high sustainability firms have higher bond ratings; for total score, the difference is statistically significant at the 5% level. In the third case, firms with higher corporate governance scores have lower bond ratings (lower rank sum), although the results are not statistically significant.

In the final entry of Panel A, we divide insurance companies into U.S. and non-U.S. firms. None of the U.S. firms are in the World sustainability index and only 4 of the 15 make it into the North American index. On average, U.S. firms have a lower sustainability score than non-U.S. firms, 33.67 vs. 47.95. Consistent with the previous results, the non-U.S. insurance companies also have higher bond ratings.

The bond results in Panel A tend to support the hypothesis that high sustainable insurance companies weathered the economic crisis in better shape than low sustainable firms. In general, high sustainable firms have higher bond ratings, and thus, a lower probability of default. However, bond ratings tend to lag market price movements [see, for example, Ederington and Goh (1998)] so that the results in Panel A may be misleading. If bond ratings only change slowly, it may be that the ratings reflect perceived default rates corresponding to a period prior to or at the start of the economic crisis.

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Still another reason to look beyond credit ratings is that the role of the rating agencies may not be impartial. Conflicts of interest arise because agencies are typically paid by issuers. Some have charged that rating agencies have a cozy relationship with management that leads to biases, while others believe that the agencies do not downgrade companies quickly enough. The recent meltdown in the mortgage backed securities market suggests that ratings were of low quality.¹⁰

As an alternative to credit ratings issued by an agency, Panel B instead looks at market implied credit ratings which may better signal contemporaneous credit risk perceptions. Moreover, market implied ratings should mitigate any of the biases inherent in agency ratings. To estimate a firm's implied credit rating, Moody's considers market prices from the company's bond, credit swaps, and equity issues. Specifically, implied ratings compare price signals for a given company to market wide measures such as the median credit spread. In this way, market prices can be used to detect early credit deterioration.¹¹

For some firms, Moody's only reports implied ratings from one or two of the markets. In all cases, we use an average of the available implied credit ratings to compare to sustainability measures. The market based results appear in Panel B and are virtually identical to those found previously. High sustainability measures have higher implied credit ratings and the difference is statistically significant in all but one case. In general, market signals in June 2009 imply that risk management programs and corporate governance policies leading to a high sustainability score yield higher implied credit ratings. This, in turn, suggests that sustainable firms are more likely to survive the recent economic turmoil.

¹⁰ For a discussion of problems concerning the credit rating industry and why reputation incentives are not enough, see Hunt (2009).

¹¹ Still other possible credit metrics to consider include distance to default measures. See, for example, Moody's KMV statistic in Glantz (2003).

TABLE 4 Bond Ratings June 2009 and Sustainability

PANEL A: Long Term Unsecured Debt Rating				
Sustainability Measure	High Sustainability		Low Sustainability	
	Mean	N	Mean	N
In Sustainability Index	19.4**	27	28.2	22
Company Assessed	18.8**	21	29.6	28
Total Score	12.2**	16	20.8	16
Risk Management	14.3*	16	18.7	16
Corporate Governance	18.3	16	14.7	16
	<u>Non-U.S. Firms</u>		<u>U.S. Firms</u>	
World Region	21.9**	34	32.0	15
PANEL B: Market Implied Credit Rating				
Sustainability Measure	High Sustainability		Low Sustainability	
	Mean	N	Mean	N
In Sustainability Index	22.0	27	26.7	22
Company Assessed	20.9**	21	28.1	28
Total Score	12.6**	16	20.4	16
Risk Management	13.8*	16	19.3	16
Corporate Governance	16.3	16	16.7	16
	<u>Non-U.S. Firms</u>		<u>U.S. Firms</u>	
World Region	21.5**	34	32.8	15

Note: Mann-Whitney Test, the higher the bond rating (i.e., lower default risk) the lower the rank order. Thus, the firm with the highest bond rating has a rank equal to 1.

*,** significant difference between high sustainability (non-U.S. firms) and low sustainability (U.S. firms) samples at the 10%, 5% level, respectively.

5. Changes in Corporate Status since 2007

The previous discussion focused on the period 2007 to 2009 and covered the most distressed period of the financial crisis. When analyzing performance in light of sustainability efforts, only the surviving, independent insurance companies can be examined. In fact, from the outset of the financial crisis until now, there have been a number of corporate changes among the original 63 insurance companies in our sample.

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Table 5 presents those insurance companies that are no longer independent, publicly traded firms. What is notable about the list is that only one of the eleven companies, Sampo Japan, was found in any 2007 Dow Jones sustainability index. That there is only one Dow Jones sustainable firm on the list is perhaps surprising given that 30% of the original sample of firms were in either the World, STOXX or North American indices. Moreover, Sampo joined with Nipponkoa in what appears to be a merger of equals so that it was not a matter of a sustainable firm being acquired by another company. Thus, the firms that ceased to exist as independent insurance companies are primarily entities that had lower sustainable index scores.

Another notable aspect of Table 5 is one of the firms that did *not* appear on the list, American International Group. AIG was in the 2007 Dow Jones North American Sustainability Index and remains a publicly traded company. However, largely due to the sub-prime mortgage meltdown, AIG sustained huge losses in the credit derivatives market and had to be kept afloat by the U.S. government. In exchange for a substantial line of credit to draw upon, AIG issued warrants to the Federal Reserve Bank. While AIG remains a publicly owned firm, the federal government has been a major stakeholder since 2008. Thus, one more lesson is that a high sustainability score does not ensure success in managing a firm during a financial crisis.¹²

TABLE 5 Change in Corporate Status through December 2011

Company	Disposition
Assurance Gen De France	Acquired by Allianz in 2007
Brit Insurance	Acquired by Achilles Netherland Apr 2011
Friends Provident	Acquired by Resolution Ltd Nov 2009
Resolution Plc	Merged with Pearl group in 2008
Aioi Insurance Co., Ltd	Merged with Nissay Dowa and Mitsui Sumitomo Apr 2010
Mitsui Sumitomo Insurance	Merged with Nissay Dowa and AIOI Apr 2010
Nipponkoa Insurance	Merged with Sompo Apr 2010
Sompo Japan Insurance Inc*	Merged with Nipponkoa Apr 2010
SCOR Holding (Switzerland) Ltd	Went private Dec 2007
Nationwide	Acquired by Nationwide Mutual (private) in 2008
Safeco Insurance	Acquired by Liberty Mutual 2008

*In World Sustainability Index

6. Concluding Thoughts

This paper examines the sustainability of worldwide insurance companies based on the sustainability score calculated by SAM and the Dow Jones Sustainability Index. We find that the companies that fill out the SAM assessment have higher sustainability scores than the firms that do not fill out the survey. We also find that the U.S. firms' sustainability scores are significantly lower than their non-U.S. counterparts which is related to the U.S. insurers' low response rate to the SAM survey. When comparing the companies that filled out the survey (company assessed)

¹² A too big to fail argument can be made for many of the large insurance companies, thereby inducing a moral hazard aspect to resource expenditures on sustainable risk management measures.

with those that did not (SAM assessed), we find little difference in the performance and value of the two groups. In more direct tests, insurance companies with greater measured sustainability do not exhibit greater performance or value than their lower sustainability counterparts.

While insurance firms with high and low sustainability rankings exhibit little difference in value and performance measures, sustainability may affect a firm's default probability. By comparing the bond ratings of insurance firms, we find evidence that default risk is lower for insurance companies with greater measured sustainability. These results hold when we consider market implied credit ratings.

Finally, a number of insurance companies in the original sample no longer exist as publicly independent firms. The firms were overwhelmingly insurance companies with lower sustainable scores and give context to the performance and value findings. The implication that sustainability does not seem to matter may in part be explained by survivorship bias.

In the end, it is reasonable to conclude that while not a panacea in times of crisis, there are still good reasons for firms to incorporate detailed risk management plans as part of their sustainability effort. Moreover, global and U.S. financial reform proposals include a number of sustainability features. Additionally, G20 reform principles contain many SAM assessment factors including financial transparency, codes of conduct and corporate governance, incentives for risk taking and executive compensation and enterprise risk management. Nevertheless, to what extent insurance companies embrace sustainable measures will ultimately depend on whether management believes it is in the best interests of shareholders.

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APPENDIX

Insurance Companies Assessed by SAM in 2007

Company Name	Country	Insurance Line	Sustainability Index
AMP Ltd*	Australia	Life/Health	
Insurance Australia Group	Australia	Property/Casualty	World
QBE Insurance Group Ltd*	Australia	Property/Casualty	
Fairfax Financial Holdings*	Canada	Multi-Line	
Industrial Alliance Ins &Fin	Canada	Life/Health	
Manulife Financial Corp*	Canada	Life/Health	North American
Sun Life Financial Inc*	Canada	Life/Health	North American
Topdanmark As	Denmark	Multi-Line	
Sampo Oyj*	Finland	Multi-Line	
Assurance Gen De France*	France	Multi-Line	
AXA*	France	Multi-Line	STOXX, World
CNP Assurances	France	Life/Health	
Allianz*	Germany	Multi-Line	STOXX, World
Hannover Re*	Germany	Reinsurance	
Munich Re*	Germany	Reinsurance	STOXX, World
Admiral Group Plc	Great Britain	Property/Casualty	
Amlin Plc*	Great Britain	Property/Casualty	
Aviva Plc*	Great Britain	Multi-Line	STOXX, World
Brit Insurance	Great Britain	Property/Casualty	
Friends Provident*	Great Britain	Life/Health	
Legal & General Group	Great Britain	Life/Health	STOXX, World
Old Mutual Plc*	Great Britain	Life/Health	
Prudential Plc*	Great Britain	Life/Health	
Resolution Plc	Great Britain	Life/Health	
RSA Insurance Group Plc*	Great Britain	Multi-Line	
Assicurazioni Generali	Italy	Multi-Line	
Societa Cattolica Di	Italy	Life/Health	
Unipol*	Italy	Multi-Line	
Aioi Insurance Co., Ltd*	Japan	Property/Casualty	
Mitsui Sumitomo	Japan	Property/Casualty	
Nipponkoa Insurance *	Japan	Property/Casualty	
Sompo Japan Insurance	Japan	Property/Casualty	World
T&D Holdings, Inc.	Japan	Life/Health	
Tokio Marine Holdings,	Japan	Property/Casualty	
AEGON*	Netherlands	Life/Health	STOXX, World
ING Groep*	Netherlands	Life/Health	STOXX, World
Storebrand ASA*	Norway	Life/Health	World
Sanlam	South Africa	Life/Health	
MAPFRE	Spain	Multi-Line	
Baloise-Holding	Switzerland	Multi-Line	World

Swiss Re*	Switzerland	Reinsurance	STOXX, World
SCOR Holding	Switzerland		
Swiss Life Holding	Switzerland	Life/Health	
Zurich Financial Services*	Switzerland	Multi-Line	STOXX, World
Allstate Corp*	United States	Property/Casualty	North American
American International	United States	Multi-Line	North American
Arch Capital Group Ltd*	United States [#]	Reinsurance	
W. R. Berkley Corp*	United States	Property/Casualty	
The Chubb Corporation*	United States	Property/Casualty	North American
Endurance Specialty	United States [#]	Reinsurance	
Everest Re Group, Ltd.*	United States [#]	Reinsurance	
Genworth Financial, Inc.*	United States	Multi-Line	
The Hanover Insurance	United States	Property/Casualty	
MBIA Inc*	United States	Property/Casualty	
MetLife*	United States	Life/Health	
Nationwide*	United States	Life/Health	
Old Republic International*	United States	Property/Casualty	
Progressive Corp-Ohio*	United States	Property/Casualty	
Protective Life Corp*	United States	Life/Health	
RenaissanceRe Holdings	United States [#]	Reinsurance	
Safeco Insurance*	United States	Property/Casualty	
The Travelers Companies,	United States	Property/Casualty	North American
Unum Group*	United States	Life/Health	

Note: Sixty-three insurance companies were assessed by SAM in 2007.

Forty-nine of the companies had Moody's bond ratings available that are used in Table 4. These firms are denoted with a * in the first column.

Four of the companies reported on Compustat to be in the United States are marked with # as these companies are actually incorporated in Bermuda. The main line of the insurance company is reported according the GICS notation. The top twenty percent in each region were put into the Dow Jones Sustainability Index: North American, STOXX and overall World.