Are SRI Funds More Resilient towards the Global Financial Crisis?

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Abstract

This paper compares the resilience of Socially Responsible Investment (SRI) funds with that of conventional funds towards the global financial crisis by using an event study methodology. Taking the bankruptcy of Lehman Brothers as the particular event, we estimated the average cumulative abnormal returns of both SRI funds and conventional funds. Our results show that SRI funds are more resilient to such a shock. Similar results are obtained by an estimation with a market model that accounts for ARCH effects.

Keywords SRI; Event study; Financial crisis

JEL Classification A13; G01; M14

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1 Introduction

The global recession after the subprime crisis has dealt a crippling blow to the economy not only in the United States but all over the world. Since 2007, the potential global writedowns on loans and securities due to this financial crisis were estimated to be 4.1 trillion US dollars (IMF, 2009). The falls in GDP from 2008 to 2009 were -2.6%, -4.1%, -5.2% and -4.9% in the US, Euro Area, Japan and the UK, respectively (IMF, 2010). Major economic indicators show the seriousness of the impact of the financial crisis: without doubt it has been the worst economic downturn since the Great Depression in 1929.

One of the causes of the economic crisis was subprime lending, which was intended for low-income households or subprime borrowers and which would inevitably lead to defaults. The loans were securitized into wide-ranging financial commodities not to be able to track who should be responsible for defaults. Investment behaviour focusing extensively on short-term economic gains has compounded the problem. While there are calls for remedying the situation by tightening regulation of, and governance over financial institutions, there already exists a self-regulation mechanism in the market that is potentially effective in enhancing corporate activity for social profit: that is, Socially Responsible Investments (hereafter SRI).

Socially Responsible Investment is an investment process using positive or negative screening that takes into account not only financial performance but also the value of Corporate Social Responsibility (hereafter CSR), such as voluntary activities for environmental or social issues, before making investment decisions. SRI has grown rapidly throughout the world over recent

decades. At the end of 2007, Eurosif (2008) reported the EU had the biggest SRI market in the world with 3,922 billion US dollars (calculated at the exchange rate on 31st of December, 2007) and the US followed the second with 2,711 billion US dollars (Social Investment Forum, 2010).

Even though the performance of SRI might go down because of the financial crisis, the degree of fall in the return of SRI would be lower compared to conventional investments if CSR activity were evaluated positively by the market and investors in SRI funds were more resistant to the shock. On the other hand, should investors consider CSR as merely a cost that make a company's economic situation worse, SRI performed more poorly than conventional investment.

Previous studies have compared SRI funds and conventional funds with respect to their economic performance (Hamilton et al., 1993; Bauer et al., 2005; Jones et al., 2008; Climent and Soriano, forthcoming) and investment behaviour (McLachlan and Gardner, 2004; Bollen, 2007; Benson and Humphrey, 2008). However, their resilience to a large-scale shock to the economy has not been examined enough. Consequently, an investigation of their resilience would help towards a truer evaluation of the performance of the self-regulation mechanism that the financial market has developed.

This study aims to examine the resilience of SRI funds compared to that of conventional funds towards the global financial crisis in one of the biggest financial markets, Japan using the event study methodology. Based on the assumption of an efficient market, an event study casts light on the impact of an unanticipated event on changes in stock prices. For this purpose, the bankruptcy of Lehman Brothers was chosen as the event to be studied, since

it triggered the financial crisis.

The main finding of this study is that the abnormal negative impact of the global financial crisis on SRI funds was less than that on conventional funds. The Average Cumulative Abnormal Return (ACAR) of SRI funds was -0.0034 and that of conventional funds was -0.0112. They are both statistically significant at the 1% level, and the difference between the ACAR of SRI funds and that of conventional funds is also statistically significant at the 1% level.

The rest of this paper is composed as follows. Previous studies that compared SRI funds with conventional funds are reviewed in Section 2. Section 3 describes the data. Section 4 introduces the event study methodology along with a market model that accounts for ARCH effects. Estimated results are summarized in Section 5. The implication of results are discussed in Section 6. The Section 7 summarizes our findings.

2   Previous Studies

There exist a considerable number of academic studies that compare SRI and conventional investments. These studies can be divided into two categories. The first category discusses whether or not SRI funds outperform or underperform funds that are not socially screened. The general finding from those studies is that the difference between SRI funds and conventional funds is not statistically significant, although it depends on the time and area analysed (Renneboog et al., 2008).

Hamilton et al. (1993) is one of the earliest studies to compare the perfor-

mances of SRI funds and conventional funds. They used the monthly return data of equity mutual funds in the United States from 1981 through 1990. In order to measure the performance, they used Jensen's alpha in their study. Based on the Capital Asset Pricing Model (hereafter CAPM), Jensen's alpha measures the performance of the stock relative to the market portfolio (Jensen, 1968). The mean monthly excess return of SRI funds established in 1985 or earlier was greater than that of conventional funds, though the difference between them was not statistically significant. As for the funds established after 1985, the mean excess return of SRI funds was lower than that of conventional funds but not at a statistically significant level. The results indicated that the market did not value the non-financial benefits of SRI funds.

Although the market size of SRI is still small relative to the market in US or Europe, SRI has been developing in the emerging market, too. Cheung et al. (2010) obtained that the average CSR scores among firms in the Asian market such as China, Hong Kong, India and Indonesia has increased over 2001 to 2004, which indicates firms in those countries have exhibited greater attention to CSR. Moreover, they found positive and statistically significant relationships between CSR score and firm's market value in terms of Tobin's Q and market-to-book ratio.

For developed countries, similar results were obtained. Bauer et al. (2005) investigated the performance of SRI funds and that of conventional funds in Germany, the UK, and the US for the 1990 through 2001 period. Unlike the earlier studies, they included dead funds in the sample. If dead funds were disregarded in the estimation, the results would be overestimated: this

is called survivorship bias (Brown et al., 1992). They therefore added dead funds to the sample in order to mitigate the survivorship bias. They used the CAPM model and found that, in all regions, there was no statistically significant difference in performance between SRI funds and conventional funds, even though most SRI funds outperformed conventional funds in value. In terms of differences in exposure to market risk, SRI funds were significantly less sensitive than conventional funds except in the case of the US international mutual funds. They used the multi-factor model introduced by Carhart (1997) that was developed from the 3-factor model of Fama and French (1993). Although SRI funds outperformed to conventional funds in all areas (except Germany) in value, there was again no statistically significant difference in returns between SRI funds and conventional funds, even after controlling for four factors. Moreover, they analysed how people in three countries have been pricing CSR through time by subtracting Jensen's alpha of conventional funds from that of SRI funds in these four-year periods: 1990-1993, 1994-1997, and 1998-2001. Except in the UK domestic market, SRI funds significantly underperformed conventional funds in the earliest period, but in the third period SRI funds in all areas outperformed conventional funds. Given these outcomes, it seems that SRI funds have been catching up on conventional funds, probably as a result of greater investor confidence in them.

Bollen (2007) raised the interesting question, whether investor behaviours in SRI funds and conventional funds are different: this brings us to the second category of studies on SRI. He examined the relation between fund flows and return for SRI funds in the US. It was found that SRI funds were

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more sensitive to lagged positive returns than conventional funds, whilst SRI investors exhibited a smaller response to negative returns than investors in conventional funds for the period 1980 through 2002. Further, he showed that flow volatility was lower in SRI funds than in conventional funds for the period 1991 to 2002. In other words, the frequency of SRI investors moving money into or out of funds was lower compared to conventional fund investors. From this it can be concluded that SRI investors were more loyal than investors in conventional funds.

While Bollen (2007) focused on the single relationship between past returns and money flows for US SRI funds, Renneboog et al. (2006) expanded the analysis by investigating whether or not the investment decision was made not only with past returns in mind but also with other factors such as fund size, age, risk, and the fee structure. Their main findings were that investors in SRI funds chased past returns, return rankings, and persistence in performance the same as conventional investors did. Just as Bollen (2007) had found, investors in SRI funds did not mind negative returns that much more than positive returns, unless poor performance persisted. In addition, higher money inflows were induced by smaller, younger funds or funds belonging to the large-fund families. They also showed that higher intensity of screenings attracted more inflows than otherwise: however, some types of screenings such as environmental screens or ethical screens, lowered cash flows. On the other hand, the volatility of money flows in SRI funds was greater than that in conventional funds unless poor performance persisted. Furthermore, they indicated smaller, younger or riskier SRI funds were associated with a higher magnitude of volatility of money flows than conventional

funds were.

Benson and Humphrey (2008) provided further insight into SRI investor behaviour by incorporating both monthly and annual returns in order to investigate if investors react to current and/or past information, and also by incorporating lagged flow to take into account the persistence of fund flow. The flow of SRI funds was a negative function of current, past, and lagged returns, unlike the conventional fund flow. This suggested that SRI investors cared about returns less than their conventional counterparts; this would accord with the hypothesis that investors in SRI funds obtain some additional non-financial utility. The lagged flow was significantly positive and its coefficient was larger than that of the conventional one. This means that SRI fund flows were more persistent than conventional funds. Therefore, it seems likely that investors in SRI funds reinvest in funds they have already owned. Benson and Humphrey also investigated the differences in the flow-performance relation for the best and worst performing funds. While conventional fund investors responded to a good performance greatly but reacted less to a poor performance, SRI fund investors were less sensitive to performance than conventional fund investors were.

In summary, the earlier studies found that investors do not consider SRI as "costs" – at least since there is no difference in performance between SRI funds and conventional funds. In terms of investor behaviour, SRI investors are more loyal than conventional investors, since SRI funds are more sensitive to lagged positive returns but less so to negative returns. Taking these results into consideration, we would expect that, even though most countries in the world experienced a recent significant economic downturn, SRI investors

might hold their funds instead of selling them off. Further, it is known that political support for environment-friendly industries has spread, mainly in developed countries. Thus we set up a hypothesis that SRI funds can be more resilient towards a negative impact than conventional funds, and we examine this hypothesis using the event study methodology. Although Curran and Moran (2007) used an event study to investigate the impact on corporate financial performance of inclusion in or deletion from the SRI index, their focus was not on evaluating SRI funds compared with other funds. This study, therefore, is the first attempt to use the event study methodology to analyse the impact of a specific event on SRI funds and conventional funds and compare the results.

3 Data

The first SRI fund in Japan was launched in 1999 and its history is much shorter than similar funds in Europe and the US (Social Investment Forum Japan, 2010a). While investors in SRI funds in Europe and the US are basically institutional investors, especially in pension funds, in Japan most investment is in the publicly offered SRI funds targeting individual investors. Figure 1 shows changes in the number of publicly offered SRI funds in Japan and their total net assets in billion US dollars (Social Investment Forum Japan, 2010b). In the beginning of the SRI market in Japan, there were only a few funds. Both the number of funds and their total net assets have steadily been growing, though there was a sudden considerable decrease in 2008 due to the financial crisis. Total net assets of the SRI funds amount

to 5.4 billion US dollars in 2010; this represents only 0.7% of the Japanese mutual fund market, a smaller share than in Europe and the US, where SRI funds represent 10% of those mutual fund markets. The main screening has been directed at the environmental aspect since 2007; it is reported that, as of 2009, 80% of SRI funds are environmentally screened. Although domestic equity funds made up the mainstream of investment types for many years, international equity funds have expanded and now account for 60% of SRI funds in Japan as environment-related funds keep increasing. Sakuma and Louche (2008) summarise the characteristics of Japanese SRI as "Japan has adopted a 'soft' version of European SRI, choosing for engagement rather than activism, and for positive screening rather than exclusion."

Figure 2 shows the number of conventional funds and their total net assets in Japan (The Investment Trusts Association, Japan, 2010). While the SRI fund market in Japan is still developing, the conventional fund market seems to have already matured, hence there has been no rapid increase in the number and net assets of conventional funds. The conventional funds experienced a slight drop in total net assets, (compared to that of SRI funds), and their number has been gradually increasing since 2004.

To conduct our analysis, we used data on the value of funds and on the market portfolio. The daily return data of publicly offered investment trusts is available from the Investment Trusts Association Japan, which gives a sample of 3,824 funds at the end of July 2010. Data on privately offered investment trusts are unavailable and therefore these were not included in our sample. We used the Social Investment Forum (SIF) Japan classification to identify SRI funds, of which there are 89 listed for the same time.

Table 1: Sample Numbers

	Domestic	International	Total
SRI	24	38	62
Conventional	793	1343	2136
Total	817	1381	2198

An additional condition was that the funds had to be surviving during the whole of the research period, which was from 7th of February through 17th of September in 2008. As a result, our data covers 2,136 conventional funds 62 SRI funds (for these latter, see Appendix A). Funds can be also classified into domestic or international funds. Domestic funds are mutual funds that invest stocks and/or bonds of mainly domestic companies, whilst international funds largely invest those of companies outside the country. In accordance with the criteria, there are 793 domestic conventional funds and 24 domestic SRI funds. International funds have 1343 conventional funds and 38 SRI funds (See Table 1). In addition, we used the Tokyo Stock Price Index (TOPIX) obtained from Datastream as the market index.

Table 2 gives the descriptive statistics for the fund returns of SRI and conventional funds. The fund return is calculated as Equation 1 in Section 4. Therefore, each fund has 152 returns in this period. The basic statistics shows that the average return and standard deviation of both types of funds were similar in the whole period.
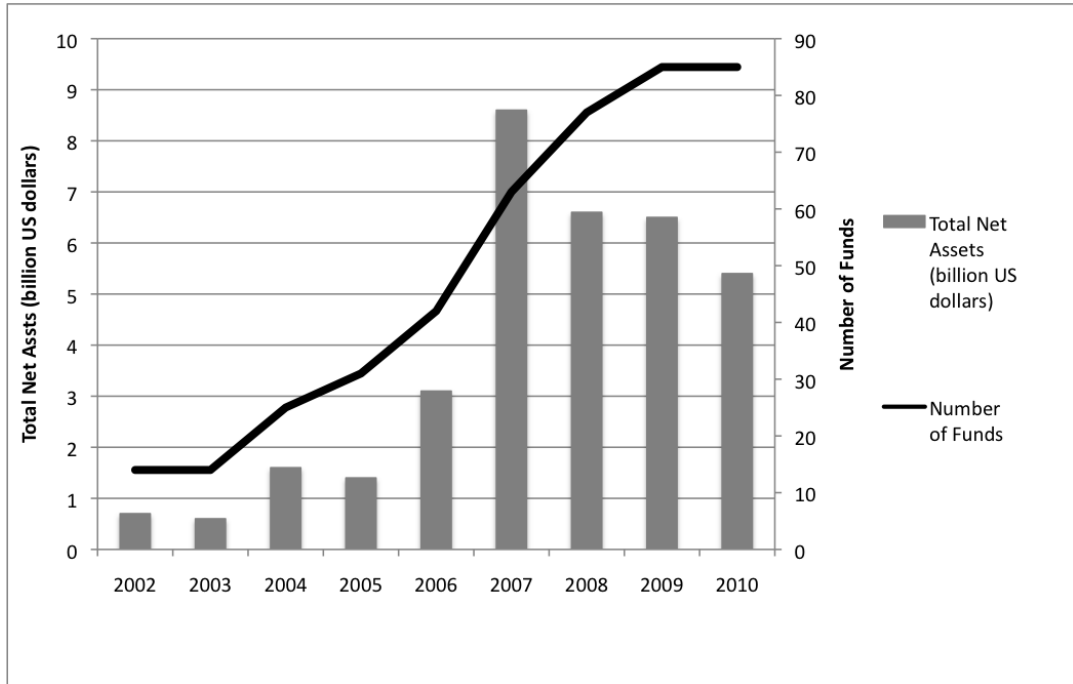
Figure 1: The Number of SRI Funds and Total Net Assets in Japan

Table 2: Descriptive Statistics

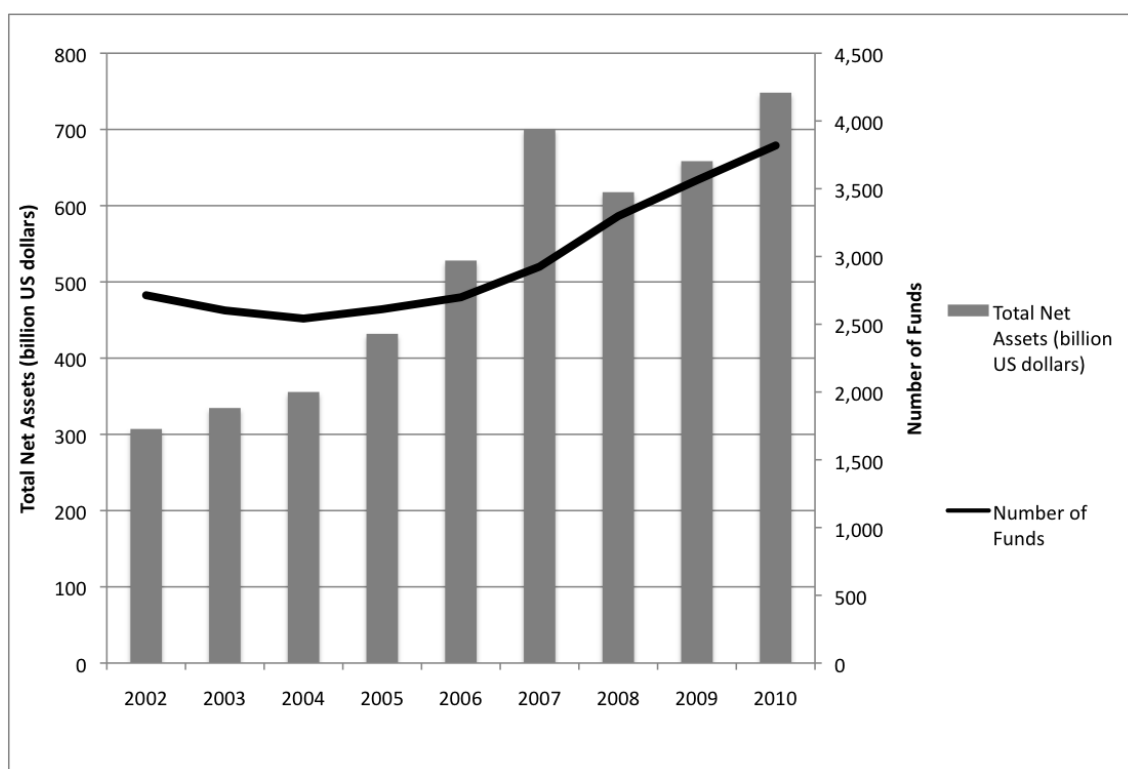|	Observation	Mean	S.D.	Min.	Max.
SRI	9,424	-0.0009067	0.0150	-0.0672	0.0661
Conventional	325,128	-0.0008833	0.0135	-0.1852	0.1131
Market proxy	152	-0.0009978	0.0168	-0.0519	0.0410

Figure 2: The Number of Conventional Funds and Total Net Assets in Japan

4 Methodology

4.1 Event Study Methodology with OLS

Event study methodology was introduced by Fama et al. (1969) for the purpose of examining the relationship between a particular unanticipated event and changes in the stock prices. Numerous studies have analysed whether or not either a positive or a negative CSR-related event has an impact on a corporation's share price (Arora, 2001; Gupta and Goldar, 2005; Hamilton, 1995; Takeda and Tomozawa, 2006; Yamaguchi, 2008; Yamaguchi, 2009). The validity of an event study relies on a few assumptions: the notion of market efficiency; the unexpectedness of the event; and the nonexistence of other events that could affect the share price during the event chosen for analysis (McWilliams and Siegel, 1997). In order to conduct our event study, we needed to define the event window, that is, the period examined for changes in fund prices. We set three days as our event window: the day before the event, the day of the event, and the day after the event. The event window is normally set for a period longer than the day of the event in order to include any changes in the fund price resulting from information leaked before the event happened, and to include the investment action taken by latecomers on the day following the event.

Since the Japanese market was closed on 15th September 2008 due to public holiday, we identify the bankruptcy of Lehman Brothers on 16th of September 2008 as the event day (designated here as T_0), designated the last transaction day before the event (12th of September) as T_{-1}, and designated the transaction day following the event (17th of September) as T_{+1}. Ad-

ditionally, we used the fund price data for 150 transaction days before the event window as our estimation window. Using the following formula, we calculate the fund returns from fund prices:

$$r_{i,t} = log(P_{i,t}/P_{i,t-1}), \tag{1}$$

where $r_{i,t}$ is the fund return and $P_{i,t}$ is the fund price on day t for firm i. Next, we need to estimate the normal return, which is the counterfactual return if the event does not occur. There is an assumption that the return of the market proxy (TOPIX in this study) and the return of each fund have a linear relationship. In order to calculate the normal return, α_i and β_i should be estimated in the market model with data from the estimation window, as shown below:

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \epsilon_{i,t}, \tag{2}$$

where $E[\epsilon_{i,t}] = 0$ and $Var[\epsilon_{i,t}] = \sigma^2_{(\epsilon_{i,t})}$; $r_{m,t}$ is the return of the market index; α_i and β_i are unknown parameters. With estimated parameters, the normal return for each day of the three-day event window can be estimated; subtracting this from the realized return gives the abnormal return (AR).

$$AR_{i,t} = r_{i,t} - (\hat{\alpha}_i + \hat{\beta}_i r_{m,t}). \tag{3}$$

The cumulative abnormal return (CAR) is calculated after adding the abnormal returns of firm i for the three-day event window.

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$$CAR_i(T_{-1}, T_1) = \sum_{t=T_{-1}}^{T_1} AR_{i,t}. \tag{4}$$

The CARs can be analysed over the whole sample in the same category, called ACAR (averaged cumulative abnormal return), as follows:

$$ACAR(T_{-1}, T_1) = \sum_{i=1}^{N} CAR_i(T_{-1}, T_1)/N. \tag{5}$$

The variance of the averaged cumulative return can be obtained as follows:

$$VAR[ACAR(T_{-1}, T_1)] = \frac{1}{N^2} \sum_{i=1}^{N} \hat{\sigma}^2(T_{-1}, T_1). \tag{6}$$

Once ACAR is obtained, we need to test the null hypothesis that the event does not have any impact on the fund returns, by using the following J-statistics:

$$J = \frac{ACAR(T_{-1}, T_1)}{\sqrt{\frac{1}{N^2} \sum_{i=1}^{N} \hat{\sigma}^2(T_{-1}, T_1)}} \sim N(0, 1). \tag{7}$$

If we cannot reject the null hypothesis, it becomes meaningless to interpret the value of ACAR.

4.2   Event Study Methodology with EGARCH

Most earlier studies listed in Section 4.1 used an event study methodology that does not account for heteroskedasticity. The standard market model assumes that the residuals of share price are simply white noise. However,

financial time series data such as share prices or the exchange rates generally have nonconstant variance. An Autoregressive Conditional Heteroskedasticity (ARCH) model (Engle,1982) and a more extended version of the ARCH model, Generalized Autoregressive Conditional Heteroskedasticity (GARCH) processes (Bollerslev, 1986) were introduced to account for heteroskedasticity. In several earlier studies, the GARCH model was employed to estimate time-varying conditional variance, but it has some limitations (for example, it imposes the nonnegative restriction on the estimators). On the other hand, the Exponential General Autoregressive Conditional Heteroskedasticity (EGARCH) model introduced by Nelson (1991) does not assume the nonnegative constraint when using a natural logarithm, so it is superior to the GARCH model since the nonnegative conditions are often violated by estimators. We use the EGARCH (1,1) model to confirm that the result from OLS methodology is robust. In the same manner as in the OLS model, parameters must be estimated to calculate the normal return. The error term is divided into the independent white noise and the standard error:

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \epsilon_{i,t}, \tag{8}$$

where $\epsilon_{i,t} = \sqrt{h_{i,t}} \upsilon_{i,t}$. The variance of the standard error, called the conditional variance, can be shown as

$$log(h_{i,t}) \;\; = \;\; \omega_i + \alpha_{1,i}\left| \frac{\epsilon_{i,t-1}}{\sqrt{h_{i,t-1}}} \right| + \alpha_{2,i}\frac{\epsilon_{i,t-1}}{\sqrt{h_{i,t-1}}} + \beta_i log(h_{i,t-1}), \tag{9}$$

where $\epsilon_{i,t}|\Omega_t \sim N(0, h_{i,t})$ and Ω is the information set at time t on which the distribution of errors is assumed to be conditioned. This is well known as

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the conditional variance equation in the EGARCH (1,1) model. The abnormal returns, the cumulative abnormal returns, and the averaged cumulative abnormal returns are estimated in the same manner as in OLS.

In order to obtain the standardized residual terms, we need to calculate the conditional variance in each three-day event window for firm i using estimated parameters in Equation (9) and using data from the estimation window. Once the conditional variances for each event window are calculated for firm i, we can take the exponential for each of them and find the average over the three-days, and then we can obtain the averaged conditional variance for firm i as follows:

$$\bar{h}_i(T_{-1}, T_1) = \frac{exp(\hat{h}_{i,T_{-1}}) + exp(\hat{h}_{i,T_0}) + exp(\hat{h}_{i,T_1})}{3}. \tag{10}$$

The variance of the averaged cumulative return can be obtained as follows:

$$VAR[ACAR(T_{-1}, T_1)] = \frac{1}{N^2} \sum_{i=1}^{N} \bar{h}_i(T_{-1}, T_1). \tag{11}$$

Finally, we need to test the null hypothesis that the event does not have any impact on the fund returns, by using the following J-statistics:

$$J = \frac{ACAR(T_{-1}, T_1)}{\sqrt{\frac{1}{N^2} \sum_{i=1}^{N} \bar{h}_i(T_{-1}, T_1)}} \sim N(0, 1). \tag{12}$$

5 Empirical Results

5.1 Results with OLS

We estimate the ACARs for the group of SRI funds and the group of conventional funds. In this study, each ACAR shows the degree of impact of the Lehman Brothers bankruptcy on the return. The ACAR of SRI funds is -0.0034 and that of conventional funds is -0.0112, as shown in Table 3. They are both statistically significant at the 1% level. Therefore, we can reject the null hypothesis that the event did not have any effect on the funds. As can be seen from the results, the Lehman Brothers collapse did have a negative impact on both types of fund. Still, SRI funds obviously have more resilience towards the event. The difference in the ACARs between SRI funds and conventional funds is statistically significant at the 1% level.

In order to analyse how serious this negative shock was, we would have to compare the obtained ACARs with other event studies. Unfortunately, there have been no other event studies using fund data that we know of. Comparison of the impact of the financial crisis on SRI funds with other events that might affect the returns of SRI funds would require further study.

5.2 Results with EGARCH

If data contains an ARCH effect, it means the data has heteroskedasticity. We conducted an ARCH-LM test for all of the data and found that 34 out of 62 SRI funds and 1,003 out of 2,139 conventional funds have ARCH effects. (The results of the ARCH-LM test for SRI funds are shown in Appendix B). Since it is confirmed that there exists an ARCH-effect in a considerable number of

Table 3: Comparisons of ACAR

The Type of Fund	OLS	EGARCH
SRI Fund	-0.0034*** (-3.0408)	-0.0024** (-1.7236)
Conventional Fund	-0.0112*** (-56.5757)	-0.0110*** (-41.3268)
Difference	0.0078*** (6.5642)	0.0086*** (5.3272)

***=Significant at 1%. **=Significant at 5%.
Numbers in parentheses and square brackets are
J statistics and t statistics respectively.

funds, we also analysed the data using the EGARCH (1,1) model. As with the OLS model, we estimated the ACARs for both SRI funds and conventional funds. We found that the ACAR of SRI funds is -0.0024, which is statistically significant at the 5% level. On the other hand, the ACAR of conventional funds is -0.0110, which is statistically significant at the 1% level. Here again, we can reject the null hypothesis that the Lehman Brothers collapse did not have any effect on fund performance. Both SRI and conventional funds suffered from that company's bankruptcy, though the degree of impact on SRI funds is much lower than that on conventional funds, and its difference is statistically significant at the 1% level.

6   Discussion

Why was the impact of financial crisis on SRI funds smaller than that on conventional funds? One possible reason is that SRI investors might have supposed that a company aiming at CSR would be one that has a long-term

strategy. They would then believe that such a firm could be more likely to come through the financial crisis. It is consistent with the idea that the activity of CSR is a factor that could bring a stable and growing development for firms (Scalet and Kelly, 2010). Hence, they would have been less inclined to sell off their funds on the day of the bankruptcy of the Lehman Brothers. This section discusses the estimated result in terms of two other aspects that can influence the size of impact: any possible differences of estimated result between domestic and international funds, and maturity of funds.

6.1 Domestic and International Funds

Funds can be classified into domestic or international funds. Domestic funds are mutual funds that invest stocks and/or bonds of mainly domestic companies, whilst international funds largely invest those of companies outside the country. If investors behave differently towards domestic SRI funds and international SRI funds, this might result in different response to the shock by these funds.

As shown in Table 4, we sorted the whole sample out domestic funds and international funds. We estimated the ACARs for the group of domestic funds and the group of international funds since they could perform differently. For domestic funds, the ACAR of SRI funds is estimated lower than that of conventional funds by both of OLS and EGARCH methods although the difference between two funds are not statistically significant by OLS. However, the ACAR of international SRI funds are less negatively affected by the Lehman Brother's bankruptcy than that of international conventional funds and their difference is statistically significant, which is similar result

Table 4: Comparisons of ACAR: Domestic Funds and International Funds

	Domestic		International	
	OLS	EGARCH	OLS	EGARCH
SRI Fund	-0.0015*** (-2.7269)	-0.0016*** (-5.9867)	-0.0045*** (-2.5418)	-0.0003* (-1.3304)
Conventional Fund	-0.0002 (-1.1822)	-0.0002* (-1.3242)	-0.0178*** (-60.7034)	-0.0175*** (42.3994)
Difference	-0.0013 (-1.1078)	-0.0014* (-1.4190)	0.0133*** (7.5220)	0.0172*** (6.9517)

***=Significant at 1%. **=Significant at 5%. *=Significant at 10%.
Numbers in parentheses and square brackets are
J statistics and t statistics respectively.

to the one estimated with the whole sample. This result might indicate that SRI investors value CSR related strategies of foreign companies than that of domestic companies although it is difficult to make a definitive interpretation about this result as the ratio of international stocks in the fund varies considerably.

6.2 Fund Age

Another possibility is that investors might have been influenced by fund attributes, in particular fund age. Renneboog et al. (2006) found that more mature funds attracted less money flow and also induced less volatility. The expectations about a younger fund by a Bayesian investor would be more diversified, so the younger fund would attract a higher money flow (Bollen, 2007). The obvious conclusion one can come to is that fund age should be taken into account when comparing SRI funds and conventional funds. As can been seen in Table 5, the mean age of the SRI funds in our study is

Table 5: Fund Age Comparison (days)

	Mean	S.D.	Min	Max	Range
SRI	1819.435	893.6856	953	3998	3045
Conventional	2914.868	3616.139	906	151193	150287

much younger than that of the conventional funds, since the conventional fund market has a much longer history.

Consequently, it is easy to suspect that the difference in the ACARs result not because SRI funds are more resilient than conventional funds but because SRI funds are younger on average than conventional funds. And yet, there is no clear correlation between abnormal return and the maturity of fund as correlation coefficient between those of SRI fund is -0.0166 and of conventional fund is 0.2094 (Figure 3 and 4). Therefore, the reason that SRI funds were more resilient towards the financial crisis might be because investors evaluated the companies included in SRI funds positively, and so they expected the funds would survive the critical situation.
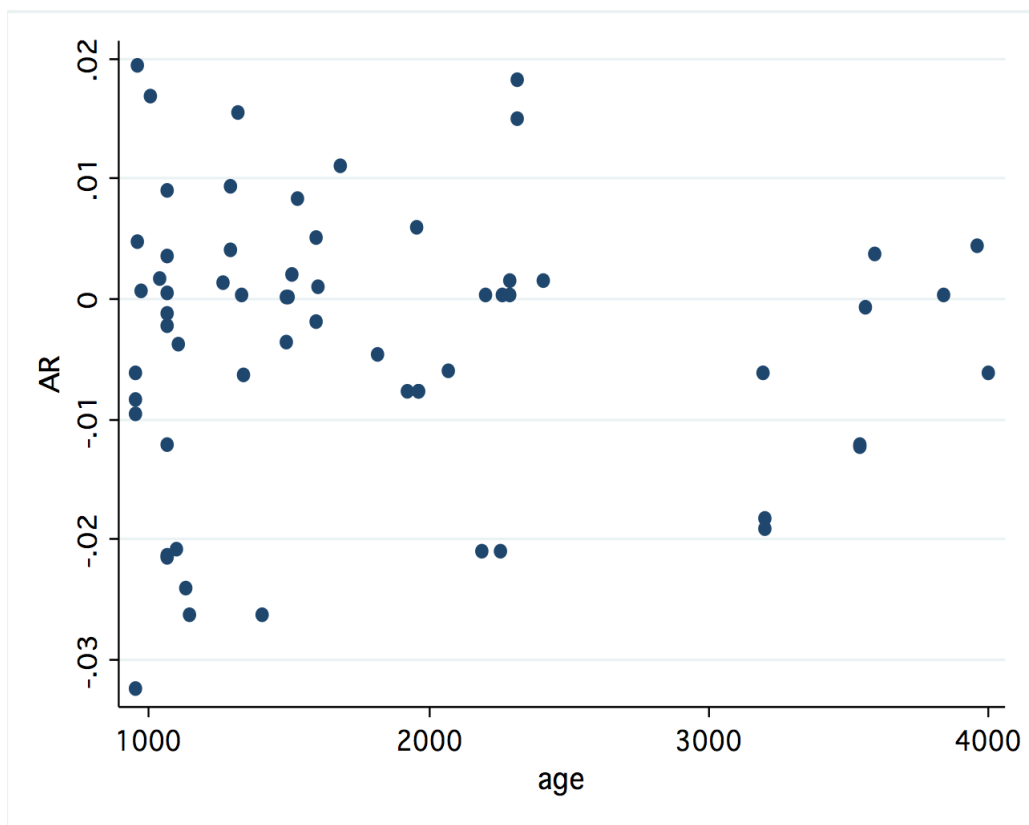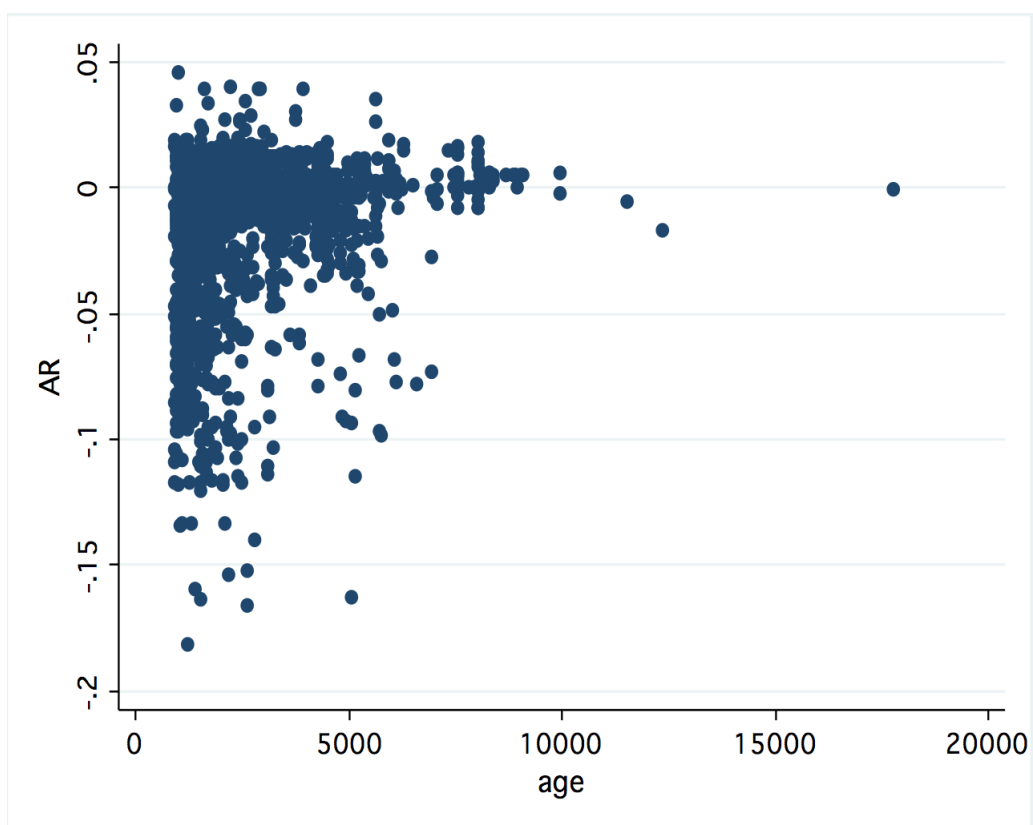
Figure 3: AR and Age of SRI Funds

Figure 4: AR and Age of Conventional Funds

7 Conclusion

This study examined the resilience of SRI funds relative to conventional funds towards the global financial crisis in the Japanese market, making use of event study methodology. We chose the bankruptcy of the Lehman Brothers because it is known as the trigger of this greatest financial crisis since the Great Depression in 1929. The empirical results showed the event significantly had a negative impact on both groups of funds at the 1% level. The ACAR for SRI funds was much smaller in absolute value than that of the conventional funds and its difference is statistically significant at the 1% level. We confirmed that the results are robust by using the EGARCH processes to account for the heteroskedasticity. These results show that the SRI funds are more resilient than conventional funds towards the bankruptcy of the Lehman Brothers.

SRI investors might consider a corporation aiming at CSR as one with a long-term management strategy. They therefore expect such firms more likely to survive a financial crisis than others less interested in CSR. We classified both SRI and conventional funds into domestic and international funds and estimated the ACARs of them. In the subgroup of domestic funds, the ACAR of SRI funds was more affected by the bankruptcy of Lehman Brothers. On the other hand, the ACAR of international SRI funds was smaller in absolute value than that of conventional funds, which was similar result to the whole sample. In addition, we also analysed the correlation between fund age and abnormal return, since previous studies argues that the maturity of a fund affects fund flow and volatility. However, abnormal return and fund age were not correlated in the case of either type of fund.

In future studies, other events could be examined in order to ascertain how serious the Lehman Brothers bankruptcy was. Comparison of the impact of the financial crisis on SRI funds with other events, using data from other countries as well would provide useful information. Fund data in the United States market could be analysed with the same methodology, since the financial crisis was triggered by defaults on subprime loans in the US. Such studies might lead to some interesting comparison of the level of impact on SRI funds in Japan with SRI funds elsewhere in the world.

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Appendix A: The list of SRI funds used for our analysis

Fund ID	Name of fund	Stock companies	Date established
1	Nikko Eco Fund	Nikko Asset Management	20 Aug 1999
2	Nenkin Tsumitate Eco Fund	Nikko Asset Management	31st Oct 2001
3	Sompo Japan Green Open	Sompo Japan	30 Sep 1999
4	Eco Partners	Mitsubishi UFJ Trust and Banking	28 Jan 2000
5	Asahi Life SRI Shakai Kouken Fund	Asahi Asset Life Management Co., Ltd.	28 Sep 2000
6	Sumishin SRI Japan Open	The Sumitomo Trust and Banking Co., Ltd.	26 Dec 2003
7	Sumishin DC Good Company	The Sumitomo Trust and Banking Co., Ltd.	27 Feb 2004
8	Fukoku SRI Fund	Shinkin Asset Management Co., Ltd.	27 Feb 2004
9	Daiwa SRI Fund	Daiwa Asset Management	20 May 2004
10	DC Daiwa SRI Fund	Daiwa Asset Management	20 July 2004
11	Mitsubishi UFJ SRI Fund	Mitsubishi UFJ Trust and Banking	3 Dec 2004
12	SAIKYO Nihon Kabushiki CSR Fund	PineBridge Investments Japan Co., Ltd.	18 Mar 2005
13	Risona Japan CSR Fund	PineBridge Investments Japan Co., Ltd.	18 Mar 2005
14	Sompo Japan SRI Open	Sompo Japan	25 Mar 2005
15	PineBridge Hirogin Nihon Kabushiki CSR Fund	PineBridge Investments Japan Co., Ltd.	28 Apr 2005
16	Nihon SRI Open	Okasan Asset Management Co., Ltd.	12 Aug 2005
17	Daiwa Eco Fund	Daiwa Asset Management	9 Mar 2006
18	Sumishin Nihon Kabushiki SRI Fund	The Sumitomo Trust and Banking Co., Ltd.	12 Jun 2006

19	Amundi Risona Woman J Fund	Amundi Asset Management Japan	30 May 2006
20	Chuo Mitsui Shakaiteki Sekinin Fund	Chuo Mitsui Asset Management Co., Ltd.	30 Nov 2006
21	Shinkin SRI Fund	Shinkin Asset Management Co., Ltd.	8 Dec 2006
22	STAM SRI Japan Open (only for SMA)	The Sumitomo Trust and Banking Co., Ltd.	16 Feb 2007
23	PineBridge Nihon Kabushiki SRI Fund	PineBridge Investments Japan Co., Ltd.	20 Dec 2007
24	Eco Balance	Sumitomo Mitsui Asset Management Co., Ltd.	31 Oct 2000
25	Nikko Global Sustainability Fund A (without hedge)	Nikko Asset Management	17 Nov 2000
26	Nikko Global Sustainability Fund B (with hedge)	Nikko Asset Management	17 Nov 2000
27	Nenkin Tsumitate Global Sustainability (without hedge)	Nikko Asset Management	25 Oct 2001
28	Nenkin Tsumitate Global Sustainability (with hedge)	Nikko Asset Management	25 Oct 2001
29	World Water Fund A Course (with currency hedge)	Nomura Asset Management	26 Mar 2004
30	World Water Fund B Course (without currency hedge)	Nomura Asset Management	26 Mar 2004
31	Nomura Global SRI 100	Nomura Asset Management	28 May 2004
32	Nomura Sekai SRI Index Fund (for defined contribution pension fund)	Nomura Asset Management	30 July 2004
33	Chikyu Ondanka Boushi Kanren Kabu Fund	Shinko Asset Management Co., Ltd.	30 May 2006
34	Nikko DWS New Resource Fund	Deutsche Asset Management	20 Dec 2006
35	Global Water Fund	Nikko Asset Management	15 June 2007
36	New Generation Sekai Kankyo	United Investments Co., Ltd.	29 June 2007

37	Chikyu Ondanka Boushi Kanren Kabu Fund (3-month closing type)	Shinko Asset Management Co., Ltd.	25 July 2005
38	Mitsubishi UFJ Global Eco Water	Mitsubishi UFJ Trust and Banking	27 July 2007
39	Nomura Aqua Toushi A Course (with exchange hedge)	Nomura Asset Management	29 Aug 2007
40	Nomura Aqua Toushi B Course (without exchange hedge)	Nomura Asset Management	29 Aug 2007
41	UBS Chikyu Ondanka Taiou Kanren Kabu Fund	UBS Global Asset Management	31 Aug 2007
42	Ondanka Taisaku Kabushiki Open	Kokusai Asset Management Co., Ltd.	31 Aug 2007
43	Chikyu Ondanka Taisaku Kabushiki Open	Kokusai Asset Management Co., Ltd.	31 Aug 2007
44	Chikyu Kankyo Kabu Fund	Daiwa Asset Management	31 Aug 2007
45	DWS Shinshigen Technology Fund	Deutsche Asset Management	31 Aug 2007
46	Ondanka Boushi Kankyo Kanren Kabu Open	Okasan Asset Management Co., Ltd.	27 Sep 2007
47	Fidelity Three Basic Fund	Fidelity Investments Limited	29 Oct 2007
48	Tokyo Kaijo Select Sekai Kabushiki Fund	Tokio Marine Asset Management Co., Ltd.	6 Dec 2007
49	Amundi Sekai Mizukanren Kabushiki Fund	Amundi Asset Management Japan	17 Dec 2007
50	TA Clean Energy Fund	Toyota Asset Management Co., Ltd.	20 Dec 2007
51	Amundi Sekai Kankyoryoku Kabushiki Fund	Amundi Asset Management Japan	21 Dec 2007
52	DIAM Koukakuzuke Income Open SRI (monthly closing type)	DIAM Co., Ltd.	22 Dec 2005
53	6 Shisan Balance Fund (distribution-type)	Daiwa Asset Management	14 Mar 2006
54	6 Shisan Balance Fund (growth-type)	Daiwa Asset Management	14 Mar 2006

55	Shizen Kankyo Hogo Fund	DIAM Co., Ltd.	26 May 2006
56	Sekai 6Shisan Kintou Bunsan Fund (monthly distribution-type)	Daiwa Asset Management	28 June 2006
57	"Shigagin" SRI 3Shisan Balance Open (distribution-type in the odd months)	Daiwa Asset Management	27 Sep 2006
58	Amundi Womenomics Balance Kabushiki 30 (monthly distribution-type)	Amundi Asset Management Japan	19 Jan 2007
59	Amundi Womenomics Balance Kabushiki 30 (active growth)	Amundi Asset Management Japan	19 Jan 2007
60	Chikyu Kankyo Kabu Gaisai Balance Fund	Daiwa Asset Management	31 Aug 2007
61	Kankyo Hozen Global Balance	Shinko Asset Management Co., Ltd.	14 Dec 2007
62	Amundi Risona Sekai Green Balance Fund	Amundi Asset Management Japan	21 Dec 2007

Appendix B: ARCH-LM Test for SRI Funds

ID	ARCH	Significance	ID	ARCH	Significance
1	0.966067		32	15.87687	***
2	1.027735		33	16.22302	***
3	2.68646	*	34	7.315012	***
4	1.402577		35	3.2449	*
5	0.010112		36	1.531446	
6	0.525505		37	16.2176	***
7	0.471471		38	5.985241	**
8	1.227087		39	3.641264	*
9	0.116404		40	5.598984	**
10	0.087552		41	6.926547	***
11	0.00211		42	16.0997	***
12	1.582857		43	16.04057	***
13	0.948066		44	19.68416	***
14	0.163512		45	7.191673	***
15	1.650385		46	0.436857	
16	0.901857		47	6.381472	**
17	0.044793		48	29.76349	***
18	0.061683		49	33.6517	***
19	0.03634		50	0.752861	
20	0.040993		51	24.56617	***
21	1.197089		52	17.05208	***
22	0.695522		53	3.056855	*
23	0.661225		54	0.630496	
24	0.082158		55	23.84215	***
25	25.51617	***	56	0.096191	
26	25.48944	***	57	9.647576	***
27	11.17471	***	58	20.62302	***
28	12.13686	***	59	5.670033	**
29	5.405308	**	60	20.79893	***
30	9.281398	***	61	16.46026	***
31	15.70286	***	62	24.95287	***

***=Significant at 1%, **=Significant at the 5%, *=Significant at 10%.