What Motivates Socially Responsible Fund Managers to Shift Risk: Remuneration Incentives or Career Concerns?

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Abstract

This study investigates the extent to which personal remuneration versus job security affect risk-shifting behaviour of socially responsible fund (SRF) manager in a comparison to conventional fund (CF) managers. Contrary to the conventional views that fund managers shift risk to improve performance in order to earn higher personal remuneration, I find that they are more concerned about their job losses when making portfolio risk decisions. Compared to CFs, SRF managers are found more likely to be terminated due to poor performance and their risk shifting behaviour is more constrained by their job loss concerns comparing to CF managers. Although this research finds that the remuneration incentives are not the same between SRFs and CFs, that difference is less influential on manager risk-shifting behaviour than fear of job loss.

Key words: Socially Responsible Investing, Risk-Shifting Behaviour, Remuneration Incentive, Job Loss Concerns

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1. Introduction

The emergence of Socially Responsible Investments (SRIs) as a popular investment vehicle has seen a growth of academic research in this area. Most of this work reveals little difference in performance between socially responsible funds (SRFs) and conventional funds (CFs) even though they operate in a vastly reduced investment universe.[2] However, most of the studies investigating performance differences between SRFs and CFs have not investigated portfolio risk decisions taken to achieve that similar performance. Investors are attracted to SRFs not only because, in a large part, they want to incorporate personal beliefs into their investments but also with the hope of achieving returns concordant with their expected risk. Therefore, it is important to understand how SRF managers manage risk taken to achieve their reported returns. Therefore, this study fills the gap by investigating the difference between SRFs and CFs with respect to risk performance management.

The increasing interest and rapid expansion in SRIs' total assets under management as a distinct category within the U.S. fund industry has made them an important segment of the industry. Total U.S. domiciled SRI products account for one out of every five dollars under professional management in the U.S. at the end of 2016 according to the Forum for Sustainable and Responsible Investment (USSIF, 2016). One of the drivers of the increasing size of SRI assets is investor demand for ethically focused investments. Women and millennials are two of the fastest growing segments of the investing public, and they both want SRI investments.[3] First, based on their spending and earning power, women in the U.S. now represent a growth market bigger than that of China and India combined (Silverstein and Sayre, 2009).[4] The

[2] List of studies find similar performance between SRFs and CFs are as follows (Bauer, Koedijk, and Otten, 2005; Bello, 2005; Benson et al., 2006; Białkowski and Starks, 2016; Cortez, Silva, and Areal, 2009; Galema, Plantinga, and Scholtens, 2008; Humphrey et al., 2016).
[3] A recent interview with the chief executive Mr Joe Keefe of Pax World Management which launched its Socially Responsible Pax World Balanced Individual Fund (PAXWX) in 1971.
[4] https://hbr.org/2009/09/the-female-economy

second trend is the ever-increasing percentage of Millennials in the workforce—forty-six percent by the year 2020. On top of the social trend of investors who are interested in SRI products, demand spikes follow an important ruling from the U.S. Department of Labour in the last quarter of 2015. That new ruling allows institutional investors such as pension fund managers to incorporate SRIs in their portfolios without concerns of violating fiduciary duty and hence, providing a strong motive for the rapid growth of SRIs. So given similar performance between SRFs and CFs it is important to understand their investment decisions and how they achieve performance commensurate with investor expectations.

Fund managers of socially conscious funds are employed as for traditional funds by investment companies to manage funds to achieve target returns in accordance with the degree of risk that is indicated by fund prospectus. But they differ from the broader group of managers in that they have an additional Environmental, Social, and Governance (ESG) focus in their portfolio construction process that reduces investable choices. However, little evidence is available on whether they are remunerated differently to other fund managers when it comes to their compensation structures. With the growing availability of sustainability data, some investment companies are able to measure the social impact of funds and start to tie fund managers' pay to meeting their ESG criteria to create the appropriate incentives. However, it is still an uncommon practice in the asset management industry.[5] Thus, it is unclear whether SRF managers are motivated differently to CF managers to achieve portfolio goals as advertised or they face similar performance criteria to perform on top of their ESG criteria.

This study investigates the implicit incentive mechanisms that are found to influence manager behaviour. Two well-documented incentives, namely remuneration and job loss

[5] See "Social Funds Tie Pay to Impact", retrieved from https://www.wsj.com/articles/social-funds-tie-pay-to-impact-1480907100

concerns, can lead to excessive risk-taking behaviour that may not be in the best interest of fund investors (Starks, 1987). [6] In the mutual fund industry, it is an established convention that a fund manager's remuneration is typically proportionate to the total assets under management (Khorana, 1996). Hence, this convention creates an implicit remuneration incentive for fund managers to strive to attract higher fund flows in order to increase personal wealth benefits. In addition, manager actions are moderated by risk of job loss as continued employment and careers within the mutual fund industry depends on the success of such funds' return performance and thus their ability to attract fund flows. Therefore, in circumstances where fund managers are likely to miss return targets, they are motivated to take actions to enhance or protect portfolio performance, at the expense of riskiness of their portfolios, to maximise personal gains.

Though remuneration and job retention incentives are critical to fund managers, they differ in relative importance depending on circumstances. The relative importance of these incentives crucially influences managerial risk shifting decision and such relative importance depends on market conditions (Kempf, Ruenzi, and Thiele, 2009; Popescu and Xu, 2017). During bull markets, aggregate capital flows into mutual funds are high and the risk of being unemployed is low. Hence, the new money attracted into top-performing funds is considerably larger as investors are attracted to those funds. Consequently, the potential bonus is attractive for fund managers and they are more motivated to compete with other fund managers for fund flows during good markets. However, in bear markets, there is a higher probability of fund closures especially for poorly performing funds than that in bullish markets (Zhao, 2005) and a shrink of job opportunities for fund managers (Kacperczyk, Nieuwerburgh, and Veldkamp,

[6] Studies focus on the risk-shifting incentives are as follows (Boyson, 2010; Brown et al., 1996; Chevalier and Ellison, 1997, 1999; Chung, 2016; Ha and Ko, 2017; Huang, Sialm, and Zhang, 2011; Kempf et al., 2009; Kim, 2011)

2014). Therefore, it is likely that fund managers are more concerned with keeping their jobs rather than remuneration benefits or bonuses when markets are in recessions. To understand the importance of market conditions on managerial incentives, this study investigates how risk shifting incentives vary across market cycles, especially the periods before, during and after Global Financial Crisis (GFC). Furthermore, I explore how market conditions affect risk-shifting incentives and explain the relative difference in risk-shifting behaviour between SRF and CF managers.

As fund manager remuneration is related to fund flows, remuneration effects of fund managers is proxied utilising the fund flow-performance sensitivity as a proxy. I find that fund flows of SRFs are more sensitive than CFs to good prior performance, suggesting a greater incentive for SRFs to shift risk to achieve better performance. However, the flow-performance sensitivity in both SRFs and CFs decrease over time. To analyse the risk of job losses, the likelihood of termination of fund managers is estimated using prior fund performance and other fund and manager characteristics. I find that SRF managers have a stronger termination-performance sensitivity than their CF counterparts, meaning they are more likely to be terminated due to poor performance than are CF managers. Moreover, such a negative effect becomes stronger after the Global Financial Crisis. In summary, this study finds evidence that SRF managers operate funds that exhibit similar return performance to CF managers. However, they exhibit differences in risk-shifting behaviour that are motivated by the dissimilarity in their remuneration and job security incentives in which SRFs have stronger remuneration incentives and higher probability of job losses compared to CFs.

Risk shifting as a result of manager stock selection or market timing ability could benefit fund investors and may be an indication of manager skill since it could be related to the activeness of the investment strategies of funds (Cremers and Petajisto, 2009). For SRF

managers, in addition to their ESG-focused mandates, they also need to achieve desirable returns to compete for fund flows and to retain their jobs. Thus, this study examines the performance consequences of risk shifting for both SRFs and CFs and documents a competing effect of risk shifting on fund performance across different sub-periods.

This study contributes to the literature explaining differences in SRFs and CFs risk shifting in relation to fund manager incentives, including implicit remuneration incentive (Chevalier and Ellison, 1997) and risk of job losses (Hu et al., 2011; Khorana, 1996). No studies have jointly considered the relative effects of both incentives on fund risk shifting decision and the differences of these effects between SRFs and CFs. Prior studies examine these incentives in isolation and use market returns as a proxy to determine relative importance of these incentives (Kempf et al., 2009; Popescu and Xu, 2017). This study fills this gap by allowing for both incentives to understand their relative importance across market cycles for SRFs and CFs. Additionally, it adds to the literature examining the consequence of risk-shifting differences between SRFs and CFs in the context of different market cycles.

The remainder of this paper is organised as follows. Section 2 reviews the existing literature specifically related to remuneration incentives and job loss concerns. Section 3 describes the data and variables used in the study. Section 4 presents a discussion of key empirical findings. Section 5 concludes.

2. Literature Review

There exists a vast amount of literature on agency issue between mutual fund managers and investors, a principle-agent relationship in the mutual fund management industry (Starks, 1987). It is a common notion that the remuneration structure in the mutual fund industry can induce fund managers to choose higher risk levels that exceed investors' expectations. Implicit incentive effects arise from two avenues, one from the relation between fund managers and investors. Through their capital allocation decisions, investors allocate more (less) money in funds that perform well (poorly). Moreover, fund investors are less reactive to recent poor performance but more responsive to recent well-performing funds by disproportionately allocating their investment flows into those funds (Ippolito, 1992; Sirri and Tufano, 1998). Such incentive effects arising from this asymmetric flow-performance relation create a call-option like payoff structure to fund managers and encourage them to take on excess risk. Second, implicit incentives can arise from the relation between fund managers and their employed fund investment companies through their practice of firing and hiring practices (Chevalier and Ellison, 1999; Khorana, 1996). The following sections review the two types of implicit incentives as well as other fund or manager attributes that may affect fund manager choices with respect to risk modifications.

In the mutual fund industry, the fund advisor fee is directly linked to the total assets under management (AUM) (Khorana, 1996). The AUM of a fund increases if fund inflows exceed fund outflows over time and is positively related to fund managers' remuneration. Fund investors endeavour to choose mutual funds that provide the best-expected return in the context of their risk tolerance. Given the difficulty involved in identifying and choosing the best funds for future investment, prior studies find that mutual fund investors pursue mutual funds with superior historical performance in order to reduce search costs. Namely, they equate past

performance with future performance (Sirri and Tufano, 1998). Such investor bias creates an implicit incentive for fund managers to assume a higher level of risk in order to achieve better return performance in order to gain personal benefits.

SRF and CF investors are not alike in terms of their investment allocation decision. Studies have shown that SRF investors tend to have higher education (i.e. hold tertiary qualifications) and higher self-reported investment knowledge (Pérez-Gladish, Benson, and Faff, 2012; Riedl and Smeets, 2017). Moreover, they show that SRF investors are willing to sacrifice financial returns in order to support their social beliefs. Therefore, these characteristics of SRF investors are consistent with prior studies which document that SRFs differ from CFs in their flow-performance relation due to such clientele difference (Benson and Humphrey, 2008; Bollen, 2007; Renneboog, Ter Horst, and Zhang, 2008a). Therefore, the implication for manager risk-shifting behaviour is not likely to be same between these two types of funds.

Existing studies focus much on the managers' desire to increase fund returns to attract fund flows, however, fund managers' intention to retain their jobs cannot be ignored. In fact, losing one's employment not only means a loss of income, but also damage to reputation, and future job and career prospects. Therefore, the hiring and firing practices of investment companies is very pertinent to fund managers in making portfolio decisions.

The literature reports that there is a negative relation between the probability of termination of fund managers and past fund performance, i.e., fund managers with poor past performance are more likely to be replaced (Chevalier and Ellison, 1999; Hu et al., 2011; Khorana, 1996; Kostovetsky and Warner, 2015). However, the literature is inconclusive on the relation between the threats of dismissal and fund managers' risk-shifting decisions. There is competing evidence documented in the literature on this matter. On the one hand, studies find

that fund managers with greater employment risk are more likely to herd with other fund managers to lower the likelihood of termination and window dress their portfolios in the belief that they are safe. For instance, younger fund managers who have stronger termination-performance sensitivity are less conservative in their portfolio risk choices and tend to hold more conventional portfolios (Chevalier and Ellison, 1999; Hu et al., 2011). Other studies, however, find that reputable senior managers who are highly paid tend to maintain their status and protect their remuneration to the extent that they take on less risk and exhibit greater herding behaviour relative to their peers (Boyson, 2010; Chung, 2016; Graham, 1999). This study fills the gap by investigating the effect of the threat of job loss on fund manager risk-shifting behaviour for SRF and CF managers.

The relative effects of remuneration versus job loss concerns may not be the same over time and can vary with overall market conditions. For example, when a market is moving out of a slump, increasing amount of capitals flows into capital markets and the new money invested into funds is considerably greater if the fund outperforms its peers. Consequently, the potential bonus or remuneration effects can be quite attractive to fund managers as they are likely to be incentivised to outperform other fund managers. Moreover, investors tend to be more overconfident when there is a bull market and rush to funds that recently perform well (Jun et al., 2014). Such remuneration-related incentives during market recessions become less important to managers because returns and aggregate capital flows are low and the probability of fund closure and job losses is high.

In addition to the two incentives, specific managerial attributes that are associated with mutual fund performance and risk-shifting behaviour within the existing literature typically involve fund manager's tenure and team management structure. Fund manager tenure is the number of years that a manager has managed a fund for, and is used to measure managerial

experience. Team management structure, represents the number of managers involved in managing a fund. A team-managed fund is one managed by two or more mangers; otherwise, the fund is deemed as being controlled by a single fund manager. There are many debates about the effect of team structure on fund performance and risk decisions. Team-managed funds have the benefit of diversified opinions, found to be more conservative and hold less extreme investment styles (Bär, Kempf, and Ruenzi, 2011; Sah and Stiglitz, 1986). One study shows that team managed funds tend to take less total risk in their portfolio compared to sole-managed funds and hold a larger number of securities but more concentrated portfolios (Patel and Sarkissian, 2017). Another recent study shows that fund performance or risk do not differ between team- or sole-managed funds. However, managers in team-managed funds have lower flow-performance sensitivity compared to when they are in single-managed funds (Wang, 2016).

This study also investigates fund-specific characteristics that have an impact on risk shifting behaviour following the literature as it relates to impact on fund performance, namely: (1) fund size; (2) expense ratio; (3) fund age; and (4) family size. Existing literature typically suggests that scale erodes fund performance (Nanda, Wang, and Zheng, 2009) or finds a significant inverse relationship between fund size and fund performance in terms of traditional fund performance measurement (Yan, 2008). Gil-bazo and Ruiz-verdú (2009) suggest that high-expense funds perform worse and tend to use strategic fee-setting to target naive investors and be more prone to agency issues. Fund age is the number of years that a fund has been operating for. Chevalier and Ellison (1997) point out that young funds significantly outperform older funds, which means that fund age is negatively related to fund performance.

3. Research Design

3.1. Data and Sample Selection

This section explains the data sources and describes the main characteristics of mutual funds in the sample. I obtain fund data, and fund manager data from the Morningstar Direct Survivorship-Bias-Free U.S. Mutual Fund Database.[7] The analysis requires information about fund names, FundId, CUSIPs, monthly net returns, total net assets, inception and obsolete dates, expense ratios, turnover ratios, investment objectives, and Morningstar categories. Fund manager related information include manager names, manager starting and ending dates associated with a fund, and the number of managers in the fund.

The sample period spans from January 1998 to December 2016, which reflects the period where SRFs emerged as a growing investment vehicle within the mutual fund industry. In addition, the sample commences in 1998 as there is an insufficient number of SRFs prior to 1998 to conduct empirical analysis. As the sample period spans over a relatively long period, it is disaggregated into significant crisis period and non-crisis period.[8]

The sample consists of all U.S. domestic equity funds. I exclude index funds, bond funds, international funds, sector funds, and balanced funds from the sample to be consistent and comparable with prior studies. Observations with less than $5 million in fund size and with return history of fewer than 36 months are excluded to avoid potential incubation bias (Evans, 2010; Kacperczyk, Sialm, and Zheng, 2008; Ma and Tang, 2018). Morningstar Direct reports each share class as an individual entry in the database. However, different share classes of a

[7] Morningstar Direct Mutual Fund Database is an institutional investment analysis platform known for its comprehensive and accurate fund and fund manager data (Ma, Tang, and Gomez, 2018). Patel and Sarkissian (2017) show managerial history accuracy is highest at 96% for Morningstar Direct when compared to Securities and Exchange Commission (S.E.C.) filings.

[8] The crisis periods are identified using the peak and through of S&P 500 index following Nofsinger and Varma (2014)

fund are essentially backed by the same portfolio of assets. They are only distinguishable in terms of the fee structure and minimum investment requirements to cater for different groups of investors.[9] Therefore, the analysis does not include all share classes and only contain the oldest share class of the fund (Kempf and Ruenzi, 2008).

SRFs are identified using Morningstar's domestic equity mutual funds characterised with a socially conscious objective. The term socially conscious funds, used interchangeably with socially responsible funds according to Morningstar, includes funds that take a proactive stance by selectively investing in environmentally friendly companies or firms with good employee relations; this group also includes funds that avoid investing in companies involved in promoting alcohol, tobacco, or gambling, or in the defence industry. Statman (2000) is amongst the first to adopt this list in his study and followed by several other studies (Benson, Brailsford, and Humphrey, 2006; Białkowski and Starks, 2016; Humphrey, Warren, and Boon, 2016).

The initial sample includes 4,239 unique U.S. domestic equity funds, of which 155 are SRFs and 4,084 are CFs. There are 44 SRFs and 557 CFs that do not have at least 36 continuous months of history or that have missing data and are thus dropped out from the sample. The final sample is 111 SRFs and 3,530 CFs.[10]

[9] For example, A share classes typically carry front-end sales charges whilst B share classes carry deferred sales charges, see http://news.morningstar.com/articlenet/article.aspx?id=346727

[10] As robustness, a matched sample is employed based on a 1-to-5 matching rule following Bollen (2007). The matching procedure is detailed in Appendix and the matching sample consists of 666 funds, 111 classified as SRFs and 555 as CFs.

3.3.2. Variable Definition and Construction

Risk-Taking measure ($\Delta\sigma^{2\text{-}1}$), the temporal risk change within a year using the difference between the second half and the first half period of monthly return standard deviations (Brown, Harlow, and Starks, 1996).

The measure is defined as follows:

$$\Delta\sigma^{2-1} = \sigma_{f,t}^{2} - \sigma_{f,t}^{1} \quad (1)$$

where σ_{ft}^{2} ($\sigma_{f,t}^{1}$) is the return volatility based on the second (first) half year of returns.

Fund Risk-Adjusted Returns (Alpha): the risk-adjusted return is estimated using the market model defined as follows:

$$R_{j,t} - R_t^f = \alpha_j + \beta_{MKT,j,t} \cdot \left(R_t^m - R_t^f\right) + \varepsilon_{j,t} \quad (2)$$

where $R_{j,t}$ is fund j 's net return on month t which is determined each month by taking the change in monthly net asset value, reinvesting all income and capital-gains distributions during that month, and dividing by the starting net asset value. It is also adjusted for management expenses and 12-1b fees; R_t^f is the one-month T-bill rate on time *t*; $\left(R_t^m - R_t^f\right)$ is the excess return of the equity market index over the one-month T-bill rate. The parameter α_j denotes the risk-adjusted performance, *Alpha,* for fund *j*.

Fund Flow (Flow): is the growth rate based on changes of TNA and adjusted for returns following Sirri and Tufano (1998), defined as follows:

$$Flow_{i,t} = \left(TNA_{i,t} - TNA_{i,t-1}\left(1 + R_{j,t}\right)\right)/TNA_{i,t-1} \quad (3)$$

where TNA_{t-1} is total net assets from the end of period *t-1,* and $R_{j,t}$ is the fund's net return over the period of time *t*.

Other variables: a set of additional variables is included to control for fund, manager, and fund family-specific characteristics in the empirical analysis. (1) *Rank* is the fractional performance ranks assigned to each fund each year according to their raw return over the past year; *rank* ranges from zero to one (2) Fund size *(Size)* is defined as the total net assets under management. (3) Fund age (*Age*) is the total number of years the oldest share class of a fund has listed in the database. (4) Expense ratio (*Expense*) is the percentage of fund assets used to pay for a fund's operating expenses and management fees, including 12b-1 fees, administration fees and all other asset-based costs incurred by the fund. (5) Turnover ratio (*Turnover*) of a fund is calculated by taking the minimum of new securities sales or purchases, divided by the total net asset value of the fund. (6) Manager tenure (*Tenure*) is the number of years the fund manager has worked at the fund. (7) Management team size (*Team Size*) is the number of fund managers in the fund. (8) Family size *(Family Size)* is the aggregate of all assets under management of funds in each family.

4. Results

This sections commences by examining some stylistic facts with respect to SRFs and CFs with the objective of identifying differences in these fund groupings. This study is motivated to investigate the motives for differences in risk-shifting behaviour identified by Wang, Vaz, and Watson (2018). This analysis is in the context of SRFs achieving similar performance to CFs in a vastly restricted investment universe due to additional constraints. The similar performance between the two types of funds suggests other fund performance attributes and behaviours such as risk shifting may serve to explain this.

4.1. Descriptive statistics

Table 1, Panel A presents means and differences in fund characteristics between conventional funds (CFs) and Socially Responsible Funds (SRFs). The first two columns show the results for the full sample of SRFs and CFs, respectively. Column 3 to 8 show the estimation results for the three sub-sample periods. The comparison shows that the average fund annual returns are 9.06% and 8.92% for CFs and SRFs respectively in the overall sample period, however, the difference is not statistically significant. Analysing the differences in the sub-sample periods, namely Pre-GFC, during GFC and Post-GFC, there is no statistically significant differences in return performance. Moreover, an examination of other key average measures of these funds such as Sharpe ratios, fund flows, age and size, reveals no significant differences in the sample data. These results are consistent across the sub-sample periods. These similarities confirm that SRFs appear to achieve the goal of "doing well by doing good" (Hamilton, Jo, and Statman, 1993). Similar size and age of SRFs relative to CFs show that SRFs are no longer a niche market and have gradually become mainstream in the mutual fund industry.

[Insert Table 1 here]

In terms of fund manager related characteristics, SRFs appear to achieve return performance from a slightly larger team size than CFs, though the difference is not statistically significant. It is interesting to note that although the average manager tenure of SRFs is no different to that of CF managers, SRF managers tend to have longer industry working experience, measured by the total number of years working in the mutual fund industry. Furthermore, a larger proportion of fund managers with longer than 25 years of industry experience is seen amongst SRFs (*Experience25+)*, confirming that SRFs employ more senior and experienced fund managers compared to CF counterparts. This finding suggests SRFs appear to hold the requirement that their fund managers to have accumulated some experience in the funds management industry to achieve both financial and non-financial objectives, whereas junior fund managers are more likely to start in CFs.

To estimate the likelihood of fund manager termination, I analyse histories of the entire mutual fund manager from 1998 to 2016, including non-equity focused mutual funds. Thus, I am able to obtain the complete history of manager employment in the mutual fund industry. Firstly, I identify all manager turnover over the sample period, including manager removal or addition to the fund in a given year. Managers who are no longer associated with the fund that they were responsible may not necessarily mean employment termination. Evidence shows that investment companies strategically relocate fund managers to market segments where manager skill is best utilised and rewarded (Fang, Kempf, and Trapp, 2014). Therefore, those replaced fund managers is analysed further to identify those who are no longer working in the fund family. The probability of termination is 15% for the SRF fund-year observations and 16% for CF fund-year observations, suggesting that one in seven funds would terminate at least one fund manager in a given year.[11] This relatively high termination rate means that SRF managers

[11] To be more conservative in identifying manager firing, only fund managers leaving the entire mutual fund industry are counted as termination and find that they account for 6% and 7% of SRF and CF fund-year

are not better off in terms of job security by working in SRFs although they may require a higher level of expertise due to the additional analysis and screening process required for those funds.

An analysis of the three sub-periods namely on either side of the GFC, I note a few temporal changes in fund characteristic in terms of differences between SRFs and CFs. Firstly, fund expense ratios are higher in SRFs than CFs before the period preceding the GFC. Investors initially face a higher cost to invest in ethical investments in the early years of 2000 when there are fewer SRFs in the market. However, since the onset of GFC, the average expenses ratios investing with SRFs reduce from 1.34% prior to GFC to 1.11% post-GFC, suggesting that investors do not need to pay higher fees to enter into the ethical investments market.

The second noticeable temporal change is with respect to the net fund flows. Over the whole sample period, the average annual fund flow percentage is not significantly different between SRFs and CFs. However, it is seen that during the GFC period the fund flows to SRFs (25%) are significantly greater than that to CFs (15%). This finding is consistent with the evidence that while CFs experience major fund outflows during the crisis period SRFs have positive fund flows over the majority of the turmoil period (Białkowski and Starks, 2016).

Lastly, the observation of more experienced fund managers working in SRFs is a phenomenon post the GFC. Prior to that period, the average manager tenure working in a fund no different between those funds. However, during GFC, the industry experience of managers working in SRFs is on average one year longer than that of CFs. This trend suggests that as the

observations respectively. Using the stricter definition of manager firing in the analysis the results remain qualitatively unchanged.

number and size of SRFs grow over time, more experienced fund managers are drawn to funds with a social responsibility focus.

Table 1, Panel B reports the correlation matrix of the main independent variables that are used in the regression analysis. As would be expected fund returns are highly correlated with fund Sharpe ratios and thus Sharpe ratios are excluded in the regression analysis. Funds with larger assets under management tend to be older and more expensive. Therefore, fund size or fund age do not enter regressions at the same time to avoid the multicollinearity concern.

Some manager-related variables, due to the nature of the measures, are correlated with each other. For instance, manager industry experience has a 45% correlation with manager average tenure and 61% correlation with the Experience25+ dummy. Overall, Table 1 suggest that fund return and characteristics of SRFs tend to be similar to those of CFs. In next section, the attention is now turned to considering the results of investigating whether differences in remuneration incentive and job loss concern serve to explain SRF and CF difference in their portfolio risk choices.

3.4.2. Implicit Remuneration Incentive measured by Flow-Performance Sensitivity

This section starts the empirical analysis by examining the relative implicit remuneration incentive arising from the sensitivity of fund flows to past fund performance. Bearing in mind that fund managers have an implicit pay-related incentive tied to fund flows arising from return outperformance (Brown et al., 1996; Chevalier and Ellison, 1997; Sirri and Tufano, 1998).

The relations between fund past returns and flows for SRFs and CFs are plotted in Figure 1. For each year, funds are ranked into deciles according to their total returns net of expenses. Panel A plots the average fund flows for the next year for the funds within the same

decile groups for the whole sample period. Plots for sub-sample periods (i.e. the periods before, during and after the GFC) are shown in Panel B, C and D. The results for CFs are consistent with prior studies that there exists a convex relation between prior fund performance and fund flows (Ippolito, 1992; Sirri and Tufano, 1998). Comparing to fund flows of CFs, SRFs in the same return deciles as CFs attract slightly higher fund flows across all ten groups (Panel A). Moreover, there is a penalty for CFs with extremely poor return (decile one) whilst on average there is no such evidence for SRFs, suggesting that SRF investors seem to be more tolerant to poor fund performance as they derive non-financial utility from such investments. However, the noticeable reward in to top twenty percent (decile eight to ten) are similar between SRFs and CFS.

The flow-performance relations vary across market conditions. During the GFC period, the flow-performance relation of SRFs is shallower than that of CFs and the penalty for poor performance of CFs is more pronounced during market turmoils. The prima facie observation further suggests that SRF investors are more patient than traditional mutual fund investors in terms of their investment allocation decisions and such effect is especially evident when the market is volatile and the conventional investors are more averse to losses. This evidence confirms the finding of SRF outperformance during market crisis documented by Nofsinger and Varma (2014) and suggests that conventional profit-seeking investors would exert pressure on fund managers to involuntarily sell their holdings with their redemption flows and such flow-induced asset sales by fund managers have a negative impact on price. (Coval and Stafford, 2007).

[Insert Figure 1 here]

As the graphs do not convey relationship between fund flows and other fund characteristics, a multivariate analysis is now used following Sirri and Tufano (1998) who employ a piecewise linear regression to explore the shape of flow-performance relation. For performance measures, a fund's performance ranking relative to other funds in the same period is used. A fund's fractional rank represents its percentile performance relative to other funds in the same period and ranges from zero to one. For the purpose of comparison, this study follows the convention in the literature to break the funds' fractional ranks down into three subgroups by their relative performance in the same period: isolating the top 20 percent and bottom 20 percent quintiles from the middle 60 and they are defined as

$$Low_{i,t-1} = min(Rank_{i,t-1}, 0.2)$$

$$Mid_{i,t-1} = min(Rank_{i,t-1} - Low_{i,t-1}, 0.6)$$

$$High_{i,t-1} = Rank_{i,t-1} - Mid_{i,t-1} - Low_{i,t-1} \quad (4)$$

The following piecewise regressions include time fixed effects to control for time-invariant fund characteristics and standard errors are clustered at the fund level as fund flows are likely to correlated for the same fund:

$$\begin{aligned} Flow_{i,t} = \alpha + \beta_1 Low_{i,t-1} + \beta_2 Mid_{i,t-1} + \beta_3 High_{i,t-1} + \gamma_1 Flow_{i,t-1} + \gamma_2 StdDev_{i,t-1} \\ + \gamma_3 Expense_{i,t-1} + \gamma_4 FundSize_{i,t-1} + \gamma_5 FundAge_{i,t-1} \\ + \gamma_6 FamilySize_{i,t-1} + Year\ Dummies + \varepsilon_{i,t} \end{aligned} \quad (5)$$

where the dependent variable is the annual percentage fund flows, $Flow_{i,t}$; all the explanatory variables lagged by one year and variables are defined in section 2.

Table 2 shows the estimation results of regressions defined in Eq.(5) The first two columns present results for SRFs and CFs using the whole sample period. Additionally, results for sub-periods (pre, during and post GFC) are shown to understand the temporal change of

flow-performance sensitivities. These results confirm that there is a difference in the flow-performance relation between SRFs and CFs.

[Insert Table 2 here]

In Table 2, I find support for the hypothesis that SRFs have greater remuneration incentive than CFs as the flow-performance sensitivity is greater in SRFs than that of CFs and such effect is most pronounced for funds in *High* return group. Specifically, top-performing SRFs (CFs) attract 3.4% (2.5%) fund flows with one percentile return increase. This result holds regardless of the sample period examined. The stronger flow-return relations shown in SRFs relative to CFs implies that ethical investors with an ESG preference not only gain financial returns but also obtain non-financial utility associated with SRI products. On the other end, SRFs at the bottom return group *(Low)* see little penalties for their poor performance, suggested by the insignificant coefficients fund prior returns on fund flows. However, CFs who perform poorly are subject to fund outflows. For example, one percentile return decrease for fund in the *Low* group is associated with 1% fund outflows.

In relation to fund flow persistence, the coefficient on $Flow_{t-1}$ reveals a higher fund flow persistence in SRFs relative to CFs and in fact SRF flow persistence is twice than that of CFs. For example, funds with 1% increase in fund flows in the prior year would attract 0.3% (0.14%) of increase in fund inflows for SRFs (CFs) in the current year. Compared to the effect of prior returns, prior flows are less influential on future fund flows regardless of the types of funds.

From the results of flow-performance relation, it is illustrated that the implicit remuneration incentive arising from the flow-performance relation is stronger in SRFs from that in CFs. This stronger flow-performance sensitivity suggests two things. First, the implicit remuneration incentive to SRF managers should be higher as they get higher rewards for good

performance than CF managers do. This higher pay-related incentive could be a motivation for the fund manager to take on more risk in order to achieve higher performance as prior studies suggest (Brown et al., 1996; Chevalier and Ellison, 1997; Sirri and Tufano, 1998).

Turning to the sub-period analysis, there is a consistent evidence with respect to the higher flow-performance relation in SRFs than CFs in the top-performing fund groups across all sub-periods including pre-, GFC and post-GFC. The persistence of flow-performance sensitivity suggests that the flow-performance sensitivity is consistent in terms of the relative difference between SRFs and CFs under changing market conditions.

With respect to other control variables, it is found that fund flows are negatively related to fund size, fund age and fund expenses. Moreover, the riskiness of fund, measured by return volatility over the twelve months negatively affects fund flows, meaning that investors are sensitive to fund risks and generally allocates to funds with less risk. This relation is more salient during the period after the GFC.

Motivated by the greater flow-performance sensitivity in SRFs, the following analysis uses the flow-performance sensitivity as the proxy for the manager remuneration incentive. Running a 36-month rolling window regression on a monthly basis, I compute a measure of individual fund's implicit remuneration incentive using fund historical fund flow and fund return information. Then monthly data for each fund is averaged to obtain the annual measure of incentive for each fund.

4.3. Termination Risk

To investigate the extent to which fund managers are motivated by concerns about loss of employment and how that affects their risk-shifting behaviour, this study first examine the probability of job loss and then relate the predicted risk of job loss with respect to fund risk

shifting. From the summary statistics in Table 1, it is shown that on average 15% of fund-year observations occur the event of employment termination, which suggests that termination risk is an important factor to fund managers in making portfolio risk decision. Prior literature document that past return performance is critical to fund firing/hiring decisions (Chevalier and Ellison, 1999; Khorana, 1996). Therefore, this study also adopts a termination-performance framework in the analysis.

To estimate the probability of termination for each fund, logistic regressions are used over the sample period. The dependent variable is a dummy variable which takes a value of one if at least one fund manager is terminated by the fund family in a given year. Termination takes place when the fund manager responsible for fund *f* in year *t-1* permanently leaves the fund family at the beginning of year *t* while being under the average retirement age.[12] Specifically, the following equation is estimated:

$$Termination_{i,t} = \alpha + \gamma_1 Return_{i,t-1} + \gamma_2 Age_{i,t-1} + \gamma_3 Size_{i,t-1} + \gamma_4 Tenure_{i,t-1} + \gamma_5 TeamSize_{i,t-1} + \gamma_6 Experience25 +_{i,t-1} + Year\ Dummies + \varepsilon_{i,t} \quad (6)$$

A fund's performance in a given year is measured using its percentile rank on the basis of its total returns. Other fund attributes are included such as fund age, and fund size as well fund management characteristics such as manager tenure and team size. The dummy variable, *Experience25+*, which takes the value of one if the manager's industry experience is 25 years old or greater, and zero otherwise (Barber, Scherbina, and Schlusche, 2017)[13] is to control for

[12] This study assumes the retirement age is 60 following prior literature (Chevalier and Ellison, 1999). As the manager age information is not available in the Morningstar Direct database, manager industry experience that are over 25 years is used as the retirement threshold (Barber et al., 2017).

[13] The choice of 25 years of manager industry experience follows the definition of Barber et al. (2017) which report that managers on average start at the age of 35, which is similar to define retirement if the manager is 60 years old or greater (Chevalier and Ellison, 1999).

the probability of manager voluntary retirements,. All specifications include year dummies to control for time-fixed effects. t-statistics are calculated using clustered standard errors by funds to account for dependence across funds.

The results from the Eq. (6) are presented in Table 3. As expected, the probability of a manager departure is significantly negatively related to past fund performance, measured by fund relative ranks. The coefficient for the one-year lagged rank variable implies that, if a manager's return performance reduces by one percentage point last year, his/her probability of termination increases by 2.5% ($1-e^{(-0.0256)}$) in SRFs and 1.7% ($1-e^{(-0.0168)}$) in CFs.

[Insert Table 3 here]

Control variables included in the analysis are manager tenure and team size in the regressions. Managers with longer tenure are more likely to be highly regarded by their employers and hence are less likely to be fired due to a poor performance (Boyson, 2010; Hu et al., 2011). Whilst managers of a larger team, measured by the number of fund manager during a year, are more likely to be fired since funds with a higher number of managers have a greater talent pool and greater competition. As expected, the results show that average manager tenure is negatively associated with termination risk, suggesting funds with relatively younger managers have a higher likelihood of manager termination. Additionally, funds with larger team sizes have higher termination risk.

Turning to the sub-sample period results reveals that the negative effect of return performance on termination in SRFs becomes most noticeable in the most recent periods. The negative and highly significant coefficients of prior return ranks suggest that SRF managers are more likely to be terminated than CFs because of poor performance in the post-GFC period

compared to prior years. This evidence suggests that SRF managers face greater pressure than CFs to perform to keep employed.

Having established the link between prior fund performance and manager termination risk, the coefficients from this regression is employed to estimate the probability of termination for each fund for each year of the sample period. This estimated probability is referred to as the predicted probability of termination and is the main proxy for termination risk in the following regressions.

4.4. Remuneration or Job Loss Concern affects Risk-Shifting Behaviour

This section now estimates the effect of incentives on fund manager risk-shifting behaviour for both SRFs and CFs. As mentioned earlier, the measure of fund risk shifting is the difference between the level of risk between the second and the first half of the fiscal year as measured by the standard deviation. A fund manager's remuneration incentive is proxied by estimating the flow-performance sensitivity using fund historical flows and returns. The risk of job loss for each fund is estimated using the logit regression. The following ordinary least squares (OLS) equations with year dummies are used to examine the joint effect of incentives on fund risk changes during the year:

$$\begin{aligned}\Delta\sigma_{i,t} = \alpha + \beta_1 Remuneration_{i,t-1} + \beta_2 Termination_{i,t-1} + \gamma_1 Return_{i,t-1} \\ + \gamma_2 StdDev_{i,t-1} + \gamma_3 Tenure_{i,t-1} + \gamma_4 Size_{i,t-1} + \gamma_5 Expense_{i,t-1} \\ + Year\ Dummies + \varepsilon_{i,t}\end{aligned} \quad (7)$$

The primary variables of interest in this equation are remuneration incentive (β_1) and termination risk (β_2), and how these two factors affect fund risk changes. Table 4 shows regression results that test the relation between fund risk-shifting behaviour and manager termination risk and remuneration incentive.

[Insert Table 4 here]

Table 4 presents the estimation results of Eq. (7). From the full sample, it is found that the remuneration incentive measured by the flow-performance sensitivity has relatively insignificant effect on risk-shifting behaviour for SRFs. This evidence does not support the prediction that the flow-performance sensitivity has a positive effect on fund risk-shifting behaviour and such effect is different in SRFs compared to CFs due to their different investor clientele.

However, termination risk of fund managers measured by the probability of fund managers terminated by the investment companies show significant impact on manager risk modifications. Amongst all the explanatory variables, termination risk of fund managers has the strongest relation with risk shifting and is highly significant across all sample periods. The impact of termination risk on risk shifting for SRFs is higher than that of CFs during the full sample period. This result implies that SRF managers are likely to take more risk than CF managers are if the threat of dismissal decreases. In the period preceding the GFC, the relation between termination risk and risk shifting is insignificant for SRFs whilst positive for CFs. This finding implies that CF managers increase risk to a greater extent when facing higher termination risk than their peers who have lower termination risk.

The coefficients on termination risk, however, are highly significant for both SRFs and CFs. Over the entire sample period, it is seen that the relation between *Termination* and *Risk Shifting* is negative and significant in both funds. Specifically, 1% reduction in termination risk sees a 5.0% (3.8%) of risk increase for SRFs (CFs). The magnitude is double for SRFs to that of CF counterparts, suggesting that termination risk is of greater importance to SRF managers when it comes to risk modification decisions compared to that of CF managers. Such a sizeable negative effect is more evident since the onset of the GFC, as you can see that prior to the GFC

the coefficients on *Termination* was insignificant for SRFs. CFs show a positive relation during the period before the GFC, suggesting that CFs with higher termination risk take on more risk than those with lower termination risk. Since the GFC, the result supports the hypothesis that funds with higher termination risk modify their portfolio risk less aggressively than those with lower termination risk. Taken together, the evidence suggests that fund manager risk-shifting behaviour is significantly influenced by their concerns about job losses rather than any remuneration effects. SRFs show greater concern for job security than CFs.

Among the fund characteristics control variables, fund sizes and fund manager average tenure are related to fund risk changes. Specifically, smaller funds with less experienced fund managers tend to take on higher risk than other larger funds with managers that are more senior.

4.5. Consequences of Risk-Shifting Behaviour

Lastly, risk shifting per se may not be harmful to investors if it does not negatively impact fund performance and may be an indication of manager skill since it could be related to the activeness of the investment strategies of funds (Cremers and Petajisto, 2009). For SRF managers, on top of adhering to their fund mandates, they also have the incentive to perform and achieve desirable returns to compete for fund flows and to improve their job prospect. A risk shifting as a result of manager stock selection or market timing ability could benefit fund investors. Thus, this study further investigates the performance consequences of risk shifting for both SRFs and CFs using the following regression specification:

$$Alpha_{i,t} = \alpha + \beta_1 \Delta\sigma_{i,t-1} + \gamma_1 Alpha_{i,t-1} + \gamma_2 StdDev_{i,t-1} + \gamma_3 Size_{i,t-1} + \gamma_4 Expense_{i,t-1} + \gamma_5 Turnover_{i,t-1} + \gamma_6 Flow_{i,t-1} + Year\ Dummies + \varepsilon_{i,t} \quad (8)$$

where the dependent variable the risk-adjusted return, *Alpha,* defined in Eq. (2). All explanatory variables are lagged by one-year period. $\Delta\sigma$ is the risk-shifting measures are

defined as in Eq. (1). *Stdev* is the standard deviation of returns over the twelve months of a year. *Size* is the logged assets under management. *Expense* is calculated by dividing the fund total operating expenses by the average dollar value of its assets under management. *Turnover* is measured by taking the minimum of new securities sales or purchases, divided by the total net asset value of the fund. *Flow* is measured as the growth rate based on changes of TNA and adjusted for returns. All regressions include year dummies to control for time-fixed effect and standard errors are clustered by funds.

[Insert Table 5 here]

The estimation of Eq. (8) is presented in Table 5. Over the full sample, the effect of risk shifting on fund performance is positive and significant amongst CFs. It suggests that on average CF managers improve fund performance through risk modifications. However, such effect is not seen in SRFs. When disaggregating the sample into three sub-periods, it is seen that the effects of risk shifting on fund performance vary with market conditions. Specifically, the investors of CFs can benefit from the risk enhancing during the periods prior to and during the GFC, and risk reduction will be better for them post the GFC periods. Similarly, SRFs are particularly better off during the GFC and one percent increase in risk shifting improves their risk-adjusted return by almost 6% per annum. However, during the period post the GFC, fund performance is negatively impacted by fund risk changes regardless of being SRFs or CFs. In terms of other fund characteristics, fund volatilities measured using the twelve monthly returns are negatively related to fund alphas.

5. Conclusion

Much research has been done to investigate the performance difference between SRFs and CFs albeit few studies find a significant difference between the two groups. Research to date has typically ignored the investment actions taken to achieve the similar performance. This study postulate that socially responsible fund managers are facing different risk-shifting incentives from conventional fund managers and hence exhibit different risk-shifting behaviour. I investigate remuneration incentive using fund flow-performance sensitivity and estimate the fund termination risk using a performance-termination relation. Taken the two incentives together, I find that the threat of termination significantly reduce the tendency of fund taking on excessive risk or risk-shifting behaviour. Such negative effect is more prevalent amongst socially responsible funds due to a stronger likelihood of job loss after a bad performance. However, I observe weak evidence that remuneration incentive arising from flow-performance sensitivity motivates greater fund risk shifting. It could be due to increasing fund outflows from the mutual fund industry as a whole and remuneration incentive becomes less attractive to fund managers.

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Figure 1. Difference in Remuneration Incentive between SRFs and CFs

This figure presents average annual fund flows by return deciles. For each year from 1998 to 2016, funds are ranked into ten equal groups based on their total return. For each of each ten groups, the mean fund flows of the funds is calculated. The fund flow percentage is defined as $(TNA_t-TNA_{t-1})*(1+R_t)/TNA_{t-1}$, where TNA_t is the total net assets of the fund at time t, and R_t is the return of the fund in period t.

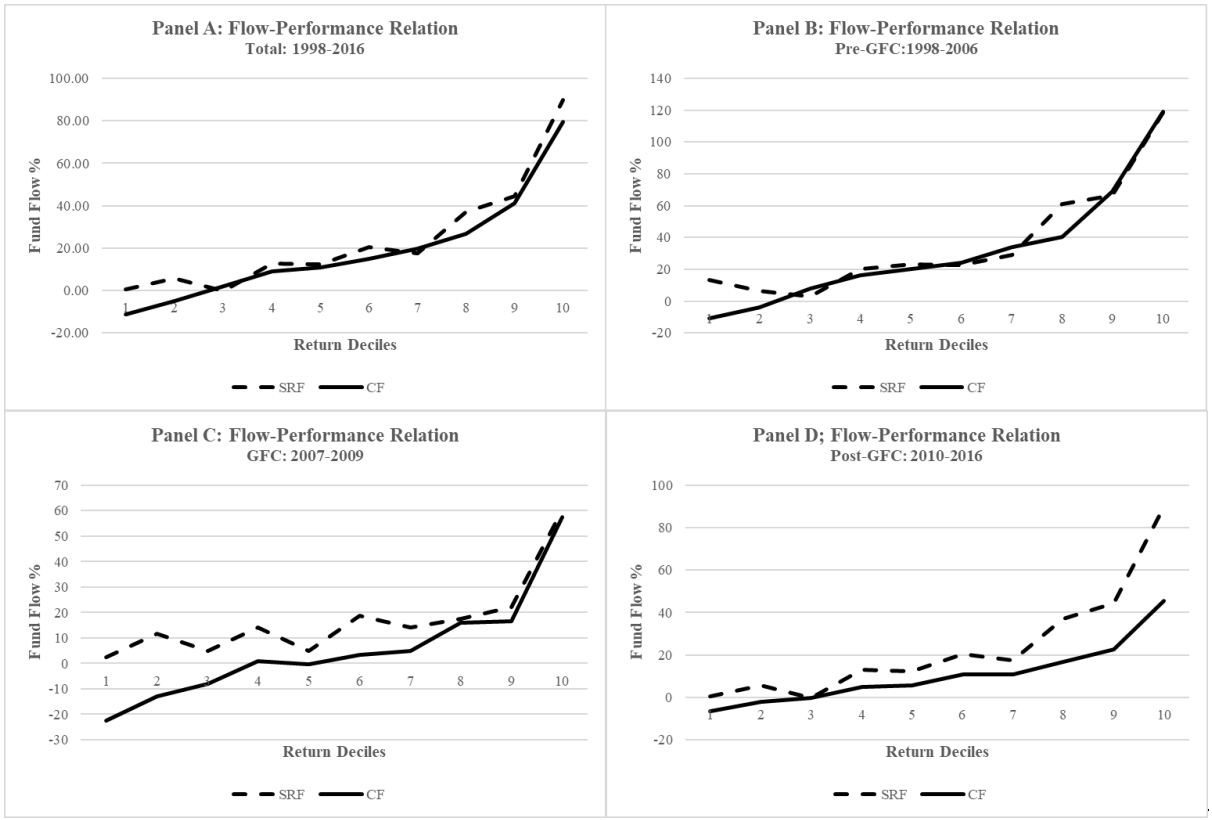

Table 1. Descriptive Statistics and Correlation Matrix

This table reports summary statistics (Panel A) and correlation matrix (Panel B) of all the main variables used in this study. *Return* is the total annual return over the 12-month window in a year. *Sharpe* is the Sharpe ratio measured as the "reward-to-risk" for a given year. *Flow* is the annual fund flow in percentage calculated as the change in TNA excluding growth in TNA due to fund returns (Sirri and Tufano, 1998). *Size* is the sum of assets under management across all share classes measured in billions. *Age* is the number of years the oldest share class has traded. *Expense* is the annual total expense ratio calculated by dividing the fund's operating expenses by the average dollar value of its assets under management. *Team size* is the total number of fund managers working in a fund. *Experience25+* is a dummy variable taking a value of one if the manager has over 25 years of experience working in the industry, and zero otherwise. *Tenure* measures the average length of years that a manager has been since the inception of a mutual fund. *Industry Tenure* (Longest) measures the longest length of years that a manager has been since he/she first works at the mutual fund industry. *Termination*, is a dummy variable taking a value of one when a fund manager is terminated from the mutual fund industry, and zero otherwise. Column "CF" and "SRF" report means and standard deviations of the above variables for conventional funds (CFs) and socially responsible funds (SRFs) separately. Column "Diff=CF-SRF" reports the difference between the two sample means and the Welch's (1947) t-test for equality of two sample means with unequal variance and an unequal number of observations. The symbols ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10%, 5%, and 1% levels, respectively. Four panels present the summary statistics for the whole period and three sub-periods respectively. The three sub-periods are the Pre-GFC (1998-2006), GFC (2007-2009), and Post-GFC (2010-2016) periods.

Panel A	All: 1998 : 2016			Pre-GFC: 1998-2006			GFC: 2007-2009			Post-GFC: 2010-2016		
	CF	SRF	Diff = CF-SRF	CF	SRF	Diff = CF-SRF	CF	SRF	Diff = CF-SRF	CF	SRF	Diff = CF-SRF
Return (in %)	9.06	8.92	0.13	10.19	9.36	0.83	-0.38	1.3	-1.67	12.11	11.83	0.28
Sharpe	0.57	0.61	-0.04	0.54	0.52	0.02	-0.13	-0.07	-0.06	0.99	1	-0.01
Flow (in %)	33.51	30.38	3.13	53.21	46.47	6.75	15.24	25.29	-10.05*	19.56	19.83	-0.27
Size (in Billions)	1.16	1.35	-0.19	0.95	1.45	-0.5	1.05	1.15	-0.1	1.52	1.33	0.19
Age (in Years)	12.12	12.33	-0.21	9.93	10.06	-0.13	12.46	11.54	0.92	15.66	15.32	0.34
Expense (in %)	1.22	1.22	0.01	1.28	1.34	-0.06**	1.22	1.22	0	1.16	1.11	0.05***
FamilySize (in Billions)	30.73	14.05	16.68***	24.13	9.96	14.17***	29.78	13.13	16.64***	40.13	18.05	22.09***
Team Size	2.83	2.96	-0.13	2.38	2.29	0.08	3.22	3.48	-0.26	3.36	3.45	-0.1
Experience25+	0.06	0.11	-0.05***	0.03	0.03	0.01	0.04	0.06	-0.02	0.11	0.22	-0.11***
Tenure (in Years)	5.3	5.36	-0.06	4.4	4.57	-0.18	5.24	4.67	0.56**	6.76	6.52	0.24
IndustryTenure (in Years)	12.37	13.33	-0.96***	9.82	10.2	-0.38	13.05	14.07	-1.03**	16.06	16.38	-0.32
Termination	0.15	0.16	-0.01	0.13	0.12	0.01	0.19	0.19	0	0.17	0.18	-0.02

Panel B	Return (in %)	Sharpe	Flow (in %)	Size	Age	Expense (in %)	Team Size	Experience 25+	Tenure (in Years)	Industry Tenure (in Years)	Termination
Return (in %)	1										
Sharpe	0.90***	1									
Flow (in %)	-0.02***	-0.03***	1								
Size (in Billions)	0.00	0.03***	-0.10***	1							
Age (in Years)	0.00	0.04***	-0.31***	0.49***	1						
Expense (in %)	0.00	-0.04***	0.02***	-0.36***	-0.16***	1					
Team Size	0.00	0.01**	-0.03***	0.11***	0.01	-0.10***	1				
Experience25+	0.02***	0.04***	-0.03***	0.11***	0.13***	-0.03***	0.14***	1			
Tenure (in Years)	0.02***	0.04***	-0.14***	0.22***	0.47***	-0.04***	-0.11***	0.27***	1		
IndustryTenure (in Years)	0.03***	0.07***	-0.09***	0.22***	0.27***	-0.10***	0.27***	0.61***	0.45***	1	
Termination	-0.02***	-0.02***	-0.04***	0.02***	0.02***	-0.02***	0.31***	0.03***	-0.09***	0.08***	1

Table 2. Difference in Remuneration Incentive between SRFs and CFs

This table reports the results of flow-performance relation using a piecewise linear regression estimation with year dummies. The dependent variable is *Flow*, the net fund flow percentage measured by the change in TNA excluding growth in TNA due to fund returns. All explanatory variables are lagged by a one-year period. Three performance variables are defined as $Low_{i,t-1}=min(0.2, Rank_{i,t-1})$, $Mid_{i,t-1}=min(0.6, Rank_{i,t-1}-Low_{i,t-1})$,, and $High_{i,t-1}=Rank_{i,t-1}-Low_{i,t-1}-Mid_{i,t-1}$; *Flow* is the fund flow percentage lagged by one year. *StdDev* is computed as the annualized standard deviation of fund monthly returns. *Expense* is calculated by dividing the fund's operating expenses by the average dollar value of its assets under management. *Size* is the logged assets under management. *Age* is the logged number of year the fund has incepted. *Family Size* is the logged total assets under managements of funds that belong to the same fund family. The last two rows report the number of observations and the adjusted R^2. Standard errors are clustered at the fund level and t-statistics are reported in parentheses. The last column presents the p-value of Wald tests of the difference between High and Low coefficients by groups of funds. The symbols $*$, $**$, and $***$ denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	All:1998-2016		Pre-GFC: 1998-2006		GFC: 2007-2009		Post-GFC: 2010-2016	
	SRF	CF	SRF	CF	SRF	CF	SRF	CF
Low(t-1)	0.788	1.012***	-0.811	1.262***	0.393	1.075***	1.407***	0.863***
	(1.52)	(7.59)	(-0.68)	(4.62)	(0.65)	(4.01)	(2.65)	(5.55)
Mid(t-1)	0.465***	0.359***	0.858*	0.510***	0.703***	0.282***	0.185*	0.260***
	(3.56)	(11.49)	(1.98)	(7.71)	(3.37)	(5.35)	(1.82)	(7.26)
High(t-1)	3.395***	2.546***	4.463*	3.522***	3.514**	2.509***	2.606***	1.695***
	(3.98)	(14.11)	(1.82)	(9.76)	(2.36)	(6.40)	(3.47)	(9.19)
Flow(t-1)	0.304***	0.132***	0.127*	0.117***	0.339***	0.110***	0.489***	0.212***
	(3.66)	(10.04)	(1.76)	(6.48)	(7.08)	(6.49)	(12.50)	(15.05)
StdDev(t-1)	-3.180*	-0.782*	1.249	0.451	-0.394	-1.397	-5.999**	-2.864***
	(-1.73)	(-1.79)	(0.38)	(0.79)	(-0.11)	(-1.07)	(-2.20)	(-3.86)
Expense(t-1)	0.592	-7.911***	1.433	-15.09***	-31.48***	-4.620	-0.332	-3.500**
	(0.08)	(-5.46)	(0.09)	(-5.60)	(-3.78)	(-1.63)	(-0.05)	(-2.19)
Size(t-1)	-10.90***	-11.16***	-19.07***	-16.35***	-16.66***	-10.20***	-4.193***	-7.032***
	(-4.21)	(-13.21)	(-4.00)	(-9.62)	(-5.30)	(-6.02)	(-2.68)	(-9.61)
Age(t-1)	-2.092	-9.826***	5.047	-9.036***	6.741	-7.576***	-3.452	-7.589***
	(-0.63)	(-8.28)	(0.57)	(-3.95)	(1.60)	(-4.72)	(-1.28)	(-6.82)
Family Size(t-1)	2.782	3.920***	8.671*	5.778***	4.910***	4.680***	-1.177	2.150***
	(1.29)	(8.65)	(1.73)	(6.55)	(2.75)	(4.88)	(-0.91)	(4.84)
Constant	25.60	14.78*	-76.74	-7.970	-1.277	-36.19**	89.12*	28.72***
	(0.55)	(1.65)	(-0.82)	(-0.46)	(-0.04)	(-2.17)	(1.89)	(3.19)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1100	28716	320	10812	225	5862	555	12042
Adjusted R2	0.372	0.228	0.220	0.207	0.621	0.313	0.542	0.245
Wald Test High=Low (p-value)	0.0053	<0.000	0.0156	<0.000	0.0398	0.0007	0.1493	0.0002

Table 3. Difference in Termination Risk between SRFs and CFs

This table presents the results of the probability of termination using logit regressions with year dummies. The dependent variable is *Termination*, a variable that equals to the proportion of fund managers relative to the total team size being terminated during a given year. All explanatory variables are lagged by a one-year period. *Return* is the cumulative return of a fund over the twelve months in a given year. *Age* is the logged number of years the fund has incepted. *Size* is the logged assets under management. *Tenure* measures the average length of time that a manager has been since the inception of a mutual fund. *Team Size* is the total number of fund managers in a fund. *Experience25+*, is a dummy variable which takes the value of one if the manager's industry experience is 25 years old or greater, and zero otherwise. The last row reports the number of observations. The standard errors of the estimates are corrected for clustering at the fund level and t-statistics are reported in parentheses. The symbols ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	All:1998-2016		Pre-GFC: 1998-2006		GFC: 2007-2009		Post-GFC: 2010-2016	
	SRF	CF	SRF	CF	SRF	CF	SRF	CF
Return(t-1)	-0.0256**	-0.0168***	-0.0142	-0.0110***	-0.0373	-0.0200***	-0.0518**	-0.0349***
	(-2.44)	(-10.76)	(-1.16)	(-6.03)	(-1.43)	(-4.71)	(-2.42)	(-9.74)
Age(t-1)	0.163	0.143***	-0.441*	0.103***	0.379	0.214***	0.511***	0.149***
	(1.33)	(6.55)	(-1.86)	(2.98)	(1.40)	(4.65)	(2.68)	(4.10)
Size(t-1)	-0.0432	-0.0552***	0.221**	-0.0311**	-0.225*	-0.0876***	-0.116	-0.0572***
	(-0.83)	(-6.30)	(2.44)	(-2.22)	(-1.73)	(-4.55)	(-1.45)	(-4.06)
Tenure(t-1)	-0.156	-0.161***	-0.0191	-0.133***	0.0615	-0.215***	-0.264	-0.158***
	(-1.13)	(-6.66)	(-0.08)	(-3.60)	(0.21)	(-4.13)	(-1.21)	(-3.82)
TeamSize(t-1)	1.062***	0.772***	0.397	0.572***	1.378***	0.878***	1.306***	0.876***
	(8.99)	(34.61)	(1.55)	(14.89)	(4.88)	(18.60)	(7.82)	(25.29)
Experience25+	-0.205	-0.0162	-1.444	0.111	-0.939	-0.370*	-0.0752	-0.0358
	(-0.78)	(-0.25)	(-1.20)	(0.82)	(-0.96)	(-1.83)	(-0.25)	(-0.45)
Constant	-2.160*	-1.119***	-5.860***	-1.470***	0.570	-0.569*	0.226	-0.347
	(-1.92)	(-6.47)	(-3.47)	(-5.80)	(0.28)	(-1.69)	(0.17)	(-1.35)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1217	32610	392	13241	239	6389	586	12980
Pseudo R2	0.116	0.055	0.081	0.028	0.153	0.074	0.167	0.072

Table 4. Incentives and Risk Shifting Behaviour

This table presents the results of estimating the determinants of fund risk adjustments using an ordinary least squares (OLS) estimation with year dummies. The dependent variables, $\Delta\sigma$, are defined as in Eq. (1) All explanatory variables are lagged by one-a year period. *Remuneration* is the flow-performance sensitivity estimated using the fund flow-sensitivity to prior fund returns using 36 rolling month regression. *Termination* is the estimated probability of termination risk obtained from the coefficients in Table 3. *Return* measures the cumulative return of a fund over the twelve months in a year. *StdDev* is the standard deviation of returns over the year. *Size* is the logged assets under management. *Tenure* is the average number of years fund managers work in a fund. *Expense* is calculated by dividing the fund total operating expenses by the average dollar value of its assets under management. The last two rows report the number of observations and the adjusted R^2. The standard errors of the estimates are corrected for clustering at the fund level and t-statistics are reported in parentheses. The symbols $*$, $**$, and $***$ denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	All:1998-2016		Pre-GFC: 1998-2006		GFC: 2007-2009		Post-GFC: 2010-2016	
	SRF	CF	SRF	CF	SRF	CF	SRF	CF
Remuneration(t-1)	0.174	-0.0650**	-0.278	0.0264	0.495	-0.158**	0.112	-0.00174
	(1.12)	(-2.02)	(-0.78)	(0.60)	(1.39)	(-2.48)	(0.47)	(-0.03)
Termination(t-1)	-4.998**	-3.779***	13.22**	11.87***	-17.19***	-15.15***	-7.185**	-6.121***
	(-2.02)	(-6.97)	(2.65)	(14.11)	(-2.98)	(-7.06)	(-2.56)	(-7.25)
Return(t-1)	-0.000851	-0.000116	0.0199	0.0119***	-0.0542***	-0.0317***	0.00862	0.0159***
	(-0.12)	(-0.09)	(1.46)	(7.15)	(-2.78)	(-7.47)	(1.22)	(10.93)
StdDev(t-1)	-0.00535	0.0163*	-0.00854	-0.0747***	-0.0856	0.173***	-0.00592	0.0173
	(-0.08)	(1.93)	(-0.06)	(-4.67)	(-0.60)	(5.38)	(-0.15)	(1.56)
Size(t-1)	-0.0135	-0.0219***	0.110**	0.104***	-0.0888	-0.0977***	-0.0464*	-0.0575***
	(-0.50)	(-4.03)	(2.22)	(11.96)	(-1.25)	(-4.52)	(-1.72)	(-7.66)
Tenure(t-1)	-0.0452	-0.0644***	0.228*	0.0691***	-0.407**	-0.225***	-0.0218	-0.0641***
	(-0.77)	(-5.46)	(1.79)	(3.84)	(-2.24)	(-6.61)	(-0.32)	(-4.08)
Expense(t-1)	0.201*	0.0889***	0.302*	0.0564**	0.655**	0.240***	-0.0759	0.0326
	(1.95)	(4.83)	(1.69)	(2.12)	(2.31)	(4.75)	(-0.74)	(1.37)
Constant	3.940***	3.526***	0.0722	0.686***	4.622**	4.332***	1.018	0.643**
	(4.03)	(21.73)	(0.04)	(2.83)	(2.20)	(7.14)	(1.17)	(2.46)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	873	22166	196	6053	166	4895	511	11218
Adjusted R2	0.869	0.843	0.701	0.757	0.901	0.856	0.901	0.879

Table 5. Risk-Shifting Consequences

This table presents the results of estimating the consequences of fund risk adjustments using an ordinary least squares (OLS) estimation with year dummies. The dependent variables, *Alpha*, are defined as the risk-adjusted return using the market model. All explanatory variables are lagged by a one-year period. $\Delta\sigma$, the risk-shifting measures are defined as in Eq. (2). *Stdev* is the standard deviation of returns over the twelve months of a year. *Size* is the logged assets under management. *Expense* is calculated by dividing the fund total operating expenses by the average dollar value of its assets under management. *Turnover* is measured by taking the minimum of new securities sales or purchases, divided by the total net asset value of the fund. *Flow* is measured as the growth rate based on changes of TNA and adjusted for returns. *Family Size* is the logged assets under management of all funds of the same fund family. The last two rows report the number of observations and the adjusted R^2. The standard errors of the estimates are corrected for clustering at the fund level and t-statistics are reported in parentheses. The symbols $*$, $**$, and $***$ denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	All:1998-2016		Pre-GFC: 1998-2006		GFC: 2007-2009		Post-GFC: 2010-2016	
	SRF	CF	SRF	CF	SRF	CF	SRF	CF
$\Delta\sigma_{(t-1)}$	0.807	4.402***	4.621	10.45***	5.950***	4.548***	-4.957**	-3.510***
	(0.51)	(13.63)	(1.52)	(16.29)	(2.65)	(11.05)	(-2.26)	(-12.56)
Alpha $_{(t-1)}$	0.661***	0.687***	0.584***	0.641***	0.728***	0.748***	0.709***	0.763***
	(17.39)	(86.86)	(9.46)	(56.70)	(13.34)	(41.70)	(14.99)	(114.81)
StdDev $_{(t-1)}$	2.419	1.154***	6.697**	4.203***	-3.709*	-1.829***	-1.238	-2.936***
	(1.39)	(2.90)	(2.13)	(6.61)	(-1.77)	(-3.23)	(-0.70)	(-6.71)
Size $_{(t-1)}$	-1.130	-1.107***	-1.031	-1.531***	-3.516*	-0.994***	-0.0803	-1.107***
	(-1.31)	(-5.79)	(-0.42)	(-3.17)	(-1.76)	(-3.29)	(-0.11)	(-6.43)
Expense $_{(t-1)}$	-8.463*	-4.717***	-7.653	-3.214*	-9.494	-2.620**	-5.382*	-5.203***
	(-1.95)	(-6.49)	(-0.69)	(-1.79)	(-1.58)	(-2.27)	(-1.83)	(-8.04)
Turnover $_{(t-1)}$	-0.0569**	-0.0351***	-0.133	-0.0615***	0.0222	0.0213**	-0.0593*	-0.0180***
	(-2.05)	(-5.72)	(-1.62)	(-4.63)	(1.01)	(2.39)	(-1.93)	(-2.81)
Flow $_{(t-1)}$	0.00911	0.0171***	-0.0223	0.0305***	0.0192	-0.00713*	0.00169	-0.0132***
	(0.46)	(2.69)	(-0.51)	(4.18)	(1.46)	(-1.75)	(0.04)	(-3.15)
FamilySize $_{(t-1)}$	-0.563	0.535***	-2.859	-0.438	-0.582	0.679***	0.878	1.052***
	(-0.61)	(3.83)	(-1.16)	(-1.13)	(-0.45)	(2.98)	(1.57)	(7.49)
Constant	76.71**	61.10***	102.3*	72.36***	97.02***	7.980	-5.267	22.94***
	(2.61)	(12.97)	(1.68)	(7.47)	(3.00)	(1.39)	(-0.22)	(5.35)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	975	25069	244	7738	184	5437	547	11894
Adjusted R2	0.587	0.621	0.494	0.560	0.592	0.586	0.668	0.713

Appendix: Matching procedure

For robustness and to ensure that the findings are not driven by selection bias, I tabulate the results using a matched sample. I adopt a matching procedure following Bollen (2007). The main results remain qualitatively similar with those using the entire sample funds. One SRF is matched with five CF based on time, age, size, and risk profiles.[14] Initially, to ensure that the funds experience similar macroeconomic conditions, only CFs whose first and last year are within three years of the first and last years of the SRF are selected. To control for age, the age of CFs must be no more than three years different from that of the SRF. For each SRF, only CFs that are from different fund families are selected. Then all eligible CFs for a given SRF are scored based on the distance between the CF's size and γ coefficients and the SRF's size and γ coefficients. The distance measures how close a SRF i is to each of the CF j using the following algorithm:

$$Distance_{i,j} = \frac{(\gamma_{MKT,i}-\gamma_{MKT,j})^2}{\sigma^2_{MKT}} + \frac{(\gamma_{SMB,i}-\gamma_{SMB,j})^2}{\sigma^2_{SMB}} + \frac{(\gamma_{HML,i}-\gamma_{HML,j})^2}{\sigma^2_{HML}} + \frac{(\gamma_{UMD,i}-\gamma_{UMD,j})^2}{\sigma^2_{UMD}} + \frac{(TNA_i-TNA_j)^2}{\sigma^2_{TNA}},$$

where each of the γ coefficients are derived from the Fama-French-Carhart four-factor model,[15] *MKT* represents the CRSP market portfolio; *SMB* represents the difference in returns across small and large size portfolios; *HML* is the difference in returns between high and low book-to-market equity portfolios; *UMD* is the difference in return between winners and loser portfolio based on momentum. *TNA* is the maximum size of a fund's total net assets during the fund's lifetime, and σ is the cross-section standard deviation of the γ coefficients and TNA.

[14] There are several studies using Bollen (2007)'s matching procedure (Białkowski and Starks, 2016; Nofsinger and Varma, 2014; Renneboog, Ter Horst, and Zhang, 2008b)

[15] The Fama-French three factors and momentum factor were obtained from Ken French's Web site at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/.