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RISK SHIFTING & MUTUAL FUND PERFORMANCE

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Risk Shifting & Mutual Fund Performance

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Abstract – Mutual funds change their risk levels significantly over time. Risk shifting might be caused by ill-motivated trades of unskilled or agency-prone fund managers who trade to increase their personal compensation. Alternatively, risk shifting might occur when skilled fund managers trade to take advantage of their stock selection and timing abilities. This paper investigates the performance consequences of risk shifting and sheds light on the mechanisms and the economic motivations behind the risk shifting behavior. Using a holdings-based measure of risk shifting, we find that funds that increase risk perform worse than funds that keep stable risk levels over time, suggesting that risk shifting is either an indication of inferior ability or is motivated by agency issues.

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INTRODUCTION

Mutual funds change their total risk exposure substantially over time. Using the disclosed holdings of a sample of 2,335 U.S. equity funds over the period between 1980 and 2006, we document that 27.1% of equity mutual funds change their annualized volatility by more than 2.5% in a given quarter, and 9.6% of funds change their volatility by more than 5%. These changes are significant given that their average long-term volatility level is only 17.9%.

Mutual funds might change their risk levels for several reasons. On the one hand, agency issues in delegated portfolio management might induce fund managers to strategically change their risk levels to increase the expected money inflows to the fund (e.g., Brown, Harlow, and Starks (1996) and Chevalier and Ellison (1997)) or to manipulate their performance numbers (e.g., Goetzmann, Ingersoll, Spiegel, and Welch (2007)). On the other hand, fund managers might change their risk levels to take advantage of their stock selection and timing abilities (e.g., Daniel, Grinblatt, Titman, and Wermers (1997)). While the change in portfolio risk is deliberate for either agency-induced or timing-motivated trades, the risk change might also be an unintended consequence when fund managers change their portfolio composition to utilize their stock selection ability.

Regardless of the source of risk shifting, mutual fund investors are primarily concerned about the future risk-adjusted performance of their funds. Surprisingly, while an extensive literature studies the risk taking incentives of fund managers, no prior paper asks if risk shifting is a signal of superior investment ability or an indication of ill-motivated trades. Our paper fills this gap by investigating the performance consequences of risk shifting. If agency problems are the main cause behind risk shifting, then we should not expect a superior performance for risk shifting funds. To the extent that opportunistic risk shifting causes trading costs, constrains the investment opportunity set, and distracts fund managers from their goal of investing in the most promising securities, we expect risk shifters to perform poorly. In addition, if mutual funds with inferior ability are more prone to shift risk, then we should also expect worse performance for risk shifting funds. Alternatively, if risk shifting is an indication of skilled fund managers adjusting their portfolio composition to take advantage of stock selection or timing ability, then we should expect risk shifting funds to exhibit superior performance.

RISK SHIFTING MEASURE

Mutual funds can change the total risk of their portfolio by holding assets with different risk properties or by changing the diversification level of their overall portfolio. To capture the risk shifting behavior of mutual funds, we examine their portfolio holdings. We measure risk shifting of a mutual fund f at time t by comparing the current holdings volatility based on the fund's most recently disclosed positions with the past realized volatility based on the fund's realized returns.

The past realized volatility of fund f at time t is estimated as the sample standard deviation of the actual fund returns over the prior 36 months. It captures the total risk of the actual positions. The realized volatility is identical to the current holdings volatility if a fund maintains constant portfolio weights over the prior 36 months. The risk shifting measure RS is positive if the most recently disclosed holdings exhibit a higher volatility than the actual fund holdings over the prior 36 months and is negative otherwise. Thus, a positive risk shifting measure indicates that a

mutual fund increases the portfolio risk, which is achievable either by holding assets with higher risk levels or by concentrating its portfolio more.

Most previous papers analyze risk shifting by comparing the standard deviations of the returns of mutual funds over two non-overlapping time periods.4 Comparing risk levels of a fund over two non-overlapping time periods may capture the exogenous changes in market conditions rather than the intentional changes in portfolio risk, especially during periods of dramatic market movements. By using identical time periods to estimate both the current holdings volatility and the realized volatility for a fund, our measure of risk shifting is designed to capture the changes in risk levels induced by changes in the portfolio composition and is unaffected by changes in market conditions.

DATA AND SUMMARY STATISTICS

This section explains the data sources and describes the main characteristics of mutual funds in our sample.

- **Sample Selection** : For our empirical analysis, we merge the CRSP Survivorship Bias Free Mutual Fund Database with the Thomson Financial CDA/Spectrum holdings database and the CRSP stock price data using the MFLINKS file based on Wermers (2000) and available through the Wharton Research Data Services. Our sample covers the time period between 1980 and 2006. The CRSP mutual fund database includes information on fund returns, total assets under management, different types of fees, investment objectives, and other fund characteristics. The Thomson Financial database provides long positions in domestic common stock holdings of mutual funds. The data are collected both from reports filed by mutual funds with the SEC and from voluntary reports generated by the funds. During most of our sample period, funds are required by law to disclose their holdings semi-annually. Nevertheless, about 78% of the observations are from the most recent quarter and only 3% of the holdings are more than two quarters old.

- **Summary Statistics** : Summary statistics of the main fund attributes. Our sample includes 2,335 distinct funds and 184,519 fund-month observations with a valid risk shifting measure RS. The number of funds ranges from 141 (April 1983) to 1,559 (October 2006). Since we need 36 months of prior fund return data to compute the risk shifting measure, we lose the first three years of the return histories of all mutual funds. Thus, our final sample covers the period between 1983 and 2006.

The average investor return of mutual funds in our sample equals 0.83% per month. We compute the gross holdings return based on the most recently disclosed quarter-end Thomson equity holdings and the asset allocation weights from CRSP. The holdings database includes only long positions in domestic common stocks and excludes other non-equity holdings. Since we focus our analysis on equity mutual funds, these disclosed holdings compose the vast majority of fund assets (91.28%), with the remaining assets invested in cash (6.26%) and other non-equity holdings (2.46%) including bonds, preferred stocks, and other securities. We proxy for these asset returns using published indices. For bonds and preferred stocks we use the total return of the Lehman Brothers Aggregate Bond Index; for cash holdings and other assets we use the Treasury bill rate. The gross holdings return has a mean of 0.91% per month and a correlation of 95.5% with the net investor return across the mutual funds in our sample.

CHARACTERIZATION OF RISK SHIFTING

This section discusses the characteristics of risk shifters and clarifies the main mechanisms through which mutual funds shift risk.

- **Characteristics of Risk Shifters** : To identify the characteristics of risk shifters, we sort all mutual funds in each quarter into five portfolios according to the most recent RS measure and compute average characteristics of these funds. Funds in Portfolio 1 (5) decrease (increase) risk by more than 2.5% per year and compose 14% (13%) of our sample, whereas funds in Portfolio 3 change risk by less than 1% and compose 41% of our sample.

The current holdings volatility and the realized volatility contribute asymmetrically to the RS measure across different RS portfolios. Funds in Portfolio 5 exhibit high current holdings volatility, and their realized volatility is not very different from the mean realized volatility. On the other hand, funds in Portfolio 1 have high realized volatility, and their current holdings volatility is not substantially different from the mean holdings volatility. Most fund characteristics exhibit a U or inverse-U pattern, which indicates that funds that increase risk share similar characteristics to funds that decrease risk. Funds that shift risk are smaller, younger, charge higher expense ratios, and have higher turnover than funds with more consistent risk levels.

- **Mechanisms of Risk Shifting** : Mutual funds have several potential mechanisms through which they change the riskiness of their portfolios. First, they can change the composition between equity holdings and cash holdings. Second, within their equity holdings, funds can change their exposure to systematic risks by switching between low beta stocks and high beta stocks. Third, funds can change their idiosyncratic risk

exposures by changing the number of stocks or the concentration in particular industries and styles.

Funds with more consistent risk exposures have lower market betas despite holding smaller cash positions than funds which shift risk. Risk shifters have higher initial levels of idiosyncratic volatility and hold more concentrated portfolios as reflected by the lower number of stocks and the higher industry concentration index. Risk shifters also differ in their style exposure from funds with more consistent risk exposures as they focus their holdings on small, growth, and momentum stocks.

CROSS-SECTIONAL DIFFERENCES IN RISK SHIFTING

In this section we investigate whether the propensity to shift risk and the performance consequences of risk shifting differ across funds with different characteristics.

- **Motivations for Risk Shifting** : The literature suggests that several fund characteristics affect their flow-performance relation and hence may affect the risk taking incentives of funds. In addition, these funds might differ in the ability level of their fund managers. The fund characteristics that we consider include expense ratio, fund age, family size, and past performance. For each characteristic we divide mutual funds in each period into two groups depending on whether the fund characteristic is above or below the median value. In a second step, we further divide the two groups of funds into five portfolios according to their most recent risk shifting measure. The first group of columns in Table 8 summarizes the frequency distribution of funds across the two groups and the last group of columns reports the subsequent Carhart alphas for the ten mutual fund portfolios.

Gil-Bazo and Ruiz-Verdu (2009) find that high-expense funds do not perform better than low-expense funds, even before subtracting expenses. They interpret this evidence as an agency problem in which high-expense funds target naive investors who are not responsive to expenses. Thus, high-expense funds might also have bigger incentives to manipulate their risk levels by opportunistically shifting risk. Consistent with this hypothesis, we report in Panel A of Table 8 that 7.36% of funds charging above-median expense ratios belong to Portfolio 5, whereas only 5.27% of funds charging below-median expense ratios belong to Portfolio 5. We also find that risk shifting is more costly for high-expense funds. For example, high-expense funds in Portfolio 5 exhibit a Carhart alpha of -24 basis points per month, which is statistically significant at the 1% level, whereas low-expense funds in Portfolio 5 have an insignificant alpha of -10 basis points per month. The performance difference between high- and low-expense risk shifters (at 14 basis points per month) is substantially higher than the performance difference between all high- and low-expense funds (at only 3 basis points per month).

- **Trading Costs** : In this section we consider whether the poor performance of risk shifters is caused by the trading costs to implement risk shifting strategies or to accommodate fund flows. Since we analyze only the future performance of funds after computing the risk shifting measure, our performance measures are not contaminated by the direct trading costs to implement the current risk shifting strategy. However, since risk shifting is persistent, these funds might also have higher trading costs in the future. We use turnover as a proxy for trading costs since it captures the majority of trading costs as described by Chalmers, Edelen, and Kadlec (1999). If trading costs are the main cause of the poor performance of risk shifters, then we should observe that the relation between performance and risk shifting is particularly pronounced for high turnover funds. We sort funds into subgroups with different turnover and risk shifting measures, following the procedure in Section 7.1, and report the frequency distribution and the Carhart alphas in Panel A of Table 9. Surprisingly, we find that increasing risk has worse performance consequences for funds with low turnover than for funds with high turnover. For example, the performance difference between Portfolios 5 and 3 is -25 basis points per month for funds with low turnover and only -8 basis points for funds with high turnover. Thus, direct trading costs are unlikely the main reason behind the poor performance of risk shifters.

REVIEW OF LITERATURE & RESEARCH

Mutual funds attracted the interests of academicians, researchers and financial analysts mostly since 1986. A number of articles have been published in financial dailies like economic times, business line and financial express, periodicals like capital market, Business India etc., and in professional and research journals. Literature Review on performance evaluation of mutual fund is enormous. Various studies have been carried out in India and abroad to evaluate the performance of mutual funds schemes from time to time.

Jensen (1968) developed a classic study; an absolute measure of performance based upon the

Capital Asset Pricing Model and reported that mutual funds did not appear to achieve abnormal performance when transaction costs were taken into account.

John McDonald (1974) examined the relationship between the stated fund objectives and their risks and return attributes. The study concludes that, on an average the fund managers appeared to keep their portfolios within the stated risk. Some funds in the lower risk group possessed higher risk than funds in the most risky group.

James R.F. Guy (1978) evaluated the risk-adjusted performance of UK investment trusts through the application of Sharpe and Jensen measures. The study concludes that no trust had exhibited superior performance compared to the London Stock Exchange Index.

Sowmya Guha, Deb & Ashok Banerjee (2009) in the article entitled "Downside risk analysis of Indian equity MFs A value at risk approach" put forward downside risk lends of Indian equity MF using a VaR measure. Three parametric models random walk, moving average, exponentially weighted moving average and one non parametric model were employed to predict the VaR of a sample of equity MFs in India in a rolling basis and actual changes in NAV registered by the funds were compared with the estimated VaR post facto. The results indicated presence of considerable downside risk for an investor in equity MFs for the study period under consideration. The study also tested the robustness of the models using two popular back testing approaches.

CONCLUSIONS

Mutual funds shift risk significantly over time. Risk shifting per se does not necessarily hurt fund investors. As long as risk shifting is well-known and has no performance consequences, investors can form efficient portfolios by adjusting their allocation to the funds based on the expected ability and risk levels. However, if investors are not fully aware of the risk shifting behavior or if the changing risk level hampers their ability to assess fund performance, then individual portfolios are less likely to be efficient.

In addition, if risk shifting is detrimental to fund performance, then even if investors are fully aware of the risk shifting behavior, they are better off avoiding funds that are prone to switching risk over time. Our paper documents that risk shifting funds perform worse than funds that keep stable risk levels over time. We also find that funds with larger incentives to shift risk are more likely to increase risk and perform particularly poorly after increasing risk.

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