THE PERFORMANCE CHARACTERISTICS OF HYBRID MUTUAL FUNDS

Zakri Bello[1]
Email: belloz@ccsu.edu

ABSTRACT

This study investigates the sample characteristics and investment performance of three categories of hybrid mutual funds and the extent to which hybrid funds are a hedge against inflation. The aggressive allocation category held the largest positions in stocks, was smaller in size, and, on average, the least diversified. The conservative allocation category held the smallest positions in stocks but was the most diversified. On average, hybrid mutual funds had diversification advantages over an unmanaged portfolio of stocks; however, the funds under-performed the stock market from April 1993 to March 2013 and they had significant tracking errors. The aggressive allocation category had the worst investment performance. Finally, the average hybrid mutual fund was a poor hedge against inflation. The aggressive allocation category was the best inflation hedge and the conservative category was the worst.

Keywords: hybrid mutual funds, performance evaluation, inflation hedge, portfolio allocation.

JEL Codes: G11, G12, G20, G23.

I. INTRODUCTION

The Capital Asset Pricing Model (CAPM) specifies that investors should require higher expected rates of return on riskier assets. Historical rates of return on various investment securities generally support the CAPM theory. It is well known that common stocks are riskier than preferred stocks which, in turn, are riskier than

1. Zakri Bello, Ph.D., Central Connecticut State University, 1615 Stanley Street, New Britain, CT 06050 (860) 832-3262

corporate bonds. Accordingly, historical data show that the rates of return provided by riskier common stocks have generally been higher than those provided by safer securities. According to Reilly and Norton (2006), "the data show that expectation has generally been met. Riskier stocks have higher levels of average return than safer bonds and Treasury bills."

Furthermore, Ibbotson et al. (1985), Soldofsky (1984), and Reilly and Wright (2004) are all in agreement that equity securities have historically provided higher rates of return than cash and fixed income securities. Ibbotson et al. (1985), who focused on the 1959 to 1984 period, and on aggregate values and returns on equities, bonds, cash, and other assets from the U.S. and several other countries, found that equities provided higher returns than cash and bonds. Soldofsky (1984), on the other hand, focused on the 1971 to 1982 period and studied several U.S. asset classes and concluded that the risk-return relationship on these assets is indeed positive. Michaud et al. (1996) focused on the 1976 to 1995 period and showed that a globally diversified equity portfolio would provide higher return for the same level of risk than a domestically diversified equity portfolio, as suggested by Harry Markowitz's portfolio theory. This is because of the significant expansion of investment opportunities that is possible when foreign stocks are combined with domestic stocks.

Moreover, Malkiel and Xu (1997) reported that, since 1926, data from Ibbotson Associates confirm that U.S. stocks have provided greater return than that provided by safer securities such as Treasury bills. They observed that, over the long run, it is not possible to achieve exceptional returns without accepting substantial risk; however, Malkiel and Xu (1997) also observed that theory and practice do not always accord. Although the CAPM specifies that the higher the beta of an individual stock or portfolio, the higher the return an investor should expect, Fama and French (1992) have demonstrated that from 1963 to 1990, returns and beta appeared to be completely unrelated, and that beta is not likely to be an effective predictor of future returns. Reilly and Wright (2004) arrived at similar conclusions.

Practitioners generally agree that, in the long run, stocks outperform other asset classes, but that stocks are significantly more volatile than bonds. Accordingly, Schultz (2002) reported that a Moody's Investor Service study had found that corporate bonds have outperformed stocks from 1990 to 2002 when the volatility of market prices was factored in. Nolte (2011) also reported that, beginning in 2011, bonds began to outperform stocks.

A few academic studies have focused on hybrid mutual funds. Comer (2006) examined the timing performance of hybrid mutual funds from 1981 to 1991, and from 1992 to 2000. He found that the inclusion of bond indices and a bond timing variable in a multi-factor Treynor-Mazuy model framework led to substantially different conclusions. The multi-factor model found less stock-timing ability in a subset of their sample from 1992 to 2000. Similarly, Comer et al. (2009a) examined whether explicitly controlling for fixed-income exposure of hybrid mutual funds effected conclusions

drawn in performance assessment. After extending the Carhart (1997) model to correct for bond holdings, they found that estimates within one of their samples changed from positive to negative during the 1994 to 2005 period. Thus, the absence of bond indices might provide misleading conclusions about the risk-adjusted performance of hybrid mutual funds.

Comer et al. (2009b) examined the value of active management of hybrid mutual funds from 1997 to 2003 and found that hybrid funds do not appear to add value; however, these funds outperformed their style benchmark during poor stock market conditions, which appeared to suggest a hedge-fund-like downside risk protection. Comer (2012) examined the relationship between the allocation strategy, investing style, and performance of hybrid mutual funds and found that funds with higher average equity allocations substantially underperformed more conservative funds, and that funds with higher exposure to the default factor are better performing funds.

Finally, Herrmann and Scholz (2013) found that hybrid mutual funds exhibited significantly negative performance from 1998 to 2009. After decomposing the funds' total performance into in-quarter abnormal performance and style-shifting performance, and after splitting the total style-shifting performance into active and passive components, they found that hybrid funds do not outperform their benchmarks and that these funds exhibit short-term persistence in in-quarter abnormal performance but not in style-shifting abilities.

The objective of the present study is to investigate the performance characteristics of the three groups of hybrid mutual funds: aggressive allocation, moderate allocation, and defensive allocation funds. The three types of hybrid funds mainly differ with regard to the percentage of stocks included in the portfolio, relative to bond and cash contained in the same portfolio. All three categories of hybrid mutual funds "seek to provide both capital appreciation and income by investing in three areas: stocks, bonds, and cash" according to Morningstar, Inc. Aggressive allocation funds hold the largest positions in stocks, and conservative allocation funds hold the smallest positions in stocks.

Hybrid funds invest in several asset classes, including domestic and international stocks, corporate bonds, convertible bonds, preferred stocks, and cash. Hybrid funds may be actively managed or passively managed, and have various investment objectives similar to conventional mutual funds. Types of hybrid funds include asset allocation funds, funds of funds, balanced funds, lifecycle funds, and target date funds. Sponsors of hybrid mutual funds claim that the funds are suitable for those investors that want portfolio diversification within a single fund, because generally the funds have low volatility. The *Economic Times* asserted that an investor should try hybrid funds if they "suffer stock fright," suggesting that these mutual funds have more stable returns than a portfolio of unmanaged stocks.[2]

[2] Http://articles.economictimes.indiatimes.com/2013-02-19/news/

Because, over the long run, the stock market outperforms the bond market, I expect the aggressive allocation mutual fund category to outperform both the conservative and moderate categories on a risk adjusted basis. A secondary objective of the study is to investigate the extent to which a hybrid fund is a hedge against inflation. As shown by Ibbotson, et al. (1985), almost all categories of stocks and bonds have negative slopes when nominal returns on stocks and bonds are regressed against inflation rates, which means that stocks and bonds are poor hedge against inflation. Since mutual funds are professionally managed, based on the fund manager's asset selection and market timing ability, I expect to find that hybrid mutual funds are effectively a better hedge against inflation than an unmanaged portfolio of stocks or bonds.

II. The Data

The sample consists of three categories of hybrid mutual funds: aggressive allocation, conservative allocation, and moderate allocation funds. The study period is April 1993 to March 2013. For the mutual funds identified as "hybrid," I obtained monthly net assets, market capitalization, monthly rates of return, and other data from Morningstar Principia database. Only mutual funds with at least 60 monthly rates of return are included in this study. I then obtained corresponding monthly rates of return on three-month-Treasury bills, Barclays Aggregate Bond index, and the S&P 500 index. Finally, I obtained monthly U.S. inflation rates from the Federal Reserve District Bank of St. Louis.[3] The final sample consists of 1,482 hybrid mutual funds.

A profile of the sample is shown in Table 1. As indicated in the table, aggressive allocation funds held the largest positions in stocks, on average, and conservative allocation funds held the least positions in stocks as I expected. The reverse is true regarding their positions in bonds, with the conservative allocation category holding the largest positions and the aggressive category holding the least positions in bonds.

Furthermore, the moderate allocation category had the largest size, on average, in terms of net assets and market capitalization, followed by the conservative allocation category. The aggressive allocation category, which is smaller in terms of net assets and market capitalization, on average, had the lowest portfolio turnover of 44.9%, which suggests an average holding period of 26.7 months, compared with 16.7 months for the average moderate allocation fund. The aggressive allocation category also appears to be the least diversified as indicated by its smallest holdings and the largest percentage of its portfolio funds invested in the top ten companies it held.

In summary, the more aggressive the hybrid fund (i.e. the larger its positions in stocks), the smaller its size (i.e. net assets or market capitalization), portfolio holdings, and portfolio turnover, and the more concentrated the fund's portfolio is.

[3] http://research.stlouisfed.org/fred2/

Table 1. Sample Characteristics of Hybrid Mutual Funds
April 1993 – March 2013

Variable	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Aggressive :				**Moderate:**		
Nassets ($mm)	254	317.935	986.959	592	882.104	4030.22
Cap ($mm)	214	23482.020	9441.640	559	34300.110	17202.020
Holdings	299	246.231	555.851	691	495.219	959.515
Dstocks %	299	51.372	11.894	691	45.222	12.895
Fstocks %	299	23.735	10.141	691	13.517	9.922
Bonds	299	15.843	6.392	691	30.390	8.345
Cash	299	5.203	4.779	691	6.790	7.030
Turnover	299	44.850	42.231	689	71.724	105.550
Top Ten %	299	67.191	29.076	691	49.974	31.435
Conservative:				**Sample:**		
Nassets ($mm)	416	526.551	2886.590	1262	651.352	3256.180
Cap ($mm)	384	25944.290	11727.160	1157	29525.950	15062.220
Holdings	492	418.650	753.968	1482	419.565	829.646
Dstocks %	492	24.883	10.724	1482	39.710	16.085
Fstocks %	492	9.685	5.454	1482	14.307	10.087
Bonds	492	50.399	11.742	1482	34.098	15.759
Cash	492	9.653	10.101	1482	7.420	8.017
Turnover	490	61.708	163.098	1478	62.967	120.246
Top Ten %	492	64.810	30.144	1482	58.373	31.530

Note:
NASSETS represent the fund's net assets (in millions of dollars); Cap is the fund's market capitalization; DStocks is the percentage of the fund's portfolio invested in domestic common stocks; FStocks is the percentage of the portfolio invested in non-U.S. stocks; Bonds is the percentage of the mutual fund's portfolio invested in bonds; Holdings represent the number of stocks held by the fund; and TOPTEN is the percentage of the mutual fund's portfolio invested in the top-ten stocks it held; Portfolio compositions (percentage stocks, bonds, and cash) do not add up to 100% because other components such as preferred stocks and convertible bonds are not included in the table.

III. THE METHODOLOGY

I measured the performance of each hybrid mutual fund in the sample using two alternative measures of performance: the modified Jensen's Alpha, and the Sharpe Information Ratio. The modified Jensen's Alpha is as follows:

$$r_{pt} = \alpha_p + \hat{\beta}_{p1} r_{mt} + \hat{\beta}_{p2} r_{bt} + e_{pt}, \qquad [1]$$

where, r_{pt} is the excess return on mutual-fund portfolio p, in month t (i.e. the portfolio's monthly return in excess of the corresponding monthly yield on 91-day-Treasury bills); r_{mt} is the excess return on the S&P 500 index in month t; r_{bt} is the monthly excess return on the Barclays Aggregate Bond index in month t; and e_{pt} is the residual return on portfolio p, in month t. Portfolio p's risk-adjusted performance is measured by the alpha, α_p. I measured the risk-adjusted performance again using the Sharpe Information Ratio as suggested by Reilly and Norton (2006) and Goodwin (1998). If "D_t" is the differential return between the portfolio and the benchmark $(r_{pt} - r_{mt})$ in month t, then:

$$S_p = \frac{\bar{D}}{\sigma_D}, \qquad [2]$$

where, $\bar{D}$ is the arithmetic average of the monthly differential returns, i.e. $\bar{D} = \frac{1}{n}\sum_{t=1}^{n} D_t$; σ_D is the standard deviation of the differential returns; and n is the number of monthly returns. For the test of null hypothesis--that the differential returns are zero, on average--the t-statistic is:

$$t = \frac{\bar{D}}{\sigma_D \sqrt{n}}. \qquad [3]$$

The t-statistic has a t distribution with n-1 degrees of freedom.

As with the modified Jensen's Alpha, the Sharpe Information Ratio indicates portfolio performance relative to the fund's benchmark index and lends itself to

statistical testing of significance. However, unlike the Alpha, the Sharpe Information Ratio adjusts for total risk, rather than just systematic risk. This is crucial for performance measurement because previous studies have shown that mutual fund portfolios, on average, contain significant idiosyncratic risks. Reilly and Norton (2006) and Goodwin (1998) argue that the Sharpe Information Ratio is a more general measure of portfolio performance than the traditional Sharpe measure.

Tracking error of the fund's portfolio is calculated as follows:

$$\text{Tracking Error} = \sigma_D \sqrt{12}, \qquad [4]$$

where "12" signifies that the number of return periods in a year is 12 (for monthly returns).[4]

IV. THE RESULTS

The calculated information ratios and alphas for each of the three categories of hybrid mutual funds and for the entire sample are contained in Table 2. As shown in Panel A, the Sharpe information ratio, S_p, for the three hybrid-fund categories and for the entire sample are all approximately -0.060 and statistically not significantly different from zero. Thus the average hybrid fund did not outperform an unmanaged stock portfolio over the study period, which is in accord with Comer (2009b) and Herrmann and Schloz (2013). A small number of individual funds achieved positive performance measures, which were also not statistically significant. Portfolio tracking errors, however, are on average between 9.9 and 5.2 and are significant. Not surprisingly, since the tracking errors were computed using the S&P 500 index as a benchmark, the Aggressive category had the lowest tracking error.

[4] See Reilly and Brown (2009) for the measurement of tracking error.

Table 2.The Performance of Hybrid Mutual Funds April 1993 – March 2013

Variable	N	Mean	Std. Dev.	N	Mean	Std. Dev.
			Panel A: Sharpe Information Ratios			
Aggressive:				**Moderate:**		
S_p	299	-0.064	0.065	684	-0.063	0.054
T-Statistics	299	-0.004	0.004	684	-0.004	0.004
Tracking Error	299	5.163	1.759	684	6.830	1.436
Conservative:				**Sample:**		
S_p	491	-0.052	0.045	1472	-0.059	0.054
T-Statistics	491	(-0.003)	(0.003)	1472	(-0.004)	(0.004)
Tracking Error	491	9.904	1.852	1472	7.515	2.444
			Panel B: Jensen's Alphas			
Aggressive:				**Moderate:**		
$\hat{\alpha}_p$	299	-0.069	0.100	684	-0.040	0.122
$\hat{\beta}_{p1}$	299	0.846	0.107	684	0.649	0.093
$\hat{\beta}_{p2}$	299	0.156	0.140	684	0.295	0.160
Conservative:				**Sample:**		
$\hat{\alpha}_p$	491	-0.049	0.091	1474	-0.049	0.109
$\hat{\beta}_{p1}$	491	0.427	0.126	1474	0.615	0.186
$\hat{\beta}_{p2}$	491	0.480	0.179	1474	0.329	0.202

Note:

Sharpe Information Ratios (S_p) and associated t statistics, and tracking errors are calculated using equations [2], [3], and [4] as follows:

$$S_p = \frac{\bar{D}}{\sigma_D} \qquad (2)$$

$$t = \frac{\bar{D}}{\sigma_D \sqrt{n}} \qquad (3)$$

$$TE = \sigma_D \sqrt{12} \qquad (4)$$

Modified Jensen's Alphas were computed using equation (1), as follows:

$$r_{pt} = \alpha_p + \hat{\beta}_{p1} r_{mt} + \hat{\beta}_{p2}\, r_{bt} + e_{pt} \qquad (1)$$

All variables are as defined in the "methodology" section.

Furthermore, I measured the Jensen's Alphas for each fund in the sample and then average the alphas by fund category and across the entire sample. These averages, shown in Panel B of Table 2, indicate that the aggressive allocation category has the highest slope on S&P 500 index ($\hat{\beta}_{p1}$) and the lowest slope on Barclays Aggregate Bond Index ($\hat{\beta}_{p2}$) on average, which is not surprising since the aggressive category had the largest positions in stocks and lowest positions in bonds. The conservative allocation category held the largest positions in bonds and, accordingly, it had the largest slope on the bond index ($\hat{\beta}_{p2}$) and the lowest slope on the S&P 500 index ($\hat{\beta}_{p1}$). The risk adjusted portfolio performance as measured by Alpha is negative for all categories of hybrid funds and for the sample as a whole. This finding agrees with Comer (2009b) and Herrmann and Schloz (2013). The aggressive allocation category had the worst performance during the 20 year study period. This is in accord with Comer (2012). The alphas for the conservative allocation and moderate allocation categories did not differ significantly.

In summary, the risk adjusted performance during the study period was negative for all categories of hybrid mutual funds whether performance is measured using the modified Jensen's Alpha or the Sharpe Information Ratio. The aggressive allocation category underperformed the conservative category irrespective of the measure of performance.

A. Hybrid Funds as Inflation Hedge

To investigate the effect of inflation on mutual fund returns, I regressed monthly mutual fund returns on monthly U.S. inflation rates separately for each hybrid fund category, using the following regression equation:

$$R_{pt} = \alpha_p + b_p(Inflation_t) + e_{pt},$$

where, R_{pt} is the monthly nominal return on portfolio p; and b_p is the estimated slope of the regression equation. A slope of 1.0 suggests that mutual fund portfolio is a perfect hedge against inflation, and the lower the slope the poorer the fund portfolio is as a hedge against inflation. I estimated the following equations:

1. Aggressive Allocation Funds

$$R_p = 2.357 - 0.748Inflation + e$$
$$(61.59)^* \quad (-54.19)^*$$

2. Moderate Allocation Funds

$$R_p = 1.980 - 0.576Inflation + e$$
$$(103.61)^* \quad (-82.61)^*$$

3. Conservative Allocation Funds

$$R_p = 1.630 - 0.484Inflation + e$$
$$(97.13)^* \quad (-79.74)^*$$

4. Entire Sample

$$R_p = 1.944 - 0.580Inflation + e$$
$$(148.29)^* \quad (-121.86)^*$$

The slopes of the regression equation are all negative and similar to Ibbotson et al. (1985), who found negative slopes for U.S. common stocks and for bonds. For the entire sample, the slope is -0.580 indicating that, on average, hybrid mutual funds are a poor hedge against inflation. With a slope of -0.748, the Aggressive category is the poorest hedge, and the conservative category is the best hedge against inflation. Thus the effect of inflation on hybrid mutual funds is similar to that of an unmanaged portfolio of U.S. common stocks and bonds. When inflation rises, both stocks and hybrid funds decline similarly.

V. SUMMARY AND CONCLUSIONS

I investigated the sample characteristics and investment performance of three categories of hybrid mutual funds: Aggressive Allocation, Moderate Allocation, and Conservative Allocation funds. I also investigated the extent to which hybrid mutual funds are a hedge against inflation. The aggressive category held the largest positions in stocks and the smallest positions in bonds. Conversely, the conservative group held the largest positions in bonds and the smallest positions in stocks. Furthermore, the aggressive category had the lowest holdings and is more concentrated in the top ten securities it held, suggesting that the aggressive category consisted of those hybrid funds that were smallest on average and least diversified.

Moreover, the stock beta of the aggressive category is 8.5 and that of the conservative category is only 0.4. It is known that most stocks have betas between 0.5 and 1.5, and that the average stock beta is 1.0. Accordingly, the conservative category contains funds most suitable for investors that want to achieve portfolio diversification using a single hybrid fund. Furthermore, since by definition the S&P 500 index has a beta of 1.0, it appears that hybrid mutual funds have lower volatility than the stock index and provide diversification advantages over an unmanaged portfolio of stocks, but with regard to risk-adjusted performance, generally did not outperform the stock market over the April 1993 to March 2013 study period. The Sharpe Information Ratio and the modified Jensen's Alpha for the each of the three categories of hybrid mutual funds, and for the entire sample, were found to be negative.

Finally, when I regressed the mutual funds' nominal returns against U.S. inflation rates, the slope of the regression was found to be negative and statistically significant for each of the three fund categories and for the entire sample of hybrid mutual funds. I therefore conclude that hybrid mutual funds, like stocks and bonds, are not a good hedge against inflation. The aggressive category was the best hedge against inflation.

REFERENCES

Carhart, Mark. (1997). On the Persistence in Mutual Fund Performance. *Journal of Finance* 52,

57-82.
Comer, George.(2006). Hybrid Mutual Funds and Market Timing Performance. *Journal of*
Business 79, 771-797.
Comer, G., N. Larrymore, and J. Rodriguez. (2009)a. Controlling for Fixed-Income Exposure in
Portfolio Evaluation: Evidence from Hybrid Mutual Funds. *The Review of Financial*
Studies 22, 481-507.
Comer, G., N. Larrymore, and J. Rodriguez. (2009)b. Measuring the Value of Active Fund
Management: The Case of Hybrid Mutual Funds. *Managerial Finance*. 35, 63-77.
Comer, George. (2012). On Equity and Fixed Income Investing Styles: A Look at Hybrid Mutual
Funds. SSRN Working Paper Series.
Fama, Eugene F., and Kenneth R. French. (1992). The Cross-Section of Expected Stock Returns.
The Journal of Finance 47, 427-465.
Goodwin, Thomas H.(1998). The Information Ratio. Financial Analysts Journal (July/August), 34-
43.
Herrmann, U., and H. Scholz. (2013). Short-term Persistence in Hybrid Mutual Fund Performance:
The Role of Style-Shifting Abilities. *Journal of Banking and Finance* 37, 2314-2328.
Ibbotson, R. G., L. B. Siegel, and K. S. Love. (1985). World Wealth: Market Values and Returns.
The Journal of Portfolio Management (Fall), 6-23.
Malkiel, B. G., and Y. Xu. (1997). Risk and Return Revisited. *The Journal of Portfolio*
Management (Spring), 9-14.
Michaud, R. O., G. L. Bergstrom, R. D. Frashure, and B. K. Wolahan. 1996. Twenty Years of
International Equity Investing. *The Journal of Portfolio Management* (Fall), 9-15.
Nolte, Paul J. (2011). Stocks or Bonds?
Http://www.financialsense.com/contributors/paul-nolte/2011/08/18
Reilly, Frank K., and Keith C. Brown. (2009). Investment Analysis and Portfolio Management.
South-Western).

Reilly, Frank K., and Edgar A. Norton. (2006). Investments, Seventh Edition (Thomson South-
Western).
Reilly, F, and W. J. Wright. (2004). Analysis of Risk-Adjusted Performance of Global Market
Assets, *The Journal of Portfolio Management* (Spring), 63-76.
Schultz, Abby. (2002). Investing; Stocks vs Bonds: A Risk Scoreboard.
http://www.nytimes.com/2002/06/30/business/investing-stocks-vs-bonds-a-risk-scoreboard.
Soldofsky, R. M. (1984). Risk and Return for Long-term Securities: 1971-1982. *The Journal of Portfolio Management* (Fall), 57-64.