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On The Cash Holdings of Corporate Bond Mutual Funds

An honors thesis presented to the
Department of Finance,
University at Albany, State University of New York
in partial fulfillment of the requirements
for graduation with Honors in Finance
and
graduation from The Honors College

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Abstract

In this research, I examine the impact of cash holdings on the risk and returns of U.S. corporate bond mutual funds. Using a sample of 1,672 corporate bond funds during 2002-2019, I find that higher cash holdings are significantly associated with lower risk-adjusted returns and lower total and idiosyncratic volatilities of corporate bond funds. Further analysis suggests that these results are mainly driven by non-crisis periods when cash holdings might adversely impact the alpha of corporate bond mutual funds while reducing risk for these funds. During the crisis periods, however, we do not document a negative relation between cash holdings and corporate bond fund performance although we still document a negative relation between cash holdings and fund risk-taking. Overall, the results suggest that the liquidity provided by cash holdings make corporate bond funds less risky.

Keywords: *Corporate bond mutual funds, Fund risk, Fund performance, Crisis period, Investment grade, High yield*

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List of Tables

Table 1 Summary Statistics.....	13
Table 2 Regression Results – All Funds	14
Table 3 Regression Results – Investment Grade.....	15
Table 4 Regression Results – High Yield	16
Table 5 Regression Results – Crisis Period	17
Table 6 Regression Results – Noncrisis Period	18
Table 7 Regression Results – Crisis Period, Investment Grade	19
Table 8 Regression Results – Crisis Period, High Yield.....	20
Table 9 Regression Results – Noncrisis Period, Investment Grade	21
Table 10 Regression Results – Noncrisis Period, High Yield.....	22

List of Figures

Figure 1 Corporate Bond Fund Growth	23
Figure 2 All Funds, Average Assets & Average % of Cash and Treasuries.....	23

Table of Contents

Abstract	ii
Acknowledgements	iii
List of Tables	iv
List of Figures	v
Introduction	1
Literature Review	3
Hypothesis	5
Data	6
Subsamples	6
Variables	7
Summary Statistics	7
Methodology	8
Empirical Analysis	8
Regression Analysis	8
Regression Results for All Funds	8
Investment Grade vs High Yield Funds	9
Crisis vs Noncrisis	9
Investment Grade Crisis vs Noncrisis	10
High Yield vs Noncrisis	10
Conclusion	10
References	12
Appendix	13
Tables	13
Figures	23

Introduction

The corporate bond fund market has grown substantially within the past decade, increasing its importance in the financial system. The 2020 Investment Company Fact Book reported that total net assets of bond funds increased from 6.1 trillion in 2010 to 11.8 trillion in 2019, making up 21% of total worldwide open-end fund assets. Although bonds make up most of the composition of corporate bond mutual funds, the amount of cash a fund owns can play a major role in how the fund operates. These operations may include shareholder redemptions, opportunistic buying, and asset protection. Bond mutual funds must be ready to redeem a user's request for cash during their normal business hours, and this could be difficult if not enough cash is available on hand. Having cash on hand can also assist a fund on buying assets at a moment's notice in order to take advantage of attractive deals.

In this paper, I explore whether the cash holdings of corporate bond mutual funds have any correlation to the returns experienced by these funds, and if high cash holdings could be associated with certain characteristics of a fund, such as volatility. Although this topic has been briefly studied for funds primarily invested in equity securities, there happens to be quite a limited amount of research performed on this issue with regard to the corporate bond mutual funds, considering that the cash holdings. Due to its nature, bond funds are far less liquid than its equity counterparts, and the findings of the studies performed on equity mutual funds may not necessarily translate over to bond funds. Do the conditions of the market have any influence on the cash holding of bond mutual funds? How closely are the returns experienced by bond funds and cash holdings associated with each other? A multiple linear regression model was used on several variables, which included the percentage of cash held by bond funds to analyze any

possible links, and a sample of over 1600 bond fund were examined to graph and visualize any possible connections.

Why would a fund hold more cash than it needs to? The money not in use by a fund has no chance of making any returns, causing the fund to miss out on potential profits. This may be true, but there are also many benefits that a fund may encounter while holding an excess amount of cash. It can provide flexibility, allowing fund managers to quickly satisfy redemption requests and purchase attractive stocks quickly and cheaply (Simutin, 2013). When pressured with investor redemption requests, a fund with low cash availability would be forced to sell off a portion of its assets and would be less prepared to purchase attractive stock positions, adversely affecting the performance of the fund.

The papers that I reviewed displayed a clear association between the cash holdings of a fund and the performance it experienced. Research performed on the cash holdings of equity mutual funds suggests that higher cash holdings provide greater flexibility for fund managers due to the fact they can purchase any desirable stock at a moment's notice. These funds outperformed its low cash peers by an average of 2% per year, which can partly be attributed to the fact that low cash funds have to fire sell assets they possess to meet investor redemptions, which harms the fund's short-term and long-term performance. Whereas equity mutual funds dynamically manage cash to buy attractive stocks, research completed on the liquidity management of corporate bond funds suggests funds increase their cash holdings to protect the fund's illiquid assets (Jiang et al., 2017).

I executed a multilinear regression analysis on cash holdings against four different dependent variables: excess returns, adjusted returns, volatility, and idiosyncratic volatility. Upon observing the results that took all funds and time periods into account, as cash holdings

increased, all other variables decreased. The results from the sample of funds separately categorized as investment grade and high yield across the same time period also yielded the same results.

When all funds were split up into crisis and noncrisis periods, the regression results for the crisis time period displayed that as cash holdings increased, excess returns and adjusted returns also increased, while volatility decreased across the board. During noncrisis periods, increased cash led to a decrease in excess returns, adjusted returns, and volatility.

Next, I performed regressions on funds categorized as investment grade over crisis and noncrisis periods. During times of crisis, an increase in cash holdings was associated with greater excess returns and adjusted returns, while volatility and idiosyncratic volatility decreased. During noncrisis periods, an increase in cash holdings led to a decrease in excess returns, adjusted returns, volatility, and idiosyncratic volatility.

Finally, I conducted regressions on funds considered high yield over crisis and noncrisis periods. In times of crisis, high yield funds experienced an increase in excess returns, adjusted returns, and volatility as cash holdings increased. Over periods of noncrisis, holding cash was associated with a decrease in excess returns and adjusted returns, while experiencing increases in volatility.

Literature Review

The condition of a market can also determine whether excess cash holdings can be beneficial to a fund or not. In times of uncertainty, corporate bond fund managers tend to scale down on both liquid and illiquid assets in order to maintain a level of liquidity that satisfies its investors (Jiang et al., 2017), jeopardizing the performance of the fund. Although having an excess amount of cash could mitigate the losses in this scenario, the same cannot be said when

the market is in a state of tranquility. I believe that in the case of corporate bonds, mutual funds that hold excess cash in times of certainty simply miss out on too many potential profits by not choosing to invest.

In his paper, Simutin (2013) stipulated that there are numerous factors that go hand in hand with cash holdings which could explain the excess returns that were experienced by the equity funds he researched. Although bonds and equities are different types of assets, analyzing the results of the research done on cash holdings and its effect on equity funds can help with the understanding of the effects of cash holdings and bond funds.

One major factor that was looked into was market timing. He believed the excess cash that funds carried should fluctuate widely depending on whether the market was in a bull state or bear state. “When attractive investment opportunities are abundant, a skilled manager may be more fully invested in equities. When such opportunities are sparse, he may carry high excess cash to be able to take quick advantage of lucrative investments as they become available. As a result, excess cash in the hands of skilled managers is likely to fluctuate” (Simutin, 2013). He went on to say less capable managers would have steady levels of cash year round due to their inability to anticipate market upturns and downturns. The overall effect that market timing played on returns varied widely based on the approaches used to detect the market timing skills.

However, in every method used, all approaches displayed that funds with low cash holdings displayed the worst market timing skills, and funds with high cash holdings consistently demonstrated competent market timing skills.

Another major factor that could explain the higher returns associated with equity funds are cash outflows related to the fund; Simutin (2013) states “the difference in future performance of high and low excess cash funds can be attributable in part to the fact that high excess cash

fund managers are better positioned to control fund expenses by economically satisfying fund outflows and cheaply conducting stock transactions”. An inability to satisfy fund outflows due to low liquidity levels led funds to fire sell off assets, causing detrimental effects on the performance of the fund. selling off of assets is referred to as the “flight-to-liquidity” (Ben-Rephael, 2017) This evidence shows that funds with higher cash holdings may outperform those with lower cash holdings not necessarily due to market returns but can be attributed to the fact that low cash funds need to sell off investments to meet outflows.

Market timing and fund cash flows are both factors related to cash holdings, which can be associated with the returns experienced by bond funds. Although mutual fund flows tend to be stable (Collins & Plantier, 2014), they can be highly dependent on market timing, as demand for investor redemptions increase in times of uncertainty. The strategy a bond fund devises, particularly corporate bond mutual funds, is contingent on whether a market downturn can be anticipated or not. When bond funds predicted a market downturn would occur by observing the CBOE Volatility Index, funds were more likely to scale down their assets to a point where an acceptable level of liquidity could be preserved and allocations between liquid and illiquid assets could be maintained (Simutin, 2010). This approach is taken to circumvent the possibility of having to fire sell illiquid assets off to meet investor redemptions. Funds that failed to anticipate market down turns are forced to sell off their most liquid assets, leaving its illiquid assets vulnerable an exposed to fire sales.

Hypotheses

High cash holdings of corporate bond mutual bond funds could provide an edge in uncertain market conditions, as observed in equity mutual funds. However, if this excess cash is

not utilized properly in market upturns, the fund may fail to outperform those with more investments in illiquid assets.

- | | |
|--|--|
| Hypothesis 1 (H_1) | Higher cash holdings have a negative effect on corporate bond mutual funds. |
| Hypothesis 1 ₀ (H_{10}) | Higher cash holdings have no negative effect on the volatility and risk. associated with s corporate bond mutual fund. |
| Hypothesis 2 (H_2) | Higher cash holdings have a negative effect on returns. |
| Hypothesis 2 ₀ (H_{20}) | Cash holdings have no negative effect on return. |

Data

All data was downloaded from Morningstar Direct. The categories that the sample of bond funds were taken from include “High Yield Bond”, “Long-Term Bond”, “Intermediate Core Bond”, “Intermediate Core-Plus Bond”, “Short Term Bond”, and “Corporate Bond”. All bonds not labeled “High Yield” are categorized under “Investment Grade” for the purposes of the data presented. Funds that did not survive were also included in the sample to eliminate survivorship bias. This resulted with a total sample size of 1,672 funds. 653 funds are classified as High Yield bonds, and the remaining 1019 funds are Investment Grade.

Subsamples

The data from all funds was then split up into two time periods; the Crisis Period (7/2007-2/2009) and the Noncrisis Period. The data was then split further between Investment Grade and High Yield, for a total of 6 categories:

- ❖ Crisis Period – All Funds
- ❖ Noncrisis Period – All Funds
- ❖ Crisis Period – Investment Grade
- ❖ Crisis Period – High Yield
- ❖ Noncrisis Period – Investment Grade
- ❖ Noncrisis Period – High Yield

The different categories allow for the analysis of funds operating under different factors and different market conditions.

Variables

A number of variables were taken into consideration when performing the regression analysis of the data.

- ❖ The main independent variable used was the percentage of cash held by the bond mutual funds (labeled *mcash* in the data).
- ❖ The independent control variables used include fund size (*logmtna*), fund age (*logage*), fund level net flow (*mflow*), turnover rate (*tr*), and expense ratio (*exp*)
 - The log of fund size and age were taken to standardize the variables
- ❖ High yield (*HY*) is included as a dummy variable
- ❖ The dependent variables used include excess returns (*retrf*), adjusted returns (*retadj*), volatility (*vol*), and idiosyncratic volatility (*idvol*)
 - Adjusted returns take into account risk factors faced by the bond market; the Three Factor Fama-French model and term structure model is used to control for interest rate risk and credit spread
 - Volatility is measured by taking the standard deviation of returns over the past 24 months

Summary Statistics

Table 1 shows the statistical summary of my corporate bond mutual fund sample. As explained earlier, the main variable used to provide evidence supporting my hypothesis is *mcash*, or the percentage of cash making up the bond fund's portfolio. Across all funds, there is a large standard deviation between cash holdings of 6.58. There is an even larger deviation of 14.63

observed when looking at a fund's percentage of treasury and cash holdings. When examining some of the independent control variables, I found that the average corporate bond mutual fund had a logmtna of \$19.70 million and logage of 2.22 years. The natural logs of mtna and age were used to standardize the variables. Next, the sample of funds taken had an average fund flow of .004%, expense ratio of .011%, and turnover rate of 1.43.

Methodology

A total of 36 regressions were performed from the following four formulas, with slight alterations in place for time periods and when differentiating between High Yield and Investment Grade funds.

Empirical Analysis

This section presents my main empirical results regarding the association between cash holdings and different fund characteristics and explores the correlation between cash holdings and bond fund performance in times of crisis and noncrisis.

Regression Analysis

I ran a multiple linear regression on four different variables multiple times over different conditions. The regressions are as follows:

$$\text{RetRf}_{i,t} = \alpha + \beta C_{i,t-1} + \beta \log \text{mtna}_{i,t-1} + \beta \log \text{age}_{i,t-1} + \beta \text{mflow}_{i,t-1} + \beta \text{tr}_{i,t-1} + \beta \text{exp}_{i,t-1} + \beta \text{HY}_{i,t-1} + \varepsilon_{i,t}$$

$$\text{RetAdj}_{i,t} = \alpha + \beta C_{i,t-1} + \beta \log \text{mtna}_{i,t-1} + \beta \log \text{age}_{i,t-1} + \beta \text{mflow}_{i,t-1} + \beta \text{tr}_{i,t-1} + \beta \text{exp}_{i,t-1} + \beta \text{HY}_{i,t-1} + \varepsilon_{i,t}$$

$$\text{Vol}_{i,t} = \alpha + \beta C_{i,t-1} + \beta \log \text{mtna}_{i,t-1} + \beta \log \text{age}_{i,t-1} + \beta \text{mflow}_{i,t-1} + \beta \text{tr}_{i,t-1} + \beta \text{exp}_{i,t-1} + \beta \text{HY}_{i,t-1} + \varepsilon_{i,t}$$

$$\text{IDVol}_{i,t} = \alpha + \beta C_{i,t-1} + \beta \log \text{mtna}_{i,t-1} + \beta \log \text{age}_{i,t-1} + \beta \text{mflow}_{i,t-1} + \beta \text{tr}_{i,t-1} + \beta \text{exp}_{i,t-1} + \beta \text{HY}_{i,t-1} + \varepsilon_{i,t}$$

I ran each of these regression on the subsamples mentioned previously.

Regression Results for All Funds

The regression analysis against all funds contains significant results that provide support for my hypotheses. In this regression (and in all the subsequent regressions) I observe the

relationship between cash holdings and excess returns, adjusted returns, volatility, and idiosyncratic volatility.

The results of this regression, which are summarized in Table 2, show that the coefficient for cash on excess return, adjusted returns, volatility, and idiosyncratic volatility was -0.001, -0.001, -0.001, and -0.002 respectively. This suggests that as cash holdings increases, all of the fund characteristics previously stated decrease.

Investment Grade vs High Yield Funds

The results from the regression for investment grade funds across all time periods (shown in Table 3) yielded the same coefficients as the regression results for all funds.

The regression for high yield funds across all time periods, the results of which are shown in Table 4, displays a coefficient of -0.001 for both excess returns and adjusted returns, suggesting that as cash holdings rise for these funds, the returns decrease. The coefficient for volatility and idiosyncratic volatility were both .001, suggesting that as cash holdings increase, these factors also increase. This could be due to the fact that the nature of high yield bonds are riskier than investment grade funds (Chen et al., 2019).

Crisis vs Noncrisis

The results of the regressions from the crisis periods were the only outcomes that did not fully agree with my hypotheses. There was no negative correlation between cash holdings and excess and adjusted returns. This could be explained by the fact that having high cash holdings in times of market uncertainty can help hedge against losses by bypassing the need to sell illiquid assets to meet investor redemptions (Ben-Rephael, 2017).

The regression run on all funds from the crisis period, which is shown in Table 5, resulted in a coefficient of .002 for excess returns and adjusted returns, and a coefficient of -0.004 and -

0.003 for volatility and idiosyncratic volatility. This shows is that higher cash holdings are associated with no negative effects on excess returns and adjusted returns, while decreasing volatility. In the case of noncrisis, the coefficients were -0.002, -0.002, -0.001, and -0.002 for excess returns, adjusted returns, volatility, and idiosyncratic volatility. These results are consistent with the predictions of my hypothesis.

Investment Grade Crisis vs Noncrisis

For investment grade funds in the crisis period, the results of which can be observed in Table 7, the coefficients for cash on excess returns, adjusted returns, volatility, and idiosyncratic volatility were 0.002, 0.002, -0.005, and -0.004. These results suggest that as cash increases, so do excess returns and adjusted returns, but has the opposite effect on volatility. In terms of noncrisis, the coefficients are -0.001, -0.001, -0.000, and -0.001. These results are in line with the baseline regression, supporting my hypotheses.

High Yield Crisis vs Noncrisis

The regression results for High Yield funds displayed coefficients of 0.002, 0.001, 0.002, and -0.001 for excess returns, adjusted returns, volatility, and idiosyncratic volatility, suggesting that higher cash holdings are associated with higher excess returns, adjusted returns, and volatility, while decreasing the idiosyncratic volatility. We again see that cash is positively associated higher volatility. In terms of the noncrisis period, the coefficients are -0.001 for excess returns and adjusted returns, 0.002 for volatility, and 0.001 for idiosyncratic volatility.

Conclusion

High cash holdings can have both good and bad effects on a fund. In times of crisis, they can possibly mitigate losses that bond funds could have otherwise incurred. However, when the

market is in tranquility, it seems to prevent funds from reaching the maximum amount of returns that they could get when compared to other funds.

Funds that possess higher holdings of cash are correlated with less volatility and reduced risk. As reviewed in the literature, this could be due to the fact that managers are able to meet investor redemptions and fund expenses with no problems, preserving the illiquid assets the fund is invested in.

On average, funds with high cash holdings perform better than those with low cash holdings in times of crisis but cannot keep up with this performance when the market is in an upturn.

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Appendix

Table 1 Summary Statistics

All data was downloaded from Morningstar Direct, and the categories of bonds looked under include High Yield, Corporate Bonds, Long Term Bonds, Short Term Bonds, Intermediate Core Bonds, and Intermediate Core Plus Bonds from 2002-2019. In total, I had a sample of 1,672 funds, 1,019 of which are classified as Investment Grade. Note the large deviation of cash holdings and treasuries between funds.

	All Funds			Investment Grade			High Yield		
	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev
# of Funds	1672			1019			653		
mcash	0.356555	0.000000	6.582411	0.039267	0.000000	7.252640	1.293229	0.000000	3.844786
mtr	10.850049	6.064985	12.866931	13.997689	11.096640	13.078452	1.557830	0.000000	5.811321
mcashtr	11.348628	7.313050	14.627461	14.199838	11.985190	15.318408	2.931508	0.734240	7.618765
logmtna	19.702759	19.682718	1.839258	19.730340	19.704983	1.876859	19.621339	19.621672	1.720979
logage	2.224154	2.302243	0.709099	2.246442	2.326860	0.712063	2.158355	2.233372	0.696156
mflow	0.004366	0.000142	0.048911	0.004627	0.000445	0.045764	0.003598	-0.001043	0.057197
tr	1.430676	0.740000	1.749743	1.616540	0.850000	1.855644	0.881985	0.610000	1.237583
exp	0.011279	0.010200	0.005705	0.010271	0.009000	0.005423	0.014252	0.016500	0.005473
mret	0.36287	0.32929	0.32929	0.306604	0.26961	1.031143	0.528975	0.615540	1.765058

	Crisis Period			Noncrisis Period			IG Crisis Period		
	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev
# of Funds	1672			1672			1019		
mcash	-0.070533	0.000000	7.735696	0.404437	0.000000	6.438577	-0.442194	0.000000	8.270076
mtr	8.232842	3.842580	11.030389	11.143473	6.380640	13.024124	10.274045	7.236235	11.256326
mcashtr	8.282320	5.338105	13.544459	11.692403	7.560130	14.704273	9.963133	7.987005	14.312037
logmtna	19.298494	19.212506	1.706932	19.748083	19.736129	1.848020	19.318484	19.283645	1.727721
logage	2.169894	2.239223	0.643482	2.230237	2.309882	0.715832	2.186567	2.224975	0.649238
mflow	0.000512	-0.002855	0.055034	0.004798	0.000404	0.048158	0.000304	-0.002190	0.051892
tr	1.485822	0.770000	1.686950	1.424494	0.740000	1.756555	1.650678	0.860000	1.748980
exp	0.011847	0.011500	0.005555	0.011215	0.010100	0.005718	0.010911	0.010000	0.005330
mret	-0.104886	0.097780	1.867009	0.415312	0.349385	1.162867	0.034769	0.172260	1.558011

	HY Crisis Period			IG Noncrisis Period			HY Noncrisis Period		
	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev
# of Funds	653			1019			653		
mcash	1.187267	0.000000	5.372400	0.095257	0.000000	7.122859	1.303821	0.000000	3.657181
mtr	1.324879	0.000000	6.544461	14.430719	11.668180	13.206230	1.581116	0.000000	5.732534
mcashtr	2.594011	0.000180	8.319504	14.692533	12.518310	15.355601	2.965243	0.791140	7.544522
logmtna	19.230840	19.046720	1.633192	19.778235	19.763732	1.887630	19.660372	19.669416	1.724691
logage	2.113468	2.271512	0.620438	2.253405	2.335375	0.718694	2.162842	2.228372	0.703132
mflow	0.001217	-0.005794	0.064553	0.005129	0.000721	0.044970	0.003836	-0.000589	0.056405
tr	0.927906	0.680000	1.312312	1.612570	0.850000	1.867625	0.877395	0.600000	1.229801
exp	0.015014	0.017000	0.005117	0.010197	0.008900	0.005429	0.014176	0.016500	0.005501
mret	-0.577516	-0.601130	2.603963	0.338216	0.278060	0.946076	0.639578	0.673180	1.617015

Table 2 Regression Results – All Funds

The regression on all fund showed a significant negative correlation between higher cash holdings and excess returns, adjusted returns, volatility, and idiosyncratic volatility.

All Funds				
Parameter	retrf	retadj	vol	idvol
Intercept	0.295***	0.234***	0.560***	0.239***
Intercept	(5.59)	(4.43)	(21.73)	(19.78)
mcash	-0.001***	-0.001***	-0.001***	-0.002***
mcash	(-2.69)	(-2.65)	(-4.49)	(-17.62)
logmtna	0.005***	0.002	0.006***	-0.004***
logmtna	(3.17)	(1.39)	(7.56)	(-10.00)
logage	0.009**	0.010**	0.005**	-0.001
logage	(2.12)	(2.24)	(2.12)	(-0.85)
mflow	0.364***	0.367***	-0.194***	-0.180***
mflow	(5.99)	(6.04)	(-6.08)	(-12.04)
tr	-0.002	-0.001	0.002**	0.003***
tr	(-0.87)	(-0.76)	(2.08)	(8.61)
exp	-7.033***	-7.018***	-0.550**	2.655***
exp	(-12.80)	(-12.78)	(-2.00)	(20.58)
HY	0.269***	0.269***	0.771***	0.441***
HY	(37.07)	(37.11)	(214.20)	(261.38)
Rsquare	0.508	0.275	0.562	0.661
AdjRsq	0.507	0.274	0.561	0.660
Number of Observation	93938	93938	81340	81340

All Funds				
Parameter	retrf	retadj	vol	idvol
mcash	-0.001***	-0.001***	-0.001***	-0.002***
Control Variables	Yes	Yes	Yes	Yes
Style & Time Fixed Effects	Yes	Yes	Yes	Yes
AdjRsq	0.507	0.274	0.561	0.660
Number of Observation	93938	93938	81340	81340

Table 3 Regression Results – Investment Grade

In the subsample investment grade, the coefficient of the regression revealed a significant negative correlation between higher cash holdings and excess returns, adjusted returns, volatility, and idiosyncratic volatility.

Investment Grade				
Parameter	retrf	retadj	vol	idvol
Intercept	-0.091**	0.147***	0.703***	0.221***
	(-2.10)	(3.39)	(24.05)	(17.94)
mcash	-0.001	-0.001	-0.001***	-0.002***
	(-1.59)	(-1.49)	(-3.85)	(-17.60)
logmtna	0.005***	0.003**	0.005***	-0.002***
	(4.13)	(2.00)	(5.88)	(-4.64)
logage	-0.005	-0.005	-0.014***	-0.002*
	(-1.56)	(-1.35)	(-5.33)	(-1.88)
mflow	0.101*	0.105**	-0.271***	-0.129***
	(1.91)	(2.00)	(-7.08)	(-7.95)
tr	0.004***	0.005***	0.005***	0.003***
	(3.37)	(3.62)	(5.38)	(8.58)
exp	-7.539***	-7.533***	-1.202***	3.149***
	(-16.85)	(-16.86)	(-3.89)	(24.18)
Rsquare	0.640	0.367	0.332	0.563
AdjRsqr	0.639	0.365	0.330	0.562
Number of Observation	70169	70169	60580	60580

Investment Grade				
Parameter	retrf	retadj	vol	idvol
mcash	-0.001	-0.001	-0.001***	-0.002***
Control Variables	Yes	Yes	Yes	Yes
Style & Time Fixed Effect	Yes	Yes	Yes	Yes
AdjRsqr	0.639	0.365	0.330	0.562
Number of Observation	70169	70169	60580	60580

Table 4 Regression Results – High Yield

The regression against high yield funds showed a negative correlation between cash holdings and excess returns and adjusted returns, but a positive relationship between volatility and idiosyncratic volatility. This could be due to the fact that the nature of high yield bonds are riskier than investment grade funds.

High Yield				
Parameter	retrf	retadj	vol	idvol
Intercept	1.687***	0.705***	1.298***	0.757***
Intercept	(22.76)	(9.53)	(33.24)	(28.99)
mcash	-0.001	-0.001	0.001**	0.001
mcash	(-0.77)	(-0.90)	(2.33)	(1.29)
logmtna	-0.003	-0.007**	-0.008***	-0.011***
logmtna	(-1.27)	(-2.49)	(-5.51)	(-11.66)
logage	0.033***	0.034***	0.057***	0.007***
logage	(5.08)	(5.15)	(15.06)	(2.72)
mflow	0.022	0.026	-0.359***	-0.237***
mflow	(0.28)	(0.33)	(-8.33)	(-8.23)
tr	-0.019***	-0.019***	-0.018***	0.001
tr	(-5.39)	(-5.31)	(-9.26)	(0.44)
exp	-6.412***	-6.321***	1.069**	1.519***
exp	(-8.23)	(-8.13)	(2.54)	(5.40)
Rsquare	0.871	0.696	0.758	0.555
AdjRsq	0.870	0.693	0.755	0.551
Number of Observation	23769	23769	20760	20760

High Yield				
Parameter	retrf	retadj	vol	idvol
mcash	-0.001	-0.001	0.001**	0.001
Control Variables	Yes	Yes	Yes	Yes
Style & Time Fixed Effect	Yes	Yes	Yes	Yes
AdjRsq	0.870	0.693	0.755	0.551
Number of Observation	23769	23769	20760	20760

Table 5 Regression Results – Crisis Period

The regression run against all funds during the crisis period displayed some interesting results. It was one of the only times where I observed that there was no negative correlation between returns and higher cash holdings. The negative relationship between cash holdings and volatility remained consistent.

Crisis Period				
Parameter	retrf	retadj	vol	idvol
Intercept	3.564***	1.122***	1.091***	0.617***
Intercept	(21.44)	(6.76)	(26.33)	(25.44)
mcash	0.002	0.002	-0.004***	-0.003***
mcash	(1.34)	(1.41)	(-9.25)	(-14.14)
logmtna	-0.019**	-0.002	0.007***	-0.002*
logmtna	(-2.43)	(-0.30)	(3.41)	(-1.80)
logage	0.007	0.009	0.036***	0.014***
logage	(0.32)	(0.43)	(6.24)	(4.22)
mflow	1.714***	1.725***	-0.080	-0.359***
mflow	(6.98)	(7.03)	(-1.27)	(-9.78)
tr	-0.004	-0.003	0.016***	0.013***
tr	(-0.56)	(-0.39)	(8.29)	(11.27)
exp	-11.548***	-11.369***	4.489***	3.619***
exp	(-4.59)	(-4.52)	(7.22)	(9.95)
HY	-0.613***	-0.614***	0.750***	0.296***
HY	(-18.18)	(-18.23)	(92.15)	(62.15)
Rsquare	0.489	0.237	0.671	0.607
AdjRsq	0.487	0.235	0.670	0.606
Number of Observation	9942	9942	8945	8945

Crisis Period				
Parameter	retrf	retadj	vol	idvol
mcash	0.002	0.002	-0.004***	-0.003***
Control Variables	Yes	Yes	Yes	Yes
Style & Time Fixed Effects	Yes	Yes	Yes	Yes
AdjRsq	0.487	0.235	0.670	0.606
Number of Observation	9942	9942	8945	8945

Table 6 Regression Results – Noncrisis Period

The regression performed on all funds during the noncrisis period yielded results similar to that of the regression run on all funds. The results show that excess returns, adjusted returns, volatility, and idiosyncratic volatility are significantly negatively correlated with higher cash holdings

Noncrisis Period				
Parameter	retrf	retadj	vol	idvol
Intercept	0.195***	0.159***	0.577***	0.243***
Intercept	(3.94)	(3.22)	(21.31)	(19.59)
mcash	-0.002***	-0.002***	-0.001**	-0.002***
mcash	(-3.94)	(-3.91)	(-2.07)	(-13.90)
logmtna	0.009***	0.005***	0.006***	-0.004***
logmtna	(5.38)	(3.34)	(6.65)	(-10.11)
logage	0.009**	0.010**	0.003	-0.002
logage	(2.21)	(2.35)	(1.18)	(-1.34)
mflow	0.177***	0.180***	-0.211***	-0.144***
mflow	(2.96)	(3.01)	(-5.97)	(-8.96)
tr	-0.002	-0.002	0.001	0.003***
tr	(-0.95)	(-0.90)	(0.77)	(5.93)
exp	-6.409***	-6.429***	-1.101***	2.570***
exp	(-12.05)	(-12.10)	(-3.68)	(18.79)
HY	0.365***	0.365***	0.774***	0.458***
HY	(52.10)	(52.18)	(197.95)	(256.31)
Rsquare	0.512	0.246	0.553	0.671
AdjRsq	0.511	0.245	0.552	0.670
Number of Observation	83996	83996	72395	72395

Noncrisis Periods				
Parameter	retrf	retadj	vol	idvol
mcash	-0.002***	-0.002***	-0.001**	-0.002***
Control Variables	Yes	Yes	Yes	Yes
Style & Time Fixed Effects	Yes	Yes	Yes	Yes
AdjRsq	0.511	0.245	0.552	0.670
Number of Observation	83996	83996	72395	72395

Table 7 Regression Results – Crisis Period, Investment Grade

I observed in Table 5 that in times of crisis, cash holdings have no negative effect on the excess and adjusted returns experienced by a fund. The results are the same for investment grade funds in times of crisis. Volatility is also significantly negatively correlated with higher cash holdings for these funds in times of crisis.

Crisis Period - Investment Grade				
Parameter	retrf	retadj	vol	idvol
Intercept	3.247***	0.586***	1.008***	0.595***
	(22.48)	(4.07)	(20.84)	(21.41)
mcash	0.002	0.002	-0.005***	-0.004***
	(1.19)	(1.30)	(-10.16)	(-14.41)
logmtna	-0.019***	0.007	0.010***	0.000
	(-2.72)	(0.98)	(4.45)	(0.21)
logage	0.004	0.005	0.029***	0.012***
	(0.20)	(0.28)	(4.41)	(3.16)
mflow	1.779***	1.793***	-0.215***	-0.455***
	(7.80)	(7.89)	(-2.76)	(-10.16)
tr	0.003	0.004	0.013***	0.009***
	(0.47)	(0.56)	(5.94)	(7.58)
exp	-12.914***	-12.631***	4.519***	3.734***
	(-5.94)	(-5.83)	(6.24)	(8.97)
Rsquare	0.564	0.323	0.409	0.510
AdjRsqr	0.562	0.320	0.407	0.508
Number of Observation	7673	7673	6885	6885

Crisis IG				
Parameter	retrf	retadj	vol	idvol
mcash	0.002	0.002	-0.005***	-0.004***
Control Variables	Yes	Yes	Yes	Yes
Style & Time Fixed Effects	Yes	Yes	Yes	Yes
AdjRsqr	0.562	0.320	0.407	0.508
Number of Observation	7673	7673	6885	6885

Table 8 Regression Results – Crisis Period, High Yield

Similar to the results I observed in the regression performed on all high yield funds, volatility seems to be positively correlated with higher cash holdings. Consistent with the results of the previous regressions ran on the crisis period, cash seems to have no negative effect on the excess and adjusted returns of these funds.

Crisis Period - High Yield				
Parameter	retrf	retadj	vol	idvol
Intercept	3.954***	1.913***	1.988***	0.924***
	(15.01)	(7.33)	(32.16)	(18.78)
mcash	0.002	0.001	0.002**	-0.001
	(0.47)	(0.39)	(2.38)	(-1.30)
logmtna	-0.011	-0.004	0.002	-0.008***
	(-0.84)	(-0.28)	(0.50)	(-3.45)
logage	-0.049	-0.045	0.065***	0.033***
	(-1.40)	(-1.30)	(7.30)	(4.71)
mflow	0.083	0.022	-0.257***	-0.216***
	(0.25)	(0.07)	(-3.18)	(-3.36)
tr	-0.034**	-0.029*	0.030***	0.033***
	(-2.17)	(-1.88)	(8.19)	(11.26)
exp	-7.253*	-7.797**	3.608***	3.070***
	(-1.86)	(-2.02)	(3.95)	(4.22)
Rsquare	0.868	0.554	0.810	0.560
AdjRsq	0.866	0.549	0.808	0.554
Number of Observation	2269	2269	2060	2060

Crisis HY				
Parameter	retrf	retadj	vol	idvol
mcash	0.002	0.001	0.002**	-0.001
Control Variables	Yes	Yes	Yes	Yes
Style & Time Fixed Effects	Yes	Yes	Yes	Yes
AdjRsq	0.866	0.549	0.808	0.554
Number of Observation	2269	2269	2060	2060

Table 9 Regression Results – Noncrisis Period, Investment Grade

Investment grade funds in the noncrisis period exhibited a significant negative correlation between excess returns, adjusted returns, and idiosyncratic volatility.

Noncrisis Period - Investment Grade				
Parameter	retrf	retadj	vol	idvol
Intercept	-0.152***	0.118***	0.735***	0.232***
Intercept	(-3.83)	(2.98)	(23.99)	(18.55)
mcash	-0.001***	-0.001***	-0.000	-0.001***
mcash	(-3.05)	(-2.95)	(-0.88)	(-13.08)
logmtna	0.009***	0.005***	0.005***	-0.002***
logmtna	(6.86)	(4.28)	(4.64)	(-5.36)
logage	-0.008**	-0.007**	-0.017***	-0.003**
logage	(-2.42)	(-2.19)	(-6.19)	(-2.57)
mflow	-0.171***	-0.169***	-0.282***	-0.073***
mflow	(-3.36)	(-3.33)	(-6.64)	(-4.20)
tr	0.004***	0.005***	0.005***	0.003***
tr	(3.42)	(3.66)	(4.88)	(7.21)
exp	-6.825***	-6.850***	-1.885***	3.107***
exp	(-16.05)	(-16.14)	(-5.61)	(22.69)
Rsquare	0.658	0.315	0.327	0.570
AdjRsq	0.657	0.312	0.325	0.569
Number of Observation	62496	62496	53695	53695

Noncrisis IG				
Parameter	retrf	retadj	vol	idvol
mcash	-0.001***	-0.001***	-0.000	-0.001***
Control Variables	Yes	Yes	Yes	Yes
Style & Time Fixed Effects	Yes	Yes	Yes	Yes
AdjRsq	0.657	0.312	0.325	0.569
Number of Observation	62496	62496	53695	53695

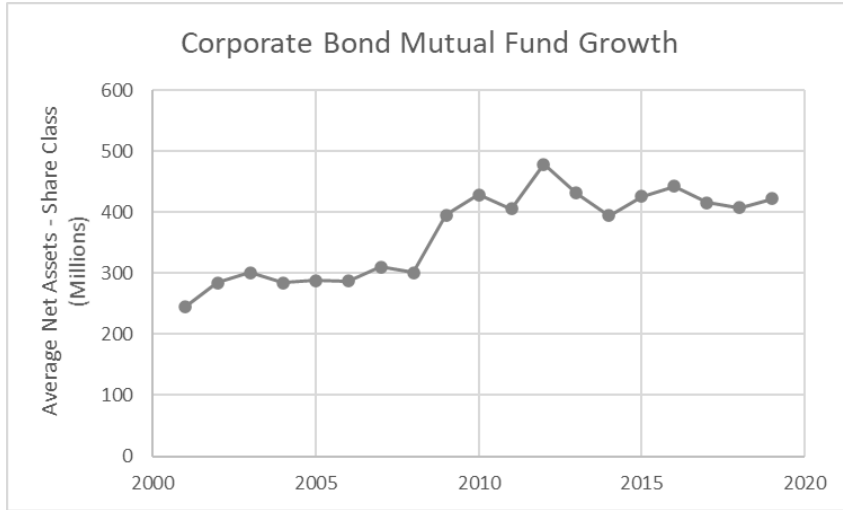
Table 10 Regression Results – Noncrisis Period, High Yield

High yield funds in the noncrisis period exhibited a negative correlation between excess returns, adjusted returns, volatility, and idiosyncratic volatility and higher cash holdings.

Noncrisis Period - High Yield				
Parameter	retrf	retadj	vol	idvol
Intercept	1.653***	0.781***	1.333***	0.778***
Intercept	(23.26)	(11.02)	(32.33)	(28.49)
mcash	-0.001	-0.001	0.002**	0.001**
mcash	(-1.30)	(-1.28)	(2.56)	(2.56)
logmtna	-0.002	-0.010***	-0.010***	-0.012***
logmtna	(-0.92)	(-3.94)	(-6.16)	(-11.68)
logage	0.039***	0.040***	0.059***	0.006**
logage	(6.12)	(6.29)	(14.40)	(2.31)
mflow	0.009	0.010	-0.373***	-0.239***
mflow	(0.12)	(0.13)	(-7.89)	(-7.63)
tr	-0.017***	-0.017***	-0.024***	-0.004***
tr	(-5.01)	(-5.02)	(-11.38)	(-2.58)
exp	-6.320***	-6.214***	0.941**	1.426***
exp	(-8.26)	(-8.14)	(2.07)	(4.74)
Rsquare	0.863	0.666	0.756	0.551
AdjRsq	0.862	0.663	0.753	0.547
Number of Observation	21500	21500	18700	18700

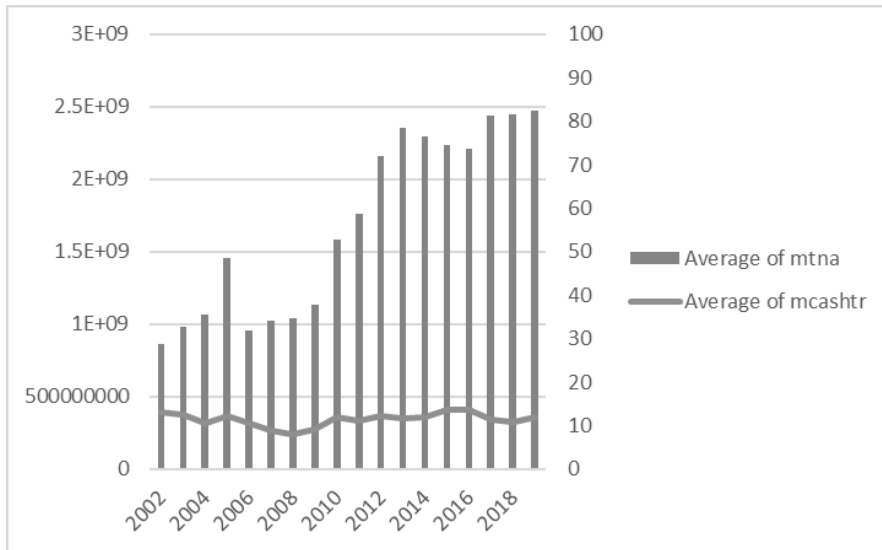
Noncrisis HY				
Parameter	retrf	retadj	vol	idvol
mcash	-0.001	-0.001	0.002**	0.001**
Control Variables	Yes	Yes	Yes	Yes
Style & Time Fixed Effects	Yes	Yes	Yes	Yes
AdjRsq	0.862	0.663	0.753	0.547
Number of Observation	21500	21500	18700	18700

Figure 1 Corporate Bond Fund Growth



This graph plots the growth of the assets controlled by corporate bond mutual funds over the past 20 years. Data for the graph was taken from Morningstar Direct.

Figure 2 All Funds, Average Assets and Average Percentage of Cash and Treasuries



This graph displays the average assets controlled by all of the funds I used in my regression analysis sample. The percentage of these assets made up of cash and treasuries is depicted by the orange line.