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The Effects of the 2010 Sec Reforms of Money Market Mutual Funds on Investment Performance

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Abstract

I investigated the effects of the 2010 SEC regulatory reforms on portfolio characteristics and investment performance of the three major categories of money market mutual funds (MMFs) from April 1993 to March 2013. MMFs are regulated under the Investment Company Act (1940) and the SEC Rule 2a-7 which mandate specified credit quality and maturity standards, and which permit perpetual $1 net assets value (NAV) per share. MMFs faced significant problems during the financial crisis of 2007 to 2008. The SEC adopted significant reforms of Rule 2a-7 in January 2010, designed to reduce credit risk, liquidity risk, and interest rate risk, and to make MMFs more resilient to runs that might affect the financial system. As a result of the reforms, the liquidity of MMFs increased substantially.

My results indicate that the investment performance of each of the three categories of funds was not statistically different from zero during the study period. Substantial tracking errors and small portfolio betas indicate a lack of fit between MMF portfolios and benchmark indices.

I find that the sub-period during which the SEC reforms were implemented had markedly worse performance than the 2007 to January 2010 period of the most severe financial crisis since the Great Depression. I attribute part of this poor performance to the opportunity costs of a much higher liquidity requirement imposed on MMFs after January 2010. I also find that SEC reforms did stabilize MMF portfolios.

Key words: SEC reforms, money market, investment, credit risk, performance

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INTRODUCTION

Money market mutual funds are open-end mutual funds that typically invest in short-term debt securities, and thus allow both retail and institutional investors to participate in foreign and domestic money markets. With $2.58 trillion in assets under management as of May 21 (ICI 2014), MMFs are important financial intermediaries in the U.S. economy, and are used by both retail and institutional investors as cash management vehicles. MMFs compete indirectly with banks for short-term funds, and although funds invested in MMFs are not FDIC insured, investors generally perceive them as safe. Institutional investors account for two thirds of the assets of MMFs (SEC, 2010). Because this group of investors is interest rate sensitive, they expose MMF portfolios to interest risk and liquidity risk.

The three major MMF categories include "prime funds," "tax exempt funds," and "government funds." "Tax-exempt funds" invest in municipal securities, and "Government funds" invest in the obligations of the U.S. Treasury and those of federal agencies, neither of which are perceived to have significant credit risk. "Prime funds" typically invest in private debt instruments and are, therefore, exposed to significant levels of risk. Investors perceive all three MMF categories as very safe, and MMFs, therefore, tend to attract risk-averse investors that are prone to flight when fund suffers losses (SEC, 2010). Ennis and Haltom (2014), however, find that unlike prime funds, government funds did not experience significant problems during the financial crisis of 2007 and 2008.

Money market mutual funds own about 40% of all outstanding commercial paper in the U.S., two thirds of municipal debt, and a significant portion of Treasury and agency securities (SEC, 2010). MMFs are regulated under the Investment Company Act (1940) and SEC Rule 2a-7 which stipulates that portfolio

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securities must meet specific credit quality and maturity requirements, and which permits MMFs to maintain a perpetual $1 net asset value. Because MMF portfolios are typically liquid, an investor is assured of redeeming each share at $1 throughout the business day. If however the fund incurs a substantial loss, the market value of the fund could decline below $1, and the fund is said to have "broken the buck," an event which triggers a run on the fund, and a possible contagion effect on other MMFs. Investors tend to redeem shares in funds that break the buck, and simultaneous runs can adversely affect the financial system. Brady, Anadu, and Cooper (2012) find that at least 31 prime MMFs would have broken the buck without the intervention of fund sponsors. Although only one MMF broke the buck from 2007 to 2011, it is likely that government and sponsor support during the financial crisis of 2007 and 2008 averted catastrophic effects on the financial system.

As a result of the problems faced by MMFs during 2007 and 2008, and to obviate the deleterious effects of future runs on MMFs, the SEC adopted significant reforms of Rule 2a-7 in January 2010. The amendments to Rule 2a-7 are designed to reduce systematic risk and to make MMFs more resilient to runs, and to reduce the possibility that funds will break the buck (ICI, 2013).[2] In the event a fund breaks the buck, its portfolio will be liquidated in an orderly fashion. According to the SEC (2013), the reforms are designed to reduce the susceptibility of MMFs to heavy redemptions, and to reduce contagious effects on other MMFs. The reforms are also designed to increase transparency of credit, liquidity, and interest rate risks. Specifically, the reforms are designed to reduce exposure to the risk of lower rated securities (second tier securities), to strengthen maturity limitations on portfolio securities, and to stipulate diversification, liquidity, and disclosure requirements. The reforms also introduce both MMF stress testing requirements and a new rule under the Investment Company Act (Rule 22e-3) that permits a board of directors to protect shareholders by suspending redemption and by liquidating a fund in danger of breaking the buck (FSOC, 2012, pp. 9-11).

For all of the three categories of MMFs, the amendments are designed to reduce credit risk, liquidity risk, and interest rate risk, and to reduce the susceptibility of MMFs to runs that might adversely affect the U.S. financial system. Plantier (2014) shows that MMFs generally hold liquidity above the minimum requirements and that their liquidity ratios change very little in any given month. However, MMF liquidity has increased substantially as a result of the reforms and, as of June 2012, MMFs exceeded the SEC's minimum liquidity requirements (ICI, 2013). Moreover, although government MMFs are more liquid than prime MMFs, the prime funds' portfolios are becoming more similar to those of government funds.

Following the 2010 reforms, MMFs were affected by two financial market shocks, including the U.S debt ceiling impasse, which ended in the first week of August 2011, and the Eurozone debt crisis which arose in 2010 and peaked in June 2011 (ICI, 2013). According to ICI, prime funds suffered greater outflows than did government funds during the summer of 2011. Prime funds have substantial investments in European banks which invest in U.S. Treasury and Agency securities, have substantial deposits at the Fed and make consumer loans to U.S. citizens. In response to the Eurozone crisis, prime funds reduced their holdings of Eurozone bank securities in order to minimize their exposure to credit risk.[3] Prime funds also shortened the maturity of portfolio securities and maintained levels of liquidity above those required by the 2010 reforms (ICI, 2013). Accordingly, prime funds took only marginally more credit risk than Treasury and tax-exempt funds.

The 2011 Eurozone debt crisis and the U.S. debt ceiling impasse tested the 2010 amendments to Rule 2a-7, and according to the Investment Company Institute (2013), MMFs passed the test by reducing risks and by meeting substantial investor redemptions.

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[2] *According to SEC (2012), MMFs are not permitted under existing federal securities statutes. They exist as a result of special exemption granted by the SEC, known as Rule 2a-7, which was adopted by the SEC in 1983.*

[3] *Ennis and Haltom (2014) find that, unlike prime funds, government funds and tax-exempt funds did not experience major problems during the financial crisis of 2007 and 2008.*

The objective of this study is to investigate the effects of the 2010 SEC reforms on MMF investment performance. The reforms are designed to reduce the exposure of MMF portfolios to liquidity, credit, and interest rate risks. Past studies of common stock returns and equity mutual fund returns generally indicate that mutual funds holding more liquid stocks significantly underperform those holding less liquid stocks, and that liquidity investment style produces risk-adjusted returns that exceed those of three best-known market anomalies (Idzorek, et al., 2012).[4] Accordingly, I hypothesize that the SEC reforms likely affected MMFs' investment performance adversely, especially from 2010 onwards.

THE DATA

The sample consists of three major categories of money market mutual funds, including "Government" funds, "Municipal" funds, and "Prime" funds. For each fund, I obtained from the Morningstar Principia database monthly net asset values, net assets per share, and portfolio turnover ratios from April 1993 to March 2013. I also acquired, from the same database, the percentages of the mutual fund's portfolio represented by domestic stocks, foreign stocks, bonds, and cash. I obtained corresponding monthly rates of return for the 20 year study period, along with the rates of return on three benchmark indices shown as best fitting MMFs, including the SBBI 30 Day Treasury Bill returns (for the government funds), the Barclays Municipal index (for the municipal funds), and the Barclays 1-5 Year Government/Corporate index (for the prime funds).[5] Finally, I collected monthly U.S. inflation rates from the Federal Reserve District Bank of St. Louis.[6]

The final sample consists of 92 money market mutual funds. Table 1 shows the characteristics of the sample. As expected, cash and near cash items make up 100% of the average MMF portfolio. During the study period, the NAV of the average fund was constant at $1 per share, and the average portfolio turnover of both the government funds and municipal funds was quite low. The portfolio turnover of government funds was zero, and the portfolio turnover of an average municipal fund was quite low at 1.23%. The average prime fund had a 253% portfolio turnover with a substantial month-to-month variability, suggesting that the fund purchased and replaced its entire portfolio securities within a period of less than five months, on average. Finally, the average prime fund was largest in the size of net assets, and the average municipal fund was smallest. The average net assets of a prime fund was $11.4 billion versus $3.5 billion and $2.7 billion for government and municipal funds, respectively.

THE METHODOLOGY

I measured the investment performance of each money market mutual fund using two alternative performance measures, including the Sharpe Information Ratio and the Jensen's Alpha. I estimated the Jensen's Alpha as follows:

$$r_{pt} = \hat{\alpha}_p + \hat{\beta} r_{mt} + e_{pt}, \qquad [1]$$

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 fund's benchmark 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, $\hat{\alpha}_p$. The alternative performance measure, the Sharpe

[4] *Idzorek, et al. (2012) provides a summary of past studies that investigate the relation between stock returns and the levels of portfolio liquidity. The present study focuses on money market mutual funds which are known to hold short-term debt securities rather than equity securities.*

[5] *Some of the indices shown on the database do not appear to be representative of the portfolio securities of the typical money market fund. For example, the Barclays Municipal 20 Year index is not likely to be appropriate since MMFs typically invest in short-term money market securities.*

[6] *http://research.stlouisfed.org/fred2/*

Information Ratio is 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 both total risk and systematic risk. This is crucial for performance measurement because previous studies show that mutual fund portfolios, on average, contain significant idiosyncratic risks (see Bello, 2005). 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).[7]

RESULTS

Results for the Full Sample Period

Panel A of Table 2 contains estimated performance measures for the three categories of money market mutual funds and for the entire sample. In both instances, the estimated Sharpe ratios are generally negative and statistically insignificant. Although not shown in the Table, the Sharpe ratio for each of the 92 mutual funds is similarly negative and statistically insignificant. This outcome of consistently negative performance measures might have been caused by the lack of fit between the mutual fund portfolios and their respective benchmark indices. Most of the indices shown in the Morningstar Principia, such as the Barclays Municipal 20 Year index, are not likely to match the portfolio securities typically held by a money market mutual fund. This 20 year municipal fund index, in particular, has not been used in this study. The Sharpe ratios for the municipal fund category as shown in Table 2 are significantly worse than those for the full sample (-0.496 versus -0.400) and the municipal funds' tracking error is larger (1.479 versus 1.461). The government funds and the prime funds have smaller tracking errors and better Sharpe ratios (-0.339 and -0.337, respectively). The tracking errors for each category are substantial, further highlighting the lack of fit between the benchmark indices used and the money market mutual funds' portfolios.

The estimated Jensen's alphas shown in Panel B of Table 2 provide a similar picture of the investment performance of money market funds. For the government funds and the prime funds, the alphas are all close to zero. For the municipal funds and for the full sample, however, the alphas are negative and statistically significant. And for all three categories of money market funds and for the full sample, the estimated betas were close to zero, highlighting the lack of fit between the indices used and the funds' portfolios. In summary, the investment performance of MMFs was poor, as one would expect. Portfolios

[7] *See Reilly and Brown (2009) concerning the measurement of tracking error.*

of cash and near cash assets may be appropriate as cash management vehicles, but not for investment purposes.

Results for Separate Sub-periods

To investigate the possible effects of the 2010 SEC reforms on the estimated Sharpe ratios and Jensen's alphas, I divided the sample into four separate sub-periods: April 1993 to December 1999, January 2000 to December 2006, January 2007 to January 2010, and February 2010 to March 2013. The estimated Sharpe ratios for the April 1993 to December 1999 were all negative and not statistically significant. Table 3 contains the results for the latter three sub-periods, and Table 4 shows corresponding Jensen's alphas.[8]

As shown in Table 3, the Sharpe performance measures for the period of severe financial crisis from 2007 to 2010 was -0.511. As expected, this is significantly smaller than the corresponding ratio for the previous period of high level of economic activity from January 2000 to December 2006 (-0.391). The period beginning in February 2010 marks the implementation of SEC reforms and includes both the U.S. debt ceiling impasse and the Eurozone debt crisis. However, these financial crises were relatively minor compared with the more intense financial crisis of 2007 to 2010, especially from 2007 to 2008. The SEC reforms are designed to reduce both systematic risk and unsystematic risk, and to increase both liquidity and credit quality requirements. I expect that a higher level of liquidity would impose opportunity costs on money market mutual funds.

The Sharpe ratios for the period of SEC reforms are substantially smaller than those for the previous period of severe financial crises (-0.718 versus -0.511). However, tracking error (TE) is lower during the reform period (0.628 versus 1.772), as shown in Table 3. This suggests that the reforms did stabilize money market fund portfolios but that they imposed some opportunity costs. Similarly, the performance measures for the government, municipal, and prime funds are worse but tracking errors are all smaller during the reform period in comparison to the 2007 to January 2010 period. The Jensen's alphas shown in Table 4 tell the same story. The alphas are significantly smaller during the reform period for the sample and for the three sub-samples. For the full sample, for example, the Jensen's alpha was 0.012 during the severe financial crisis of 2007 to January 2010 period, and -0.003 during the SEC reform. In all cases, the estimated portfolio betas are all close to zero, indicating a mismatch between the indices and the funds' portfolios. We do not, of course, expect a money market mutual fund portfolio to be very volatile.[9]

Effects of Inflation on Funds' Portfolios

To investigate the effect of inflation on mutual fund returns, we regressed monthly fund returns on monthly U.S. inflation rates separately for each money market mutual fund category and for the entire sample of funds, as follows:

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

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. Government Funds

$$R_p = 0.099 + 0.049Inflation + e$$
$$(18.18)^* \quad (24.72)^*$$

2. Municipal Funds

$$R_p = 0.066 + 0.036Inflation + e$$
$$(24.34)^* \quad (35.91)^*$$

3. Prime Funds

[8] *Notice that I am not specifically testing for announcement effects in this study.*

[9] *The market indices are reported in the Morningstar Principia database as best fitting indices for the money market mutual funds. The portfolio betas reported in the database are similarly zero or close to zero for each money market mutual fund.*

$$R_p = 0.093 + 0.051 Inflation + e$$
$$(19.53)^* \quad (29.34)^*$$

4. Full Sample

$$R_p = 0.083 + 0.045 Inflation + e$$
$$(33.770)^* \quad (49.350)^*$$

For the full sample and for each of the three categories of money market mutual funds, the estimated slopes were close to zero although they were significantly different from zero. The largest slope was 0.051 for the prime funds, and the smallest slope was 0.036 for the municipal funds. For the full sample, the slope was 0.045. Because these numbers are much lower that unity, we conclude that money market mutual funds are a poor hedge against inflation. This outcome is of course predictable since cash and near cash items typically held by money market mutual funds are known to be a poor hedge against inflation.

SUMMARY AND CONCLUSIONS

I investigated the effects of the 2010 SEC regulatory reforms on the portfolio characteristics and investment performance of the three major categories of money market mutual funds (MMFs) from April 1993 to March 2013. MMFs are regulated under the Investment Company Act (1940) and the SEC Rule 2a-7, which require MMFs to meet specified credit quality and maturity standards concerning their portfolio securities, and which permit MMFs to maintain perpetual $1 net assets value (NAV) per share.

As a result of the problems faced by MMFs during the financial crisis of 2007 to 2008, the SEC adopted significant reforms of Rule 2a-7 in January 2010, designed to reduce the credit risk, liquidity risk, and interest rate risk, and to make MMFs more resilient to runs that might adversely affect the financial system. As a result of the reforms, the liquidity of MMFs increased substantially. Following the 2010 reforms, MMFs were affected by two financial shocks: the U.S. debt ceiling impasse which ended in the first week of 2011, and the Eurozone debt crisis which peaked in June 2011.

My sample indicates that during the study period, the average prime fund had a 253% portfolio turnover, versus 1.23% turnover for the average municipal fund and a zero turnover for the average government fund. The average prime fund is larger than a government fund, which in turn is larger than a municipal fund, in terms of the size of net assets. All of the money market funds were 100% invested in cash and near cash assets.

The computed Sharpe information ratios indicate that the investment performance of each of the three categories of funds was not statistically different from zero during the study period. Portfolio tracking errors are substantial, indicating a lack of fit between the benchmark indices used and the MMF portfolios. The municipal fund category had the worst performance and the largest tracking error, whereas the prime fund category had the best performance and the smallest tracking error. The computed Jensen's alphas provide a similar picture of the performance of MMFs. The measured portfolio betas were all quite small again indicating a problem with the benchmark indices.

Segmenting the sample revealed that the sub-period during which SEC reforms were implemented had markedly worse performance compared with the previous period of the most severe financial crisis since the Great Depression. We attribute part of this poor performance to the opportunity costs of a much higher liquidity requirement imposed on MMFs during the latter period. The standard deviation of returns and portfolio tracking errors were however markedly smaller, suggesting that the SEC reforms did stabilize MMF portfolios during the February 2010 to March 2013 period.

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Table 1
Sample Characteristics of Money Market Mutual Funds
(April 1993 – March 2013)

Variable	Government Funds			Municipal Funds			Prime Funds		
	N	Mean	Std.	N	Mean	Std.	N	Mean	Std.
Nassets ($mm)	24	3516.42	4073.50	36	2687.66	5435.86	32	11347.92	25850.28
DStocks %	24	0	0	36	0	0	32	0	0
FStocks %	24	0	0	36	0	0	32	0	0
Bonds %	24	0	0	36	0	0	32	0	0
Cash %	24	100.00	0	36	100.00	0	32	100.00	0
Turover	2	0	0	13	1.23	4.44	5	253.20	456.97
NAV	24	1.00	0	36	1.00	0	32	1.00	0

Note:
Nassets represents the fund's net assets (in millions of dollars); 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; Cash is the percentage of the fund's portfolio represented by cash and near cash assets; Turnover refers to the fund's average portfolio turnover; and NAV is the fund's average net asset value.

Table 2
The Investment Performance of Money Market Mutual Funds
(April 1993 – March 2013)

Variable	N	Mean	Std. Dev.	tstat	N	Mean	Std. Dev.	tstat
Panel A: Sharpe Information Ratios								
Government:					**Municipal:**			
S_p	24	-0.339	0.054	-0.022	36	-0.496	0.034	-0.032
TE	24	1.447	0.039	---	36	1.479	0.021	---
Prime:					**Sample:**			
S_p	32	-0.337	0.072	-0.022	92	-0.400	0.095	-0.026
TE	32	1.451	0.033	---	92	1.461	0.033	---
Panel B: Jensen's Alphas								
Government:					**Municipal:**			
$\hat{\alpha}_p$	24	0.001	0.001	1.400	36	-0.072	0.001	88.86*
$\hat{\beta}_p$	24	0.013	0.001	11.000*	36	0.005	0.001	7.29*
Prime:					**Sample:**			
$\hat{\alpha}_p$	32	0.000	0.001	0.310	92	-0.028	0.040	-56.83*
$\hat{\beta}_p$	32	0.015	0.002	9.910*	92	0.003	0.001	5.93*

Note:
N is the number of mutual funds in the sample. The performance measures were estimated using 240 monthly returns for each fund. The Sharpe Information Ratios (S_p), the associated t statistics, and the tracking errors (TE) were calculated using equations [2], [3], and [4] as follows:

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

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

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

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

$$r_{pt} = \alpha_p + \hat{\beta}_p r_{mt} + e_{pt} \qquad (1)$$

*Significant at the 5% level. All variables are as defined in the "Methodology" section.

Table 3
Performance of Money Market Mutual Funds over Time:
Sharpe Information Ratios

Variable	N	Mean	Std. Dev.	tstat
January 2000 – December 2006:				
Sample				
S_p	92	-0.391	0.123	-0.025
TE	92	1.551	0.067	---
Government				
S_p	24	-0.317	0.132	-0.021
TE	24	1.520	0.116	---
Municipal				
S_p	36	-0.490	0.043	-0.032
TE	36	1.577	0.013	---
Prime				
S_p	32	-0.334	0.100	-0.022
TE	32	1.543	0.037	---
January 2007 –January 2010:				
Sample				
S_p	92	-0.511	0.064	-0.033
TE	92	1.772	0.022	---
Government				
S_p	24	-0.498	0.044	-0.032
TE	24	1.766	0.015	---
Municipal				
S_p	36	-0.564	0.036	-0.037
TE	36	1.795	0.007	---
Prime				
S_p	32	-0.460	0.054	-0.030
TE	32	1.752	0.014	---
February 2010 – March 2013:				
Sample				
S_p	92	-0.718	0.040	-0.047
TE	92	0.628	0.029	---
Government				
S_p	24	-0.727	0.004	-0.047
TE	24	0.625	0.001	---
Municipal				
S_p	36	-0.713	0.060	-0.046
TE	36	0.632	0.047	---
Prime				
S_p	32	-0.718	0.020	-0.046
TE	32	0.624	0.002	---

Note:
Std Dev. signifies the calculated standard deviation of the estimated parameter. The Sharpe information ratio and the tracking error (TE) were estimated as follows:

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

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

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

All variables are as defined in the Methodology section.
*significant at the 5% level.

Table 4
Performance of Money Market Mutual Funds over Separate Sub-periods: Jensen's Alpha

Variable	N	Mean	Std. Dev.	tstat
January 2000 – December 2006:				
Sample				
$\hat{\alpha}_p$	92	-0.042	0.001	-59.87*
$\hat{\beta}_p$	92	-0.002	0.001	-2.03*
Government				
$\hat{\alpha}_p$	24	-0.013	0.001	-17.26*
$\hat{\beta}_p$	24	0.007	0.002	4.31*
Municipal				
$\hat{\alpha}_p$	36	-0.083	0.001	-75.28*
$\hat{\beta}_p$	36	0.002	0.001	1.55
Prime				
$\hat{\alpha}_p$	32	-0.019	0.001	-18.81*
$\hat{\beta}_p$	32	0.004	0.002	1.69
January 2007 –January 2010:				
Sample				
$\hat{\alpha}_p$	92	0.012	0.001	10.09*
$\hat{\beta}_p$	92	0.004	0.001	3.69*
Government				
$\hat{\alpha}_p$	24	0.017	0.002	-10.46*
$\hat{\beta}_p$	24	0.016	0.003	5.80*
Municipal				
$\hat{\alpha}_p$	36	-0.018	0.002	-8.23*

$\hat{\beta}_p$	36	0.001	0.001	0.41
Prime				
$\hat{\alpha}_p$	32	0.034	0.002	17.42*
$\hat{\beta}_p$	32	0.030	0.003	8.73*
February 2010 – March 2013:				
Sample				
$\hat{\alpha}_p$	92	-0.003	0.000	-8.21*
$\hat{\beta}_p$	92	-0.000	0.001	-0.30
Government				
$\hat{\alpha}_p$	24	-0.004	0.000	-26.62*
$\hat{\beta}_p$	24	-0.004	0.001	-4.94*
Municipal				
$\hat{\alpha}_p$	36	-0.003	0.001	-2.61*
$\hat{\beta}_p$	36	-0.000	0.001	-0.30
Prime				
$\hat{\alpha}_p$	32	-0.003	0.000	-13.09*
$\hat{\beta}_p$	32	-0.001	0.001	-0.93

Note:
Std. Dev. Signifies the calculated standard error of the estimated parameter, and tstat is the calculated t-statistic. The performance measures were estimated as follows:

$$r_{pt} = \hat{\alpha}_p + \hat{\beta}_p r_{mt} + e_{pt}.$$

All variables are as defined in the Methodology section.
*Significant at the 5% level.