



Saïd Business School
UNIVERSITY OF OXFORD

Mitigating equity market risk with investor sentiment

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In conjunction with

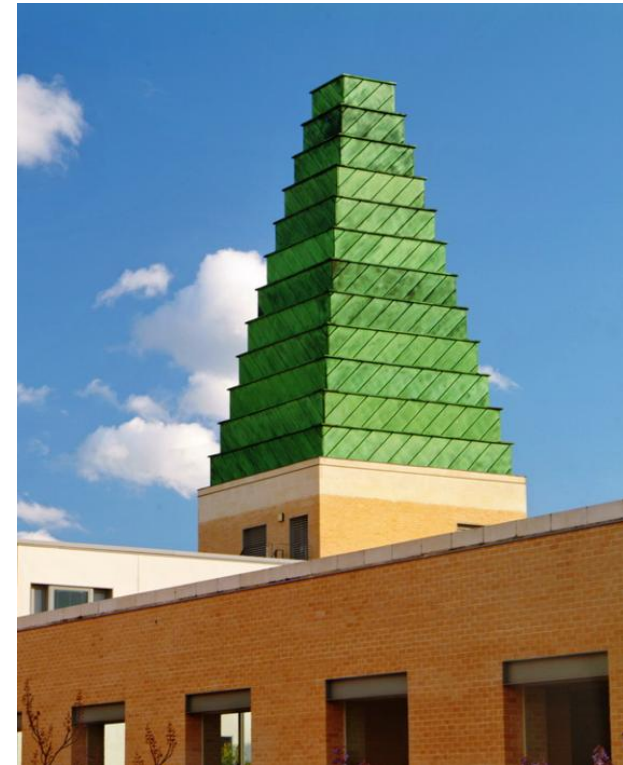
THURLEIGH | Investment
Managers

Andrey Karpov, Hiroki Shimada, Kenneth Tan
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Research Objectives



- Filling gaps left unexplained by the Market Equilibrium Theory
- Assumptions:
 - Sentiment and Market Efficiency do not always contradict each other*
 - Investor sentiment is over-optimism/pessimism about future fundamentals*
 - Role of investor sentiment varies market by market*
 - Investor sentiment is a non-linear phenomenon*

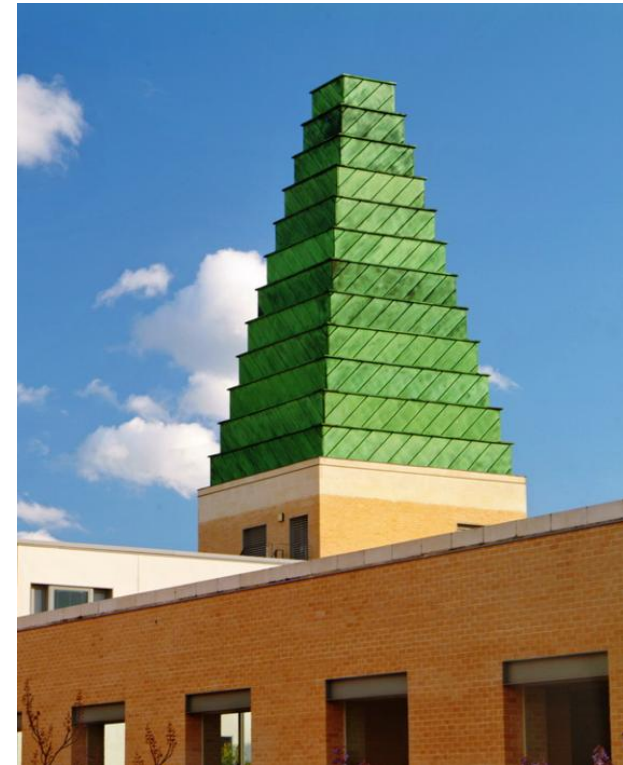


“Developing a statistical model, based on investor sentiment, capable of estimating the probability of extremely negative returns in the US equity market.”

Limitations of Research



- The sample period of 19 years includes 225 months and only 21 month with extremely negative returns
- Low number of “fat tail” observations imposes limitations on the accuracy of estimation
- The scope of our research and the nature of selected indicators require a trade-off between the sample size and the combination of particular variables
- The model incorrectly classifies certain non “fat tail” events, in particular months with excess positive returns, and therefore limits the upside potential of investments



Multivariate Regression Analysis



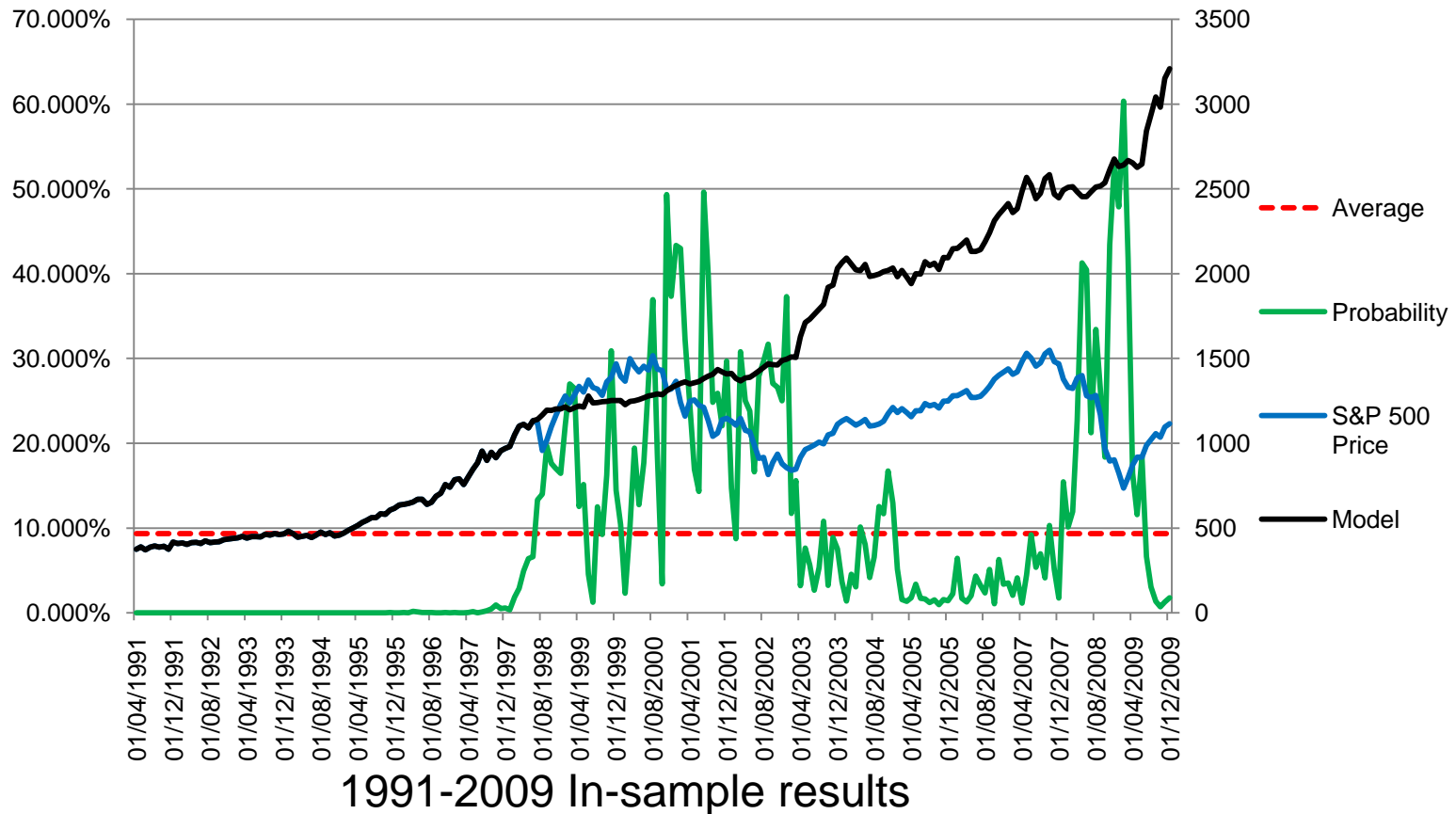
- Benchmarking against the S&P500
 - from April 1991 to Dec 2009 (In-sample)
 - from Jan 2010 to Sep 2010 (Out-of-sample)
 - From Jan 2007 to Sep 2010 (Out-of sample) w/ 3 variables
- Measures
 - (a) Average Log Returns
 - (b) Standard Deviation
 - (c) Sharpe Ratio
 - (d) Downside semi standard deviation
 - (e) Sortino Ratio
 - (f) Kurtosis
 - (g) Skewness
- Asset allocation rules
 - Allocate 100% of our portfolio to the JP Morgan developed government bond index, or to the S&P500

Multivariate Regression Analysis



- Asset allocation rules

cut-off for risk on/off at 9.3%, allocate 100% of our portfolio to the JP Morgan developed government bond index, or to the S&P500



Multivariate Regression Analysis



In-sample(1991-2009) Risk Profile

1991-2009			
	S&P 500	JPM govt bond	Model
Average Log Returns	0.058	0.063	0.113
St. Dev	0.150	0.032	0.087
Sharpe Ratio	0.386	1.955	1.292
Downside SemiStDev	0.097	0.014	0.040
Sortino Ratio	0.595	4.566	2.813
Skewness	-0.908	-0.187	0.276
Kurtosis	2.077	0.315	1.042

Out-of-sample(2010) Risk Profile

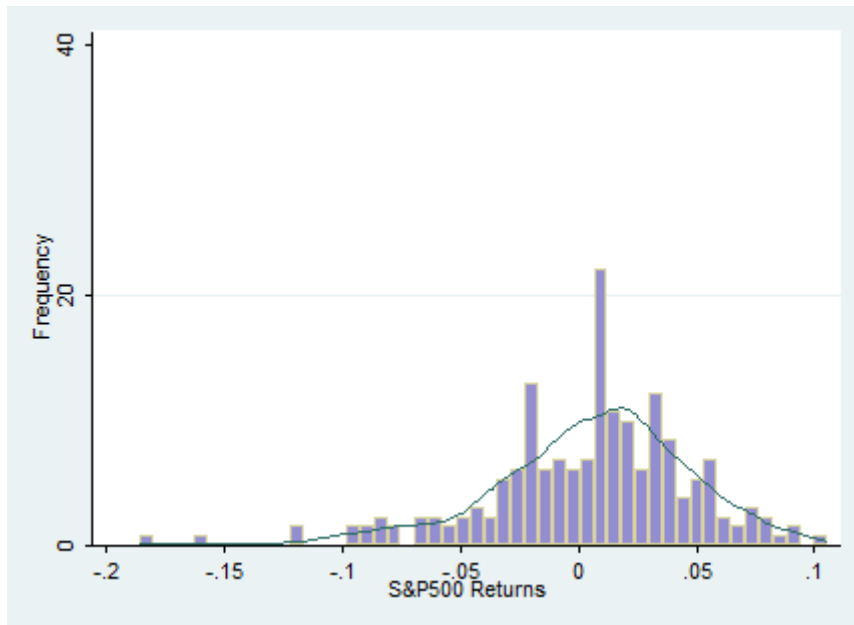
Jan 2010 - Sep 2010			
	S&P 500	JPM govt bond	Model
Average Log Returns	0.029	0.086	0.044
St. Dev	0.211	0.024	0.116
Sharpe Ratio	0.136	3.604	0.380
Downside SemiStDev	0.112	0.024	0.116
Sortino Ratio	0.255	3.604	0.380
Skewness	-0.080	0.332	-0.448
Kurtosis	-1.684	0.623	0.408

Multivariate Regression Analysis

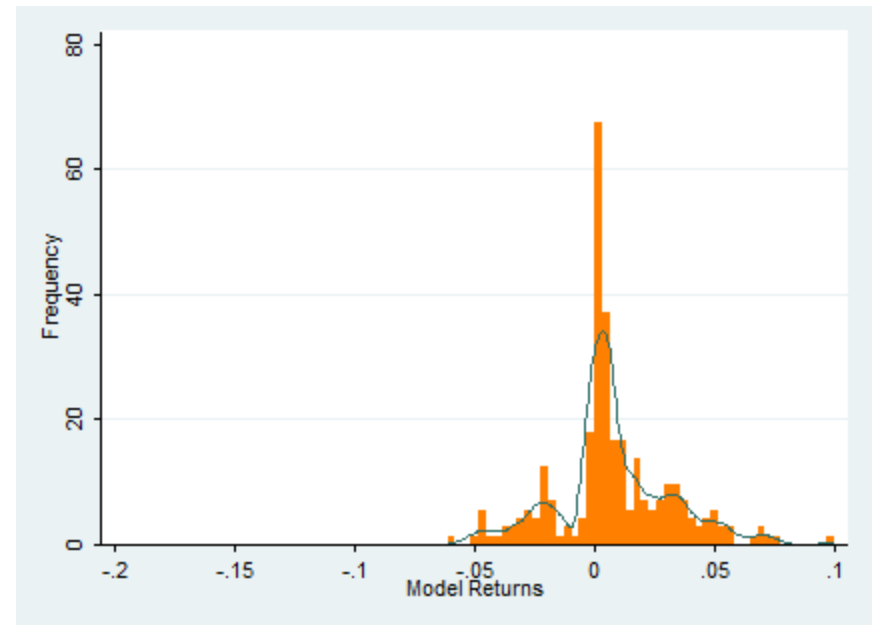


- Distribution Graphs for In-sample 1991-2009

S&P500 Distribution graph of Returns



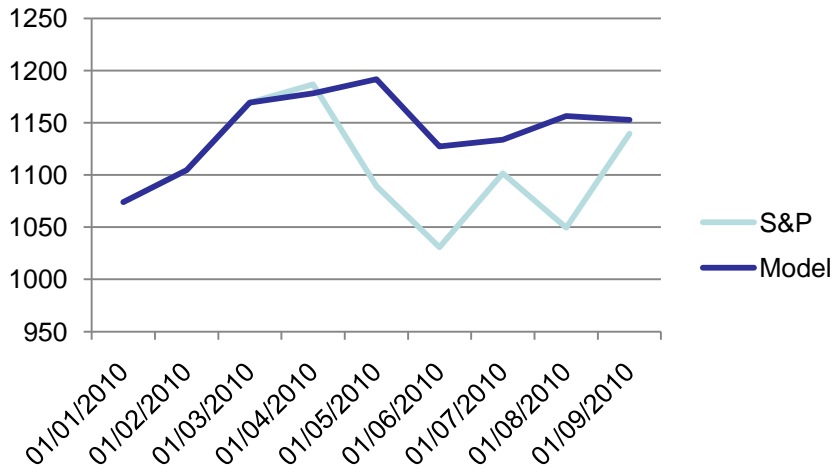
Model Distribution Graph of Returns



Multivariate Regression Analysis



- 2010 Out-of-sample results



Date	S&P 500 Price	S&P 500 log Returns	z	p
1/29/2010	1073.87	-3.768%	-1.599	5.491%
2/26/2010	1104.49	2.811%	-1.683	4.617%
3/31/2010	1169.43	5.713%	-1.677	4.675%
4/30/2010	1186.69	1.465%	-1.221	11.109%
5/31/2010	1089.41	-8.553%	-1.264	10.303%
6/30/2010	1030.71	-5.539%	-1.997	2.289%
7/30/2010	1101.6	6.652%	-0.833	20.236%
8/31/2010	1049.33	-4.861%	-0.956	16.958%
9/30/2010	1139.42	8.24%	-1.224	11.045%

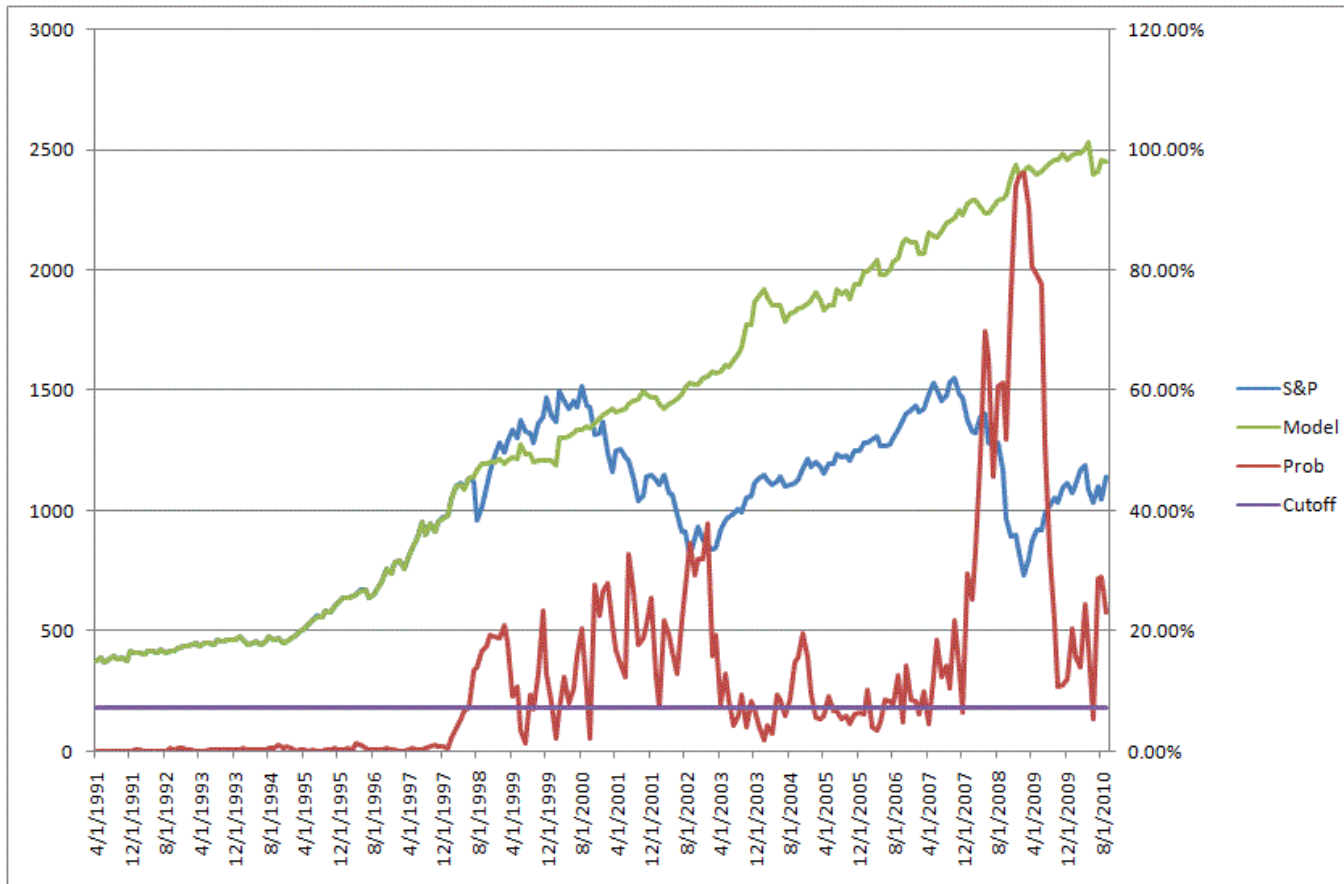
1991-2009			
	S&P 500	JPM govt bond	Model
Average Log Returns	0.058	0.063	0.113
St. Dev	0.150	0.032	0.087
Sharpe Ratio	0.386	1.955	1.292
Downside SemiStDev	0.097	0.014	0.040
Sortino Ratio	0.595	4.566	2.813
Skewness	-0.908	-0.187	0.276
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Multivariate Regression Analysis



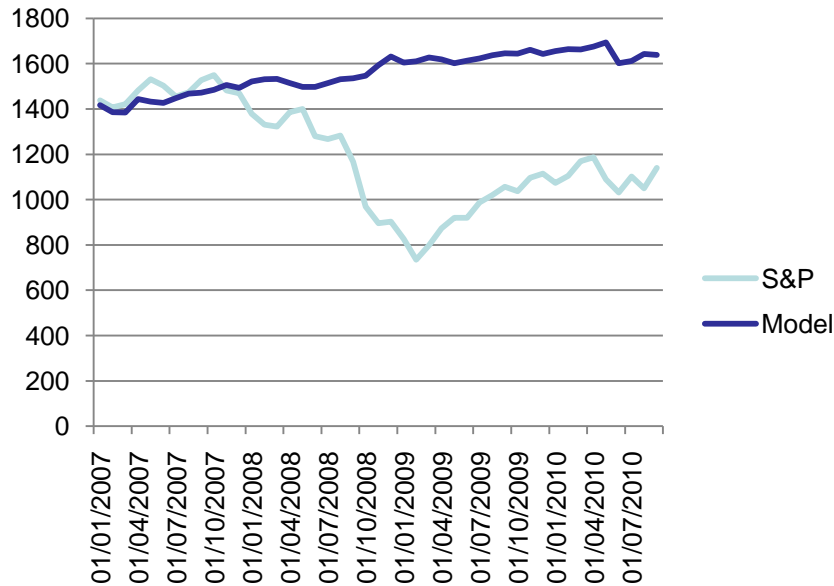
- Out of Sample Testing (2007-10) using 3 variables



Multivariate Regression Analysis



- Out of Sample Testing (2007-10) using 3 variables



1991-2006

	S&P 500	JPM govt bond	Model
Average Log Returns	0.084	0.066	0.110
St. Dev	0.137	0.031	0.088
Sharpe Ratio	0.617	2.077	1.252
Downside SemiStDev	0.082	0.013	0.040
Sortino Ratio	1.024	4.872	2.719
Skewness	-0.669	-0.267	0.393
Kurtosis	1.498	0.425	1.511

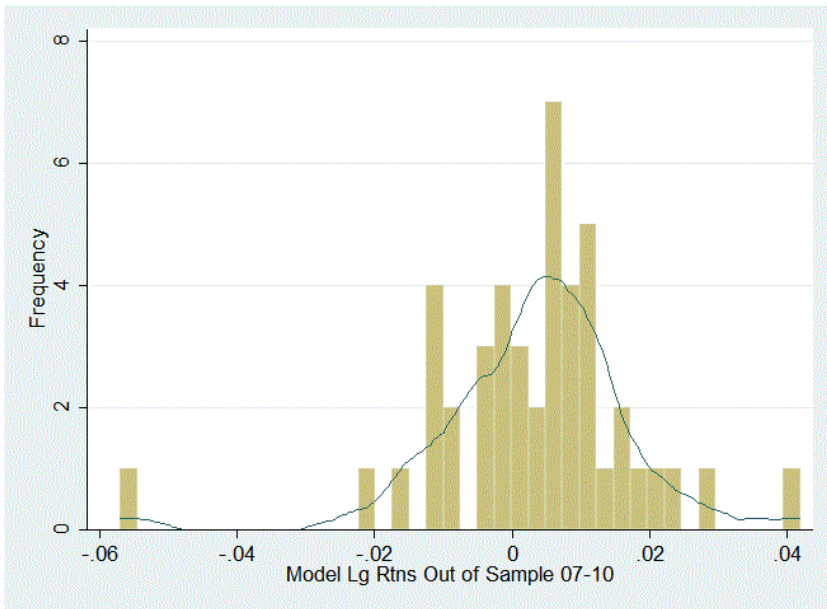
Jan 2007 - Sep 2010

	S&P 500	JPM govt bond	Model
Average Log Returns	-0.058	0.059	0.039
St. Dev	0.204	0.034	0.052
Sharpe Ratio	-0.286	1.744	0.748
Downside SemiStDev	0.142	0.034	0.052
Sortino Ratio	-0.411	1.744	0.748
Skewness	-0.760	0.052	-1.004
Kurtosis	0.674	0.317	5.089

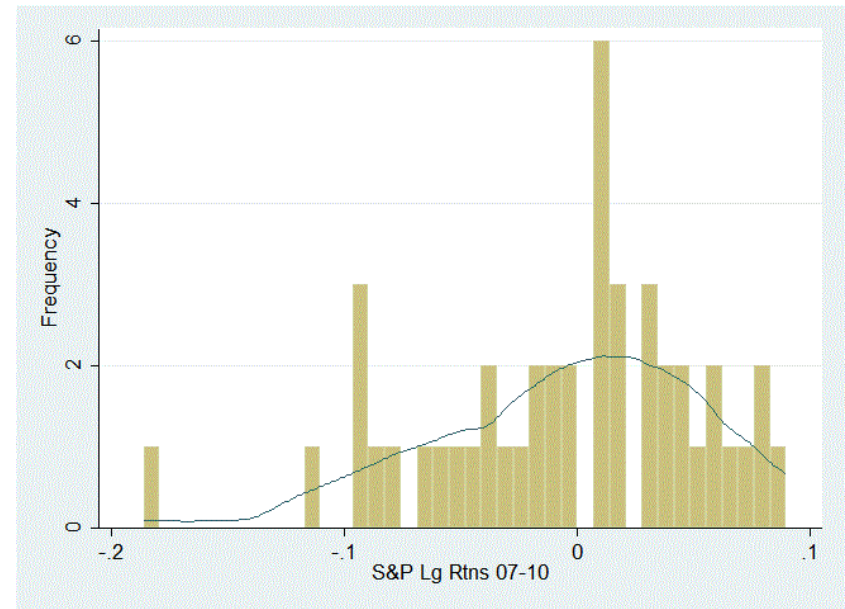
Multivariate Regression Analysis



- Out of Sample Testing (2007-10) using 3 variables



Model



S&P



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- Multivariate conclusions
 - Out-of-sample testing of 3 years show consistency and robustness of model
 - Downside risk is mitigated with the model