Can Hedge Funds Time the Market?

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Das Projekt "Futures"

- Gefördert durch die EU (FP7, Marie-Curie)
- Typ: Industry-Academia Partnership and Pathways
- Volumen 817.402,30€
- Dauer: 48 Monate (Mai 2013 – April 2017)
- Website: www.Futuresproject.eu

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This project is funded by the Seventh Framework Programme of the European Union

Das Projekt "Futures"

- Ziel des Projektes:
  "…is focusing on joint research projects aiming to boost the exchange of skills between the commercial and non-commercial sector."

Das Projekt "Futures": Partner

Prof. Michael Frömmel (coordinator)

Prof. Michael J. Moore

Dr. Youwei Li

Dr. Alexander Mende

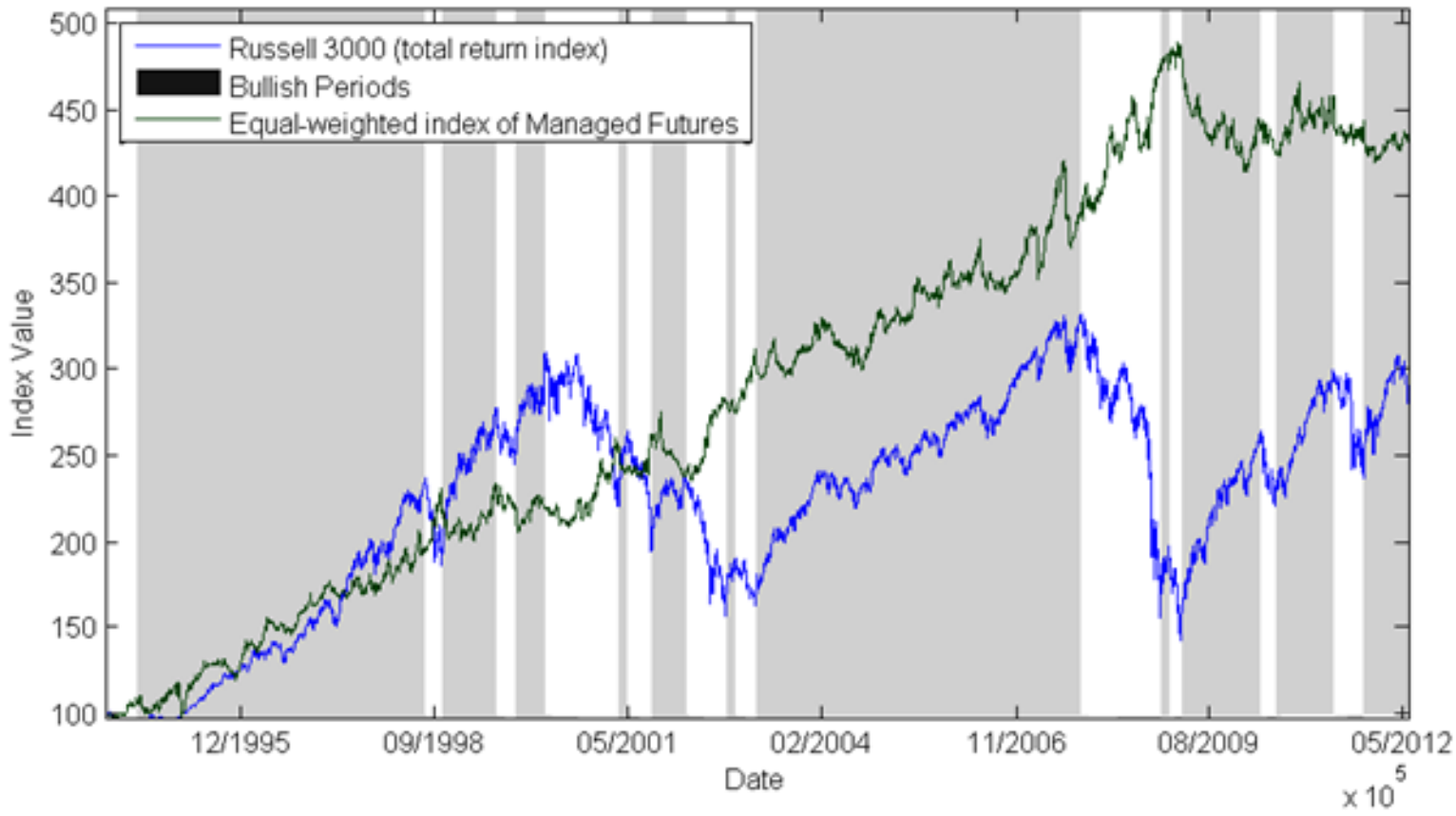
Das Projekt "Futures"

- Thema:
- Commodity Trading Advisors/Managed Futures
- "Generally speaking, a CTA fund is a hedge fund that uses futures contracts to achieve its investment objective."
- "The majority of CTAs are systematic traders or trend followers (roughly 2/3) with the ability to go long and short and to use leverage."

Das Projekt "Futures"

- "The majority of CTAs are systematic traders or trend followers (roughly 2/3) with the ability to go long and short and to use leverage."
- "Systematic traders: $269.33 billion in AUM. In contrast, discretionary traders managed $27.57 billion as of the third quarter of 2011."
- Perfekt zur Diversifikation!

FIGURE 1: Evolution CTA Index



Das Projekt "Futures"

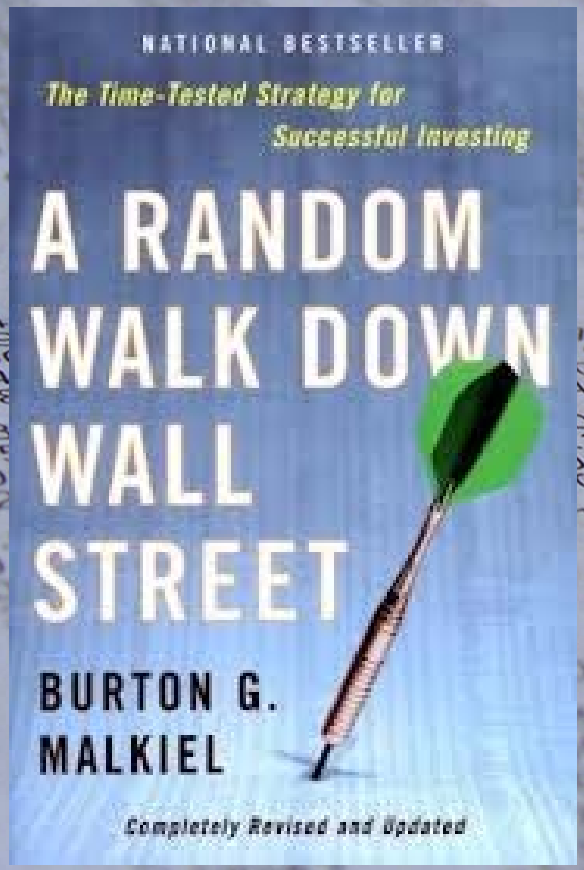
- Zwei Datenquellen:
1. Barclayhedge database
2. RPM's private data

GENERAL	Global	Hedge Fund	FoF	CTA	Graveyard	Contact
Number of reporting funds	6187	5083	1199	1104	15114	25162
Number of reporting management companies	2258	1641	258	617	5590	9706
Number of funds added this month	19	14	1	5	3	19
Number of funds added in previous month	114	82	13	32	72	114
Annual refreshes	24	24	24	24	24	12
Cost (annual subscription)	USD 6,000	USD 4,500	USD 2,000	USD 3,000	USD 4,000	USD 4,500
DISTRIBUTION						
Managers domiciled in USA	59.30%	58.81%	50.39%	60.62%	68.35%	60.98%
Managers domiciled in Europe	24.80%	23.40%	38.76%	28.53%	18.46%	19.71%
Managers domiciled in Caribbean	12.84%	14.44%	5.04%	8.59%	8.59%	3.69%
Managers domiciled in Rest of World	3.06%	3.35%	5.81%	2.27%	4.60%	15.62%
Funds domiciled in USA	30.34%	23.94%	17.68%	59.78%	35.68%	31.21%
Funds domiciled in Europe	32.16%	36.73%	41%	11.14%	14.59%	23.41%
Funds domiciled in Caribbean	31.57%	34.47%	37.61%	18.21%	38.62%	32.86%

Portfolio Management: Performance Measurement

"Trust, but verify."
(Russian saying, often used by Vladimir I. Lenin)

Monkey Managers versus Money Managers



"A blindfolded monkey throwing darts at a newspaper's financial pages could select a portfolio that would do just as well as one carefully selected by the experts."

(Burton Malkiel in seinem Buch „A Random Walk Down Wall Street“, 1973)

Monkey Managers versus Money Managers

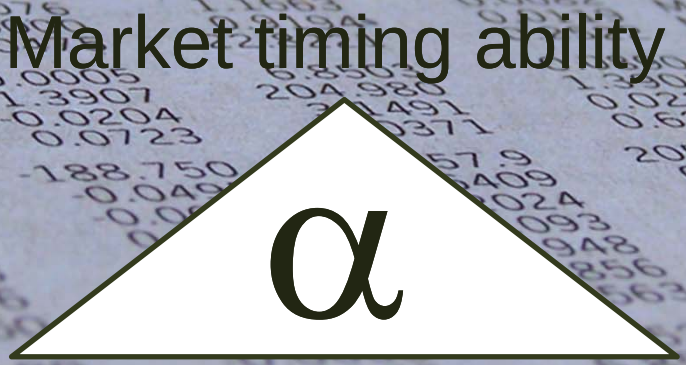
»Malkiels pessimistischer Blick auf die Fähigkeiten von Fondsmanagern hat zu dem beliebten Spiel geführt, Affen mit Finanzmarktprofis konkurrieren zu lassen.

»Beispiele:

- The Wall Street journal's dartboard contest
- Lusha, der Zirkusaffe aus Moskau

A serious question behind those funny 'monkey vs. money managers' experiments

Can professionals create excess returns?
Is there a manager alpha?



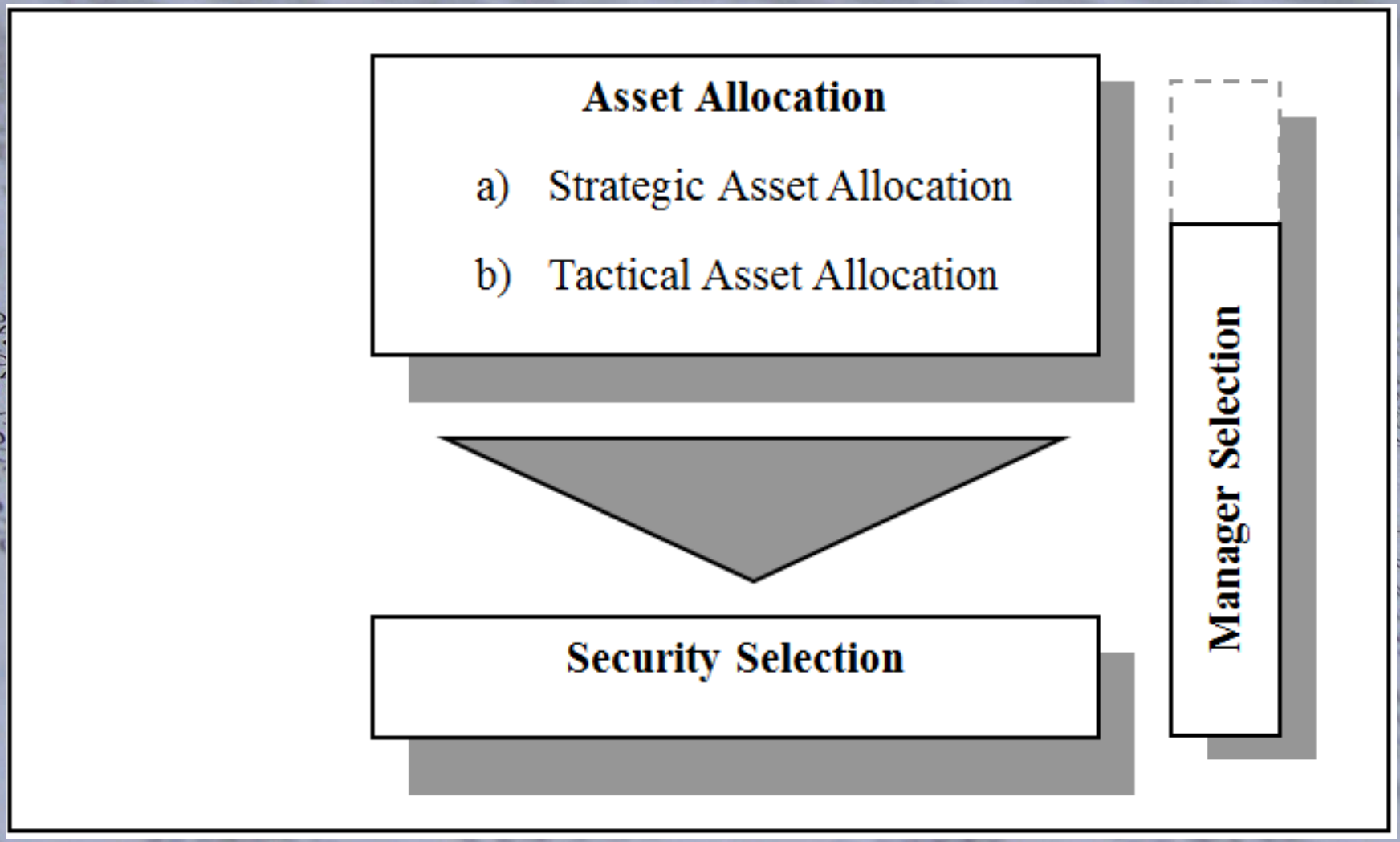
Steps of the Investment Process

» „ ... *Investors approach the investment decision in two stages. Asset allocation is the top or first stage ... Security selection is the bottom stage.“*

„*Some individual investors and many institutional investors use three stages. Asset allocation is the first stage. The second stage deals with manager selection. ... The third stage involves security selection.*“

(Sharpe et al. 2007)

Steps of the Investment Process



Tactical Asset Allocation (TAA)

	Systematic risk	Idiosyncratic risk
Beta	**Strategic Asset Allocation** Beta Indexing: compensation for taking systematic risk	--
Alpha	**Tactical Asset Allocation** Alpha TAA: alpha from timing systematic risk factors	Traditional active: alpha from **Security Selection**

Similar to Stockton and Shtekhman (2010)

TAA versus Security Selection

- Investing in assets is often possible at lower transaction costs.
- Liquidity is higher for assets than for securities.
- The correlation between assets is lower than it usually is between e.g. individual stocks, allowing more (approximately independent individual bets) $\Rightarrow$ FLAM (Grinold 1989)

Portfolio Management: Market Timing Abilities

"Buy low and sell high."

Popular saying

Portfolio Management: Market Timing Abilities

- Besides stock (security) picking market timing is a major potential source of alpha
- Market timing is the ability to “enter or leave the market at the right time”.
- Two general approaches: *portfolio-based* and *return-based*

Portfolio-based Approach

- Requires complete knowledge of the manager's portfolio, i.e. individual purchases and sales.
- For each investment it has to be determined whether the purchase/sale has been timed well.
- Complicated to perform and often lack of data.

Return-based Approach

- Compares the manager's characteristic line with benchmarks, depending on how the manager's reacts on the signals he receives (the forecast).
- Two basic models:
  1. Treynor and Mazuy (1966): Magnitude Timer
  2. Henriksson and Merton (1981): Direction Timer

The Treynor-and-Mazuy Model

- Assumes the manager *i* is a magnitude timer, i.e. increases the exposure to the market (β) depending on the signal he receives:

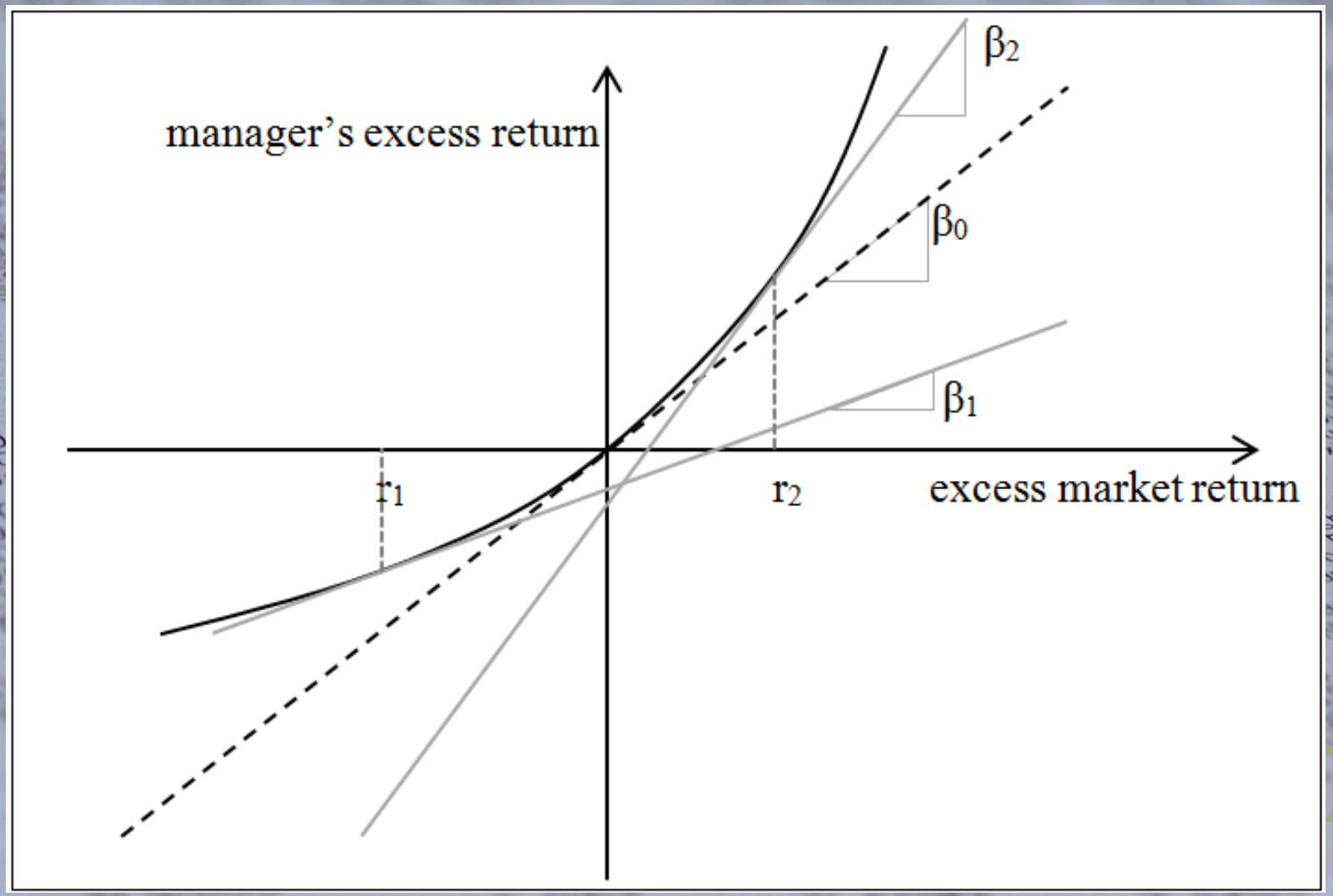
$$\beta = b + \gamma E[r_{m,t} - r_{f,t}]$$

and therefore:

$$\begin{aligned} \mathrm{E}[r_{i,t} - r_f] &= \alpha + \beta E[r_{m,t} - r_f] + \varepsilon_t \\ &= \alpha + \left(b + \gamma E[r_{m,t} - r_f]\right) E[r_{m,t} - r_f] + \varepsilon_t \\ &= \alpha + bE[r_{m,t-r_f}] + \gamma E[r_{m,t} - r_f)^2] + \varepsilon_t \end{aligned}$$

- The significance of γ is thus a test for market timing abilities!

The Treynor-and-Mazuy Model



The Henriksson-and-Merton Model

- Assumes the manager *i* is a *direction timer*, i.e. increases the exposure to the market (β) depending on the signal he receives:

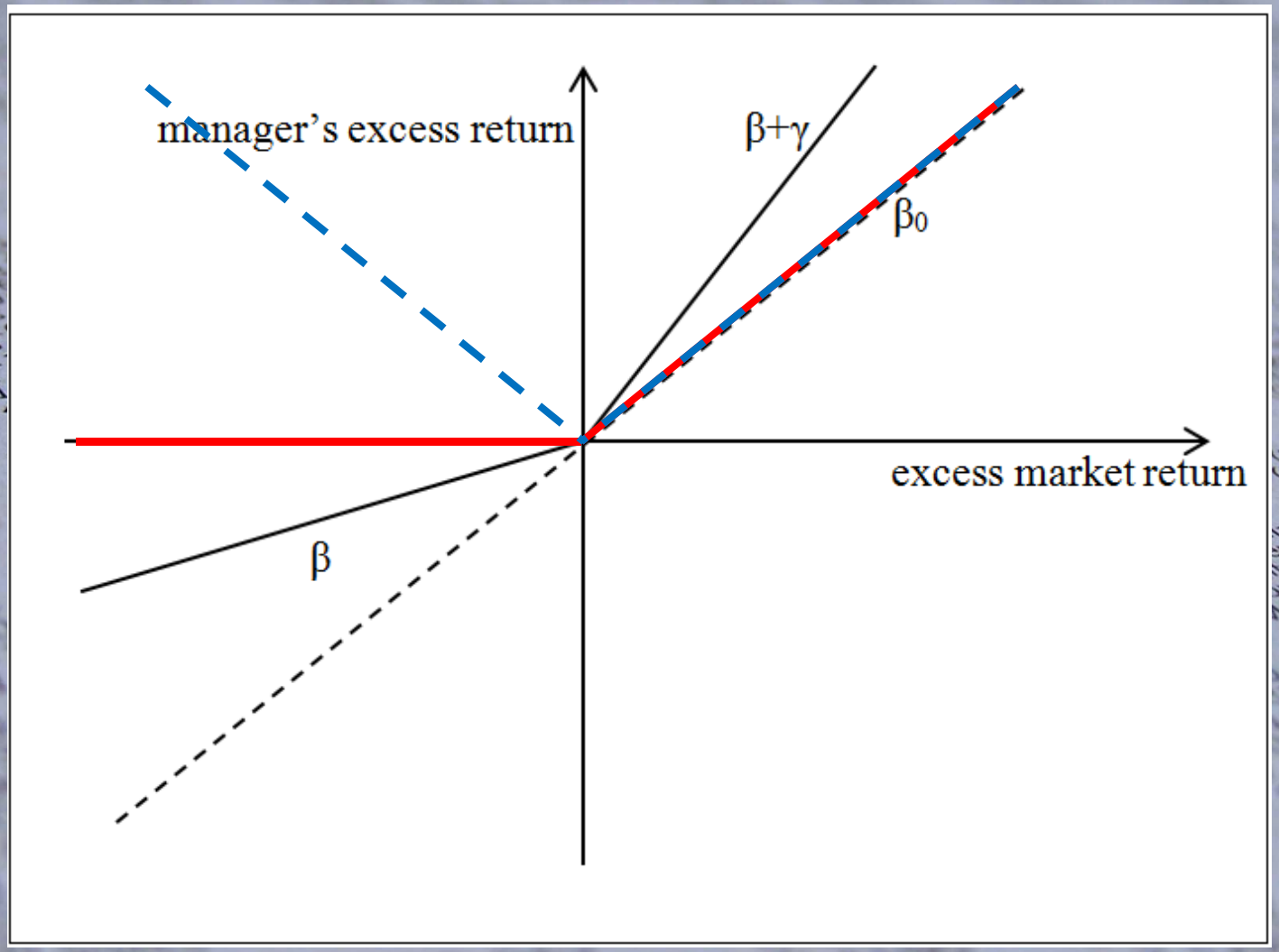
$$r_{i,t+1} - r_f = +\beta(r_{m,t+1} - r_f) + \gamma \max(\mathrm{r}_{m,t+1} - r_f; 0). + \varepsilon_{t+1}$$

or

$$r_{i,t+1} - r_f = \alpha + \beta(r_{m,t+1} - r_f) + \gamma D_{t+1}(r_{m,t+1} - r_f) + \varepsilon_{t+1}$$

- Interpretation: He exercises an option.
- Again, the significance of γ is a test for market timing abilities!

The Henriksson-and-Merton Model



Timing Multiple Markets

» This leads to the following tests:

$$r_{i,t+1} - r_f =$$

$$\alpha + \sum_{j=1}^{J} \beta_j \left(r_{j,t+1} - r_f\right) + \sum_{k=1}^{K} \gamma_k \left(r_{k,t+1} - r_f\right)^2 + \varepsilon_{t+1}$$

(as the TM version)

$$r_{i,t+1} - r_f =$$

$$\alpha + \sum_{j=1}^{J} \beta_j \left(r_{j,t+1} - r_f\right) + \sum_{k=1}^{K} \gamma_k \max\left(r_{i,t+1} - r_f; 0\right) + \varepsilon_{t+1}$$

(as the HM version with detection of over-/underperforming markets)

Empirical Evidence: Mutual Funds

- Sharpe (1966): no excess performance of funds compared to the DJIA over the period 1954-1965. The result was confirmed by Jensen (1968).
- Subsequent evidence is mixed with a tendency that mutual funds do not provide significant alphas.
- Majority of studies finds no (sometimes negative) market timing ability for mutual funds (see e.g. Becker et al 1999, Ferson and Schadt 1996, Becker et al. 1999 amongst others).
- Managers with good security selection abilities tend to be bad market timers and vice versa (Henriksson 1984, Chang and Lewellen 1984, Kao et al. 1998).

Empirical Evidence: Mutual Funds

- Fees requested seem to explain most of the reported lack of performance: Many studies, most recently Fama and French (2010) found that funds' gross returns outperform the market, while the net returns after fees do not.
- While earlier studies used monthly returns to test for timing ability, more recent studies such as Bollen and Busse (2001), using daily data come to more optimistic conclusions about the managers' market timing abilities.

Empirical Evidence: Mutual Funds

Do at least *some* managers persistently outperform the market?

» Carhart (1997): little evidence and those managers who persistently deviate from the market are the worst performers (the *cold-hand-phenomenon*).

» More recent work, e.g. Busse et al. (2010) and references therein, find at least some persistence over very short horizons.

Empirical Evidence: Hedge Funds

- More optimistic regarding positive alpha: see Nagy 2012 and the references therein.

Evidence for market timing is again mixed:

- Chen and Liang (2007): market timing ability for a sample of self-declared market-timing hedge funds
- Chen (2007) a few categories of hedge funds (Managed Futures and Global Macro funds) can time certain asset markets.
- Fung et al. (2002) find stock selection, but no market timing skills.

Empirical Evidence: Hedge Funds

- Kazemi and Li (2009) Managed Futures generate their returns mostly from successful market timing.
- Bollen and Busse (2001): using daily data appears to increase the power of the models to detect market timing ability.
- Elaut et al. (2013) extend the original Henriksson-Merton model and come to the conclusion that managed futures have superior timing abilities on most relevant markets.

Data

- Data is provided by RPM Risk and Portfolio Management Stockholm, Sweden, a Fund-of-Funds manager specialized in managed futures.

- 33 managed futures (*'commodity trading advisors'*) January 1994 to May 2012
  - 26 invest across markets
  - 4 in financial markets only
  - 3 in commodities only
- No survivorship bias, no backfill bias, no selection bias!
- Real, no reported data! Thus unbiased, because there is no smoothing (Getmansky, Lo, and Makarov, 2004)
- The combined backfill and survivorship bias in reported data so far is found in Bhardwaj et al. (2008) summing up to 7.7% annualized

Identification of Trends

Method:

Threshold filter by Lunde and Timmerman (2004)

- Identifies bull and bear markets based on a minimum price change since the last peak or trough.
- Advantage: allows for duration dependence and not to impose a phase length.
- Duration dependence means that "bull and bear hazard rates – that is, the probability that a bull or bear market terminates in the next period – depend on the age of the market" (Lunde and Timmermann 2004, p253).
- How do we get the 'mimimum price change'?

Identification of Trends

Method:

Trend identification by Wegscheider (1994)

- This method aims to identify trends, store their magnitude and subsequently remove them in an iterative way until all trends are identified.
- The advantage of this method is that, rather than imposing some arbitrary structure on the data, it focuses on the specific features of the original data series to come up with thresholds.
- What we obtain is a set of trends, starting from very small trends that last just one day up to trends lasting months, making it an ideal tool to derive thresholds for the Lunde and Timmermann filter.

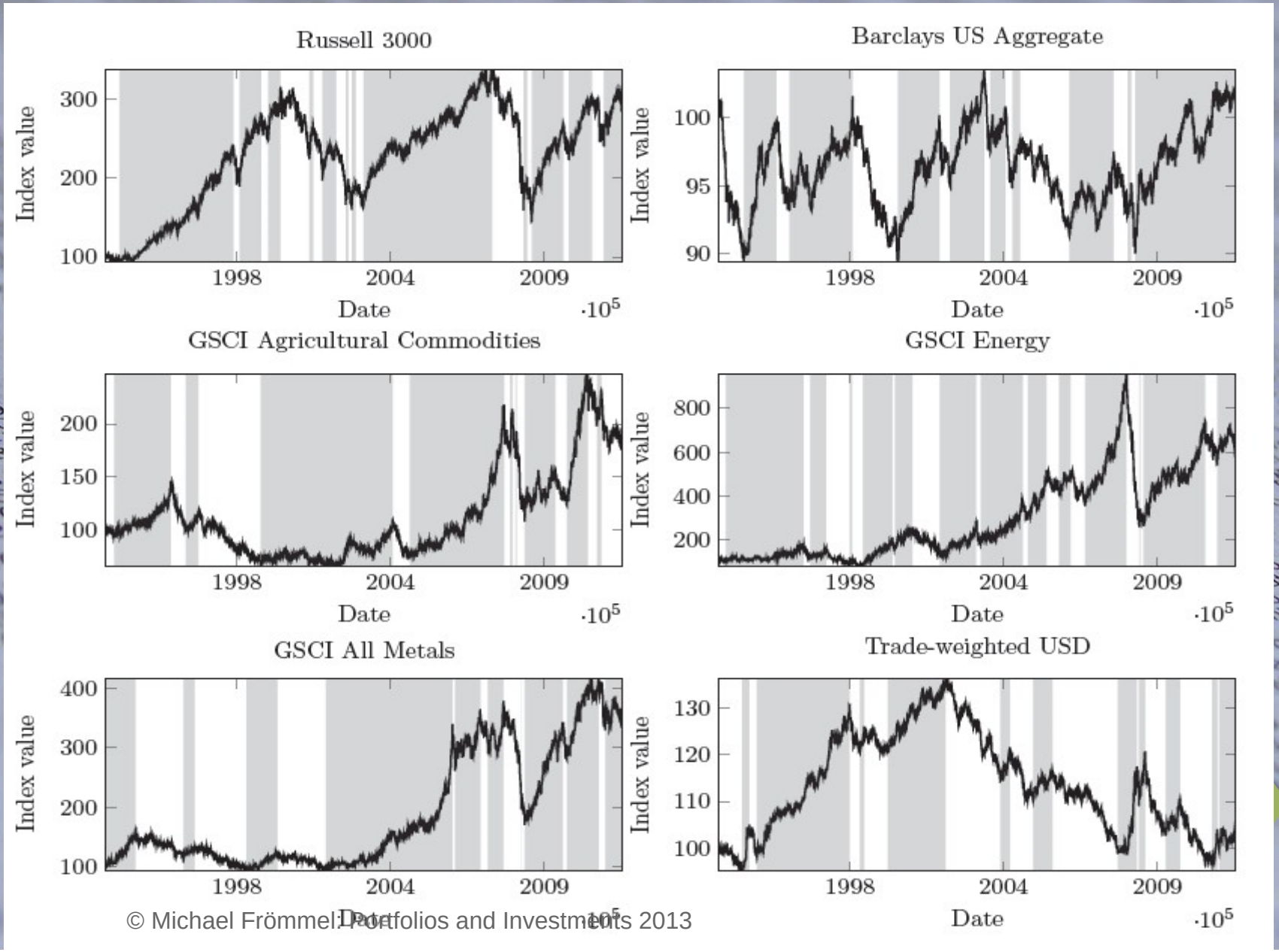
Markets

Table 4: Results Time Series Trend Decomposition

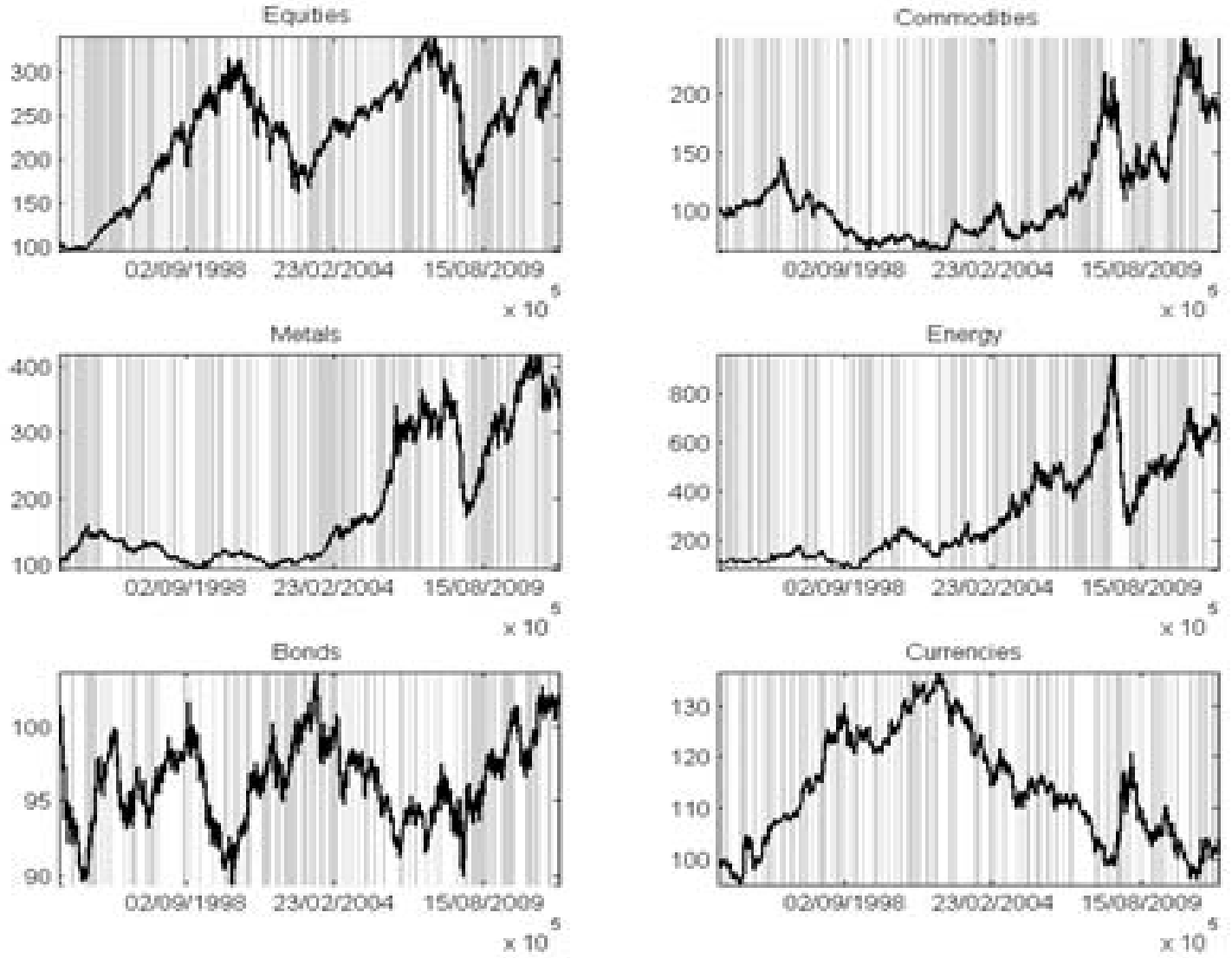
	Cutoff value	
	Upward trends	Downward trends
Russell 3000	0.1904	-0.1022
Barclays US Aggregate	0.0256	-0.0463
Bond Index GSCI Agricultural	0.1385	-0.1958
Commodities GSCI Energy	0.2390	-0.1971
GSCI All Metals	0.1061	-0.1601
Trade-weighted USD	0.0461	-0.0425

Note: The table reports the results from the trend decomposition algorithm. Trends are treated asymmetrically such that the cutoff values correspond to the 1% percentile of biggest positive and negative trends identified by the algorithm.

Identification of Trends



Identification of Trends



Note: This figure reports the market classification when using monthly excess returns

The Henriksson-and-Merton Model

- Assumes the manager *i* is a *direction timer*, i.e. increases the exposure to the market (β) depending on the signal he receives:

$$r_{i,t+1} - r_f = +\beta(r_{m,t+1} - r_f) + \gamma \max(\mathrm{r}_{m,t+1} - r_f; 0). + \varepsilon_{t+1}$$

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- Interpretation: He exercises an option.
- Again, the significance of γ is a test for market timing abilities!

(1) Our modified model
(2) Original HM model
(3) Bollen-Busse model (HM with daily data, excess-return-based)

T ... of CTAs

	(1)	(2)	(3)
	0.000***	0.000	0.000**
	(0)	(0)	(0)
Equities			
Equit	-0.161***	-0.126***	-0.134***
	(0.031)	(0.032)	(0.041)
Equit*D_t	0.152***	0.018	0.008
	(0.044)	(0.044)	(0.065)
Bonds			
Bonds	-0.568***	0.343**	0.678***
	(0.169)	(0.136)	(0.184)
Bonds*D_t	2.026***	0.739***	-0.127
	(0.219)	(0.229)	(0.323)
Agricultural Commodities			
Agri	-0.045	-0.017	0.020
	(0.034)	(0.031)	(0.04)
Agri*D_t	0.128***	0.089**	0.018
	(0.041)	(0.041)	(0.061)

Energy				
	Energy	-0.027	0.059***	0.088***
		(0.024)	(0.018)	(0.025)
	Energy*D_t	0.183***	0.053*	-0.017
		(0.028)	(0.028)	(0.041)
Metals				
	Metals	0.018	0.128***	0.197***
		(0.044)	(0.034)	(0.041)
	Metals*D_t	0.161***	0.011	-0.139
		(0.048)	(0.043)	(0.061)
Currencies				
	Currencies	-0.500***	-0.059	0.009
		(0.121)	(0.119)	(0.149)
	Currencies*D_t	1.099***	0.258	0.083
		(0.167)	(0.173)	(0.25)
# of observations		4796	4796	4796
Adjusted R-squared		12.23%	5.06%	4.18%
F-statistic		56.67	21.23	18.43

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Newey-West standard errors in parentheses.

Factors:

Table 3: Macroeconomic Control Variables

	mean	st. dev.	min	max
Dividend yield	0.0189	0.0052	0.0105	0.0407
Term spread	0.0175	0.0117	-0.0077	0.0387
Quality spread	0.0098	0.0046	0.0050	0.0350
Risk-free rate	0.0306	0.0206	0	0.0624

Note: The term spread is calculated as the difference between the US Treasury 10 year yield and the (annualised) 3 month US T-Bill yield. The latter also serves as the risk-free rate. The quality spread is the difference between the US Corporate Bonds Moody's Seasoned AAA and the US corporate Bonds Moody's seasoned BAA rate. Data from Datastream. The dividend yield is the daily dividend yield of the S&P 500. Data obtained from Bloomberg.

Table 9: Results Tests for Market Timing Ability - Conditional Performance

Dependent variable	(4)	(5) Equal-weighted index	(6)
Constant	-0.0003***	0.0000	0.0003*
	(0.0001)	(0.0001)	(0.0002)
Equities			
Russell 3000	-0.1894***	-0.1284***	-0.1091**
	(0.0356)	(0.0372)	(0.0441)
Timing coefficient	0.1772***	0.0245	-0.0343
	(0.0420)	(0.0420)	(0.0621)
Bonds and interest rates			
Barclays US Aggregate Bond Index	-0.3239*	0.5534***	0.8515***
	(0.1673)	(0.1383)	(0.1792)
Timing coefficient	1.8600***	0.7050***	-0.0979
	(0.2122)	(0.2298)	(0.2991)
Agricultural commodities			
GSCI Agricultural commodities	-0.0352	0.0185	0.0581
	(0.0369)	(0.0327)	(0.0401)
Timing coefficient	0.1493***	0.0804**	0.0140
	(0.0399)	(0.0372)	(0.0570)
Energy			
GSCI Energy	-0.0198	0.0618***	0.0774***
	(0.0276)	(0.0232)	(0.0274)
Timing coefficient	0.1447***	0.0177	-0.0178
	(0.0285)	(0.0270)	(0.0390)

Metals			
GSCI All Metals	0.0049	0.1181***	0.1670***
	(0.0499)	(0.0390)	(0.0437)
Timing coefficient	0.1402***	-0.0112	-0.1228**
	(0.0469)	(0.0415)	(0.0584)
Currencies			
Trade-weighted USD	-0.5554***	-0.1911	-0.2177
	(0.1406)	(0.1446)	(0.1810)
Timing coefficient	0.9486***	0.2811*	0.2750
	(0.1551)	(0.1619)	(0.2378)
Includes:			
Lagged market returns	*yes*	*yes*	*yes*
Controls for public information	*yes*	*yes*	*yes*
Observations	4797	4797	4797
R^2	18.78%	12.88%	11.88%
Adjusted-R^2	18.06%	12.10%	11.10%
F-statistic	26.17	16.73	15.26

$^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$. Newey-West standard errors in parentheses.
Note: The vector of control variables contains the market indices interacted with lagged values of the risk-free rate, term spread, quality spread and, dividend yield.

Results

We find that managed futures managers indeed have some market timing abilities (i.e. they can beat a monkey),

1) If we take into account duration dependence

2) If we focus on daily data (which is more realistic)