

# AAII SV CI-MI Agenda

- (6:30 – 6:40) Administrative Items (Al Z)
- (6:40 – 7:00) Since the Last Meeting (Al Z)
- (7:00 – 7:30) Benchmarks & the SIMPLE Portfolio (Peter L)
- (7:30 – 8:00) Examples of Dual Momentum at Portfolio Visualizer (Al Z)
- (8:00) **Pay Your Dinner Bill! (All)**
- (8:00 – 8:45) Year End Performance Review (Al Z)
- (Time available) Level3 Review, SCTR Study, SYLD: Start Dates Matter, Motifs: A Brief Overview (Al)
- (8:45 – 9:00) Informal chats – must leave by 9:00!

# Legal Disclaimer And Risk Disclosure

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# Administrative Items

# CI-MI Meeting Schedule

**March Meeting: Thursday 3/2/17, Holder's Country Inn**

**Dinner Orders 6 PM, Meeting 6:30 PM**

**(McClellan Oscillator/Indicator Study??)**

**April Meeting: Thursday 4/6/17, Holder's Country Inn**

**Dinner Orders 6 PM, Meeting 6:30 PM**

**(What to Look at for Hulbert??)**

**May Meeting: Thursday 5/4/17, Holder's Country Inn**

**Dinner Orders 6 PM, Meeting 6:30 PM**

**(Hirsch/Seasonality Study??)**

**Group meets the 1<sup>st</sup> Thursday of each month at Holder's Country Inn. Dinner orders at 6:00; meeting at 6:30**

# Upcoming Events

- AAI – SV Event:
  - **Dual Momentum Investing for More Profit with Less Risk, Gary Antonacci**
  - **Momentum Strategies to Increase Return & Reduce Risk, Peter Lingane**
  - **Saturday, February 11th, 8:30-11:30, AMC Cupertino Square 14 Theaters**
- AAI-SV FPW: **Managing Cash Flow in Retirement, Fred Smith**
  - **Wednesday February 8th, 7:00 – 9:00 PM**
  - 2nd Wednesday of each month through May, **Los Altos Library, Webcast**
- AAI-SV Investment Discussion Group:
  - **Monday February 27th, 6:30 – 9:00 PM**
  - 4th Monday of each month (except December), **Holder’s Country Inn**
- CTAG: **February 15th, 6:30-9:00 PM**
  - 1<sup>st</sup> and 3<sup>rd</sup> Wednesday of each month, **Holder’s Country Inn**
- SVOG: **Rolling Option Positions & Advanced Options Spreads, Bill Ryan, NYSE, and Joe Burgoyne, OIC**
  - **Thursday February 9th, 6-9 PM**, Further information at <http://www.svog.org/>
  - **Elks Lodge Sunnyvale: 375 North Pastoria Avenue, Sunnyvale**

# User Presentations???

- We are always looking for volunteers for presentation
  - Can be as informal or formal as you like
- Possibilities to consider – or add your own:
  - Review Dark Liquidity site strategies
  - Tool reviews: Investors FastTrack, SectorSurfer, VectorVest (various), ETF Replay, FinViz
  - Timers: \$NAHL, Vreba,
  - AAII: “Smart Beta” funds (DIY version), CI articles on web-based stock screening, FINVIZ, MeanVar optimization spreadsheet, O'Shaughnessy screens, CI: The Ulcer Index and Stock Screens, 52-week low screen, AAI CI Portfolio Optimization Program,
  - Even more Logical Invest strategies, VizMetrics strategies, Portfolio Monkey, VAMO ETF/Alpha Architect, Pring-Turner Business Cycle Approach
  - Biotech investing (core & explore, funds, screens, trading algs, etc..)
  - Review of algorithmic trading platform sites, motif investing, Gerstein screening papers
  - Wealth Index strategies, DIY FYLD equivalent with ADRs
  - Scott Burns' Graham Value Screen

# Yahoo! Group

- Yahoo Group is the point of contact, information
  - Name: AAI-SV-CI-MI-Group
  - Link: <https://groups.yahoo.com/neo/groups/AAI-SV-CI-MI-Group/info>
  - Alternative: **Go to Yahoo! Groups home page and search for “aai sv”**
  - Also listed in monthly AAI mailers (tinyurl provided)
- Admin points
  - Email sign-ups: **Go to the Yahoo! Group and sign-up - you’ll get full posting access to everything (after I approve your membership request)**
  - Feel free to post emails to the group (currently unmoderated), hold conversations outside meetings
  - If you want to post a file, provide a link, etc..., email Al or the group
    - Al\_zmyslowski@yahoo.com
  - **Files will be posted at Dropbox (in read-only mode) – use link in Link section**
    - To save space on larger files they may be zipped with 7zip (open source tool). Links to 7zip are also in the links section at the Yahoo! Group
- **New??: I can give you a B-card with critical info**

# Since the Last Meeting



# Since the Last Meeting

- Facebook Postings (#1370, 1374, 1377, 1385)
  - 10 Things You Can't Learn From a Backtest (wealth of common sense)
- Are Commodities Still a Good Portfolio Diversifier (#1371)
  - Another good post by Antonacci
- Is Portfolio Rebalancing Overrated?? (#1375)
  - These articles, and referenced papers, are worth the time to ponder
- January 2017 Event Files Posted (#1376)
- WSJ: New Wall Street Conflict: Analysts Say 'Buy' to Win Special Access for Their Clients (#1381, 1383)
  - Another story on a new bias re: analyst earnings estimates
- CI Article on "Backtesting the AAI Estimate Revisions Stock Screen" Posted
  - Thanks to our discussions – see next slide

# Backtesting the AAI Estimate Revisions Stock Screen

Figure 8: Impact of Trading Costs for Varying Backtest Rotation Periods

Column1	CAGR, Zero trading cost	Avg. Turnover	CAGR, 25 BP R/T Cost	CAGR, 50 BP R/T Cost	CAGR, 100 BP R/T Cost
Screen - Weekly	37.81%	43%	30.03%	23.23%	10.17%
Screen- 2 Weeks	31.08%	67%	25.27%	20.12%	10.06%
Screen- 4 Weeks	23.94%	95%	19.95%	16.40%	9.33%
Screen- 8 Weeks	18.53%	95%	16.62%	14.88%	11.34%
Screen- 13 Weeks	12.30%	91%	11.23%	10.25%	8.23%
Screen - Yearly	8.76%	89%	8.49%	8.25%	7.74%
S&P 500 Eq Weight	6.92%	--	6.92%	6.92%	6.92%

2 free articles/month (non-member) so you can access

# Backtesting the AAI Estimate Revisions Stock Screen

Figure 9: Varying Number of Stocks Held

# Stocks Held	Ttl						Correl				
	Return	CAGR	Drawdown	Sharpe	Sortino	StdDev	Bench	R-Square	Beta	Alpha	
Screen - 5	3383.34%	23.76%	-68.82%	0.76	1.06	34.49%	0.45	0.2	0.76	22.56%	
Screen - 10	4953.42%	26.56%	-56.35%	0.90	1.24	30.09%	0.51	0.26	0.75	23.66%	
Screen - 15	5080.05%	26.75%	-52.15%	0.94	1.30	28.09%	0.54	0.29	0.73	23.26%	
Screen - 20	5278.00%	27.03%	-48.01%	0.98	1.34	27.19%	0.55	0.31	0.73	23.26%	
Screen - 25	5310.84%	27.08%	-51.60%	1.00	1.37	26.26%	0.56	0.32	0.72	23.12%	
Screen - 30	3466.21%	23.94%	-53.21%	0.92	1.26	25.53%	0.57	0.33	0.71	19.95%	
Screen - 40	2772.49%	22.34%	-55.64%	0.89	1.22	24.71%	0.58	0.34	0.70	18.25%	
Screen - 50	2545.50%	21.73%	-53.88%	0.89	1.21	24.12%	0.59	0.35	0.69	17.55%	
Screen - 60	1746.34%	19.13%	-54.70%	0.81	1.10	23.75%	0.59	0.35	0.68	14.99%	
Screen - 70	1506.51%	18.14%	-55.23%	0.78	1.06	23.31%	0.60	0.36	0.68	13.97%	
Screen - 80	1481.89%	18.03%	-54.67%	0.79	1.07	23.08%	0.60	0.37	0.68	13.81%	
Screen - 90	1573.34%	18.43%	-54.59%	0.81	1.10	22.83%	0.61	0.37	0.67	14.18%	
Screen - 100	1516.27%	18.19%	-54.01%	0.80	1.09	22.57%	0.61	0.37	0.67	13.92%	
S&P 500 Eq Weight	204.21%	6.91%	-60.83%	0.37	0.52	20.60%	-	-	-	-	

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# Benchmarks & the SIMPLE Portfolio

(Peter L)

# Examples of Dual Momentum at Portfolio Visualizer

(A1 Z)

# Dual Momentum at Portfolio Visualizer

- While preparing for Gary Antonacci's upcoming talk I realized that I had never tried out the "Dual Momentum" capability at PV.
  - Gary's talk gave me an excellent excuse to do this!!
- What I'll do here...
  - For the first example I'll walk through the details of the case, the info PV puts out, etc.
  - After the first, I'll go through the other examples at a faster rate, skipping some of the details. (You can look at these off-line)
  - We'll get as far as we get – feel free to ask questions...

And away we go...

# PV Dual Momentum: VFINX, NAESX

## Momentum - Dual Momentum

The dual momentum model uses relative momentum to select the best performing model assets and incorporates absolute momentum as a filter to invest in cash if the excess return of the selected asset over cash is negative.

Timing Model ⓘ	Dual Momentum	
Start Year ⓘ	1985	Time Period
End Year ⓘ	2016	
Initial Amount ⓘ	\$ 10000 .00	Equity List
Tickers ⓘ	VFINX NAESX	
Out of Market Asset ⓘ	Select asset...	Cash ETF = FGOVX
Specify out of market asset	FGOVX	
Performance Periods	Single Period	
Timing Period	12 months	
Assets to hold ⓘ	1	Single fund, monthly
Trading Frequency ⓘ	Monthly	
Trade Execution ⓘ	Trade at end of month price	EoM Trading
Benchmark ⓘ	Vanguard 500 Index Fund	VFINX benchmark
	Run Test	Cancel

# PV Dual Momentum: VFINX, NAESX

## Market Timing Results (Jan 1987 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics

Metrics

Annual Returns

Monthly Returns

Drawdowns

Timing Periods

Market timing results from 1987 to 2016 based on dual momentum model holding the best performing asset. Absolute momentum based trend following filter is used to switch any selected assets that have a negative excess return over the risk free rate to Fidelity Government Income Fund (FGOVX). The model uses a single performance window of 12 month(s). Timing model trades are executed using the end of month close price. Note that the selected year range for the timing test was automatically adjusted based on the available data for Vanguard 500 Index Fund (VFINX) (May 1985-Dec 2016).

Portfolio	Initial Balance	Final Balance	CAGR	Std.Dev.	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Timing Portfolio	\$10,000	\$372,785	12.82%	14.13%	37.62%	-8.63%	-29.78% <b>1</b>	0.71	1.09	0.71
Equal Weight Portfolio	\$10,000	\$184,854	10.21%	16.91%	37.72%	-36.55%	-52.11% <b>1</b>	0.48	0.67	0.98
Vanguard 500 Index Fund	\$10,000	\$174,986	10.01%	15.21%	37.45%	-37.02%	-50.97% <b>1</b>	0.50	0.72	0.99



# PV Dual Momentum: VFINX, NAESX



# PV Dual Momentum: VFINX, NAESX

Market Timing Results (Jan 1987 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics

Metrics

Annual Returns

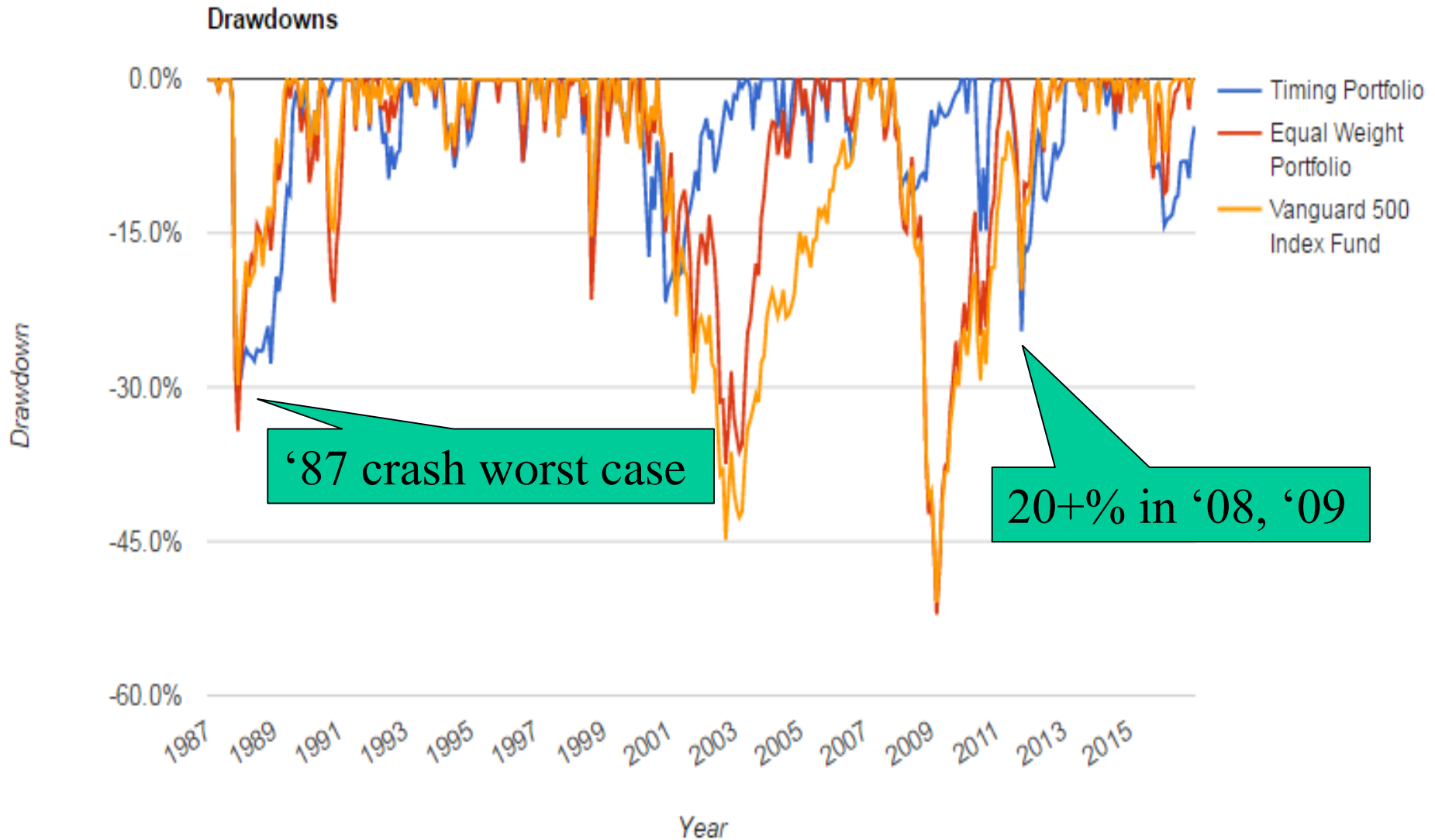
Monthly Returns

Drawdowns

Timing Periods

Metric	Timing Model	Equal Weight Portfolio	Vanguard 500 Index Fund
Mean Return (monthly)	1.09%	0.93%	0.89%
Mean Return (annualized)	13.93%	11.76%	11.27%
Compound Return (monthly)	1.01%	0.81%	0.80%
Compound Return (annualized)	12.82%	10.21%	10.01%
Volatility (monthly)	4.05%	4.76%	4.33%
Volatility (annualized)	14.13%	16.91%	15.21%
Max. Drawdown	-29.78%	-52.11%	-50.97%
Market Correlation	0.71	0.98	0.99
Beta <sup>(*)</sup>	0.63	1.04	1.00
Alpha (annualized)	6.37%	0.01%	-0.00%
R <sup>2</sup>	45.09%	89.27%	100.00%
Sharpe Ratio	0.71	0.48	0.50
Sortino Ratio	1.09	0.67	0.72
Treynor Ratio (%)	15.80	7.68	7.54
Skewness	-0.56	-1.06	-0.82
Excess Kurtosis	3.43	3.90	2.71
Historical Value-at-Risk (95%)	-5.60%	-7.48%	-7.03%
Delta Normal Value-at-Risk (95%)	-6.66%	-7.84%	-7.12%
Conditional Value-at-Risk (95%)	-8.37%	-11.28%	-9.98%
Positive Periods	237 out of 360 (65.83%)	232 out of 360 (64.44%)	232 out of 360 (64.44%)
Gain/Loss Ratio	1.06	0.91	0.94

# PV Dual Momentum: VFINX, NAESX



# PV Dual Momentum: VFINX, NAESX

Portfolio Statistics

Metrics

Annual Returns

Monthly Returns

Drawdowns

Timing Periods

#	Start	End	Months	Assets	Asset Performance	Timing Return	Equal Weight Portfolio	Vanguard 500 Index Fund
1	Jan 1987	Nov 1987	11	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: -2.65%	-2.65%	-9.78%	-2.65%
2	Dec 1987	Oct 1988	11	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 8.11%	8.11%	30.86%	24.70%
3	Nov 1988	Mar 1989	5	100.00% Vanguard Small-Cap Index Fund (NAESX)	NAESX: 7.51%	7.51%	7.42%	7.29%

Since 2016 or so...

45	Nov 2015	Jan 2016	3	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: -6.22%	-6.22%	-8.08%	-6.22%
46	Feb 2016	Mar 2016	2	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 0.93%	0.93%	7.96%	6.62%
47	Apr 2016	Nov 2016	8	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 8.24%	8.24%	11.56%	8.24%
48	Dec 2016	Dec 2016	1	100.00% Vanguard Small-Cap Index Fund (NAESX)	NAESX: 1.86%	1.86%	1.91%	1.96%
49	Jan 2017	Jan 2017	1	100.00% Vanguard Small-Cap Index Fund (NAESX)	-	-	-	-

# PV Dual Momentum: VFINX, NAESX

## Momentum - Dual Momentum

The dual momentum model uses relative momentum to select the best performing model assets and incorporates absolute momentum as a filter to invest in cash if the excess return of the selected asset over cash is negative.

Timing Model **i** Dual Momentum

Start Year **i** 1985

End Year **i** 2016

Initial Amount **i** \$ 10000 .00

Tickers **i** VFINX NAESX

Out of Market Asset **i** Select asset...

Specify out of market asset FGOVX

Performance Periods Single Period

Timing Period 12 months

Assets to hold **i** 2

Trading Frequency **i** Monthly

Trade Execution **i** Trade at end of month price

Benchmark **i** Vanguard 500 Index Fund

Run Test Cancel

**Time Period**

**Equity List**

**Cash ETF = FGOVX**

**Two funds, monthly**

**EoM Trading**

**VFINX benchmark**

# PV Dual Momentum: VFINX, NAESX

## Market Timing Results (Jan 1987 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics

Metrics

Annual Returns

Monthly Returns

Drawdowns

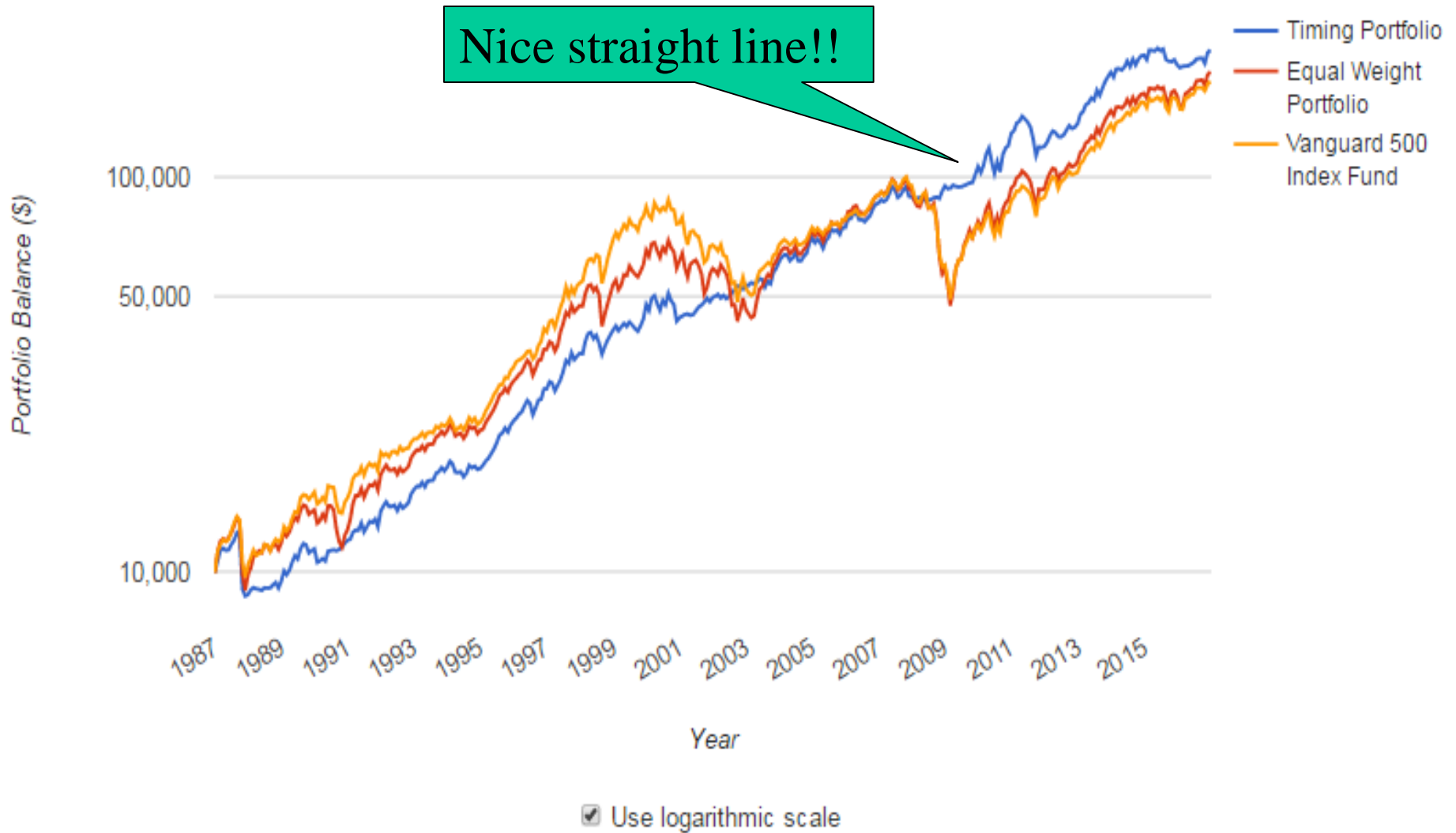
Timing Periods

Market timing results from 1987 to 2016 based on dual momentum model holding the top 2 best performing assets. Absolute momentum based trend following filter is used to switch any selected assets that have a negative excess return over the risk free rate to Fidelity Government Income Fund (FGOVX). The model uses a single performance window of 12 month(s). Timing model trades are executed using the end of month close price. Note that the selected year range for the timing test was automatically adjusted based on the available data for Vanguard 500 Index Fund (VFINX) (May 1985-Dec 2016).

Portfolio	Initial Balance	Final Balance	CAGR	Std.Dev.	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Timing Portfolio	\$10,000	\$210,075	10.68%	12.18%	34.90%	-11.98%	-30.80% <b>i</b>	0.65	0.93	0.72
Equal Weight Portfolio	\$10,000	\$184,854	10.21%	16.91%	37.72%	-36.55%	-52.11% <b>i</b>	0.48	0.67	0.98
Vanguard 500 Index Fund	\$10,000	\$174,986	10.01%	15.21%	37.45%	-37.02%	-50.97% <b>i</b>	0.50	0.72	0.99

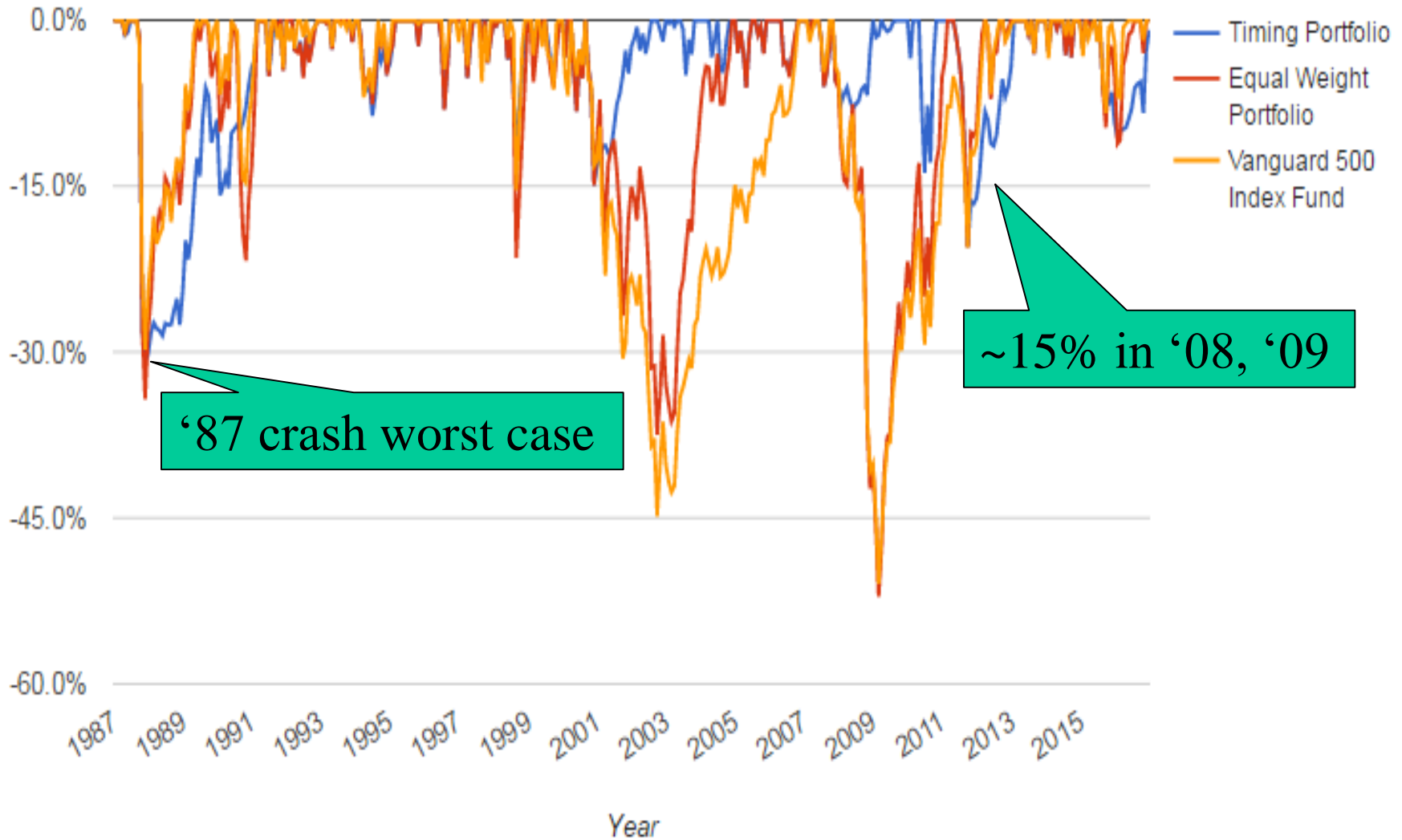
# PV Dual Momentum: VFINX, NAESX

Portfolio Growth



# PV Dual Momentum: VFINX, NAESX

Drawdowns



'87 crash worst case

~15% in '08, '09



# PV Dual Momentum: VFINX (Timer)

## Momentum - Dual Momentum

The dual momentum model uses relative momentum to select the best performing model assets and incorporates absolute momentum as a filter to invest in cash if the excess return of the selected asset over cash is negative.

Timing Model **i** Dual Momentum

Start Year **i** 1985 **Time Period**

End Year **i** 2016

Initial Amount **i** \$ 10000 .00 **Equity List**

Tickers **i** VFINX **Equity List**

Out of Market Asset **i** Select asset... **Cash ETF = FGOVX**

Specify out of market asset FGOVX **Cash ETF = FGOVX**

Performance Periods Single Period

Timing Period 12 months **Single fund, monthly**

Assets to hold **i** 1 **Single fund, monthly**

Trading Frequency **i** Monthly **EoM Trading**

Trade Execution **i** Trade at end of month price **EoM Trading**

Benchmark **i** Vanguard 500 Index Fund **VFINX benchmark**

**Run Test** **Cancel**

# PV Dual Momentum: VFINX (Timer)

## Market Timing Results (Jan 1987 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics

Metrics

Annual Returns

Monthly Returns

Drawdowns

Timing Periods

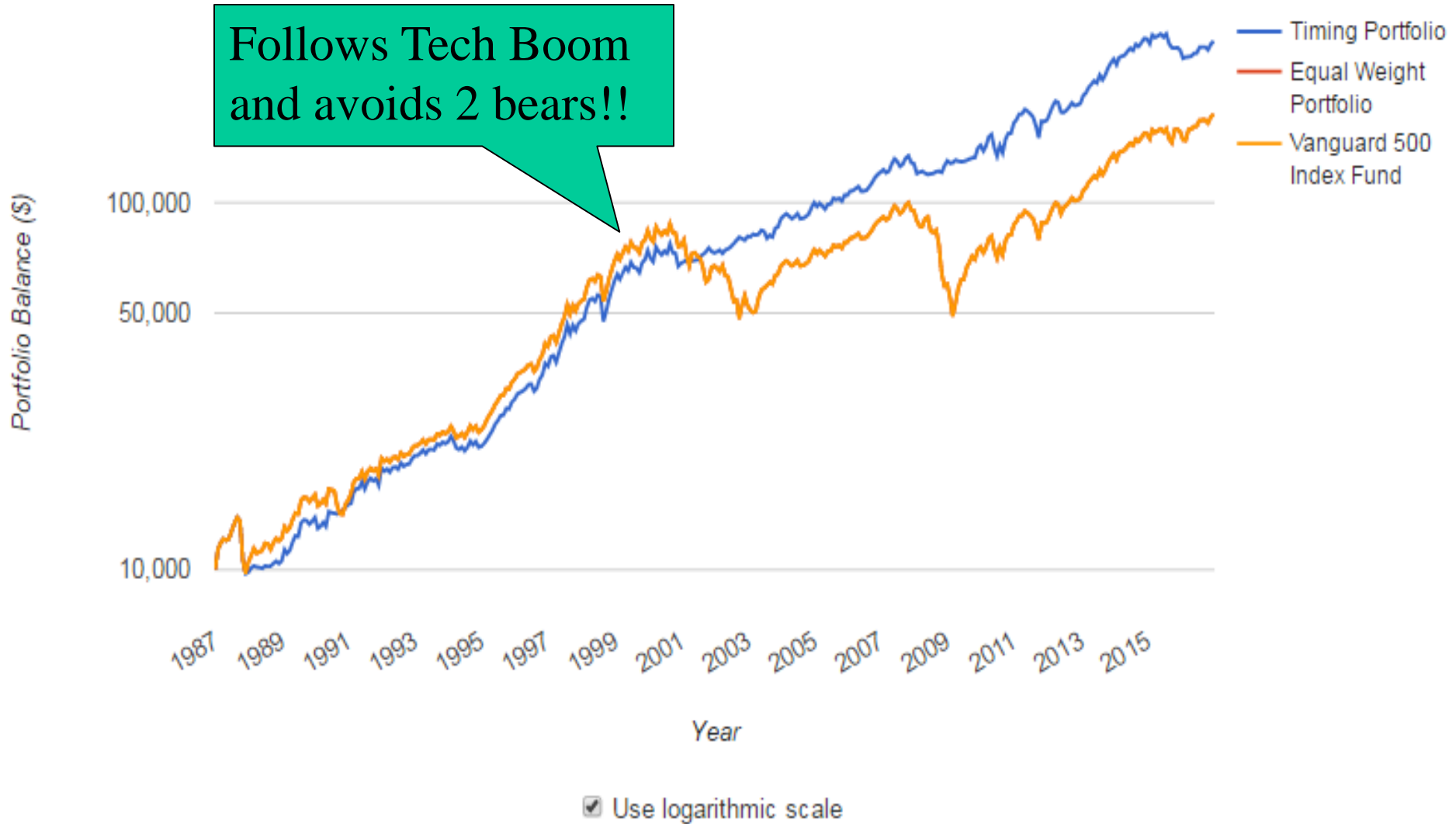
Market timing results from 1987 to 2016 based on dual momentum model holding the best performing asset. Absolute momentum based trend following filter is used to switch any selected assets that have a negative excess return over the risk free rate to Fidelity Government Income Fund (FGOVX). The model uses a single performance window of 12 month(s). Timing model trades are executed using the end of month close price. Note that the selected year range for the timing test was automatically adjusted based on the available data for Vanguard 500 Index Fund (VFINX) (May 1985-Dec 2016).

Portfolio	Initial Balance	Final Balance	CAGR	Std.Dev.	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Timing Portfolio	\$10,000	\$276,912	11.71%	12.27%	34.47%	-7.74%	-29.78% <b>i</b>	0.72	1.09	0.76
Equal Weight Portfolio	\$10,000	\$174,986	10.01%	15.21%	37.45%	-37.02%	-50.97% <b>i</b>	0.50	0.72	0.99
Vanguard 500 Index Fund	\$10,000	\$174,986	10.01%	15.21%	37.45%	-37.02%	-50.97% <b>i</b>	0.50	0.72	0.99

# PV Dual Momentum: VFINX (Timer)

Portfolio Growth

Follows Tech Boom  
and avoids 2 bears!!



# PV Dual Momentum: VFINX (Timer)

Market Timing Results (Jan 1987 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics

Metrics

Annual Returns

Monthly Returns

Drawdowns

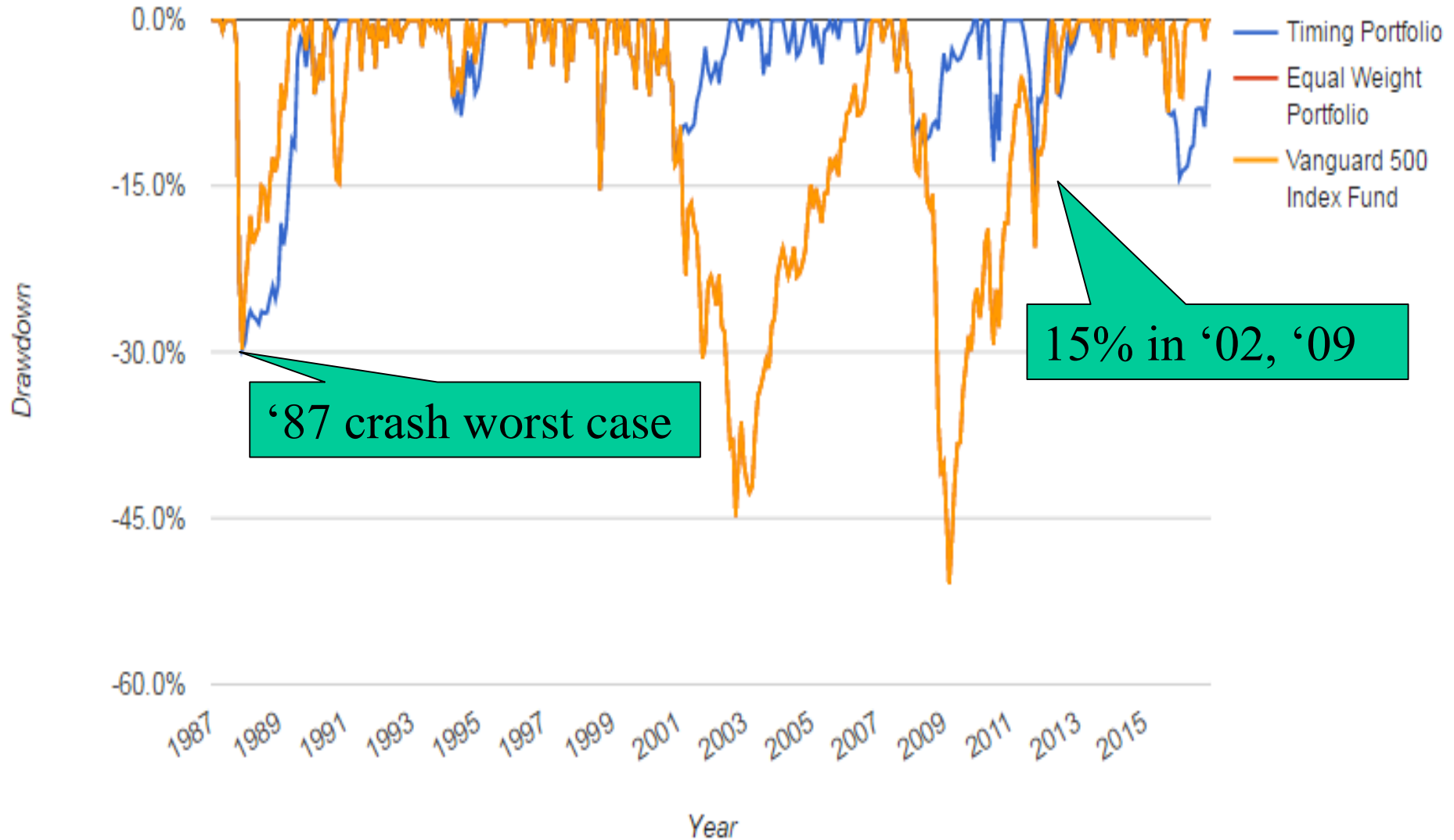
Timing Periods

Metric	Timing Model	Equal Weight Portfolio	Vanguard 500 Index Fund
Mean Return (monthly)	0.99%	0.89%	0.89%
Mean Return (annualized)	12.54%	11.27%	11.27%
Compound Return (monthly)	0.93%	0.80%	0.80%
Compound Return (annualized)	11.71%	10.01%	10.01%
Volatility (monthly)	3.51%	4.33%	4.33%
Volatility (annualized)	12.27%	15.21%	15.21%
Max. Drawdown	-29.78%	-50.97%	-50.97%
Market Correlation	0.76	0.99	0.99
Beta <sup>(*)</sup>	0.63	1.00	1.00
Alpha (annualized)	5.15%	-0.00%	-0.00%
R <sup>2</sup>	59.86%	100.00%	100.00%
Sharpe Ratio	0.72	0.50	0.50
Sortino Ratio	1.09	0.72	0.72
Treynor Ratio (%)	13.86	7.54	7.54
Skewness	-0.80	-0.82	-0.82
Excess Kurtosis	5.82	2.71	2.71
Historical Value-at-Risk (95%)	-4.52%	-7.03%	-7.03%
Delta Normal Value-at-Risk (95%)	-5.77%	-7.12%	-7.12%
Conditional Value-at-Risk (95%)	-7.38%	-9.98%	-9.98%
Positive Periods	241 out of 360 (66.94%)	232 out of 360 (64.44%)	232 out of 360 (64.44%)
Gain/Loss Ratio	1.06	0.94	0.94

(\*) Beta is calculated against Vanguard 500 Index Fund (the selected benchmark). Market correlation is against the US stock market.

# PV Dual Momentum: VFINX (Timer)

## Drawdowns



'87 crash worst case

15% in '02, '09

# PV Dual Momentum: VFINX (Timer)

Market Timing Results (Jan 1987 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics   Metrics   Annual Returns   Monthly Returns   Drawdowns   **Timing Periods**

#	Start	End	Months	Assets	Asset Performance	Timing Return	Equal Weight Portfolio	Vanguard 500 Index Fund
1	Jan 1987	Nov 1987	11	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: -2.65%	-2.65%	-2.65%	-2.65%
2	Dec 1987	Oct 1988	11	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 8.11%	8.11%	24.70%	24.70%
3	Nov 1988	Jul 1990	21	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 35.13%	35.13%	35.13%	35.13%
4	Aug 1990	Jan 1991	6	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 6.47%	6.47%	-1.70%	-1.70%
5	Feb 1991	Mar 1994	38	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 41.65%	41.65%	41.65%	41.65%
6	Apr 1994	Apr 1994	1	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: -0.95%	-0.95%	1.29%	1.29%
7	May 1994	Jun 1994	2	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: -0.88%	-0.88%	-0.88%	-0.88%
8	Jul 1994	Jul 1994	1	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 2.23%	2.23%	3.28%	3.28%
9	Aug 1994	Nov 1994	4	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 0.02%	0.02%	0.02%	0.02%
10	Dec 1994	Feb 1995	3	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 4.94%	4.94%	8.12%	8.12%
11	Mar 1995	Nov 2000	69	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 197.43%	197.43%	197.43%	197.43%
12	Dec 2000	Jul 2003	32	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 19.26%	19.26%	-21.76%	-21.76%
13	Aug 2003	Jan 2008	54	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 50.25%	50.25%	50.25%	50.25%
14	Feb 2008	Oct 2009	21	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 10.62%	10.62%	-21.55%	-21.55%
15	Nov 2009	May 2012	31	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 33.04%	33.04%	33.04%	33.04%
16	Jun 2012	Jun 2012	1	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: -0.25%	-0.25%	4.11%	4.11%
17	Jul 2012	Sep 2015	39	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 50.29%	50.29%	50.29%	50.29%
18	Oct 2015	Oct 2015	1	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: -0.23%	-0.23%	8.42%	8.42%
19	Nov 2015	Jan 2016	3	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: -6.22%	-6.22%	-6.22%	-6.22%
20	Feb 2016	Mar 2016	2	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 0.93%	0.93%	6.62%	6.62%
21	Apr 2016	Dec 2016	9	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 10.37%	10.37%	10.37%	10.37%
22	Jan 2017	Jan 2017	1	100.00% Vanguard 500 Index Fund (VFINX)	-	-	-	-

# PV Dual Momentum: VFINX, NAESX, VIMSX

## Momentum - Dual Momentum

The dual momentum model uses relative momentum to select the best performing model assets and incorporates absolute momentum as a filter to invest in cash if the excess return of the selected asset over cash is negative.

Timing Model **i** Dual Momentum

Start Year **i** 1985 **Time Period**

End Year **i** 2016

Initial Amount **i** \$ 10000 .00 **Equity List**

Tickers **i** VFINX NAESX VIMSX

Out of Market Asset **i** Select asset... **Cash ETF = FGOVX**

Specify out of market asset FGOVX

Performance Periods Single Period

Timing Period 12 months

Assets to hold **i** 2 **Two funds, monthly**

Trading Frequency **i** Monthly

Trade Execution **i** Trade at end of month price **EoM Trading**

Benchmark **i** Vanguard 500 Index Fund **VFINX benchmark**

Run Test Cancel

# PV Dual Momentum: VFINX, NAESX, VIMSX

## Market Timing Results (Jan 2000 - Dec 2016) [Link](#) [Print](#) [Download](#)

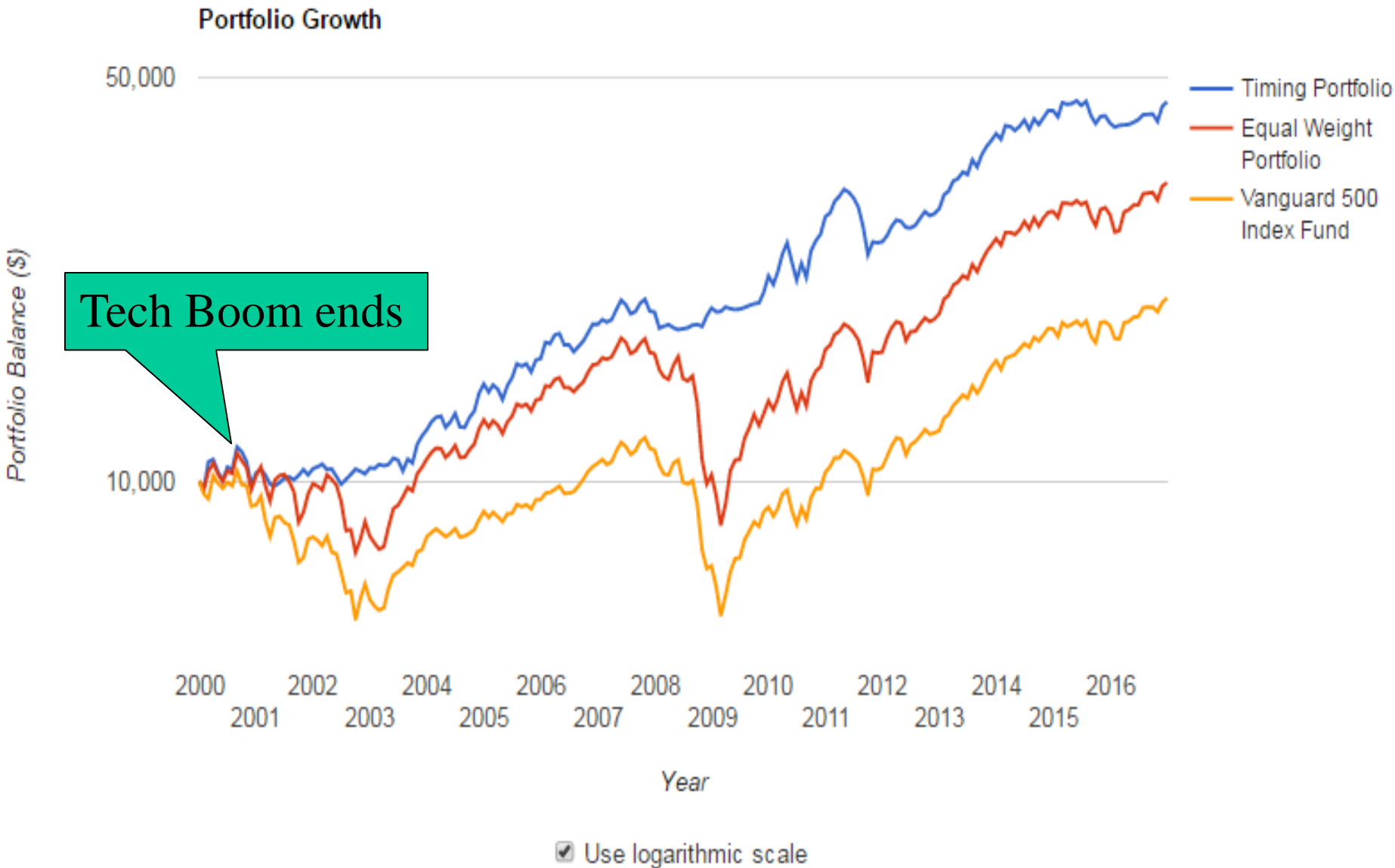
Portfolio Statistics   Metrics   Annual Returns   Monthly Returns   Drawdowns   Timing Periods

Market timing results from 2000 to 2016 based on dual momentum model holding the top 2 best performing assets. Absolute momentum based trend following filter is used to switch any selected assets that have a negative excess return over the risk free rate to Fidelity Government Income Fund (FGOVX). The model uses a single performance window of 12 month(s). Timing model trades are executed using the end of month close price. Note that the selected year range for the timing test was automatically adjusted based on the available data for Vanguard Mid-Cap Index Fund (VIMSX) (Jun 1998-Dec 2016).

Portfolio	Initial Balance	Final Balance	CAGR	Std.Dev.	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Timing Portfolio	\$10,000	\$45,458	9.32%	11.92%	34.92%	-9.53%	-22.99% <b>1</b>	0.67	1.08	0.60
Equal Weight Portfolio	\$10,000	\$32,920	7.26%	16.85%	36.09%	-38.31%	-52.69% <b>1</b>	0.41	0.58	0.98
Vanguard 500 Index Fund	\$10,000	\$20,785	4.40%	15.03%	32.18%	-37.02%	-50.97% <b>1</b>	0.25	0.36	0.99



# PV Dual Momentum: VFINX, NAESX, VIMSX



# PV Dual Momentum: VFINX, NAESX, VIMSX

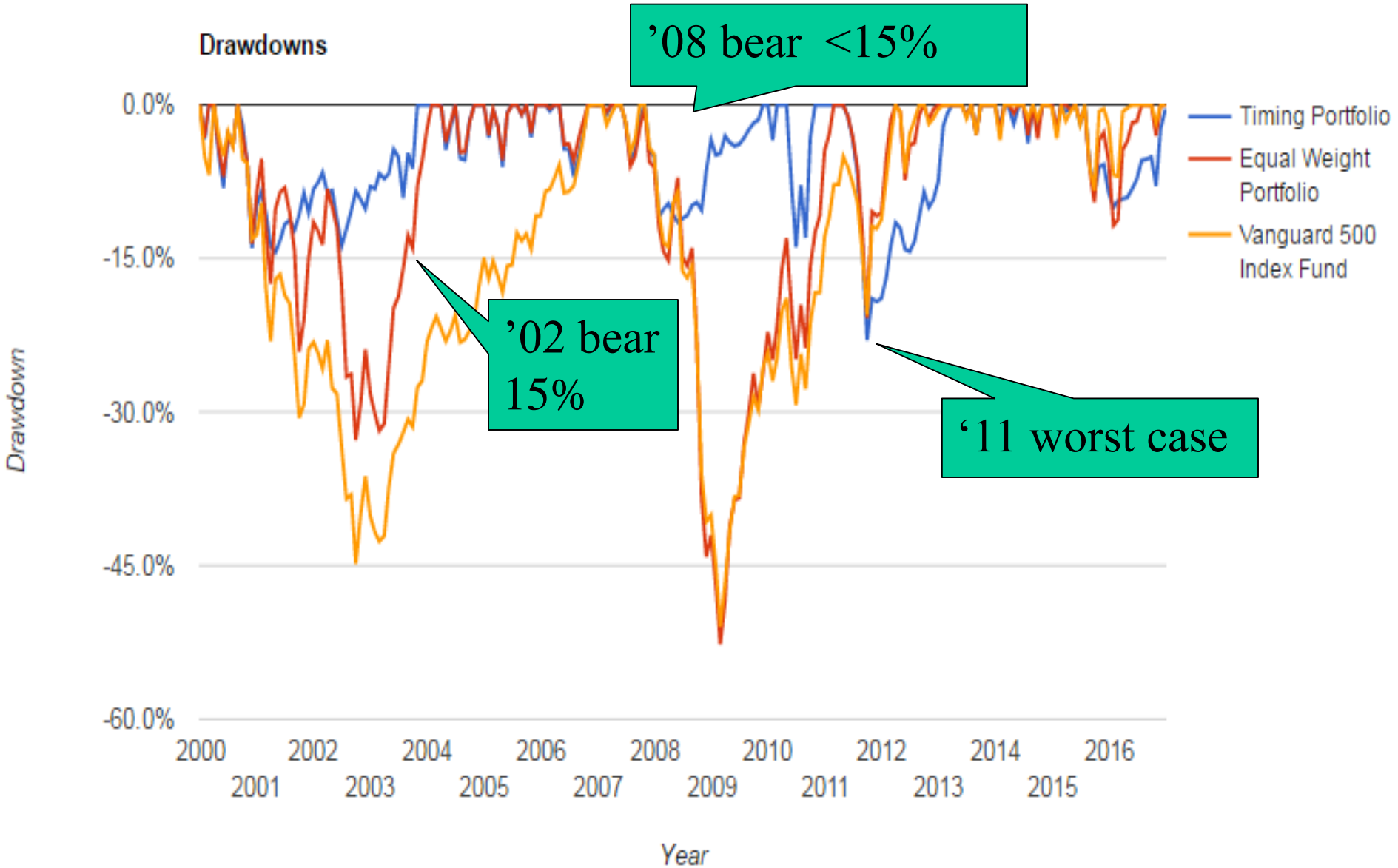
Market Timing Results (Jan 2000 - Dec 2016) [Link](#) [Print](#) [Download](#)

[Portfolio Statistics](#)
[Metrics](#)
[Annual Returns](#)
[Monthly Returns](#)
[Drawdowns](#)
[Timing Periods](#)

Metric	Timing Model	Equal Weight Portfolio	Vanguard 500 Index Fund
Mean Return (monthly)	0.80%	0.70%	0.45%
Mean Return (annualized)	10.09%	8.77%	5.57%
Compound Return (monthly)	0.75%	0.59%	0.36%
Compound Return (annualized)	9.32%	7.26%	4.40%
Volatility (monthly)	3.45%	4.80%	4.29%
Volatility (annualized)	11.92%	16.85%	15.03%
Max. Drawdown	-22.99%	-52.69%	-50.97%
Market Correlation	0.60	0.98	0.99
Beta <sup>(1)</sup>	0.44	1.06	1.00
Alpha (annualized)	7.25%	2.69%	-0.00%
R <sup>2</sup>	30.09%	89.37%	100.00%
Sharpe Ratio	0.67	0.41	0.25
Sortino Ratio	1.08	0.58	0.36
Treynor Ratio (%)	18.17	6.44	3.80
Skewness	-0.04	-0.59	-0.53
Excess Kurtosis	0.82	1.38	1.04
Historical Value-at-Risk (95%)	-4.69%	-8.44%	-7.84%
Delta Normal Value-at-Risk (95%)	-5.68%	-7.89%	-7.05%
Conditional Value-at-Risk (95%)	-6.88%	-10.79%	-9.72%
Positive Periods	127 out of 204 (62.25%)	126 out of 204 (61.76%)	125 out of 204 (61.27%)
Gain/Loss Ratio	1.11	0.90	0.82

<sup>(1)</sup> Beta is calculated against Vanguard 500 Index Fund (the selected benchmark). Market correlation is against the US stock market.

# PV Dual Momentum: VFINX, NAESX, VIMSX



# PV Dual Momentum: VFINX, NAESX, VIMSX

Market Timing Results (Jan 2000 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics Metrics Annual Returns Monthly Returns Drawdowns **Timing Periods**

#	Start	End	Months	Assets	Asset Performance	Timing Return	Equal Weight Portfolio	Vanguard 500 Index Fund
1	Jan 2000	Jan 2000	1	50.00% Vanguard Small-Cap Index Fund (NAESX) 50.00% Vanguard 500 Index Fund (VFINX)	NAESX: -1.69% VFINX: -5.03%	-3.36%	-3.16%	-5.03%
2	Feb 2000	Nov 2000	10	50.00% Vanguard Small-Cap Index Fund (NAESX) 50.00% Vanguard Mid-Cap Index Fund (VIMSX)	NAESX: -8.84% VIMSX: 12.81%	1.96%	-0.25%	-4.72%
3	Dec 2000	Mar 2001	4	50.00% Fidelity Government Income Fund (FGOVX) 50.00% Vanguard Mid-Cap Index Fund (VIMSX)	FGOVX: 4.18% VIMSX: -3.90%	0.24%	-4.53%	-11.45%
<b>Since '16...</b>								
37	Dec 2015	Dec 2015	1	50.00% Vanguard Small-Cap Index Fund (NAESX) 50.00% Vanguard 500 Index Fund (VFINX)	NAESX: -4.21% VFINX: -1.59%	-2.90%	-2.81%	-1.59%
38	Jan 2016	Jan 2016	1	50.00% Fidelity Government Income Fund (FGOVX) 50.00% Vanguard 500 Index Fund (VFINX)	FGOVX: 1.80% VFINX: -4.98%	-1.59%	-6.70%	-4.98%
39	Feb 2016	Mar 2016	2	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 0.93%	0.93%	8.40%	6.62%
40	Apr 2016	Jul 2016	4	50.00% Fidelity Government Income Fund (FGOVX) 50.00% Vanguard 500 Index Fund (VFINX)	FGOVX: 2.06% VFINX: 6.18%	4.13%	7.47%	6.18%
41	Aug 2016	Aug 2016	1	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Mid-Cap Index Fund (VIMSX)	VFINX: 0.13% VIMSX: 0.14%	0.14%	0.30%	0.13%
42	Sep 2016	Dec 2016	4	50.00% Vanguard Small-Cap Index Fund (NAESX) 50.00% Vanguard 500 Index Fund (VFINX)	NAESX: 6.49% VFINX: 3.80%	5.18%	4.28%	3.80%
43	Jan 2017	Jan 2017	1	50.00% Vanguard Small-Cap Index Fund (NAESX) 50.00% Vanguard 500 Index Fund (VFINX)	-	-	-	-

# PV Dual Momentum: VFINX, VGTSX

## Momentum - Dual Momentum

The dual momentum model uses relative momentum to select the best performing model assets and incorporates absolute momentum as a filter to invest in cash if the excess return of the selected asset over cash is negative.

Timing Model **i** Dual Momentum

Start Year **i** 1985

End Year **i** 2016

Initial Amount **i** \$ 10000 .00

Tickers **i** VFINX VGTSX

Out of Market Asset **i** Select asset...

Specify out of market asset FGOVX

Performance Periods Single Period

Timing Period 12 months

Assets to hold **i** 1

Trading Frequency **i** Monthly

Trade Execution **i** Trade at end of month price

Benchmark **i** Vanguard 500 Index Fund

Run Test Cancel

**Time Period**

**Equity List**

**Cash ETF = FGOVX**

**One fund, monthly**

**EoM Trading**

**VFINX benchmark**

# PV Dual Momentum: VFINX, VGTSX

## Market Timing Results (Jan 1998 - Dec 2016) [Link](#) [Print](#) [Download](#)

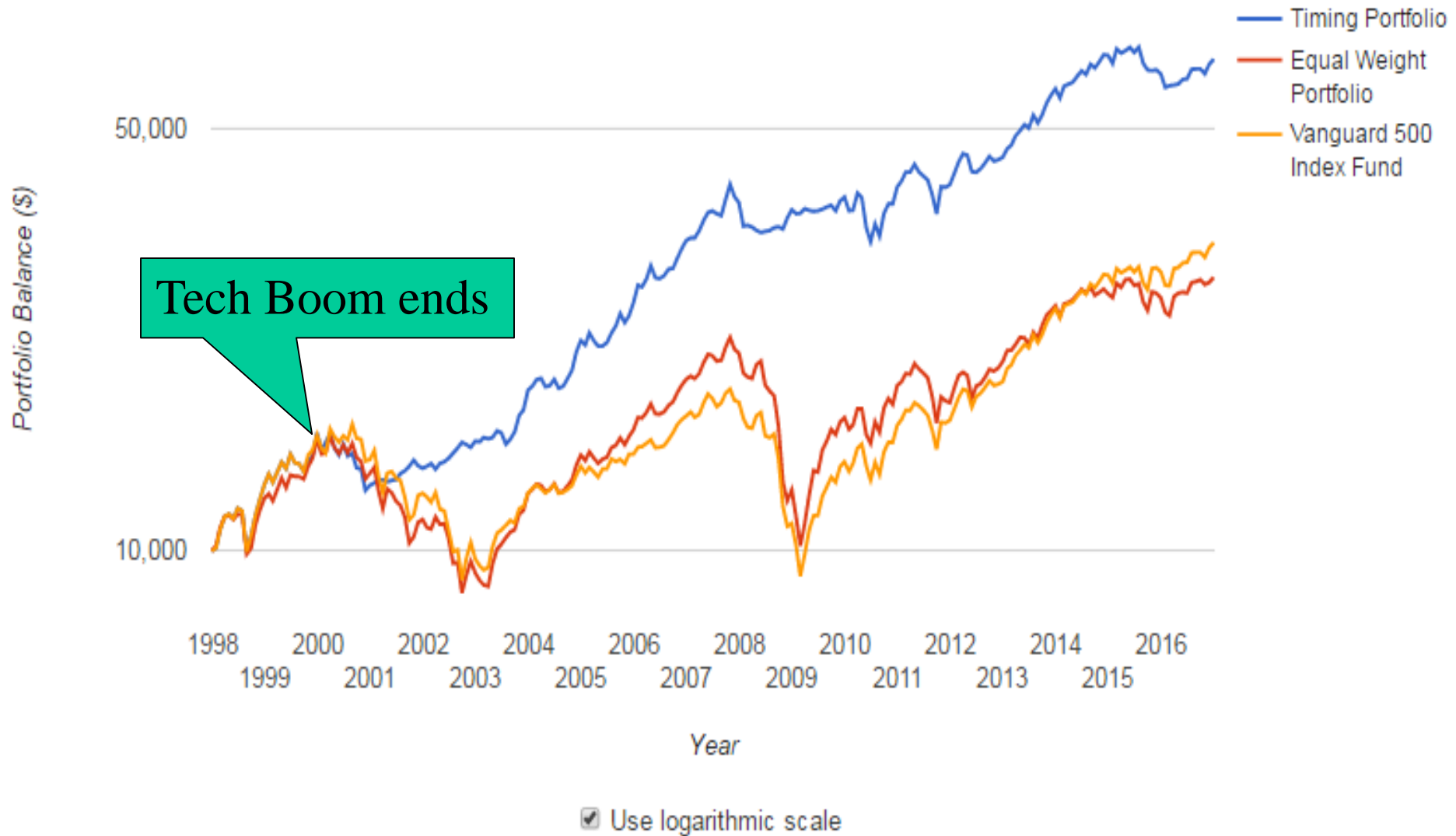
Portfolio Statistics   Metrics   Annual Returns   Monthly Returns   Drawdowns   Timing Periods

Market timing results from 1998 to 2016 based on dual momentum model holding the best performing asset. Absolute momentum based trend following filter is used to switch any selected assets that have a negative excess return over the risk free rate to Fidelity Government Income Fund (FGOVX). The model uses a single performance window of 12 month(s). Timing model trades are executed using the end of month close price. Note that the selected year range for the timing test was automatically adjusted based on the available data for Vanguard Total International Stock Index Fund (VGTSX) (May 1996-Dec 2016).

Portfolio	Initial Balance	Final Balance	CAGR	Std.Dev.	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Timing Portfolio	\$10,000	\$65,102	10.36%	12.12%	29.87%	-18.12%	-19.70% <b>i</b>	0.72	1.11	0.63
Equal Weight Portfolio	\$10,000	\$28,363	5.64%	16.08%	35.25%	-40.56%	-54.83% <b>i</b>	0.30	0.42	0.96
Vanguard 500 Index Fund	\$10,000	\$32,365	6.38%	15.39%	32.18%	-37.02%	-50.97% <b>i</b>	0.36	0.50	0.99

# PV Dual Momentum: VFINX, VGTSX

Portfolio Growth



# PV Dual Momentum: VFINX, VGTSX

Market Timing Results (Jan 1998 - Dec 2016) [Link](#) [Print](#) [Download](#)

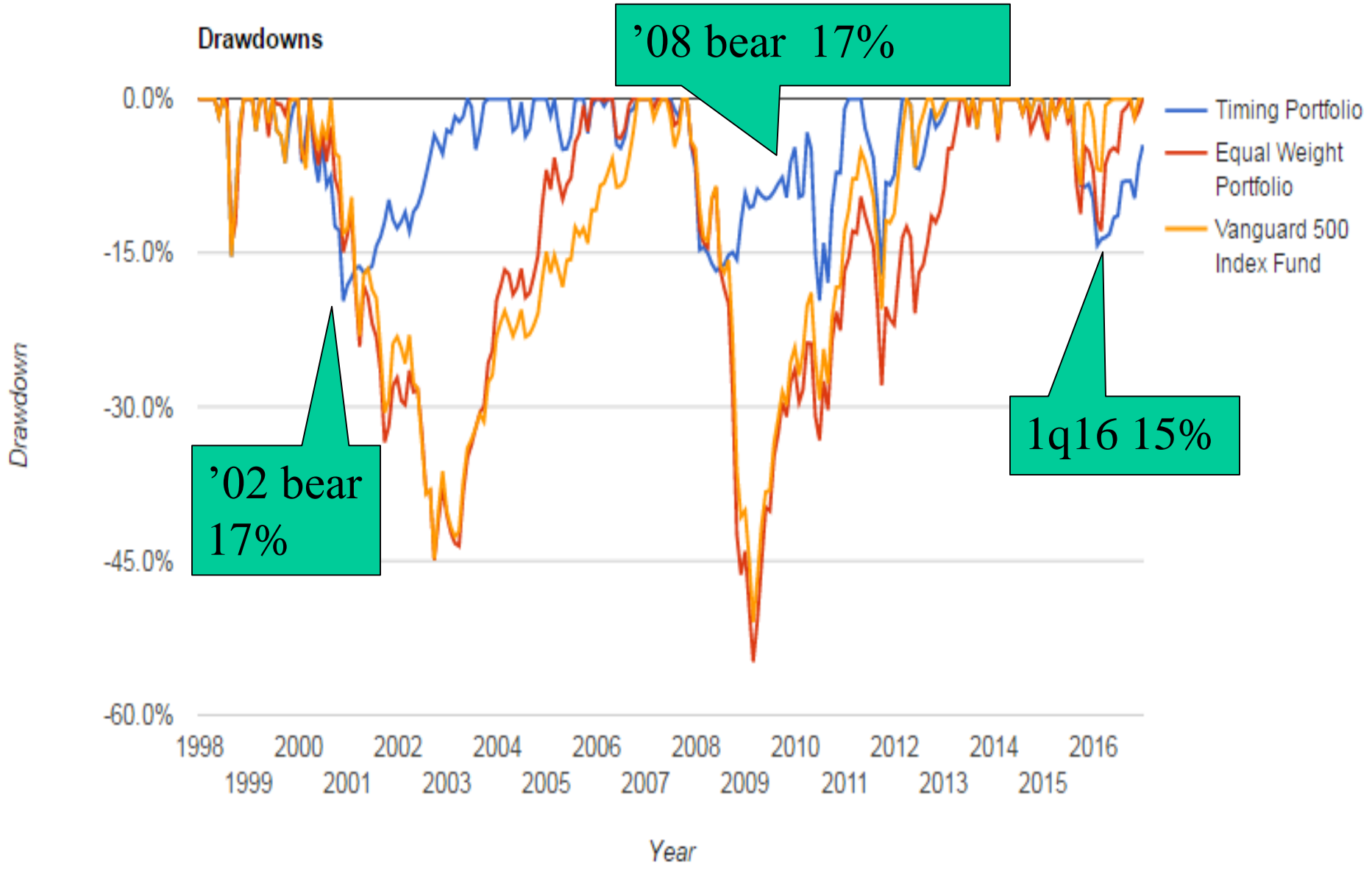
Portfolio Statistics Metrics Annual Returns Monthly Returns Drawdowns Timing Periods

Metric	Timing Model	Equal Weight Portfolio	Vanguard 500 Index Fund
Mean Return (monthly)	0.89%	0.56%	0.61%
Mean Return (annualized)	11.17%	6.99%	7.62%
Compound Return (monthly)	0.83%	0.46%	0.52%
Compound Return (annualized)	10.36%	5.64%	6.38%
Volatility (monthly)	3.48%	4.57%	4.39%
Volatility (annualized)	12.12%	16.08%	15.39%
Max. Drawdown	-19.70%	-54.83%	-50.97%
Market Correlation	0.63	0.96	0.99
Beta <sup>(1)</sup>	0.49	1.00	1.00
Alpha (annualized)	7.02%	-0.59%	0.00%
R <sup>2</sup>	38.10%	92.08%	100.00%
Sharpe Ratio	0.72	0.30	0.36
Sortino Ratio	1.11	0.42	0.50
Treynor Ratio (%)	17.72	4.83	5.42
Skewness	-0.52	-0.69	-0.63
Excess Kurtosis	1.80	1.56	1.13
Historical Value-at-Risk (95%)	-5.27%	-8.63%	-7.81%
Delta Normal Value-at-Risk (95%)	-5.73%	-7.52%	-7.21%
Conditional Value-at-Risk (95%)	-7.56%	-11.03%	-10.15%
Positive Periods	150 out of 228 (65.79%)	133 out of 228 (58.33%)	141 out of 228 (61.84%)
Gain/Loss Ratio	1.00	0.99	0.88

<sup>(1)</sup> Beta is calculated against Vanguard 500 Index Fund (the selected benchmark). Market correlation is against the US stock market.



# PV Dual Momentum: VFINX, VGTSX



# PV Dual Momentum: VFINX, VGTSX

Market Timing Results (Jan 1998 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics Metrics Annual Returns Monthly Returns Drawdowns **Timing Periods**

#	Start	End	Months	Assets	Asset Performance	Timing Return	Equal Weight Portfolio	Vanguard 500 Index Fund
1	Jan 1998	Sep 1999	21	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 35.45%	35.45%	31.47%	35.45%
2	Oct 1999	Oct 1999	1	100.00% Vanguard Total International Stock Index Fund (VGTSX)	VGTSX: 3.74%	3.74%	5.00%	6.33%
3	Nov 1999	Nov 1999	1	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 2.02%	2.02%	3.06%	2.02%
4	Dec 1999	Aug 2000	9	100.00% Vanguard Total International Stock Index Fund (VGTSX)	VGTSX: 1.10%	1.10%	5.87%	10.38%
5	Sep 2000	Nov 2000	3	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: -13.13%	-13.13%	-12.59%	-13.13%
6	Dec 2000	Jul 2003	32	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 19.26%	19.26%	-20.13%	-21.76%
7	Aug 2003	Aug 2003	1	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 1.93%	1.93%	2.22%	1.93%
8	Sep 2003	Mar 2008	55	100.00% Vanguard Total International Stock Index Fund (VGTSX)	VGTSX: 124.30%	124.30%	79.43%	41.98%
9	Apr 2008	Sep 2009	18	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 8.68%	8.68%	-17.59%	-17.01%
10	Oct 2009	May 2010	8	100.00% Vanguard Total International Stock Index Fund (VGTSX)	VGTSX: -8.15%	-8.15%	-2.02%	4.39%
11	Jun 2010	Apr 2011	11	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 27.22%	27.22%	31.03%	27.22%
12	May 2011	Jul 2011	3	100.00% Vanguard Total International Stock Index Fund (VGTSX)	VGTSX: -5.80%	-5.80%	-5.29%	-4.79%
13	Aug 2011	May 2012	10	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 3.25%	3.25%	-7.67%	3.25%
14	Jun 2012	Jun 2012	1	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: -0.25%	-0.25%	5.00%	4.11%
15	Jul 2012	Dec 2012	6	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 5.86%	5.86%	9.84%	5.86%
16	Jan 2013	Jan 2013	1	100.00% Vanguard Total International Stock Index Fund (VGTSX)	VGTSX: 3.34%	3.34%	4.26%	5.18%
17	Feb 2013	Sep 2015	32	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 34.98%	34.98%	16.46%	34.98%
18	Oct 2015	Oct 2015	1	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: -0.23%	-0.23%	7.35%	8.42%
19	Nov 2015	Jan 2016	3	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: -6.22%	-6.22%	-7.48%	-6.22%
20	Feb 2016	Mar 2016	2	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 0.93%	0.93%	6.18%	6.62%
21	Apr 2016	Dec 2016	9	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 10.37%	10.37%	7.62%	10.37%
22	Jan 2017	Jan 2017	1	100.00% Vanguard 500 Index Fund (VFINX)	-	-	-	-

# PV Dual Momentum: VFINX, VEURX, VPACX

## Momentum - Dual Momentum

The dual momentum model uses relative momentum to select the best performing model assets and incorporates absolute momentum as a filter to invest in cash if the excess return of the selected asset over cash is negative.

Timing Model **i** Dual Momentum

Start Year **i** 1985 **Time Period**

End Year **i** 2016

Initial Amount **i** \$ 10000 .00 **Equity List**

Tickers **i** VFINX VEURX VPACX

Out of Market Asset **i** Select asset... **Cash ETF = FGOVX**

Specify out of market asset FGOVX

Performance Periods Single Period

Timing Period 12 months **Two funds, monthly**

Assets to hold **i** 2

Trading Frequency **i** Monthly **EoM Trading**

Trade Execution **i** Trade at end of month price

Benchmark **i** Vanguard 500 Index Fund **VFINX benchmark**

**Run Test** **Cancel**

# PV Dual Momentum: VFINX, VEURX, VPACX

Market Timing Results (Jan 1992 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics

Metrics

Annual Returns

Monthly Returns

Drawdowns

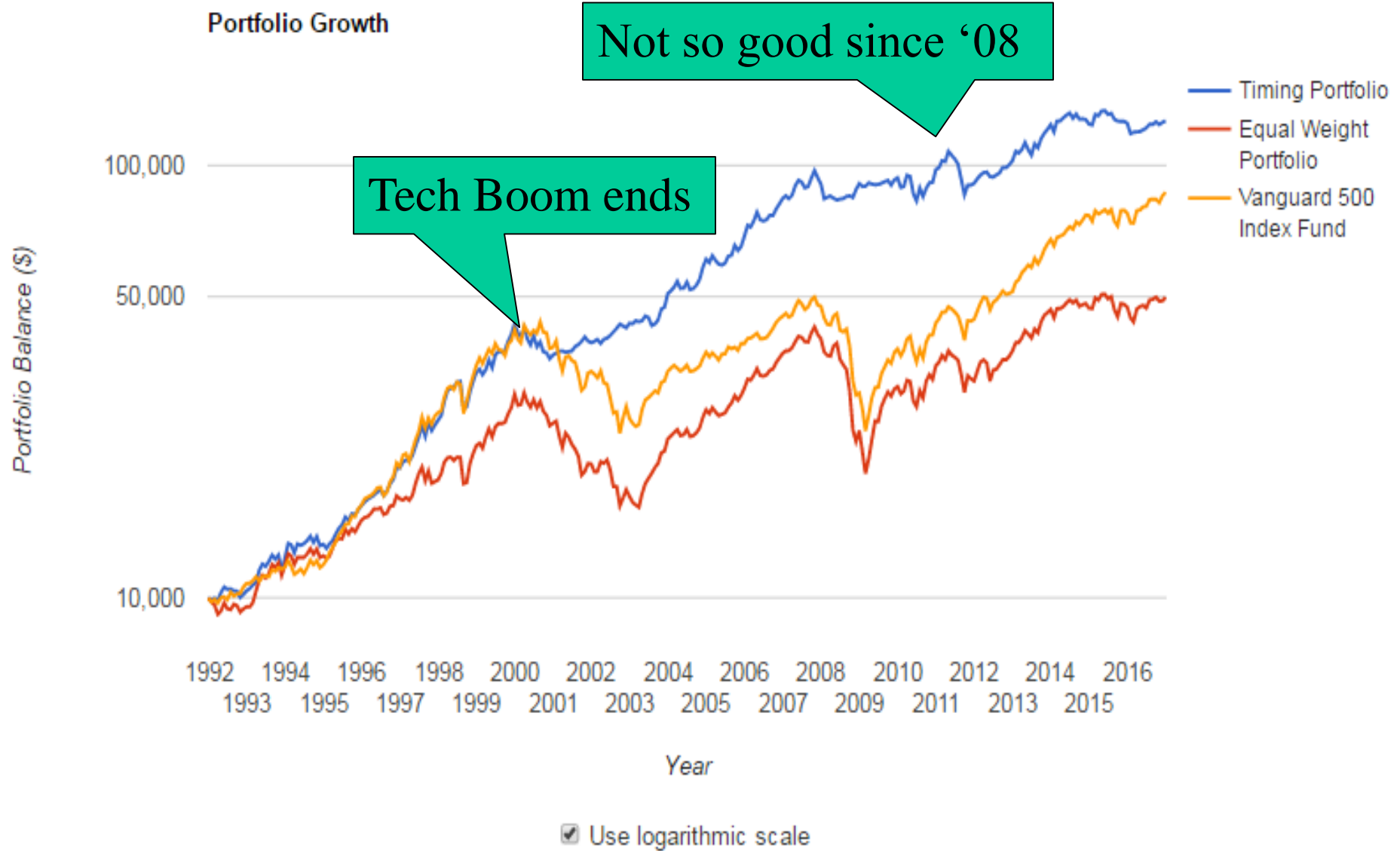
Timing Periods

Market timing results from 1992 to 2016 based on dual momentum model holding the top 2 best performing assets. Absolute momentum based trend following filter is used to switch any selected assets that have a negative excess return over the risk free rate to Fidelity Government Income Fund (FGOVX). The model uses a single performance window of 12 month(s). Timing model trades are executed using the end of month close price. Note that the selected year range for the timing test was automatically adjusted based on the available data for Vanguard European Stock Index Fund (VEURX) (Jul 1990-Dec 2016).

Portfolio	Initial Balance	Final Balance	CAGR	Std.Dev.	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Timing Portfolio	\$10,000	\$127,172	10.71%	11.09%	29.88%	-15.51%	-20.64% 	0.75	1.17	0.59
Equal Weight Portfolio	\$10,000	\$49,709	6.62%	14.90%	35.89%	-38.70%	-54.23% 	0.34	0.48	0.89
Vanguard 500 Index Fund	\$10,000	\$86,976	9.04%	14.35%	37.45%	-37.02%	-50.97% 	0.51	0.73	0.99

[Save timing model »](#)

# PV Dual Momentum: VFINX, VEURX, VPACX



# PV Dual Momentum: VFINX, VEURX, VPACX

Market Timing Results (Jan 1992 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics Metrics Annual Returns Monthly Returns Drawdowns Timing Periods

Metric	Timing Model	Equal Weight Portfolio	Vanguard 500 Index Fund
Mean Return (monthly)	0.90%	0.63%	0.81%
Mean Return (annualized)	11.38%	7.80%	10.15%
Compound Return (monthly)	0.85%	0.54%	0.72%
Compound Return (annualized)	10.71%	6.62%	9.04%
Volatility (monthly)	3.19%	4.25%	4.10%
Volatility (annualized)	11.09%	14.90%	14.35%
Max. Drawdown	-20.64%	-54.23%	-50.97%
Market Correlation	0.59	0.89	0.99
Beta <sup>(1)</sup>	0.46	0.92	1.00
Alpha (annualized)	6.41%	-1.39%	0.00%
R <sup>2</sup>	34.17%	78.79%	100.00%
Sharpe Ratio	0.75	0.34	0.51
Sortino Ratio	1.17	0.48	0.73
Treynor Ratio (%)	18.27	5.46	7.19
Skewness	-0.50	-0.66	-0.67
Excess Kurtosis	1.30	1.49	1.40
Historical Value-at-Risk (95%)	-4.41%	-7.00%	-7.01%
Delta Normal Value-at-Risk (95%)	-5.25%	-7.01%	-6.74%
Conditional Value-at-Risk (95%)	-6.67%	-9.99%	-9.38%
Positive Periods	199 out of 300 (66.33%)	180 out of 300 (60.00%)	194 out of 300 (64.67%)
Gain/Loss Ratio	1.06	0.97	0.90

<sup>(1)</sup> Beta is calculated against Vanguard 500 Index Fund (the selected benchmark). Market correlation is against the US stock market.

# PV Dual Momentum: VFINX, VEURX, VPACX

Market Timing Results (Jan 1992 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics Metrics Annual Returns Monthly Returns Drawdowns **Timing Periods**

#	Start	End	Months	Assets	Asset Performance	Timing Return	Equal Weight Portfolio	Vanguard 500 Index Fund
1	Jan 1992	Feb 1992	2	50.00% Vanguard European Stock Index Fund (VEURX) 50.00% Vanguard 500 Index Fund (VFINX)	VEURX: 0.60% VFINX: -0.64%	-0.01%	-3.55%	-0.64%
2	Mar 1992	Mar 1992	1	50.00% Fidelity Government Income Fund (FGOVX) 50.00% Vanguard 500 Index Fund (VFINX)	FGOVX: -0.65% VFINX: -1.93%	-1.29%	-4.78%	-1.93%
3	Apr 1992	Oct 1992	7	50.00% Vanguard European Stock Index Fund (VEURX) 50.00% Vanguard 500 Index Fund (VFINX)	VEURX: -2.19% VFINX: 5.36%	1.72%	1.13%	5.36%
4	Nov 1992	Mar 1993	5	50.00% Fidelity Government Income Fund (FGOVX) 50.00% Vanguard 500 Index Fund (VFINX)	FGOVX: 7.50% VFINX: 9.18%	8.36%	12.04%	9.18%
<div style="background-color: #00b050; color: white; padding: 10px; display: inline-block; border-radius: 10px;"> <p>Since '16...</p> </div>								
55	Dec 2015	Jan 2016	2	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Pacific Stock Index Fund (VPACX)	VFINX: -6.49% VPACX: -6.10%	-6.29%	-6.91%	-6.49%
56	Feb 2016	Mar 2016	2	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 0.93%	0.93%	4.78%	6.62%
57	Apr 2016	Aug 2016	5	50.00% Fidelity Government Income Fund (FGOVX) 50.00% Vanguard 500 Index Fund (VFINX)	FGOVX: 1.72% VFINX: 6.32%	4.02%	5.33%	6.32%
58	Sep 2016	Dec 2016	4	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Pacific Stock Index Fund (VPACX)	VFINX: 3.80% VPACX: -0.07%	1.90%	1.10%	3.80%
59	Jan 2017	Jan 2017	1	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Pacific Stock Index Fund (VPACX)	-	-	-	-

# PV Dual Momentum: VFINX, VGPMX

## Momentum - Dual Momentum

The dual momentum model uses relative momentum to select the best performing model assets and incorporates absolute momentum as a filter to invest in cash if the excess return of the selected asset over cash is negative.

Timing Model **i** Dual Momentum

Start Year **i** 1985 **Time Period**

End Year **i** 2016

Initial Amount **i** \$ 10000 .00 **Equity List**

Tickers **i** VFINX VGPMX

Out of Market Asset **i** Select asset... **Cash ETF = FGOVX**

Specify out of market asset FGOVX

Performance Periods Single Period

Timing Period 12 months **One fund, monthly**

Assets to hold **i** 1

Trading Frequency **i** Monthly **EoM Trading**

Trade Execution **i** Trade at end of month price

Benchmark **i** Vanguard 500 Index Fund **VFINX benchmark**

Run Test Cancel



# PV Dual Momentum: VFINX, VGPMX

Market Timing Results (Jan 1987 - Dec 2016) [Link](#) [Print](#) [Download](#)

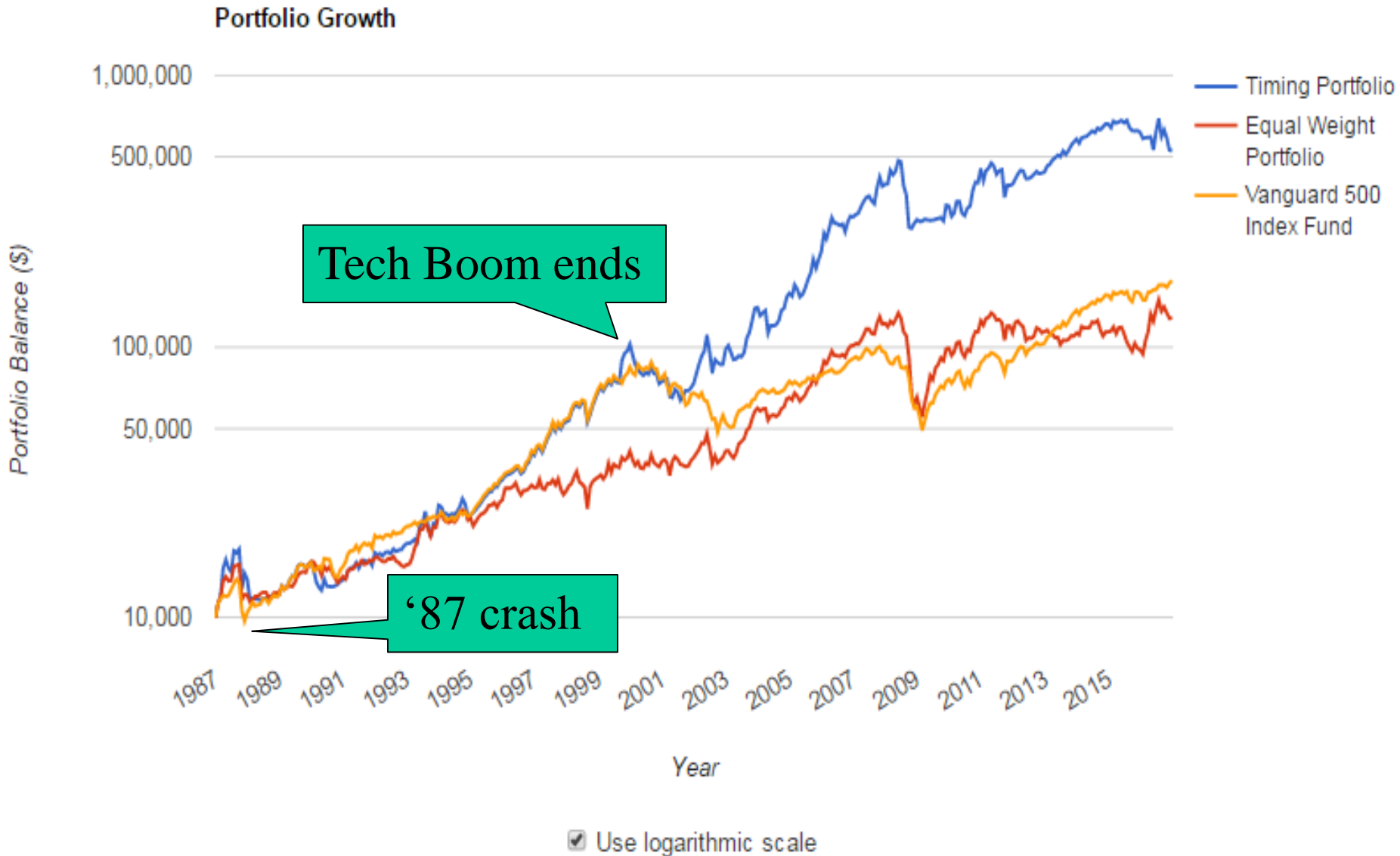
Portfolio Statistics [Metrics](#) [Annual Returns](#) [Monthly Returns](#) [Drawdowns](#) [Timing Periods](#)

Market timing results from 1987 to 2016 based on dual momentum model holding the best performing asset. Absolute momentum based trend following filter is used to switch any selected assets that have a negative excess return over the risk free rate to Fidelity Government Income Fund (FGOVX). The model uses a single performance window of 12 month(s). Timing model trades are executed using the end of month close price. Note that the selected year range for the timing test was automatically adjusted based on the available data for Vanguard 500 Index Fund (VFINX) (May 1985-Dec 2016).

Portfolio	Initial Balance	Final Balance	CAGR	Std.Dev.	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Timing Portfolio	\$10,000	\$526,768	14.13%	22.60%	50.03%	-27.05%	-43.69% <b>1</b>	0.56	0.86	0.48
Equal Weight Portfolio	\$10,000	\$127,692	8.86%	19.89%	52.05%	-46.52%	-58.66% <b>1</b>	0.37	0.55	0.68
Vanguard 500 Index Fund	\$10,000	\$174,986	10.01%	15.21%	37.45%	-37.02%	-50.97% <b>1</b>	0.50	0.72	0.99

[Save timing model »](#)

# PV Dual Momentum: VFINX, VGPMX



# PV Dual Momentum: VFINX, VGPMX

Market Timing Results (Jan 1987 - Dec 2016) [Link](#) [Print](#) [Download](#)

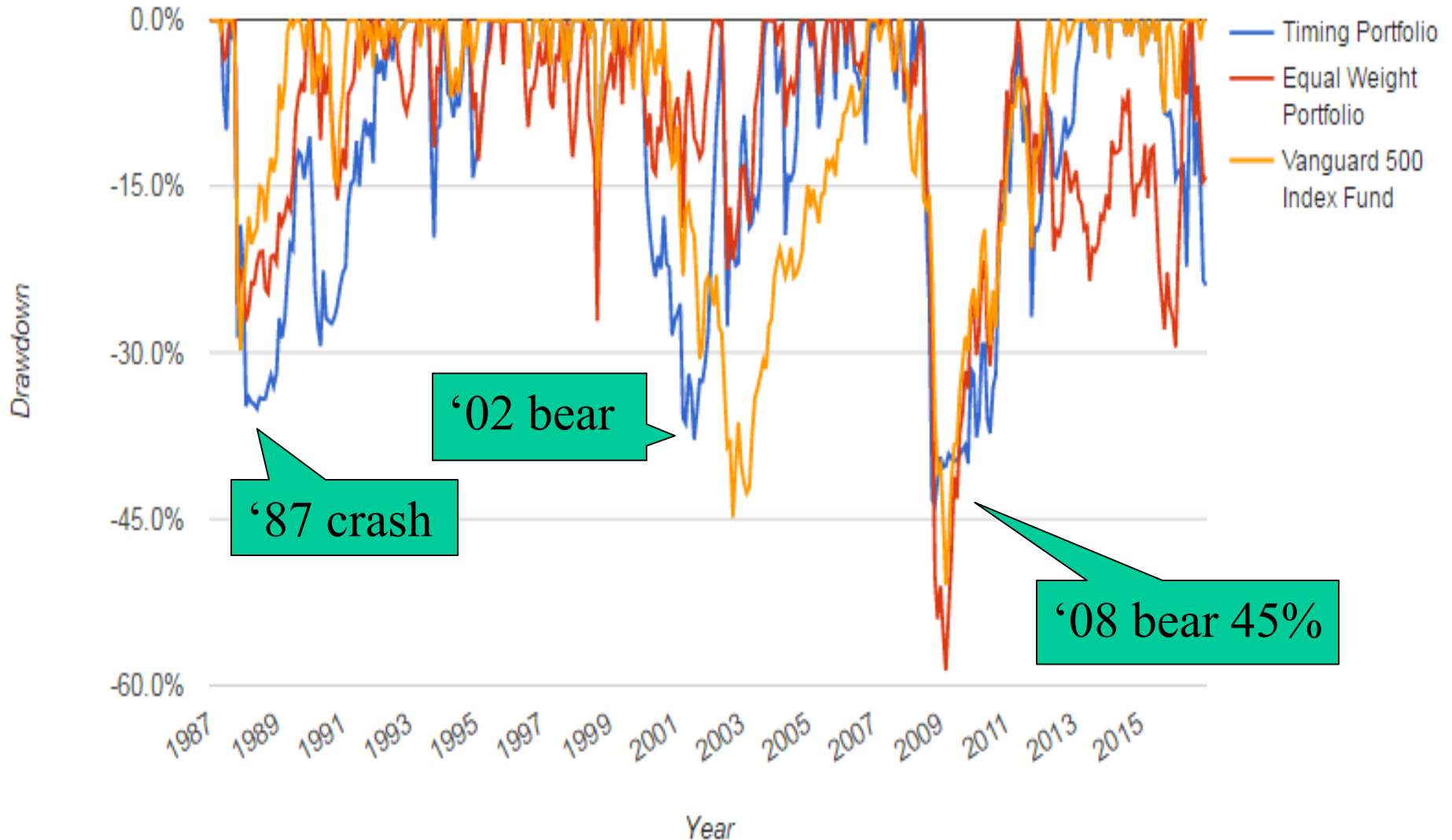
Portfolio Statistics Metrics Annual Returns Monthly Returns Drawdowns Timing Periods

Metric	Timing Model	Equal Weight Portfolio	Vanguard 500 Index Fund
Mean Return (monthly)	1.32%	0.87%	0.89%
Mean Return (annualized)	17.02%	10.99%	11.27%
Compound Return (monthly)	1.11%	0.71%	0.80%
Compound Return (annualized)	14.13%	8.86%	10.01%
Volatility (monthly)	6.45%	5.65%	4.33%
Volatility (annualized)	22.60%	19.89%	15.21%
Max. Drawdown	-43.69%	-58.66%	-50.97%
Market Correlation	0.48	0.68	0.99
Beta <sup>(1)</sup>	0.70	0.87	1.00
Alpha (annualized)	8.28%	1.17%	-0.00%
R <sup>2</sup>	22.25%	44.21%	100.00%
Sharpe Ratio	0.56	0.37	0.50
Sortino Ratio	0.86	0.55	0.72
Treynor Ratio (%)	17.97	8.41	7.54
Skewness	-0.35	-0.54	-0.82
Excess Kurtosis	3.07	3.12	2.71
Historical Value-at-Risk (95%)	-9.19%	-7.60%	-7.03%
Delta Normal Value-at-Risk (95%)	-10.62%	-9.22%	-7.12%
Conditional Value-at-Risk (95%)	-14.87%	-12.47%	-9.98%
Positive Periods	228 out of 360 (63.33%)	210 out of 360 (58.33%)	232 out of 360 (64.44%)
Gain/Loss Ratio	1.04	1.09	0.94

<sup>(1)</sup> Beta is calculated against Vanguard 500 Index Fund (the selected benchmark). Market correlation is against the US stock market.

# PV Dual Momentum: VFINX, VGPMX

Drawdowns



# PV Dual Momentum: VFINX, VGPMX

Market Timing Results (Jan 1987 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics   Metrics   Annual Returns   Monthly Returns   Drawdowns   **Timing Periods**

#	Start	End	Months	Assets	Asset Performance	Timing Return	Equal Weight Portfolio	Vanguard 500 Index Fund
1	Jan 1987	Jan 1988	13	100.00% Vanguard Precious Metals and Mining Fund (VGPMX)	VGPMX: 16.87%	16.87%	14.67%	9.08%
2	Feb 1988	Oct 1988	9	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 4.28%	4.28%	7.89%	11.30%
3	Nov 1988	Jan 1990	15	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 22.83%	22.83%	29.97%	22.83%
<div style="background-color: #00b050; color: white; padding: 5px; display: inline-block; border-radius: 10px;">Since '16...</div>								
36	Nov 2015	Jan 2016	3	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: -6.22%	-6.22%	-8.72%	-6.22%
37	Feb 2016	Mar 2016	2	100.00% Fidelity Government Income Fund (FGOVX)	FGOVX: 0.93%	0.93%	20.78%	6.62%
38	Apr 2016	Apr 2016	1	100.00% Vanguard 500 Index Fund (VFINX)	VFINX: 0.37%	0.37%	16.40%	0.37%
39	May 2016	Dec 2016	8	100.00% Vanguard Precious Metals and Mining Fund (VGPMX)	VGPMX: -11.07%	-11.07%	-3.18%	9.96%
40	Jan 2017	Jan 2017	1	100.00% Vanguard Precious Metals and Mining Fund (VGPMX)	-	-	-	-

# PV Dual Momentum: Top 5 Sectors

## Momentum - Dual Momentum

The dual momentum model uses relative momentum to select the best performing model assets and incorporates absolute momentum as a filter to invest in cash if the excess return of the selected asset over cash is negative.

Timing Model **i** Dual Momentum

Start Year **i** 1985 **Time Period**

End Year **i** 2016

Initial Amount **i** \$ 10000 .00 **Equity List**

Tickers **i** XLE XLF XLI XLK XLP XLU XLV XLY FRESX

Out of Market Asset **i** Select asset... **Cash ETF = FGOVX**

Specify out of market asset FGOVX

Performance Periods Single Period

Timing Period 12 months **Five funds, monthly**

Assets to hold **i** 5

Trading Frequency **i** Monthly **EoM Trading**

Trade Execution **i** Trade at end of month price

Benchmark **i** Vanguard 500 Index Fund **VFINX benchmark**

Run Test Cancel

# PV Dual Momentum: Top 5 Sectors

## Market Timing Results (Jan 2000 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics

Metrics

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Drawdowns

Timing Periods

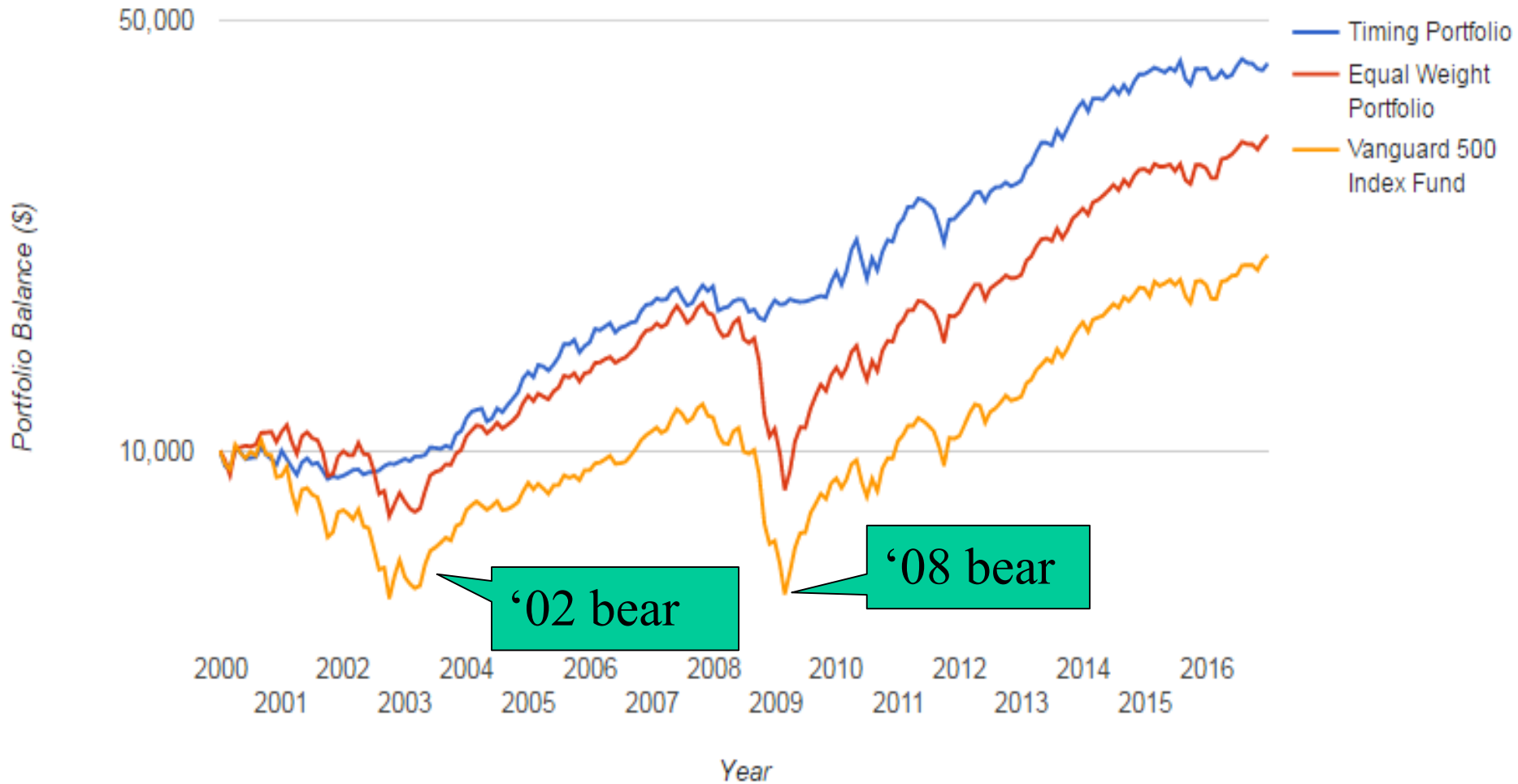
Market timing results from 2000 to 2016 based on dual momentum model holding the top 5 best performing assets. Absolute momentum based trend following filter is used to switch any selected assets that have a negative excess return over the risk free rate to Fidelity Government Income Fund (FGOVX). The model uses a single performance window of 12 month(s). Timing model trades are executed using the end of month close price. Note that the selected year range for the timing test was automatically adjusted based on the available data for SPDR Select Sector Fund - Energy Select Sector (XLE) (Jan 1999-Dec 2016).

Portfolio	Initial Balance	Final Balance	CAGR	Std.Dev.	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Timing Portfolio	\$10,000	\$42,633	8.90%	10.42%	34.46%	-8.99%	-15.25% <b>i</b>	0.71	1.15	0.66
Equal Weight Portfolio	\$10,000	\$32,548	7.19%	14.18%	28.18%	-34.74%	-50.28% <b>i</b>	0.45	0.64	0.95
Vanguard 500 Index Fund	\$10,000	\$20,785	4.40%	15.03%	32.18%	-37.02%	-50.97% <b>i</b>	0.25	0.36	0.99

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# PV Dual Momentum: Top 5 Sectors

Portfolio Growth



Use logarithmic scale



# PV Dual Momentum: Top 5 Sectors

Market Timing Results (Jan 2000 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics

Metrics

Annual Returns

Monthly Returns

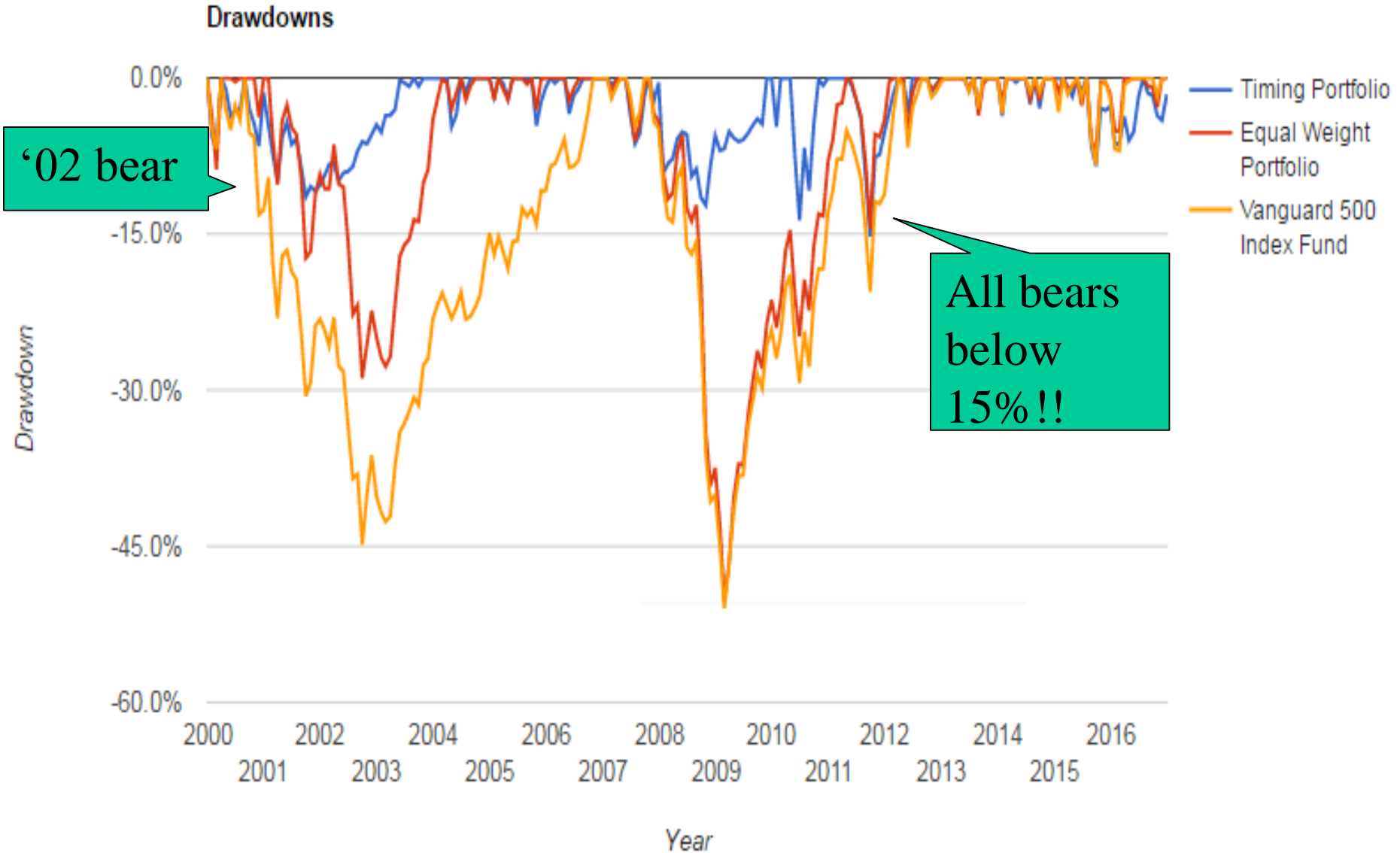
Drawdowns

Timing Periods

Metric	Timing Model	Equal Weight Portfolio	Vanguard 500 Index Fund
Mean Return (monthly)	0.76%	0.66%	0.45%
Mean Return (annualized)	9.49%	8.25%	5.57%
Compound Return (monthly)	0.71%	0.58%	0.36%
Compound Return (annualized)	8.90%	7.19%	4.40%
Volatility (monthly)	3.01%	4.03%	4.29%
Volatility (annualized)	10.42%	14.18%	15.03%
Max. Drawdown	-15.25%	-50.28%	-50.97%
Market Correlation	0.66	0.95	0.99
Beta <sup>(1)</sup>	0.47	0.91	1.00
Alpha (annualized)	6.57%	3.03%	-0.00%
R <sup>2</sup>	44.17%	92.94%	100.00%
Sharpe Ratio	0.71	0.45	0.25
Sortino Ratio	1.15	0.64	0.36
Treynor Ratio (%)	16.01	6.98	3.80
Skewness	-0.18	-0.76	-0.53
Excess Kurtosis	0.50	2.32	1.04
Historical Value-at-Risk (95%)	-4.56%	-7.24%	-7.84%
Delta Normal Value-at-Risk (95%)	-4.96%	-6.73%	-7.05%
Conditional Value-at-Risk (95%)	-6.14%	-9.65%	-9.72%
Positive Periods	131 out of 204 (64.22%)	128 out of 204 (62.75%)	125 out of 204 (61.27%)
Gain/Loss Ratio	1.07	0.91	0.82

<sup>(1)</sup> Beta is calculated against Vanguard 500 Index Fund (the selected benchmark). Market correlation is against the US stock market.

# PV Dual Momentum: Top 5 Sectors



# PV Dual Momentum: Top 5 Sectors

Market Timing Results (Jan 2000 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics Metrics Annual Returns Monthly Returns Drawdowns Timing Periods

#	Start	End	Months	Assets	Asset Performance	Timing Return	Equal Weight Portfolio	Vanguard 500 Index Fund
1	Jan 2000	Jan 2000	1	20.00% SPDR Select Sector Fund - Energy Select Sector (XLE) 20.00% SPDR Select Sector Fund - Industrial (XLI) 20.00% SPDR Select Sector Fund - Technology (XLK) 20.00% SPDR Select Sector Fund - Health Care (XLV) 20.00% SPDR Select Sector Fund - Consumer Discretionary (XLY)	XLE: 0.81% XLI: -8.18% XLK: -6.15% XLV: -2.53% XLY: -12.42%	-5.69%	-3.68%	-5.03%
2	Feb 2000	Feb 2000	1	20.00% Fidelity Government Income Fund (FGOVX) 20.00% SPDR Select Sector Fund - Energy Select Sector (XLE) 20.00% SPDR Select Sector Fund - Industrial (XLI) 20.00% SPDR Select Sector Fund - Technology (XLK) 20.00% SPDR Select Sector Fund - Health Care (XLV)	FGOVX: 1.37% XLE: -4.23% XLI: -5.52% XLK: 10.51% XLV: -6.54%	-0.88%	-5.32%	-1.91%
3	Mar 2000	Mar 2000	1	40.00% Fidelity Government Income Fund (FGOVX) 20.00% SPDR Select Sector Fund - Energy Select Sector (XLE) 20.00% SPDR Select Sector Fund - Industrial (XLI) 20.00% SPDR Select Sector Fund - Technology (XLK)	FGOVX: 1.39% XLE: 12.45% XLI: 13.92% XLK: 8.39%	7.51%	10.50%	9.76%

Since '16...

122	Jun 2016	Jun 2016	1	20.00% Fidelity Real Estate Pt (FRESX) 20.00% SPDR Select Sector Fund - Technology (XLK) 20.00% SPDR Select Sector Fund - Consumer Staples (XLP) 20.00% SPDR Select Sector Fund - Utilities (XLU) 20.00% SPDR Select Sector Fund - Consumer Discretionary (XLY)	FRESX: 6.70% XLK: -1.37% XLP: 5.36% XLU: 7.62% XLY: -1.14%	3.43%	2.14%	0.25%
123	Jul 2016	Sep 2016	3	20.00% Fidelity Real Estate Pt (FRESX) 20.00% SPDR Select Sector Fund - Industrial (XLI) 20.00% SPDR Select Sector Fund - Technology (XLK) 20.00% SPDR Select Sector Fund - Consumer Staples (XLP) 20.00% SPDR Select Sector Fund - Utilities (XLU)	FRESX: -1.42% XLI: 4.81% XLK: 10.63% XLP: -2.92% XLU: -5.84%	0.97%	1.74%	3.82%
124	Oct 2016	Oct 2016	1	20.00% Fidelity Real Estate Pt (FRESX) 20.00% SPDR Select Sector Fund - Energy Select Sector (XLE) 20.00% SPDR Select Sector Fund - Industrial (XLI) 20.00% SPDR Select Sector Fund - Technology (XLK) 20.00% SPDR Select Sector Fund - Utilities (XLU)	FRESX: -5.39% XLE: -2.82% XLI: -2.00% XLK: -0.75% XLU: 0.90%	-2.01%	-1.94%	-1.83%
125	Nov 2016	Nov 2016	1	20.00% Fidelity Real Estate Pt (FRESX) 20.00% SPDR Select Sector Fund - Industrial (XLI) 20.00% SPDR Select Sector Fund - Technology (XLK) 20.00% SPDR Select Sector Fund - Consumer Staples (XLP) 20.00% SPDR Select Sector Fund - Utilities (XLU)	FRESX: -1.86% XLI: 9.09% XLK: 0.17% XLP: -4.20% XLU: -5.42%	-0.45%	2.96%	3.70%
126	Dec 2016	Dec 2016	1	20.00% SPDR Select Sector Fund - Energy Select Sector (XLE) 20.00% SPDR Select Sector Fund - Financial (XLF) 20.00% SPDR Select Sector Fund - Industrial (XLI) 20.00% SPDR Select Sector Fund - Technology (XLK) 20.00% SPDR Select Sector Fund - Utilities (XLU)	XLE: 1.73% XLF: 3.76% XLI: 0.31% XLK: 2.26% XLU: 4.89%	2.59%	2.36%	1.96%
127	Jan 2017	Jan 2017	1	20.00% SPDR Select Sector Fund - Energy Select Sector (XLE) 20.00% SPDR Select Sector Fund - Financial (XLF) 20.00% SPDR Select Sector Fund - Industrial (XLI) 20.00% SPDR Select Sector Fund - Technology (XLK) 20.00% SPDR Select Sector Fund - Utilities (XLU)	-	-	-	-

# PV Target Volatility: VFINX, NAESX

## Target Volatility

The target volatility model adjusts the market exposure of the portfolio based on the realized historic volatility and the given volatility target. The cash allocation in the portfolio is increased or decreased as required to meet the targeted volatility level in order to improve the risk adjusted performance.

Timing Model ⓘ Target Volatility

Start Year ⓘ 1985

End Year ⓘ 2016

Initial Amount ⓘ \$ 10000 .00

Target Volatility ⓘ 16 %

Use Downside Volatility ⓘ No

Out of Market Asset ⓘ Select asset...

Specify out of market asset FGOVX

Volatility Timing Periods Single Period

Volatility Period 1 month

Trade Execution ⓘ Trade at end of month price

Benchmark ⓘ Vanguard 500 Index Fund

Portfolio Assets ⓘ Allocation

Asset	Allocation
Asset 1 VFINX	50 %
Asset 2 NAESX	50 %

Time Period

Target: 16% Yearly, ~1% Daily

Cash ETF = FGOVX

Single fund, monthly

EoM Trading

VFINX benchmark

Equity List

# Target Volatility

## Market Timing Results (Jan 1986 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics

Metrics

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Market timing results from 1986 to 2016 based on the annual target volatility of 16.00%. The timing portfolio adjusts the equity allocation monthly based on realized historical volatility and the specified target volatility using 1 calendar month volatility period. Timing model trades are executed using the end of month close price. Note that the selected year range for the timing test was automatically adjusted based on the available data for Vanguard 500 Index Fund (VFINX) (May 1985-Dec 2016).

Portfolio	Initial Balance	Final Balance	CAGR	Std.Dev.	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Timing Portfolio	\$10,000	\$244,139	10.86%	14.27%	36.83%	-16.01%	-29.99% <b>1</b>	0.58	0.81	0.92
Buy & Hold Portfolio	\$10,000	\$201,730	10.18%	16.93%	37.72%	-36.55%	-52.11% <b>1</b>	0.47	0.66	0.98
Vanguard 500 Index Fund	\$10,000	\$206,590	10.26%	15.28%	37.45%	-37.02%	-50.97% <b>1</b>	0.51	0.73	0.99

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# PV Target Volatility : VFINX, NAESX



# PV Target Volatility : VFINX, NAESX

Market Timing Results (Jan 1986 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics Metrics Annual Returns Monthly Returns Drawdowns Timing Periods

Metric	Timing Model	Buy & Hold Portfolio	Vanguard 500 Index Fund
Mean Return (monthly)	0.95%	0.93%	0.91%
Mean Return (annualized)	11.96%	11.73%	11.53%
Compound Return (monthly)	0.86%	0.81%	0.82%
Compound Return (annualized)	10.86%	10.18%	10.26%
Volatility (monthly)	4.01%	4.77%	4.35%
Volatility (annualized)	14.27%	16.93%	15.28%
Max. Drawdown	-29.99%	-52.11%	-50.97%
Market Correlation	0.92	0.98	0.99
Beta <sup>(1)</sup>	0.83	1.04	1.00
Alpha (annualized)	2.30%	-0.22%	-0.00%
R <sup>2</sup>	80.06%	89.21%	100.00%
Sharpe Ratio	0.58	0.47	0.51
Sortino Ratio	0.81	0.66	0.73
Treynor Ratio (%)	9.79	7.60	7.69
Skewness	-1.36	-1.06	-0.80
Excess Kurtosis	6.55	3.74	2.53
Historical Value-at-Risk (95%)	-5.40%	-7.87%	-7.07%
Delta Normal Value-at-Risk (95%)	-6.60%	-7.85%	-7.16%
Conditional Value-at-Risk (95%)	-9.11%	-11.41%	-10.05%
Positive Periods	243 out of 372 (65.32%)	241 out of 372 (64.78%)	240 out of 372 (64.52%)
Gain/Loss Ratio	0.97	0.90	0.94

<sup>(1)</sup> Beta is calculated against Vanguard 500 Index Fund (the selected benchmark). Market correlation is against the US stock market.

# PV Target Volatility : VFINX, NAESX

Market Timing Results (Jan 1986 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics

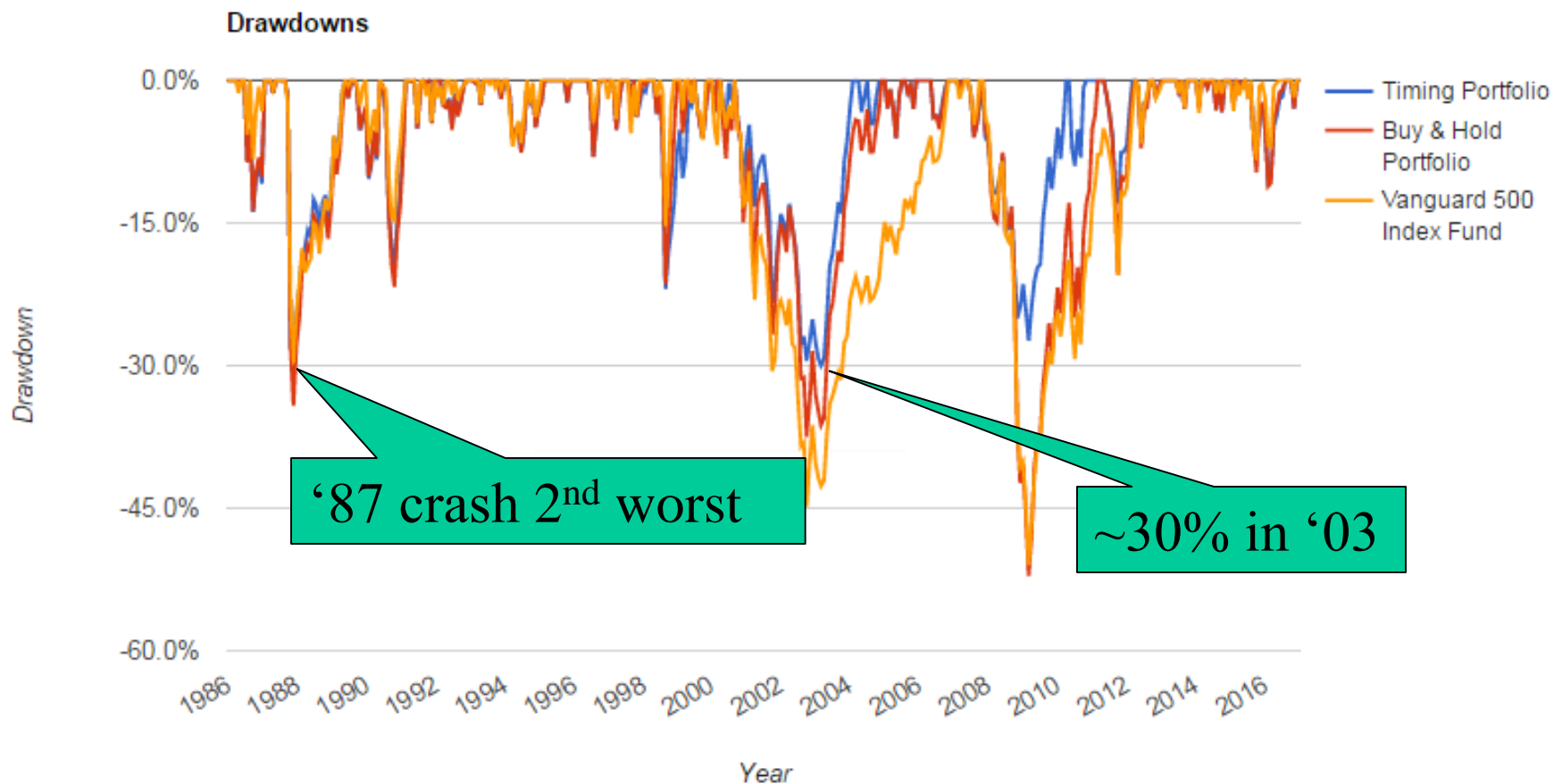
Metrics

Annual Returns

Monthly Returns

Drawdowns

Timing Periods





# PV Target Volatility : VFINX, NAESX

Market Timing Results (Jan 1986 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics   Metrics   Annual Returns   Monthly Returns   Drawdowns   **Timing Periods**

#	Start	End	Months	Assets	Timing Return	Buy & Hold Portfolio	Vanguard 500 Index Fund
1	Jan 1986	Jul 1986	7	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Small-Cap Index Fund (NAESX)	11.10%	11.01%	13.61%
2	Aug 1986	Aug 1986	1	48.96% Vanguard 500 Index Fund (VFINX) 48.96% Vanguard Small-Cap Index Fund (NAESX) 2.09% Fidelity Government Income Fund (FGOVX)	3.71%	3.81%	7.45%
3	Sep 1986	Sep 1986	1	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Small-Cap Index Fund (NAESX)	-9.12%	-9.07%	-8.31%

Since 2016 or so...

169	Mar 2016	Mar 2016	1	40.10% Vanguard 500 Index Fund (VFINX) 40.10% Vanguard Small-Cap Index Fund (NAESX) 19.80% Fidelity Government Income Fund (FGOVX)	6.11%	7.56%	6.78%
170	Apr 2016	Jun 2016	3	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Small-Cap Index Fund (NAESX)	3.18%	3.18%	2.42%
171	Jul 2016	Jul 2016	1	38.30% Vanguard 500 Index Fund (VFINX) 38.30% Vanguard Small-Cap Index Fund (NAESX) 23.41% Fidelity Government Income Fund (FGOVX)	3.40%	4.38%	3.68%
172	Aug 2016	Dec 2016	5	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Small-Cap Index Fund (NAESX)	5.57%	5.56%	3.94%
173	Jan 2017	Jan 2017	1	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Small-Cap Index Fund (NAESX)	-	-	-

# PV Target Volatility: VFINX, NAESX

## Target Volatility

The target volatility model adjusts the market exposure of the portfolio based on the realized historic volatility and the given volatility target. The cash allocation in the portfolio is increased or decreased as required to meet the targeted volatility level in order to improve the risk adjusted performance.

Timing Model **i** Target Volatility

Start Year **i** 1985

End Year **i** 2016

Initial Amount **i** \$ 10000 .00

Target Volatility **i** 10 %

Use Downside Volatility **i** No

Out of Market Asset **i** Select asset...

Specify out of market asset FGOVX

Volatility Timing Periods Single Period

Volatility Period 1 month

Trade Execution **i** Trade at end of month price

Benchmark **i** Vanguard 500 Index Fund

Portfolio Assets **i** Allocation

Asset	Allocation
Asset 1 VFINX	50
Asset 2 NAESX	50 %

Time Period

Target: 10% Yearly, ~0.6% Daily

Cash ETF = FGOVX

Single fund, monthly

EoM Trading

VFINX benchmark

Equity List

# Target Volatility

## Market Timing Results (Jan 1986 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics

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Drawdowns

Timing Periods

Market timing results from 1986 to 2016 based on the annual target volatility of 10.00%. The timing portfolio adjusts the equity allocation monthly based on realized historical volatility and the specified target volatility using 1 calendar month volatility period. Timing model trades are executed using the end of month close price. Note that the selected year range for the timing test was automatically adjusted based on the available data for Vanguard 500 Index Fund (VFINX) (May 1985-Dec 2016).

Portfolio	Initial Balance	Final Balance	CAGR	Std.Dev.	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Timing Portfolio	\$10,000	\$193,663	10.03%	11.16%	33.12%	-7.50%	-21.20%	0.63	0.90	0.88
Buy & Hold Portfolio	\$10,000	\$201,730	10.18%	16.93%	37.72%	-36.55%	-52.11%	0.47	0.66	0.98
Vanguard 500 Index Fund	\$10,000	\$206,590	10.26%	15.28%	37.45%	-37.02%	-50.97%	0.51	0.73	0.99

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# PV Target Volatility : VFINX, NAESX



# PV Target Volatility : VFINX, NAESX

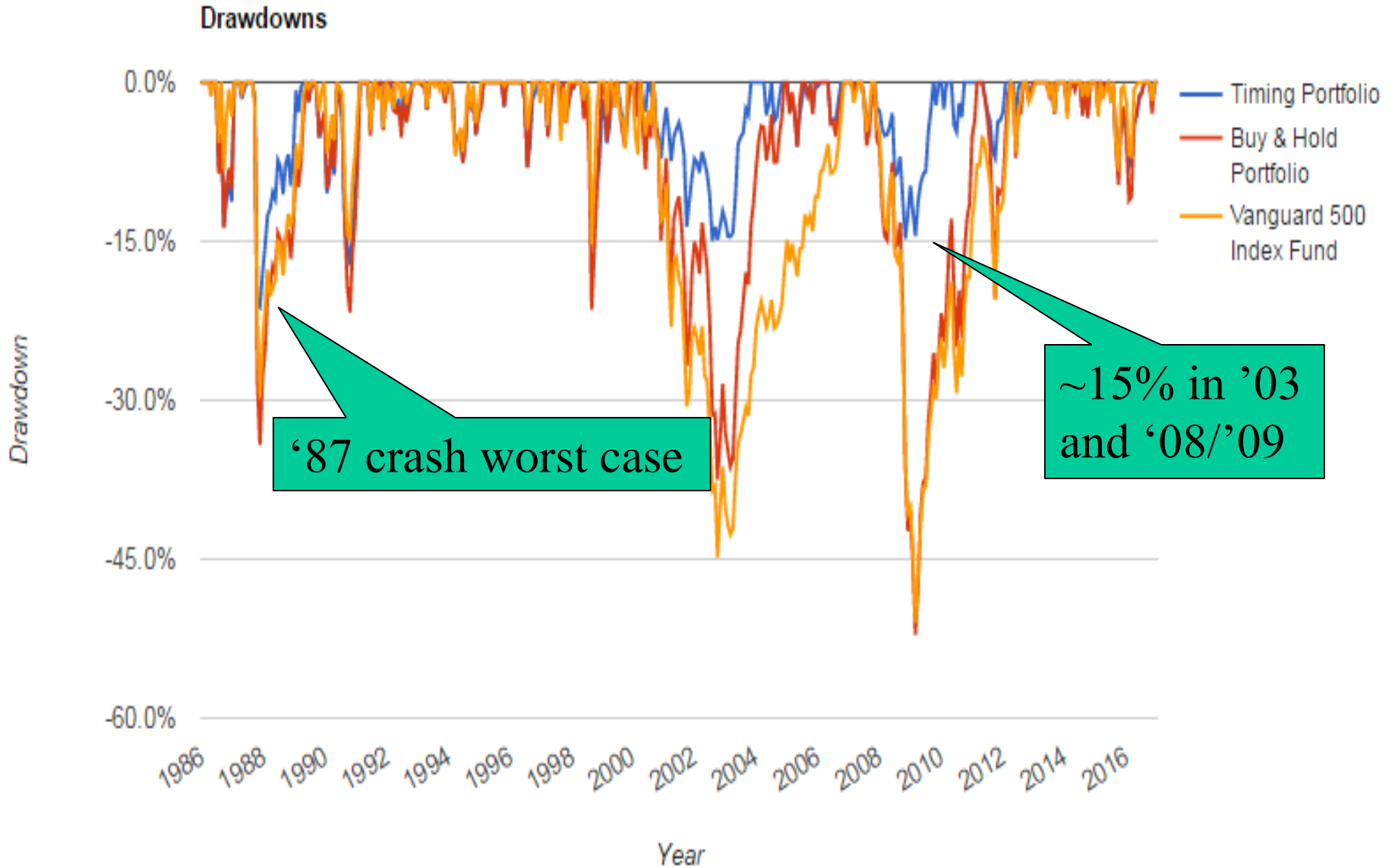
Market Timing Results (Jan 1986 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics Metrics Annual Returns Monthly Returns Drawdowns Timing Periods

Metric	Timing Model	Buy & Hold Portfolio	Vanguard 500 Index Fund
Mean Return (monthly)	0.85%	0.93%	0.91%
Mean Return (annualized)	10.71%	11.73%	11.53%
Compound Return (monthly)	0.80%	0.81%	0.82%
Compound Return (annualized)	10.03%	10.18%	10.26%
Volatility (monthly)	3.18%	4.77%	4.35%
Volatility (annualized)	11.16%	16.93%	15.28%
Max. Drawdown	-21.20%	-52.11%	-50.97%
Market Correlation	0.88	0.98	0.99
Beta <sup>(1)</sup>	0.62	1.04	1.00
Alpha (annualized)	3.38%	-0.22%	-0.00%
R <sup>2</sup>	72.80%	89.21%	100.00%
Sharpe Ratio	0.63	0.47	0.51
Sortino Ratio	0.90	0.66	0.73
Treynor Ratio (%)	11.14	7.60	7.69
Skewness	-1.07	-1.06	-0.80
Excess Kurtosis	5.32	3.74	2.53
Historical Value-at-Risk (95%)	-4.17%	-7.87%	-7.07%
Delta Normal Value-at-Risk (95%)	-5.23%	-7.85%	-7.16%
Conditional Value-at-Risk (95%)	-7.05%	-11.41%	-10.05%
Positive Periods	248 out of 372 (66.67%)	241 out of 372 (64.78%)	240 out of 372 (64.52%)
Gain/Loss Ratio	0.99	0.90	0.94

<sup>(1)</sup> Beta is calculated against Vanguard 500 Index Fund (the selected benchmark). Market correlation is against the US stock market.

# PV Target Volatility : VFINX, NAESX



# PV Target Volatility : VFINX, NAESX

Market Timing Results (Jan 1986 - Dec 2016) [Link](#) [Print](#) [Download](#)

Portfolio Statistics   Metrics   Annual Returns   Monthly Returns   Drawdowns   **Timing Periods**

#	Start	End	Months	Assets	Timing Return	Buy & Hold Portfolio	Vanguard 500 Index Fund
1	Jan 1986	Jan 1986	1	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Small-Cap Index Fund (NAESX)	2.32%	2.32%	0.43%
2	Feb 1986	Feb 1986	1	43.40% Vanguard 500 Index Fund (VFINX) 43.40% Vanguard Small-Cap Index Fund (NAESX) 13.19% Fidelity Government Income Fund (FGOVX)	7.33%	7.90%	7.58%
3	Mar 1986	Mar 1986	1	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Small-Cap Index Fund (NAESX)	3.56%	3.51%	5.48%

Since 2016 or so... high trade count strategy

309	Jun 2016	Jun 2016	1	40.62% Vanguard 500 Index Fund (VFINX) 40.62% Vanguard Small-Cap Index Fund (NAESX) 18.75% Fidelity Government Income Fund (FGOVX)	0.55%	0.25%	0.25%
310	Jul 2016	Jul 2016	1	23.94% Vanguard 500 Index Fund (VFINX) 23.94% Vanguard Small-Cap Index Fund (NAESX) 52.13% Fidelity Government Income Fund (FGOVX)	2.21%	4.38%	3.68%
311	Aug 2016	Sep 2016	2	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Small-Cap Index Fund (NAESX)	0.58%	0.58%	0.14%
312	Oct 2016	Oct 2016	1	31.35% Vanguard 500 Index Fund (VFINX) 31.35% Vanguard Small-Cap Index Fund (NAESX) 37.31% Fidelity Government Income Fund (FGOVX)	-2.17%	-2.99%	-1.83%
313	Nov 2016	Nov 2016	1	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Small-Cap Index Fund (NAESX)	6.15%	6.17%	3.70%
314	Dec 2016	Dec 2016	1	41.82% Vanguard 500 Index Fund (VFINX) 41.82% Vanguard Small-Cap Index Fund (NAESX) 16.35% Fidelity Government Income Fund (FGOVX)	1.57%	1.91%	1.96%
315	Jan 2017	Jan 2017	1	50.00% Vanguard 500 Index Fund (VFINX) 50.00% Vanguard Small-Cap Index Fund (NAESX)	-	-	-

# Year End Tracking Algs Performance Review

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# Motifs: A Brief Overview

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# SCTR Study

(A1 Z)

# SYLD - Start Dates Matter

(A1 Z)

# Reference Material

- Performance Metrics

# Performance Metrics

EC	Equity Curve	Portfolio Value plotted against time
CRR	Compound Rate of Return	Reward Measurement -- Annualized compound, or geometric, rate of return
DD	Drawdown	Percentage difference in portfolio value on a given date from the maximum portfolio value on all prior dates
MDD	Maximum Drawdown	Risk Measurement - Maximum observed DD over all portfolio valuation dates
UI	Ulcer Index	Risk Measurement - Root Mean Square of the DD measurements for all portfolio evaluation dates. For each date, measure DD and square it. Then take the square root of the average of all the $DD^2$ measurements. The result is the Ulcer Index where a high number means the portfolio has large drawdowns that take a long time to recover to a new portfolio high value.
UPI	Ulcer Performance Index	Reward to Risk Measure -- $CRR / UI$
CR	Calmar Ratio	Reward to Risk Measure -- $CRR / MDD$ This measure is inferior to the UPI because a single large DD will result in a low Calmar Ratio forever

with permission, Michael Begley, informal notes

# Performance Metrics: Examples

