

Model Description

Tactical asset allocation model results from Jan 1998 to May 2020 are based on relative strength model holding the top performing assets. Tactical asset allocation model trades are executed using the end of month close price each month based on the end of month signals. The time period was constrained by the available data for Vanguard Real Estate Index Investor (VGSIX) [Jun 1996 - May 2020].

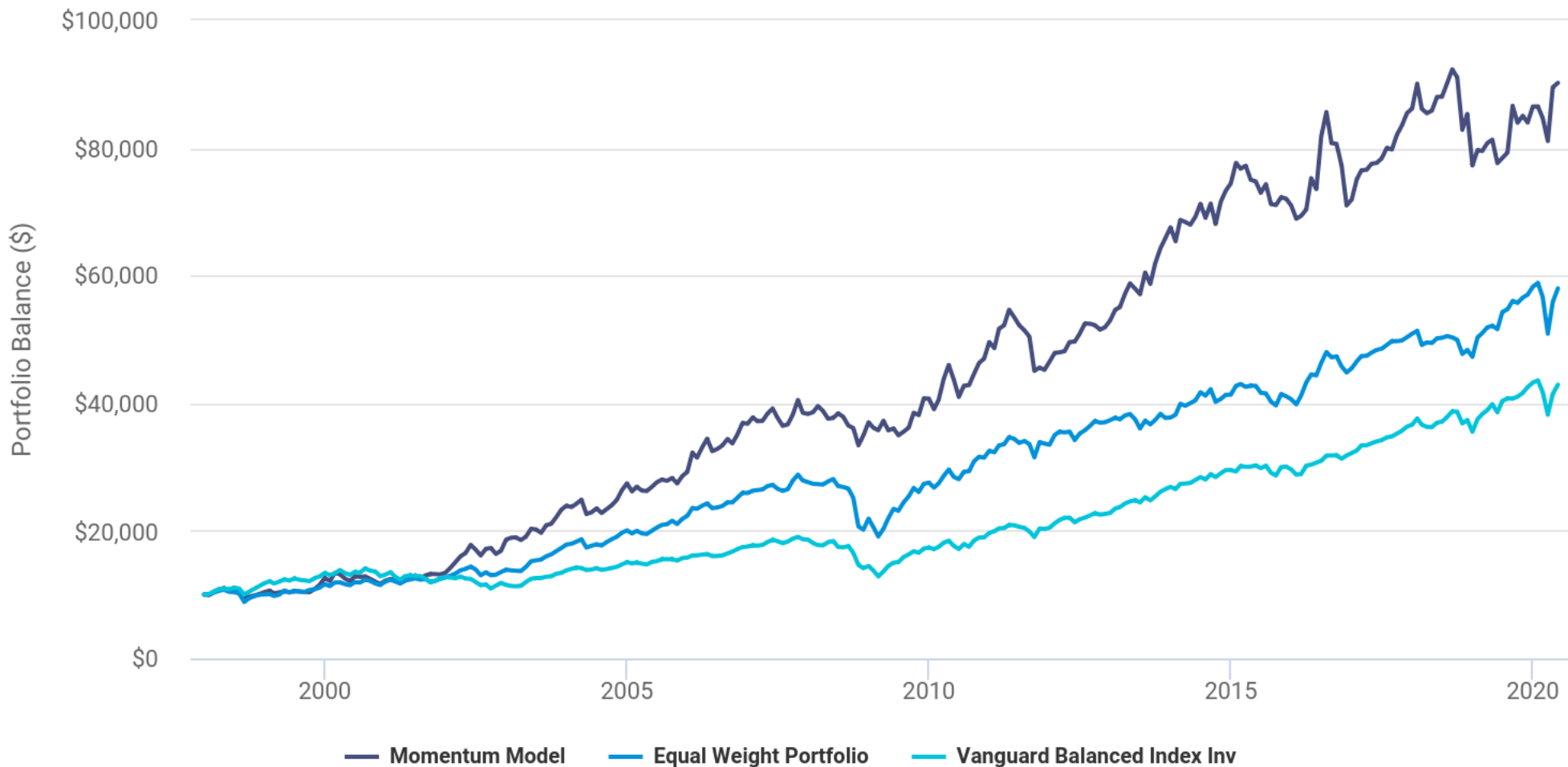
Tactical Asset Allocation Model Assets

Ticker	Name
VTSMX	Vanguard Total Stock Mkt Idx Inv
NAESX	Vanguard Small Cap Index Inv
FDIVX	Fidelity Diversified International
VUSTX	Vanguard Long-Term Treasury Inv
FNMIX	Fidelity New Markets Income
VGSIX	Vanguard Real Estate Index Investor
SGGDY	First Eagle Gold A
VFISX	Vanguard Short-Term Treasury Inv

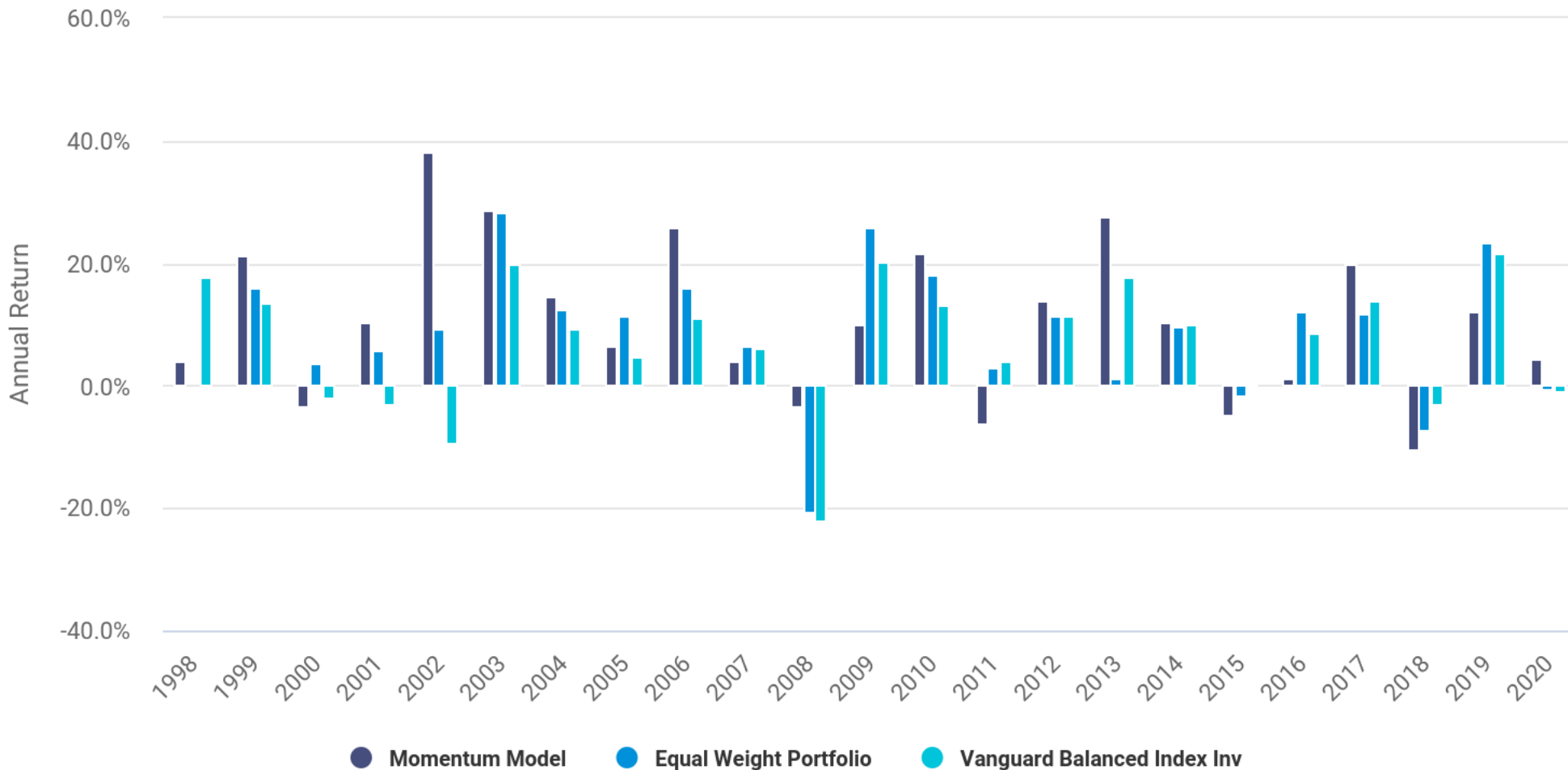
Portfolio Performance (Jan 1998 - May 2020)

Metric	Momentum Model	Equal Weight Portfolio	Vanguard Balanced Index Inv
Start Balance	\$10,000	\$10,000	\$10,000
End Balance	\$90,205	\$57,988	\$42,889
CAGR	10.31%	8.16%	6.71%
Stdev	12.83%	10.99%	9.43%
Best Year	38.16%	28.41%	21.67%
Worst Year	-10.34%	-20.74%	-22.21%
Max. Drawdown	-17.52%	-33.65%	-32.57%
Sharpe Ratio	0.68	0.60	0.53
Sortino Ratio	1.10	0.86	0.76
US Stock Market Correlation	0.51	0.81	0.99

Portfolio Growth



Annual Returns



Risk and Return Metrics (Jan 1998 - May 2020)

Metric	Momentum Model	Equal Weight Portfolio	Vanguard Balanced Index Inv
Arithmetic Mean (monthly)	0.89%	0.71%	0.58%
Arithmetic Mean (annualized)	11.21%	8.82%	7.19%
Geometric Mean (monthly)	0.82%	0.66%	0.54%
Geometric Mean (annualized)	10.31%	8.16%	6.71%
Volatility (monthly)	3.70%	3.17%	2.72%
Volatility (annualized)	12.83%	10.99%	9.43%
Downside Deviation (monthly)	2.21%	2.14%	1.82%
Max. Drawdown	-17.52%	-33.65%	-32.57%
US Market Correlation	0.51	0.81	0.99
Beta (*)	0.74	0.99	1.00
Alpha (annualized)	5.50%	1.60%	0.00%
R Squared	29.86%	71.94%	100.00%
Sharpe Ratio	0.68	0.60	0.53
Sortino Ratio	1.10	0.86	0.76
Treynor Ratio (%)	11.78	6.64	5.05
Calmar Ratio	0.31	0.46	0.65
Active Return	3.60%	1.45%	N/A
Tracking Error	11.01%	5.82%	N/A
Information Ratio	0.33	0.25	N/A
Skewness	-0.11	-1.13	-0.74
Excess Kurtosis	0.53	5.46	1.82
Historical Value-at-Risk (5%)	-5.03%	-3.93%	-4.61%
Analytical Value-at-Risk (5%)	-5.20%	-4.51%	-3.90%
Conditional Value-at-Risk (5%)	-7.34%	-7.46%	-6.30%
Upside Capture Ratio (%)	103.30	100.76	100.00
Downside Capture Ratio (%)	71.97	87.87	100.00
Safe Withdrawal Rate	11.08%	8.45%	6.67%
Perpetual Withdrawal Rate	7.59%	5.72%	4.41%
Positive Periods	164 out of 269 (60.97%)	171 out of 269 (63.57%)	178 out of 269 (66.17%)
Gain/Loss Ratio	1.18	1.05	0.88

(*) Vanguard Balanced Index Inv is used as the benchmark for calculations. Value-at-risk metrics are based on monthly values.

Momentum Model Returns

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Inflation	Balance
1998	-0.81%	4.40%	4.61%	1.52%	-2.65%	0.92%	-3.59%	-8.49%	1.38%	2.02%	2.30%	3.07%	3.95%	1.61%	\$10,395
1999	1.96%	-3.79%	1.43%	1.73%	-1.34%	1.42%	-0.28%	-1.06%	-0.08%	4.88%	5.90%	9.31%	21.20%	2.68%	\$12,598
2000	-3.88%	10.43%	-1.40%	-5.02%	-3.44%	6.26%	-0.64%	0.48%	-2.81%	-3.55%	-3.02%	4.46%	-3.30%	3.39%	\$12,182
2001	1.93%	-0.53%	-0.41%	-0.07%	1.97%	3.76%	-3.45%	3.60%	1.51%	-0.00%	-0.58%	2.53%	10.49%	1.55%	\$13,460
2002	5.91%	5.77%	6.12%	3.09%	7.76%	-4.06%	-5.46%	6.47%	0.70%	-5.28%	2.85%	10.43%	38.16%	2.38%	\$18,597
2003	1.72%	0.16%	-2.09%	2.74%	6.49%	-0.41%	-2.66%	6.07%	1.00%	5.05%	5.21%	2.69%	28.63%	1.88%	\$23,922
2004	-0.88%	2.16%	2.67%	-9.06%	1.19%	2.70%	-3.09%	2.73%	2.53%	3.53%	6.00%	4.19%	14.66%	3.26%	\$27,430
2005	-4.60%	2.80%	-2.24%	-0.27%	2.48%	2.70%	1.50%	-0.67%	1.58%	-3.03%	4.13%	2.34%	6.51%	3.42%	\$29,216
2006	10.39%	-2.44%	5.10%	4.09%	-5.64%	1.02%	1.69%	3.00%	-1.97%	4.29%	4.98%	-0.28%	25.89%	2.54%	\$36,780
2007	2.68%	-1.57%	0.14%	3.06%	2.11%	-3.74%	-3.33%	0.61%	4.17%	5.99%	-4.94%	-0.48%	4.13%	4.08%	\$38,299
2008	0.77%	2.47%	-1.96%	-3.09%	0.26%	1.94%	-1.41%	-3.64%	-1.06%	-7.48%	4.63%	5.87%	-3.41%	0.09%	\$36,992
2009	-2.37%	-0.98%	4.14%	-4.05%	0.89%	-3.03%	1.61%	1.81%	6.43%	-0.94%	6.82%	-0.03%	10.07%	2.72%	\$40,716
2010	-4.07%	3.74%	8.15%	4.94%	-5.04%	-6.16%	4.29%	0.21%	4.16%	3.85%	1.41%	5.53%	21.75%	1.50%	\$49,571
2011	-1.90%	6.25%	1.03%	4.67%	-2.12%	-2.37%	-1.48%	-1.96%	-10.64%	1.13%	-0.77%	2.85%	-6.18%	2.96%	\$46,508
2012	2.97%	0.14%	0.41%	2.97%	0.12%	2.50%	3.12%	-0.02%	-0.45%	-1.35%	0.73%	2.03%	13.85%	1.74%	\$52,949
2013	3.20%	0.73%	3.82%	2.85%	-1.38%	-1.52%	5.94%	-2.91%	5.52%	3.74%	2.49%	2.58%	27.57%	1.50%	\$67,549
2014	-3.22%	5.11%	-0.47%	-0.62%	1.85%	2.92%	-3.09%	3.23%	-4.47%	5.09%	2.42%	1.58%	10.22%	0.76%	\$74,450
2015	4.31%	-1.16%	0.60%	-2.86%	-0.34%	-2.39%	1.85%	-4.20%	-0.20%	1.72%	-0.30%	-1.48%	-4.64%	0.73%	\$70,994
2016	-2.95%	0.66%	1.43%	6.98%	-2.26%	11.29%	4.61%	-5.70%	-0.12%	-4.26%	-8.06%	1.29%	1.29%	2.07%	\$71,910
2017	4.48%	1.82%	0.10%	1.25%	0.16%	0.90%	2.10%	-0.29%	2.87%	1.82%	2.28%	0.84%	19.84%	2.11%	\$86,175
2018	4.52%	-4.39%	-0.78%	0.49%	2.49%	0.03%	2.42%	2.40%	-1.34%	-9.03%	2.98%	-9.46%	-10.34%	1.91%	\$77,261
2019	3.13%	-0.20%	1.57%	0.66%	-4.53%	1.06%	1.08%	9.24%	-3.06%	1.29%	-1.24%	2.98%	11.94%	2.29%	\$86,486
2020	0.03%	-2.09%	-4.25%	10.38%	0.77%								4.30%	-0.23%	\$90,205

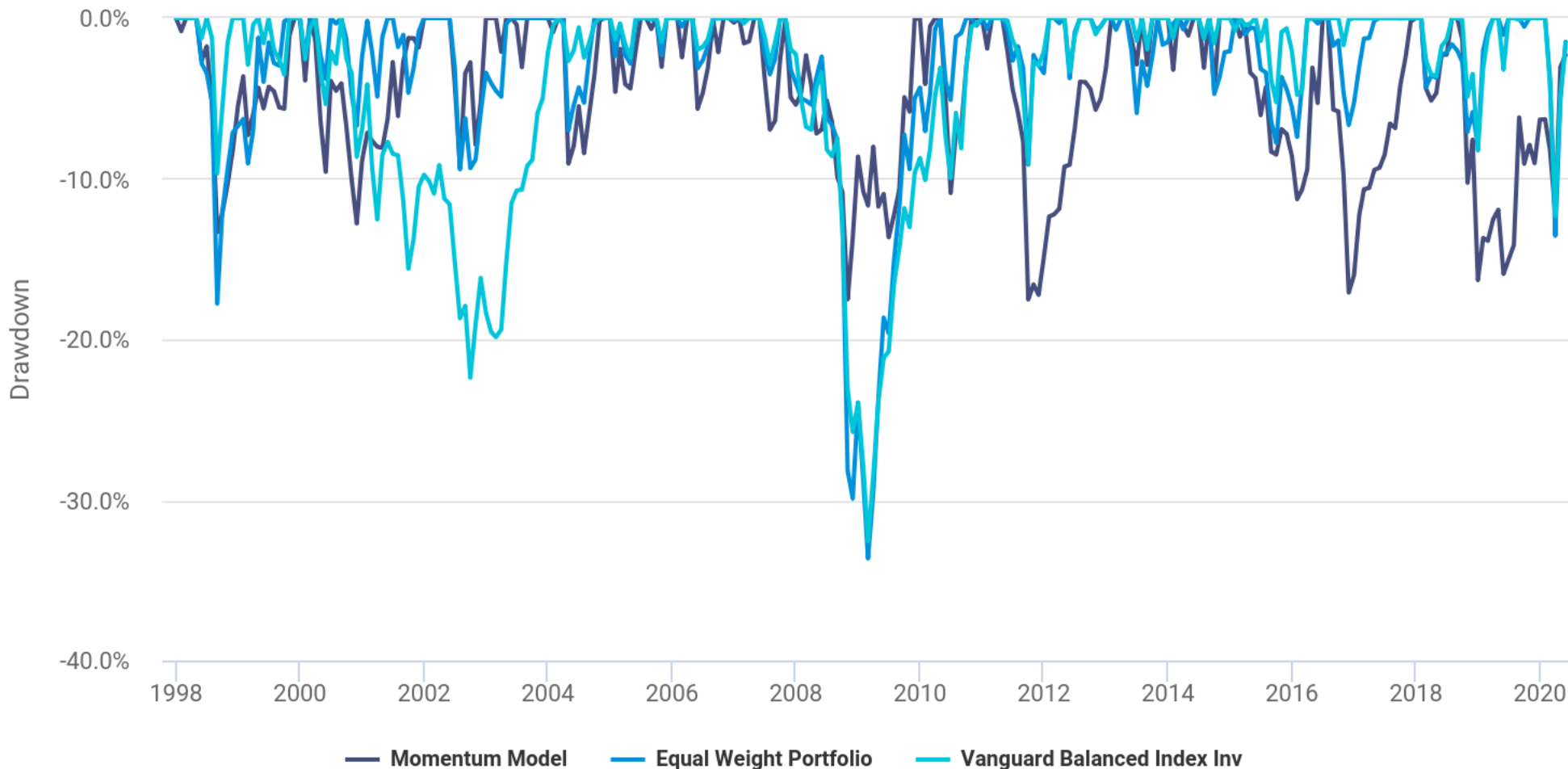
Equal Weight Portfolio Returns

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Inflation	Balance
1998	0.62%	2.37%	2.91%	1.34%	-2.83%	-0.61%	-1.89%	-13.23%	6.95%	3.04%	2.50%	0.43%	0.19%	1.61%	\$10,019
1999	0.48%	-2.96%	2.27%	6.20%	-2.79%	2.55%	-1.30%	-0.17%	2.85%	1.04%	2.37%	4.76%	15.94%	2.68%	\$11,617
2000	-2.50%	4.92%	0.21%	-2.28%	-1.53%	4.16%	-0.33%	3.56%	-1.31%	-3.51%	-2.02%	4.59%	3.49%	3.39%	\$12,022
2001	2.29%	-1.92%	-2.86%	3.91%	1.47%	1.64%	-1.80%	0.77%	-3.64%	1.62%	2.34%	2.21%	5.86%	1.55%	\$12,727
2002	1.91%	2.54%	3.78%	1.61%	2.53%	-3.01%	-6.61%	3.50%	-3.30%	0.60%	3.17%	2.66%	9.12%	2.38%	\$13,888
2003	-0.68%	-0.49%	-0.38%	4.79%	6.14%	1.01%	0.79%	3.33%	1.82%	3.17%	2.89%	3.14%	28.41%	1.88%	\$17,833
2004	0.76%	1.70%	2.15%	-6.99%	1.68%	1.18%	-1.00%	3.11%	2.43%	2.08%	3.26%	1.89%	12.46%	3.26%	\$20,056
2005	-2.38%	2.08%	-1.97%	-0.53%	2.63%	2.50%	2.03%	0.50%	2.55%	-2.31%	3.73%	2.20%	11.33%	3.42%	\$22,329
2006	5.52%	-0.52%	2.07%	1.54%	-3.12%	0.51%	0.93%	2.43%	-0.03%	3.10%	2.96%	-0.14%	16.04%	2.54%	\$25,911
2007	1.42%	0.38%	0.37%	1.99%	0.70%	-2.24%	-1.29%	1.01%	5.12%	3.32%	-3.20%	-0.87%	6.61%	4.08%	\$27,623
2008	-0.98%	-0.17%	-0.25%	1.80%	1.33%	-3.91%	-0.48%	-0.99%	-5.38%	-17.87%	-2.40%	8.53%	-20.74%	0.09%	\$21,895
2009	-6.40%	-6.80%	6.16%	8.39%	6.54%	-1.19%	5.64%	3.83%	5.19%	-2.31%	4.88%	0.69%	25.79%	2.72%	\$27,541
2010	-2.83%	2.44%	4.33%	3.47%	-3.94%	-1.20%	4.14%	0.23%	5.38%	2.27%	-0.46%	3.40%	18.08%	1.50%	\$32,521
2011	-0.67%	3.36%	0.49%	3.35%	-0.77%	-1.90%	0.91%	-1.39%	-6.18%	7.50%	-0.65%	-0.50%	2.99%	2.96%	\$33,493
2012	4.56%	1.45%	-0.31%	0.37%	-3.74%	2.98%	1.43%	1.91%	2.14%	-0.72%	0.19%	0.89%	11.47%	1.74%	\$37,334
2013	1.05%	-0.72%	1.66%	0.56%	-2.12%	-3.88%	3.42%	-1.56%	1.90%	2.53%	-1.66%	0.18%	1.11%	1.50%	\$37,749
2014	1.16%	4.43%	-0.70%	1.01%	1.10%	3.12%	-1.26%	2.48%	-4.73%	1.09%	1.62%	0.06%	9.48%	0.76%	\$41,328
2015	3.36%	0.64%	-1.01%	0.41%	-0.04%	-2.55%	-0.23%	-3.16%	-1.42%	4.45%	-0.78%	-1.17%	-1.73%	0.73%	\$40,615
2016	-1.98%	3.46%	4.99%	2.91%	-0.33%	4.46%	3.61%	-1.72%	0.34%	-3.34%	-2.07%	1.47%	11.94%	2.07%	\$45,465
2017	2.40%	1.80%	0.03%	1.10%	0.87%	0.38%	1.20%	1.25%	-0.02%	0.23%	1.02%	1.08%	11.91%	2.11%	\$50,878
2018	0.91%	-4.31%	0.78%	-0.17%	1.50%	0.15%	0.52%	-0.38%	-0.73%	-4.47%	1.31%	-2.23%	-7.11%	1.91%	\$47,262
2019	6.47%	1.29%	1.79%	0.51%	-1.04%	5.21%	0.77%	2.39%	-0.53%	1.50%	0.80%	2.17%	23.23%	2.29%	\$58,239
2020	1.07%	-3.79%	-10.14%	9.82%	3.77%								-0.43%	-0.23%	\$57,988

Vanguard Balanced Index Inv Returns

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Inflation	Balance
1998	0.80%	4.32%	3.16%	0.91%	-1.24%	2.46%	-1.24%	-8.53%	4.53%	4.25%	3.96%	3.96%	17.85%	1.61%	\$11,785
1999	2.49%	-2.90%	2.59%	2.89%	-1.56%	2.93%	-1.97%	-0.63%	-0.96%	3.89%	2.08%	4.33%	13.61%	2.68%	\$13,389
2000	-2.57%	1.98%	3.97%	-3.33%	-2.10%	3.47%	-0.79%	4.90%	-2.53%	-0.94%	-5.38%	1.84%	-2.04%	3.39%	\$13,117
2001	3.04%	-5.34%	-3.62%	4.61%	0.86%	-0.80%	-0.11%	-3.09%	-4.77%	2.19%	3.77%	0.83%	-3.02%	1.55%	\$12,721
2002	-0.45%	-0.84%	1.99%	-2.30%	-0.40%	-3.97%	-4.22%	0.95%	-5.44%	4.26%	3.58%	-2.59%	-9.52%	2.38%	\$11,510
2003	-1.47%	-0.39%	0.58%	5.22%	4.34%	0.88%	0.06%	1.66%	0.41%	3.21%	0.96%	3.03%	19.87%	1.88%	\$13,797
2004	1.70%	1.29%	-0.37%	-2.31%	0.66%	1.47%	-1.89%	0.99%	1.15%	1.30%	2.52%	2.57%	9.32%	3.26%	\$15,083
2005	-1.34%	0.99%	-1.29%	-0.84%	2.76%	0.72%	2.11%	-0.10%	0.11%	-1.47%	2.58%	0.45%	4.65%	3.42%	\$15,785
2006	2.12%	0.15%	0.69%	0.54%	-1.96%	0.16%	0.50%	2.00%	1.68%	2.43%	1.80%	0.47%	11.02%	2.54%	\$17,525
2007	1.08%	-0.32%	0.65%	2.60%	1.90%	-1.15%	-1.72%	1.43%	2.45%	1.47%	-1.94%	-0.32%	6.16%	4.08%	\$18,604
2008	-2.91%	-1.78%	-0.19%	2.83%	0.98%	-4.98%	-0.44%	1.23%	-6.04%	-11.59%	-3.43%	2.44%	-22.21%	0.09%	\$14,473
2009	-5.18%	-6.48%	6.10%	6.40%	3.58%	0.50%	5.28%	2.62%	2.98%	-1.33%	3.88%	1.03%	20.05%	2.72%	\$17,374
2010	-1.50%	2.10%	3.74%	1.74%	-4.45%	-2.75%	4.50%	-2.33%	5.59%	2.52%	0.14%	3.66%	13.13%	1.50%	\$19,656
2011	1.36%	2.26%	0.23%	2.35%	-0.18%	-1.21%	-0.72%	-2.81%	-4.39%	6.98%	-0.28%	0.92%	4.14%	2.96%	\$20,468
2012	3.40%	2.49%	1.62%	0.04%	-3.34%	2.28%	1.17%	1.55%	1.58%	-1.01%	0.51%	0.66%	11.33%	1.74%	\$22,788
2013	3.03%	0.98%	2.36%	1.39%	0.74%	-1.41%	3.33%	-1.95%	2.56%	2.83%	1.60%	1.29%	17.91%	1.50%	\$26,870
2014	-1.24%	3.02%	0.21%	0.36%	1.71%	1.57%	-1.28%	2.95%	-1.57%	2.09%	1.74%	0.01%	9.84%	0.76%	\$29,515
2015	-0.77%	2.95%	-0.44%	0.10%	0.63%	-1.42%	1.31%	-3.72%	-1.45%	4.61%	0.24%	-1.41%	0.37%	0.73%	\$29,623
2016	-2.81%	0.28%	4.59%	0.54%	1.04%	0.93%	2.64%	0.06%	0.08%	-1.68%	1.61%	1.21%	8.63%	2.07%	\$32,181
2017	1.25%	2.48%	0.02%	0.93%	0.89%	0.55%	1.28%	0.42%	1.26%	1.31%	1.79%	0.78%	13.75%	2.11%	\$36,607
2018	2.71%	-2.61%	-0.93%	-0.09%	1.93%	0.40%	2.01%	2.31%	-0.13%	-4.76%	1.48%	-4.93%	-2.97%	1.91%	\$35,521
2019	5.55%	2.10%	1.65%	2.39%	-3.21%	4.63%	0.97%	-0.11%	0.80%	1.39%	2.24%	1.64%	21.67%	2.29%	\$43,219
2020	0.82%	-4.22%	-8.48%	8.55%	3.45%								-0.76%	-0.23%	\$42,889

Drawdowns



Drawdowns for Historical Market Stress Periods

Stress Period	Start	End	Momentum Model	Equal Weight Portfolio	Vanguard Balanced Index Inv
Russian Debt Default	Jul 1998	Oct 1998	-11.77%	-14.87%	-9.66%
Dotcom Crash	Mar 2000	Oct 2002	-12.79%	-9.42%	-22.39%
Subprime Crisis	Nov 2007	Mar 2009	-17.51%	-33.65%	-32.57%

Drawdowns for Momentum Model (worst 10)

Rank	Start	End	Length	Recovery By	Recovery Time	Underwater Period	Drawdown
1	May 2011	Sep 2011	5 months	Jan 2013	1 year 4 months	1 year 9 months	-17.52%
2	Nov 2007	Oct 2008	1 year	Nov 2009	1 year 1 month	2 years 1 month	-17.51%
3	Aug 2016	Nov 2016	4 months	Dec 2017	1 year 1 month	1 year 5 months	-17.09%
4	Sep 2018	Dec 2018	4 months				-16.31%
5	May 1998	Aug 1998	4 months	Nov 1999	1 year 3 months	1 year 7 months	-13.33%
6	Mar 2000	Nov 2000	9 months	Dec 2001	1 year 1 month	1 year 10 months	-12.79%
7	Feb 2015	Jan 2016	1 year	Jun 2016	5 months	1 year 5 months	-11.27%
8	May 2010	Jun 2010	2 months	Oct 2010	4 months	6 months	-10.89%
9	Jun 2002	Jul 2002	2 months	Dec 2002	5 months	7 months	-9.29%
10	Apr 2004	Apr 2004	1 month	Nov 2004	7 months	8 months	-9.06%

Drawdowns for Equal Weight Portfolio (worst 10)

Rank	Start	End	Length	Recovery By	Recovery Time	Underwater Period	Drawdown
1	Nov 2007	Feb 2009	1 year 4 months	Apr 2010	1 year 2 months	2 years 6 months	-33.65%
2	May 1998	Aug 1998	4 months	Oct 1999	1 year 2 months	1 year 6 months	-17.78%
3	Feb 2020	Mar 2020	2 months				-13.55%
4	Jun 2002	Jul 2002	2 months	May 2003	10 months	1 year	-9.42%
5	May 2011	Sep 2011	5 months	Jan 2012	4 months	9 months	-9.11%
6	Feb 2018	Dec 2018	11 months	Mar 2019	3 months	1 year 2 months	-7.95%
7	Mar 2015	Sep 2015	7 months	Mar 2016	6 months	1 year 1 month	-7.77%
8	Apr 2004	Apr 2004	1 month	Sep 2004	5 months	6 months	-6.99%
9	Sep 2000	Nov 2000	3 months	May 2001	6 months	9 months	-6.69%
10	Aug 2016	Nov 2016	4 months	May 2017	6 months	10 months	-6.66%

Drawdowns for Vanguard Balanced Index Inv (worst 10)

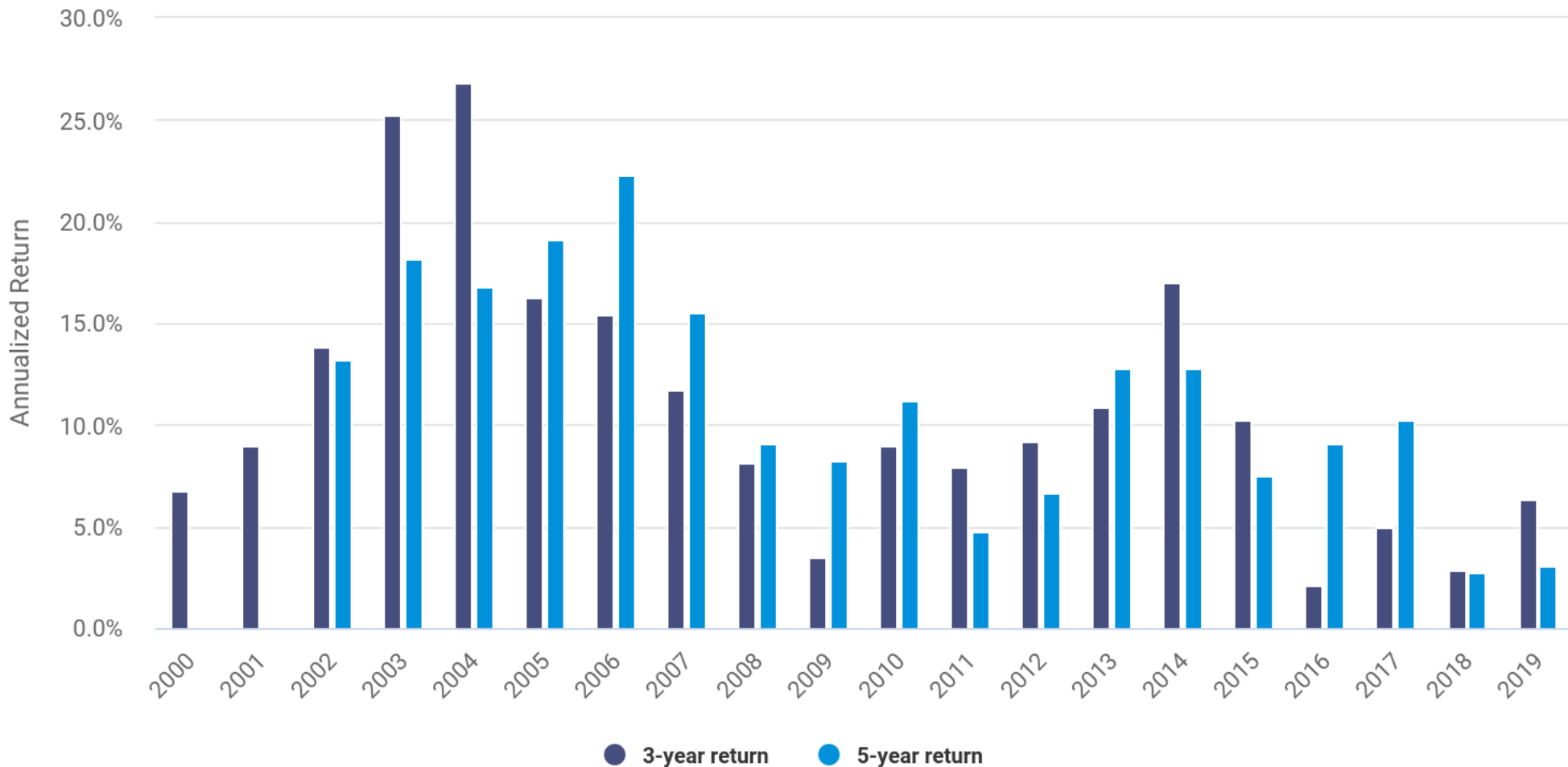
Rank	Start	End	Length	Recovery By	Recovery Time	Underwater Period	Drawdown
1	Nov 2007	Feb 2009	1 year 4 months	Dec 2010	1 year 10 months	3 years 2 months	-32.57%
2	Sep 2000	Sep 2002	2 years 1 month	Feb 2004	1 year 5 months	3 years 6 months	-22.39%
3	Feb 2020	Mar 2020	2 months				-12.34%
4	Jul 1998	Aug 1998	2 months	Nov 1998	3 months	5 months	-9.66%
5	May 2011	Sep 2011	5 months	Jan 2012	4 months	9 months	-9.03%
6	Sep 2018	Dec 2018	4 months	Mar 2019	3 months	7 months	-8.23%
7	Apr 2000	May 2000	2 months	Aug 2000	3 months	5 months	-5.35%
8	Jun 2015	Sep 2015	4 months	Apr 2016	7 months	11 months	-5.23%
9	Feb 2018	Apr 2018	3 months	Jul 2018	3 months	6 months	-3.60%
10	Jul 1999	Sep 1999	3 months	Oct 1999	1 month	4 months	-3.52%

Rolling Returns (Jan 1998 - May 2020)

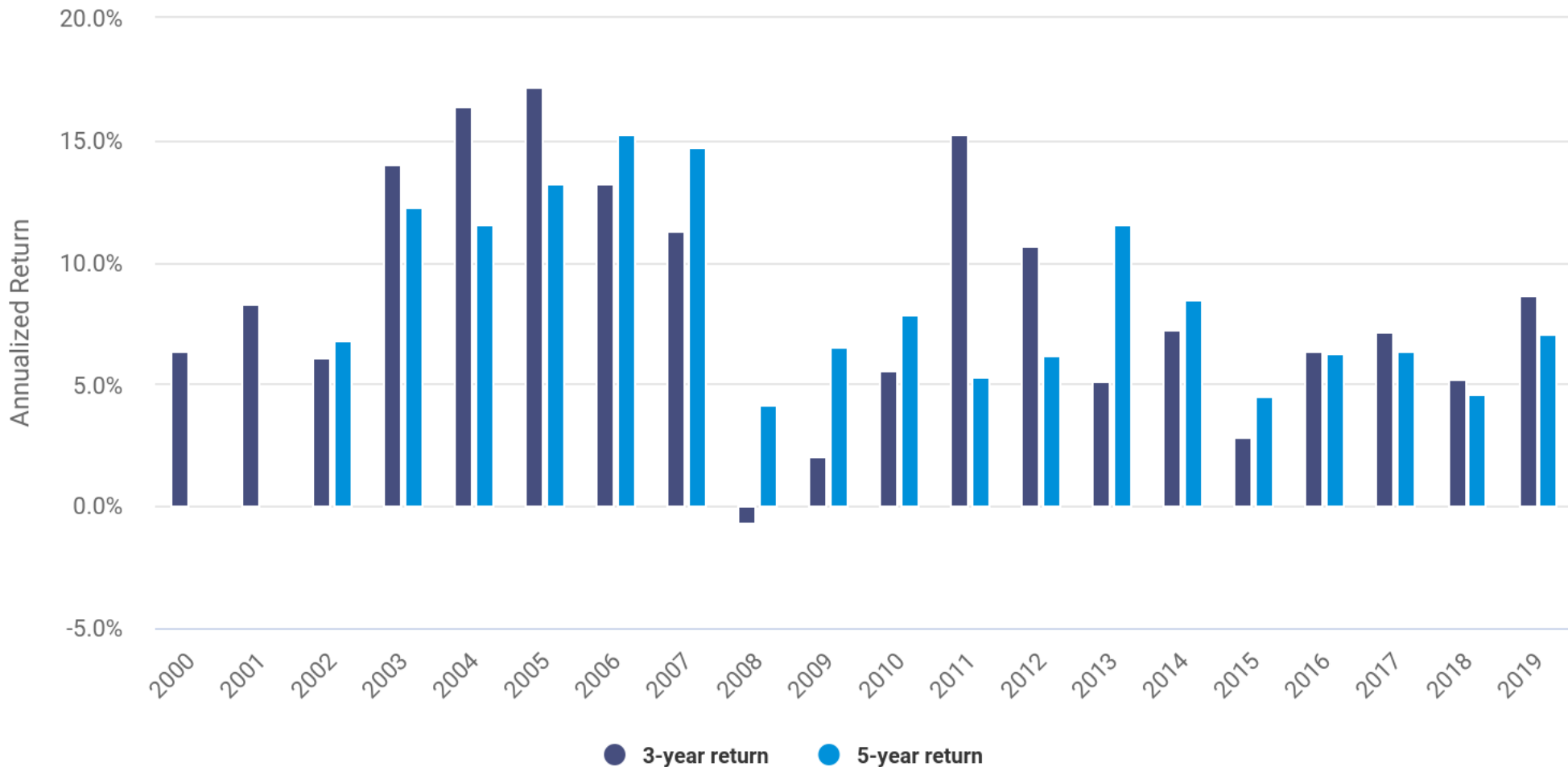
Roll Period	Momentum Model			Equal Weight Portfolio			Vanguard Balanced Index Inv		
	Average	High	Low	Average	High	Low	Average	High	Low
1 year	11.01%	38.16%	-10.34%	8.90%	28.41%	-20.74%	7.44%	21.67%	-22.21%
3 years	10.86%	26.78%	2.11%	8.42%	17.15%	-0.65%	6.25%	12.98%	-4.92%
5 years	11.29%	22.27%	2.72%	8.48%	15.28%	4.19%	6.14%	13.17%	0.96%
7 years	11.32%	17.78%	7.26%	8.51%	12.62%	5.04%	6.40%	10.77%	1.86%
10 years	10.86%	15.07%	6.93%	8.32%	10.69%	5.78%	6.13%	9.54%	2.08%
15 years	11.09%	13.29%	7.96%	8.46%	9.25%	6.71%	6.31%	8.02%	5.41%

Result statistics are based on annualized rolling returns over full calendar year periods

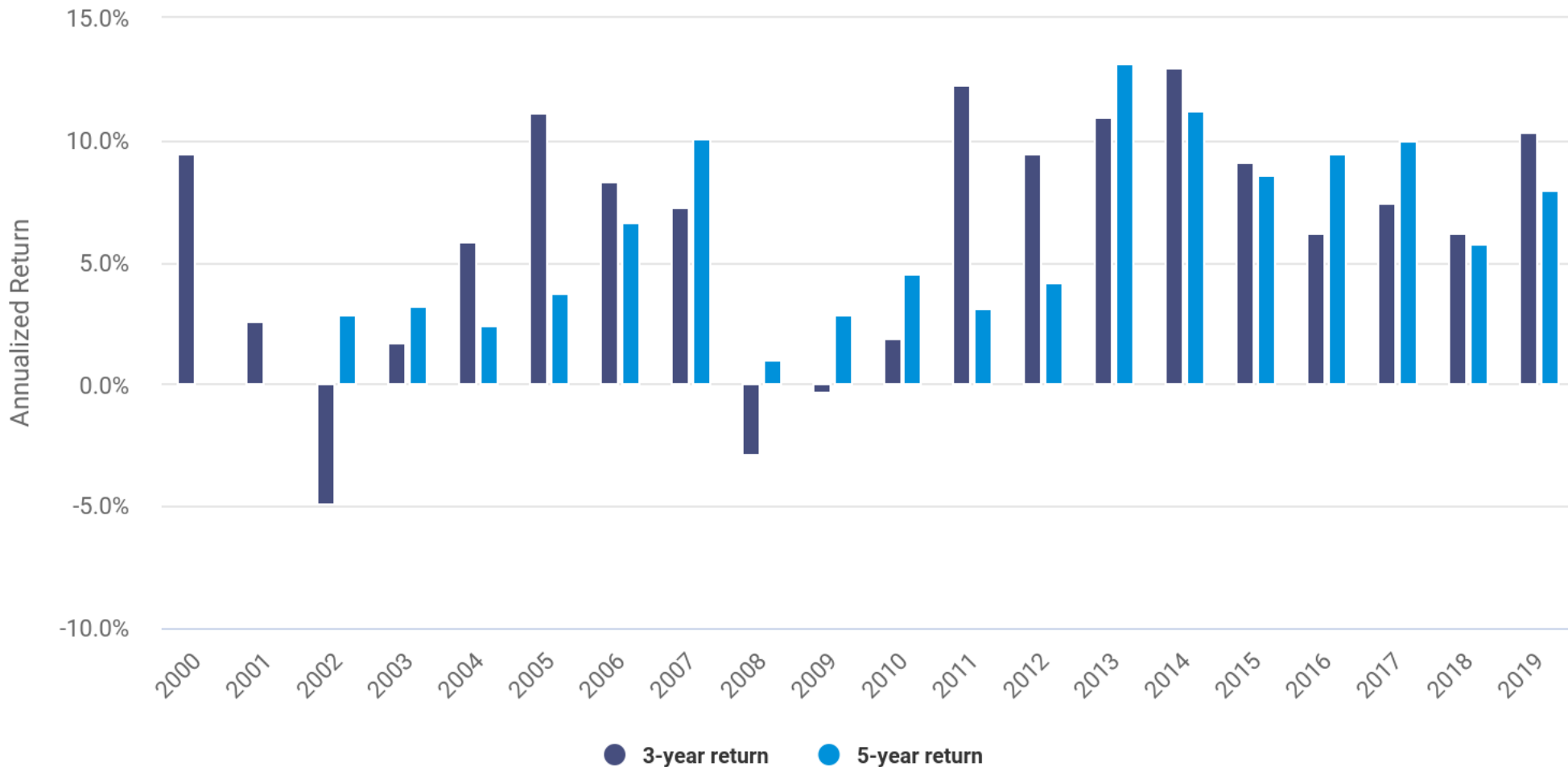
Momentum Model Rolling Returns



Equal Weight Portfolio Rolling Returns



Vanguard Balanced Index Inv Rolling Returns



Notes:

- Past performance is no guarantee of future results, which may vary. All use is subject to terms of service.
- Investing involves risk, including possible loss of principal. The value of the investments and the income derived from them may fluctuate over time.
- All portfolio returns presented are hypothetical and backtested. Hypothetical returns do not reflect trading costs, transaction fees, or taxes.
- The backtested performance results are created by retroactively applying the specified investment strategy or methodology to historical data. Backtested models are developed with the benefit of hindsight but might not have foresight of the future.
- The results are based on information from a variety of sources we consider reliable, but we do not represent that the information is accurate or complete.
- The results do not constitute investment advice or recommendation, are provided solely for informational purposes, and are not an offer to buy or sell any securities.
- The results are based on the total return of assets and assume that all received dividends and distributions are reinvested.
- The annual results for 2020 are based on full calendar months from January to May.
- The selected portfolio allocation for comparison assumes monthly rebalancing
- An equal-weight allocation is used for the assets held by the momentum model
- The results for the tactical asset allocation model assume monthly rebalancing trades
- The relative strength signal is based on total return including dividends
- Additional trading costs and taxes for tactical asset allocation models are not reflected in the results
- CAGR = Compound Annual Growth Rate
- Stdev = Annualized standard deviation of monthly returns
- Sharpe and Sortino ratios are calculated and annualized from monthly excess returns over the risk free rate (3-month treasury bill)
- Stock market correlation is based on the correlation of monthly returns
- Drawdowns are calculated based on monthly returns excluding cashflows
- Refer to the FAQ section regarding the data sources and methodology descriptions