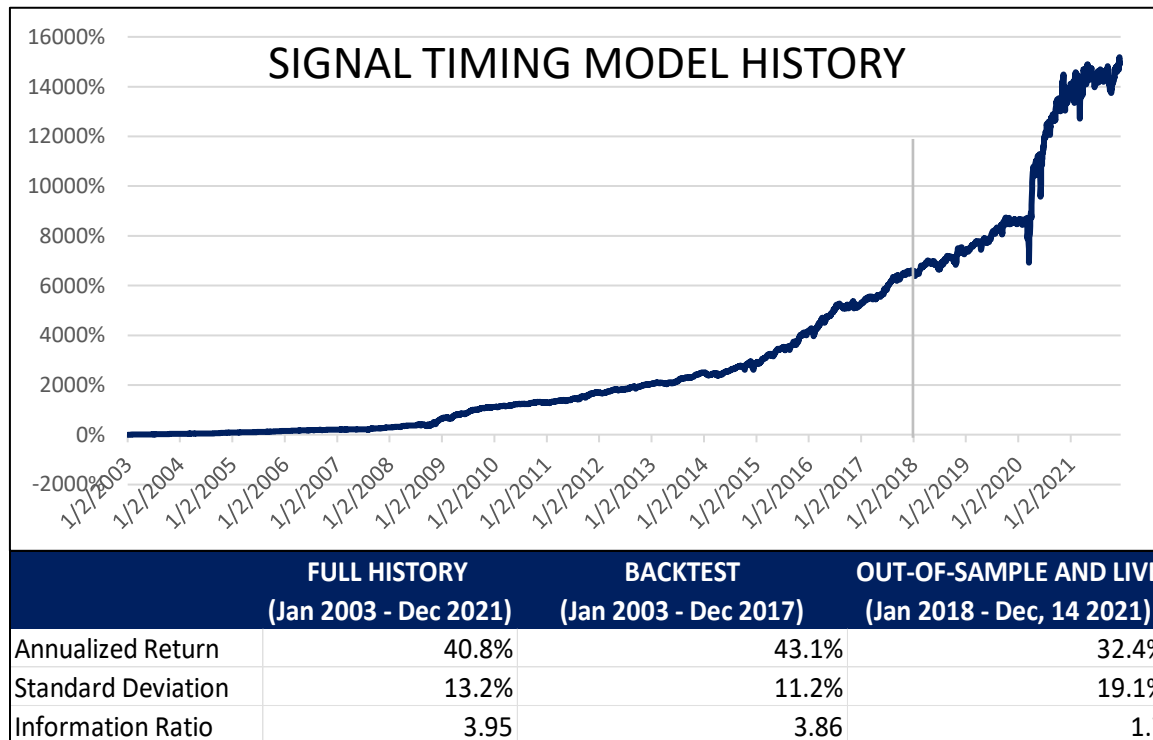# Equity Timing Model Overview

January 2022

Overview

Signal Analytics is an independent analytics firm dedicated to delivering alpha generating models and tools to institutional investors. Founded in 2011, Signal is proud to count the world's largest intuitional investors among its clients, including over 30 prominent hedge and asset managers in the U.S. and U.K.

- The Timing Model combines Signal's proprietary Technical and Stretch models into a single, easy to interpret short-term timing signal. More about the underlying Technical and Stretch models on the following pages.

- Numeric score is based on a scale of +/- 100; The highest absolute signals are our strongest.

- The stronger scores offer excellent alpha generation delivering out-of-sample annualized returns of 32.4% and 1.70 Information Ratio.

- Coverage currently includes ~3500 US listed securities, ~2000 international securities, and ~700 ETFs. Coverage can be expanded to include any listed security with a minimum 2-year trading history.

- With a relatively short optimal holding period of ~5 days, the Stretch model is an excellent tactical timing tool.

Returns are based on the Top/Bottom 10% of Crowding Z-score. Universe is top 2000 U.S. listed securities by market capitalization, including ADRs (excluding China & Russia). Portfolio is dollar neutral, 100% long / 100% short and does not include transaction costs or slippage.

TIMING MODEL PERFORMANCE

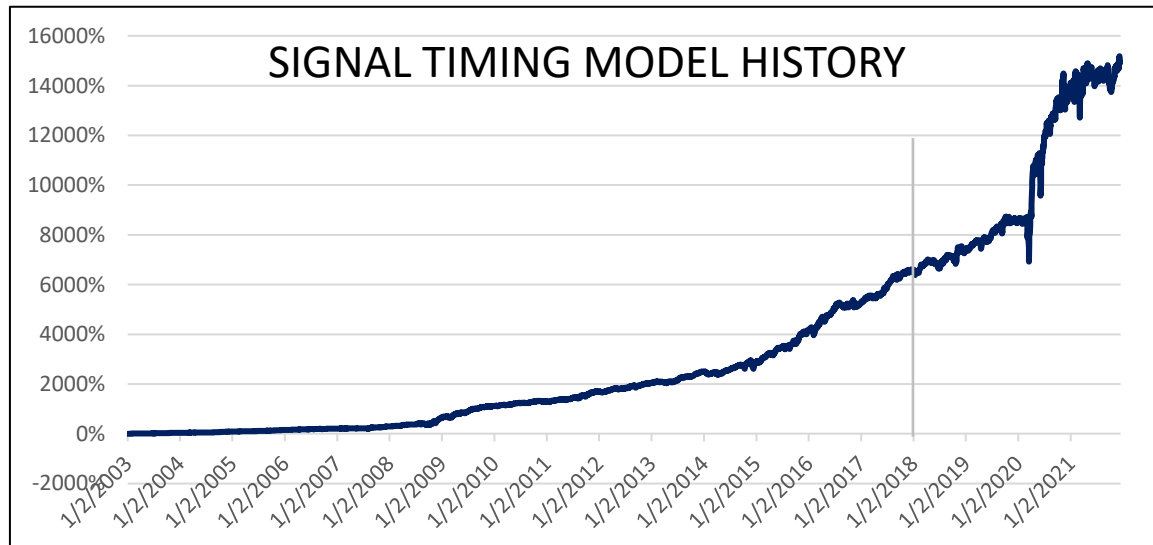The combined model offers consistent returns over time and linear signals from strongest to weakest signals.

SIGNAL TIMING MODEL HISTORY

	FULL HISTORY (Jan 2003 - Dec 2021)	BACKTEST (Jan 2003 - Dec 2017)	OUT-OF-SAMPLE AND LIVE (Jan 2018 - Dec, 14 2021)
Annualized Return	40.8%	43.1%	32.4%
Standard Deviation	13.2%	11.2%	19.1%
Information Ratio	3.95	3.86	1.7

Score	Number Observations	15 Year Backtest	3 Year Out-of-Sample	1 Year Live
100	44,399	49.34	42.73	18.80
95	15,926	39.74	32.83	32.30
90	19,202	32.85	13.74	21.97
85	23,359	21.40	29.70	21.21
80	28,668	23.78	26.04	22.80
75	33,229	19.29	22.86	12.94
70	45,230	17.51	16.34	18.22
65	51,260	15.65	14.60	17.74
60	70,833	13.17	11.73	19.57
55	86,738	9.50	15.88	7.06
50	116,406	8.07	6.19	12.42
45	145,252	6.21	7.07	(2.78)
40	189,536	6.17	3.56	5.44
35	233,854	4.94	3.14	2.68
30	331,176	3.00	3.48	0.41
25	339,334	2.50	2.99	1.84
20	517,669	2.19	1.85	3.22
15	434,323	1.55	2.89	3.21
10	792,005	1.44	(0.33)	1.34
5	423,415	0.81	(1.64)	6.72
0	1,029,441	0.96	(1.07)	(5.16)
-5	541,171	(0.54)	(1.25)	1.31
-10	588,745	(0.24)	(2.98)	(0.95)
-15	617,410	(1.64)	(2.24)	(0.66)
-20	439,976	(2.72)	(1.04)	0.41
-25	382,978	(2.95)	(3.64)	0.81
-30	347,860	(4.42)	(1.25)	(3.14)
-35	306,766	(6.56)	(1.85)	(2.83)
-40	233,077	(7.17)	(0.15)	(4.58)
-45	191,728	(7.00)	(4.28)	(11.10)
-50	156,258	(9.58)	(5.23)	(9.27)
-55	124,204	(9.67)	(2.91)	(11.70)
-60	93,885	(13.07)	(5.15)	(16.25)
-65	73,669	(13.59)	(2.01)	(11.75)
-70	57,447	(15.06)	(11.20)	(18.45)
-75	41,698	(18.95)	(11.15)	(4.80)
-80	30,552	(19.04)	(12.49)	(2.65)
-85	21,414	(21.92)	(16.69)	(12.03)
-90	16,495	(21.33)	(23.38)	(31.54)
-95	10,960	(27.27)	(26.60)	(22.53)
-100	20,489	(33.39)	(34.28)	(24.70)

Returns are based on the Top/Bottom 10% of Crowding Z-score. Universe is top 2000 U.S. listed securities by market capitalization, including ADRs (excluding China & Russia). Portfolio is dollar neutral, 100% long / 100% short and does not include transaction costs or slippage.

Component One: TECHNICALS

The Model offers consistent alpha generating results in US Top 2000 Backtest, Out-of-Sample, Live, and Out-of-Sample universes including Small Cap and International Stocks.

SIGNAL TIMING MODEL HISTORY

Score	Number Observations	15 Year Backtest	3 Year Out-of-Sample	1 Year Live
100	44,399	49.34	42.73	18.80
95	15,926	39.74	32.83	32.30
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-40	233,077	(7.17)	(0.15)	(4.58)
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-50	156,258	(9.58)	(5.23)	(9.27)
-55	124,204	(9.67)	(2.91)	(11.70)
-60	93,885	(13.07)	(5.15)	(16.25)
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-100	20,489	(33.39)	(34.28)	(24.70)

Returns are based on the Top/Bottom 10% of Crowding Z-score. Universe is top 2000 U.S. listed securities by market capitalization, including ADRs (excluding China & Russia). Portfolio is dollar neutral, 100% long / 100% short and does not include transaction costs or slippage.

Further validation of the Technical model are evident in the Small-Cap and International universes whose histories are <u>100% out-of-sample</u>.

SMALL-CAP (100% out-of-sample)

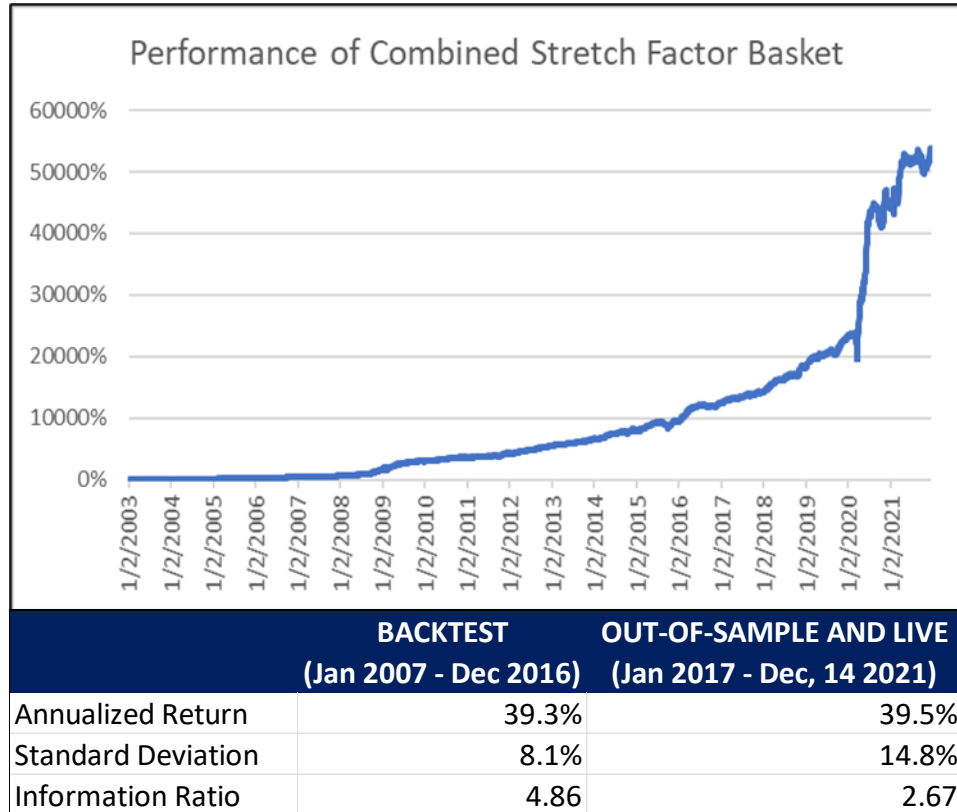| TECH SCORE	6 MONTH LIVE DEC 9, 2020 to PRESENT		3 YEAR OUT-OF-SAMPLE 2018 to 2020		15 YEAR OUT-OF-SAMPLE 2003 to 2017	
	# Occ	Annual	# Occ	Annual	# Occ	Annual
85 to 100	625	79.53	11,255	50.62	47,450	42.51
65 to 84	1,817	50.99	24,288	24.66	111,793	20.88
45 to 64	5,252	21.19	44,110	12.11	234,499	10.28
25 to 44	17,643	13.19	102,318	7.32	593,981	3.75
05 to 24	37,345	17.58	211,551	2.71	1,192,376	1.13
0	40,452	(30.07)	121,041	(1.60)	585,866	(0.04)
-05 to -24	39,115	5.51	271,025	(1.87)	1,359,612	(1.80)
-25 to -44	23,083	(2.79)	174,427	(3.89)	801,578	(4.09)
-45 to -64	9,806	(15.62)	83,492	(6.60)	363,479	(5.96)
-65 to -84	3,261	(39.74)	32,027	(15.82)	135,285	(10.61)
-85 to -100	1,069	(71.05)	12,556	(35.10)	49,691	(22.02)

INTERNATIONAL EQUITIES (100% out-of-sample)

TECH SCORE	RECENT OUT-OF-SAMPLE 2018 to PRESENT		HISTORICAL OUT-OF-SAMPLE 2003 to 2017	
	# Occ	Annual	# Occ	Annual
85 to 100	14,423	31.04	43,202	57.07
65 to 84	31,645	16.78	104,866	27.61
45 to 64	67,429	7.06	242,737	14.36
25 to 44	169,915	2.57	651,387	3.81
05 to 24	350,805	(0.37)	1,306,910	(0.00)
0	178,604	2.95	599,763	0.34
-05 to -24	403,938	(0.90)	1,378,195	(1.29)
-25 to -44	253,670	(1.89)	799,850	(4.42)
-45 to -64	118,803	(6.12)	360,673	(8.12)
-65 to -84	44,451	(9.13)	133,071	(14.54)
-85 to -100	16,132	(18.99)	46,412	(29.22)

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Component Two: STRETCH MODEL

- Signal's Stretch model combines Statistical Regression Analyses to determine when stocks deviate too much from their closest correlated macro variable and industry and sector index's

Performance of Combined Stretch Factor Basket

	BACKTEST (Jan 2007 - Dec 2016)	OUT-OF-SAMPLE AND LIVE (Jan 2017 - Dec, 14 2021)
Annualized Return	39.3%	39.5%
Standard Deviation	8.1%	14.8%
Information Ratio	4.86	2.67

Score	Number Observations	15 Year Backtest	4 Year Out-of-Sample
10	20,911	61.34	110.01
9	51,297	27.38	33.39
8	35,521	24.85	19.03
7	46,895	14.25	7.21
6	34,506	13.98	8.56
5	89,970	9.98	7.26
4	148,853	9.13	9.04
3	365,738	6.28	6.59
2	1,210,582	4.98	4.71
1	512,317	3.52	4.82
0	3,661,208	1.24	0.65
-1	598,836	-1.64	-0.20
-2	922,848	-3.41	-2.68
-3	818,666	-6.31	-2.48
-4	929,908	-7.99	-7.14
-5	122,503	-10.97	-16.58
-6	96,384	-13.03	-38.66
-7	84,916	-14.08	-26.97
-8	17,280	-19.26	-73.43
-10	9,817	-45.69	-103.33

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- Signal Analytics produces a proprietary suite of tools, data and analytics that help clients make timely, informed, and accurate investment decisions.

- Founded in 2012 by Stephen Davis, Signal Analytics provides institutional investors with macroeconomic, quantitative and technical tools to complement the fundamental research process. These tools are synthesized to generate specific investment recommendations for almost 2000 large cap stocks across most sectors of the US market.

- Signal Analytics understands the needs of intuitional investors because the team has been there. Each member of the Signal development team has multiple decades of institutional buy-side experience.

- Signal Analytics is proud to count the world's largest intuitional investors among its clients, including over 30 prominent hedge and asset managers in the U.S. and U.K.

- For more information, please contact Signal's head of sales, Patrick Quill at 917.597.3920 or pquill@signal-inc.com.

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