

# Equity Risk Factors Toolkit

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## 1 The Equity Risk Factors Toolkit

This report contains the results of a specific strategy using the **Equity Risk Factors Toolkit**. The Toolkit computes the P&L of long-short strategies based on combinations of equity risk factors. For each selected firm characteristic, at the beginning of each month all selected US public firms (available at CRSP that month) are sorted based on the value of that characteristic the one before last day of the previous month. The top and bottom firms (for the chosen percentile or number of firms thresholds) are then selected, an equal weighed long (short) portfolio is created for the top (bottom - depending on the user's choice) firms, and finally a 50-50 long-short portfolio is constructed using these long and short portfolios. Hence for each firm characteristic we have a simple "trading strategy" with a monthly portfolio rebalancing - with no hindsight, and no transaction costs considered.

## 2 Strategy details

### 2.1 Filtering

Market capitalization filter: values 100 to 1e+07 million USD

Price filter: values 1 to 1e+11 USD

Only companies in major stock exchanges (NYSE, AMEX and NASDAQ) were used. Companies from the following industries were excluded: Banking, Utilities, Oil.

### 2.2 Factor definitions

The chosen factors were predefined:

Going long the companies with high values for a particular factor implies that higher values of the factor are indicators of superior company performance. Going long the companies with low values for a particular factor implies that lower values of the factor are indicators of superior company performance.

### 2.3 Long-short quantiles

For the long-short strategy the chosen quantiles were:

- Top number of companies to go long: 0.25

	Factor	Description	Compustat	Long
1	Return On Invested Capital (ROIC) (1)	The difference between net income and dividends divided by invested capital	$(IB - (DVC + DVP)) / ICAPT$	High
2	Asset Growth (Yearly)	Yearly percentage change in total assets.	$(AT(t) - AT(t-12)) / AT(t-12)$ , where t is the current month	Low
3	EV/EBITDA Multiple	The ratio of enterprise value to earnings before interest, taxes, depreciation and amortization.	$(DLTT + DLC + PSTKRV - CHE) / OIBDP$	Low
4	Earnings / Price	The ratio between the earnings per share and the price per share.	$IB / MKVALT$	High
5	Faustmann ratio	The ratio of market capitalization to net worth	$MKVALT / (ICAPT + CHE - (DLTT + DLC + DCVT))$	High

- Top number of companies to go long: 0.25
- Bottom number of companies to go short: 0.3
- Bottom number of companies to go short: 0.3

## 2.4 Factor combination

Factors can be combined in two ways. For the first, “continuous”, at each month each factor is ranked using the empirical cumulative distribution function across all the companies for which there are available data. Then the rankings for each month are added per company and averaged by the number of factors. For the second way of combining factors, “capital across factors”, each factor is allocated an equal part of the total capital. Therefore, the P&L of the portfolio is the average of the P&L of as many distinct portfolios as there are factors.

The current report’s results were computed using “continuous” factor combination.

**Ret:13.3 Vol:9.2 Sharpe:1.48 DD:33.8**

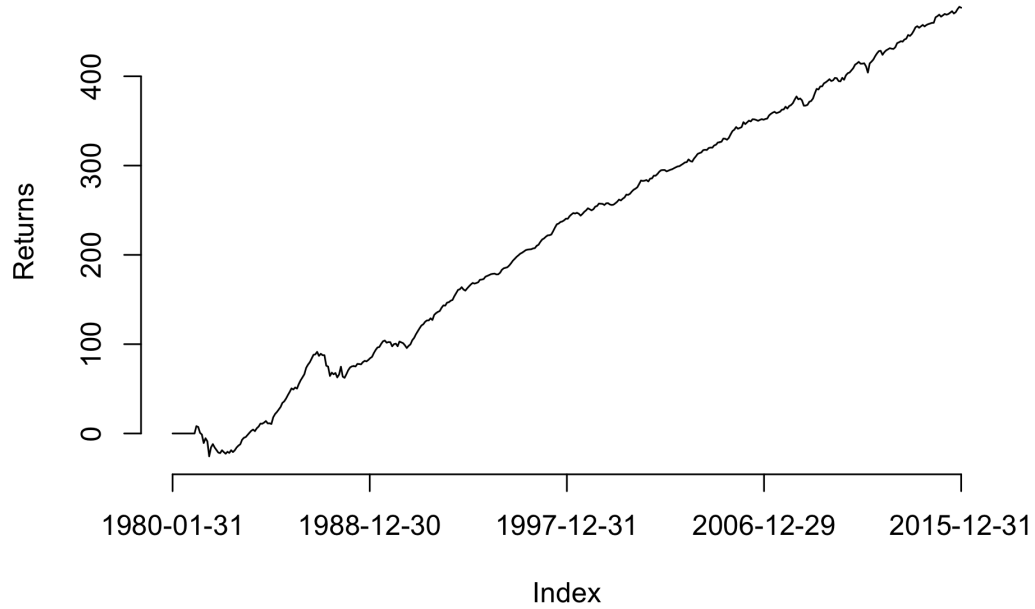


Figure 1: The monthly P&L of the strategy

## 2.5 Strategy performance

For the monthly returns of the strategy see Figure 1 and Table 1. The 12-months rolling correlation of the strategy with the S&P is shown in Figure 2

## 2.6 Market sentiment

The percentage of up months for ON months is 58.51%. The percentage of up months for OFF months is 67.48%. See Figure 3 for more details.

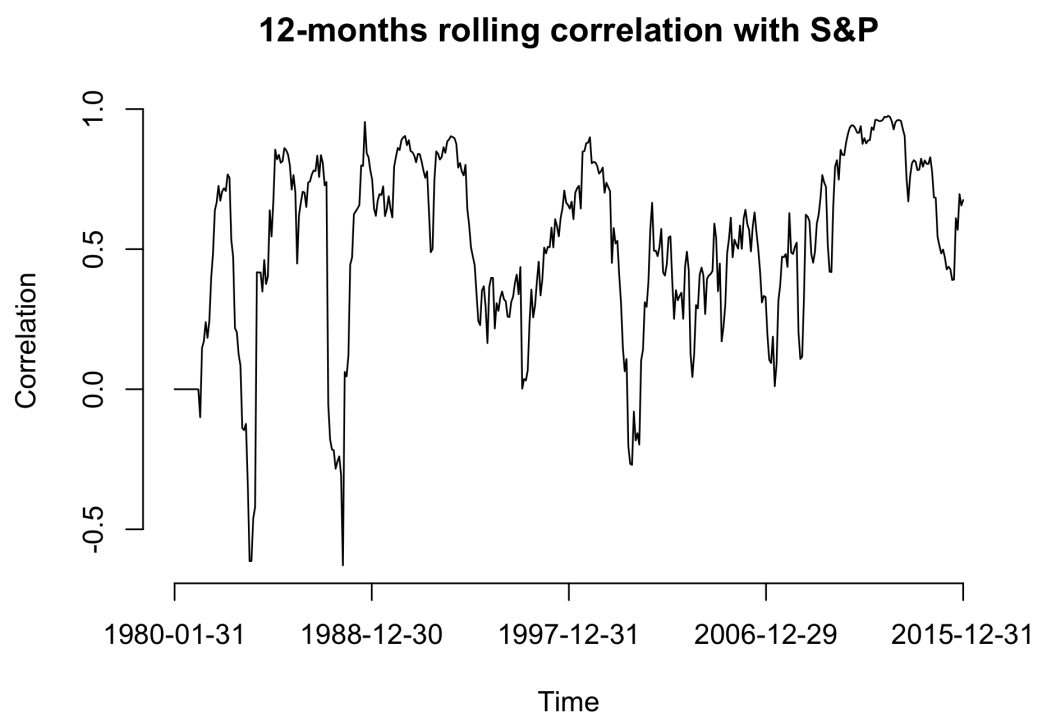


Figure 2: 12-months rolling correlation of the strategy with S&P

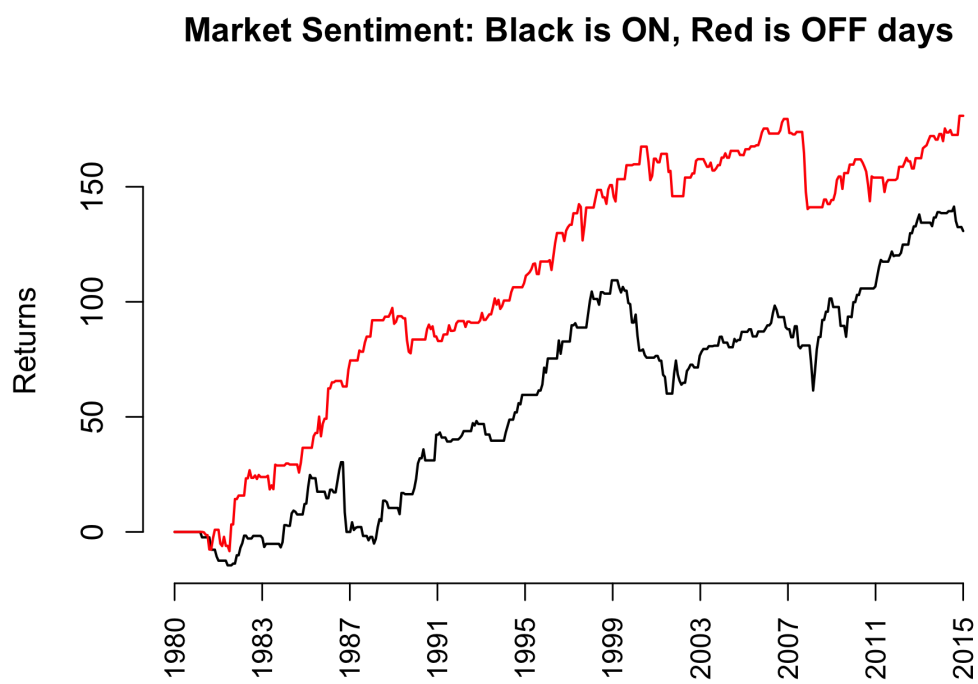


Figure 3: Returns based on market sentiment

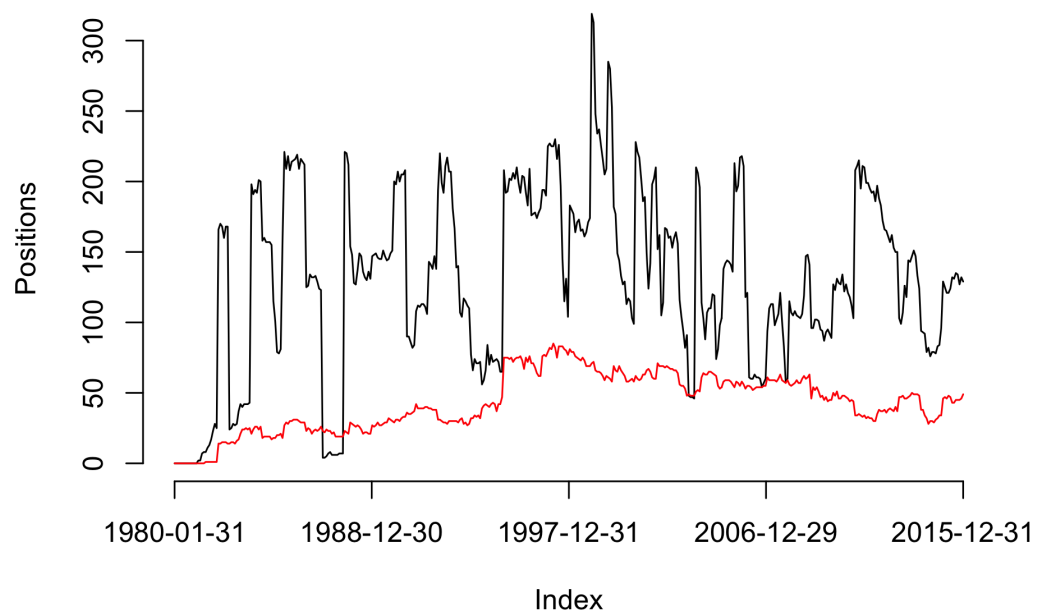


Figure 4: Number of long and short positions over time

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1980	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1981	0.00	8.22	-0.93	-6.58	-1.88	-9.55	5.36	-3.45	-16.80	10.01	3.70	-3.77	-17.42
1982	-2.90	-2.86	-0.55	3.17	-2.04	-1.82	2.19	-1.31	3.02	-2.05	2.03	3.13	-0.33
1983	2.05	1.52	5.07	2.24	0.82	2.34	2.39	2.21	1.39	-1.77	3.19	1.90	25.85
1984	3.31	-0.07	1.24	1.77	-2.64	0.09	-0.75	7.47	3.62	2.31	2.76	2.78	23.77
1985	4.66	1.71	3.12	3.87	3.59	3.96	-1.24	2.26	-1.25	5.20	4.14	3.28	38.57
1986	3.41	7.16	3.61	2.71	4.12	4.20	0.48	2.83	-4.50	2.33	-1.55	-0.04	27.12
1987	-11.71	-1.03	-10.45	3.69	-1.85	1.47	-4.94	3.18	8.78	-11.09	-1.34	4.10	-21.28
1988	4.45	3.02	1.25	0.34	-0.44	2.86	-0.16	-0.32	2.42	1.50	-0.62	1.65	17.01
1989	1.99	1.41	4.30	3.50	2.73	0.52	3.49	2.94	0.80	-2.39	0.72	-0.16	21.53
1990	-4.62	2.39	0.60	-2.93	5.26	-0.93	-0.90	-2.42	-3.03	2.46	1.69	4.59	1.63
1991	2.60	4.07	3.39	3.38	3.05	1.37	2.77	1.54	0.06	2.32	-1.87	5.75	32.17
1992	1.97	1.37	0.95	3.62	2.72	-0.28	3.34	0.49	1.70	0.85	4.23	3.45	27.17
1993	3.52	0.78	2.33	-2.63	-1.23	2.46	2.30	2.10	1.72	-0.71	0.59	0.85	12.57
1994	2.84	0.21	0.60	2.63	0.87	0.89	1.01	0.43	0.21	-0.88	0.13	1.79	11.22
1995	3.33	1.62	0.60	0.61	1.94	2.56	2.83	2.08	2.17	1.69	1.86	1.06	24.75
1996	1.41	1.51	0.59	0.25	0.16	0.90	0.34	2.59	1.22	3.21	2.67	1.19	17.19
1997	1.92	1.51	0.19	0.78	3.76	4.03	3.64	0.82	1.78	0.58	1.30	1.85	24.45
1998	-0.13	2.92	1.92	1.52	-0.51	0.82	-1.03	-2.15	1.89	2.39	1.63	2.34	12.11
1999	-1.12	-1.19	1.25	2.88	0.74	2.68	-0.15	-0.17	-1.26	1.90	0.16	-1.46	4.20
2000	-0.58	0.39	1.54	1.72	2.42	-1.01	1.92	1.43	3.22	-0.32	1.32	2.45	15.40
2001	2.02	1.18	1.52	3.73	3.86	-0.50	0.34	0.69	-1.59	3.15	0.25	3.10	19.10
2002	-0.05	1.92	2.56	1.63	0.25	-0.03	-1.48	0.84	0.90	0.62	1.10	1.08	9.68
2003	0.98	0.29	1.39	1.27	1.53	0.32	3.07	-1.90	-0.59	3.47	2.45	2.78	15.99
2004	0.88	0.76	2.53	0.39	-0.23	2.23	0.48	-0.08	2.50	0.79	2.47	0.34	13.79
2005	0.59	3.49	-0.16	-1.13	2.00	4.06	3.63	1.56	2.96	-1.89	0.88	0.92	18.05
2006	5.56	-2.16	1.89	1.96	-0.87	2.44	-0.17	-0.66	-0.91	1.03	0.81	-0.63	8.37
2007	0.82	0.46	3.52	1.75	1.38	0.90	-1.45	0.66	0.92	2.27	0.23	3.07	15.45
2008	-2.04	2.76	1.16	2.12	4.00	3.48	-3.20	0.97	-2.14	-5.95	0.11	0.81	1.59
2009	3.47	0.85	2.81	5.75	5.02	-0.66	3.38	0.13	3.38	1.18	1.64	1.81	32.59
2010	-2.06	0.85	2.66	-0.34	-3.20	-0.33	3.95	-2.13	4.98	2.29	0.85	2.39	9.98
2011	2.40	3.94	1.37	1.80	-2.06	0.05	0.41	-3.47	-6.92	10.23	2.04	2.35	11.79
2012	3.76	3.14	2.49	0.39	-4.49	2.93	2.03	1.19	1.25	-0.57	-0.25	1.91	14.34
2013	4.57	0.92	1.20	-0.38	2.29	0.99	4.10	-1.03	2.09	3.36	4.10	1.34	26.07
2014	-1.75	1.57	1.59	-1.68	1.60	0.99	0.63	0.73	0.13	6.07	1.37	1.65	13.46
2015	-2.24	1.52	1.49	-0.76	0.70	1.51	1.65	-2.56	1.45	3.38	2.66	-1.02	7.84

Table 1: The monthly P&L of the strategy per year