

A Comprehensive Look at Financial Volatility Prediction by Economic Variables

Updated Data

Table 1: Overview Realized Volatility by the Original Authors: From 01/1983 to 12/2010

Volatility	Mean	Std.	Skew.	Kurt.	AC(1)
Stocks (1982-2010) Christiansen et al.	-3.22	0.45	0.81	4.44	0.71
Stocks (1982-2010)	-3.22	0.45	0.83	4.53	0.71
Stocks (1982-2018)	-3.26	0.46	0.68	4.22	0.66

Table 2: Overview of Predictive Variables by the Original Authors: From 01/1983 to 12/2010

No.	Variable	Abbrev.	Mean	Std.	Skew.	Kurt.	AC(1)
<i>Equity Market Variables and Risk Factors</i>							
1	Dividend Price Ratio (Log) (*, †)	DP	-3.76	0.39	-0.02	1.88	0.99
2	Earnings Price Ratio (Log) (*, †)	EP	-3.02	0.43	-1.31	6.49	0.98
3	US Market Excess Return (†)	MKT	0.59	4.57	-0.91	5.77	0.10
4	Size Factor (†)	SMB	0.12	3.23	0.81	11.44	-0.03
5	Value Factor (†)	HML	0.35	3.15	0.05	5.54	0.14
6	Short Term Reversal Factor (†)	STR	0.37	3.44	0.17	8.34	-0.02
7	Return MSCI World	MSCI	0.73	4.26	-1.20	6.44	0.13
<i>Interest rates, Spreads and Bond Market Factors</i>							
8	T-Bill Rate (Level) (*, †)	TB	4.56	2.52	-0.02	2.37	0.99
9	Rel. T-Bill Rate (†)	RTB	-0.18	0.86	-0.30	2.85	0.95
10	Long Term Bond Return (*, †)	LTR	0.81	2.97	0.20	4.78	0.02
11	Rel. Bond Rate (†)	RBR	-0.18	0.63	-0.36	4.49	0.87
12	Term Spread (*, †)	TS	2.33	1.25	-0.25	1.95	0.96
<i>Liquidity and Credit Risk Variables</i>							
13	Default Spread (*, †)	DEF	1.04	0.43	2.48	12.30	0.94
14	Pastor-Stambaugh Liquidity Factor	PS	-2.55	6.83	-1.76	10.49	0.00
15	TED Spread	TED	0.01	0.00	1.78	8.67	0.80
<i>Macroeconomic Variables</i>							
16	Inflation Rate, Monthly (*, †)	INFM	0.24	0.31	-1.38	11.31	0.47
17	Inflation Rate, YoY	INFA	2.91	1.26	-0.48	4.41	0.95
18	Industrial Production Growth, Monthly	IPM	0.20	0.66	-1.32	10.18	0.23
19	Industrial Production Growth, YoY	IPA	2.24	4.35	-1.60	7.45	0.97
20	Housing Starts	HS	-2.20	24.90	-0.04	4.52	0.79
21	M1 Growth, Monthly	M1M	0.40	0.79	1.51	13.79	0.18
22	M1 Growth, YoY	M1A	4.81	4.98	0.29	2.31	0.98
23	Orders, Monthly	ORDM	0.11	1.78	0.00	3.15	-0.19
24	Orders, YoY	ORDA	1.20	6.93	-1.51	8.49	0.93
25	Return CRB Spot	CRB	0.25	2.74	-1.76	17.62	0.25
26	Capacity Utilization	CAP	0.02	0.66	-1.07	8.95	0.25
27	Employment Growth	EMPL	0.11	0.19	-0.37	7.40	0.65
28	Consumer Sentiment	SENT	0.01	4.70	0.07	5.66	0.00
29	Consumer Confidence	CONF	0.02	8.25	-0.29	9.94	0.07
30	Diffusion Index	DIFF	8.68	16.91	-0.64	3.57	0.83
31	Chicago PM Business Barometer	PMBB	55.15	7.33	-0.37	3.37	0.88
32	ISM PMI	PMI	52.08	5.35	-0.39	3.77	0.93

Note: An asterisk (*) denotes that the variable is also part of the Goyal and Welch (2008) dataset, † denotes that the variable is included in set of predictors in case of the long-term U.S. equity sample from 12/1926-12/2010. The sample period over which the summary statistics for the predictors are computed is from 01/1983-12/2010.

Table 3: Overview of Predictive Variables: From 01/1983 to 12/2010

No.	Variable	Abbrev.	Mean	Std.	Skew.	Kurt.	AC(1)
<i>Equity Market Variables and Risk Factors</i>							
1	Dividend Price Ratio (Log) (*, †)	DP	-3.76	0.39	-0.02	1.89	0.99
2	Earnings Price Ratio (Log) (*, †)	EP	-3.02	0.43	-1.33	6.63	0.98
3	US Market Excess Return (†)	MKT	0.59	4.56	-0.88	5.60	0.09
4	Size Factor (†)	SMB	0.10	3.22	0.75	11.17	-0.04
5	Value Factor (†)	HML	0.36	3.07	0.07	5.05	0.16
6	Short Term Reversal Factor (†)	STR	0.36	3.43	0.15	8.32	-0.02
7	Return MSCI World	MSCI	0.63	4.50	-0.93	5.56	0.12
<i>Interest rates, Spreads and Bond Market Factors</i>							
8	T-Bill Rate (Level) (*, †)	TB	4.56	2.52	-0.02	2.37	0.99
9	Rel. T-Bill Rate (†)	RTB	-0.15	0.74	-0.32	2.91	0.94
10	Long Term Bond Return (*, †)	LTR	0.81	3.03	0.09	5.04	0.01
11	Rel. Bond Rate (†)	RBR	-0.14	0.54	-0.32	4.59	0.85
12	Term Spread (*, †)	TS	2.39	1.30	-0.23	1.87	0.96
<i>Liquidity and Credit Risk Variables</i>							
13	Default Spread (*, †)	DEF	1.03	0.42	2.38	11.52	0.95
14	Pastor-Stambaugh Liquidity Factor	PS	-2.61	6.67	-1.78	10.60	0.01
15	TED Spread	TED	0.05	0.04	1.98	8.73	0.73
<i>Macroeconomic Variables</i>							
16	Inflation Rate, Monthly (*, †)	INFM	0.24	0.31	-1.33	11.05	0.45
17	Inflation Rate, YoY	INFA	2.91	1.26	-0.48	4.40	0.95
18	Industrial Production Growth, Monthly	IPM	0.20	0.66	-1.54	11.65	0.25
19	Industrial Production Growth, YoY	IPA	2.28	4.36	-1.71	8.07	0.97
20	Housing Starts	HS	0.00	7.22	0.15	3.85	-0.31
21	M1 Growth, Monthly	M1M	0.40	0.78	1.40	12.96	0.19
22	M1 Growth, YoY	M1A	4.81	4.98	0.29	2.30	0.98
23	Orders, Monthly	ORDM	0.13	1.80	-0.12	3.40	-0.18
24	Orders, YoY	ORDA	1.29	6.89	-1.57	8.68	0.92
25	Return CRB Spot	CRB	0.25	2.74	-1.76	17.62	0.25
26	Capacity Utilization	CAP	0.02	0.67	-1.30	10.37	0.26
27	Employment Growth	EMPL	0.12	0.19	-0.34	7.46	0.64
28	Consumer Sentiment	SENT	0.12	4.72	0.40	6.04	0.00
29	Consumer Confidence	CONF	0.36	8.36	0.77	10.43	0.09
30	Diffusion Index	DIFF	8.70	16.93	-0.69	3.70	0.83
31	Chicago PM Business Barometer	PMBB	55.14	7.34	-0.40	3.51	0.88
32	ISM PMI	PMI	52.18	5.26	-0.38	3.71	0.92

Note: An asterisk (*) denotes that the variable is also part of the Goyal and Welch (2008) dataset, † denotes that the variable is included in set of predictors in case of the long-term U.S. equity sample from 12/1926-12/2010. The sample period over which the summary statistics for the predictors are computed is from 01/1983-12/2010.

Table 4: Overview of Predictive Variables: From 01/1983 to 12/2018

No.	Variable	Abbrev.	Mean	Std.	Skew.	Kurt.	AC(1)
<i>Equity Market Variables and Risk Factors</i>							
1	Dividend Price Ratio (Log) (*, †)	DP	-3.76	0.39	-0.02	1.89	0.99
2	Earnings Price Ratio (Log) (*, †)	EP	-3.02	0.43	-1.33	6.63	0.98
3	US Market Excess Return (†)	MKT	0.59	4.56	-0.88	5.60	0.09
4	Size Factor (†)	SMB	0.10	3.22	0.75	11.17	-0.04
5	Value Factor (†)	HML	0.36	3.07	0.07	5.05	0.16
6	Short Term Reversal Factor (†)	STR	0.36	3.43	0.15	8.32	-0.02
7	Return MSCI World	MSCI	0.63	4.50	-0.93	5.56	0.12
<i>Interest rates, Spreads and Bond Market Factors</i>							
8	T-Bill Rate (Level) (*, †)	TB	4.56	2.52	-0.02	2.37	0.99
9	Rel. T-Bill Rate (†)	RTB	-0.15	0.74	-0.32	2.91	0.94
10	Long Term Bond Return (*, †)	LTR	0.81	3.03	0.09	5.04	0.01
11	Rel. Bond Rate (†)	RBR	-0.14	0.54	-0.32	4.59	0.85
12	Term Spread (*, †)	TS	2.39	1.30	-0.23	1.87	0.96
<i>Liquidity and Credit Risk Variables</i>							
13	Default Spread (*, †)	DEF	1.03	0.42	2.38	11.52	0.95
14	Pastor-Stambaugh Liquidity Factor	PS	-2.61	6.67	-1.78	10.60	0.01
15	TED Spread	TED	0.05	0.04	1.98	8.73	0.73
<i>Macroeconomic Variables</i>							
16	Inflation Rate, Monthly (*, †)	INFM	0.24	0.31	-1.33	11.05	0.45
17	Inflation Rate, YoY	INFA	2.91	1.26	-0.48	4.40	0.95
18	Industrial Production Growth, Monthly	IPM	0.20	0.66	-1.54	11.65	0.25
19	Industrial Production Growth, YoY	IPA	2.28	4.36	-1.71	8.07	0.97
20	Housing Starts	HS	0.00	7.22	0.15	3.85	-0.31
21	M1 Growth, Monthly	M1M	0.40	0.78	1.40	12.96	0.19
22	M1 Growth, YoY	M1A	4.81	4.98	0.29	2.30	0.98
23	Orders, Monthly	ORDM	0.13	1.80	-0.12	3.40	-0.18
24	Orders, YoY	ORDA	1.29	6.89	-1.57	8.68	0.92
25	Return CRB Spot	CRB	0.25	2.74	-1.76	17.62	0.25
26	Capacity Utilization	CAP	0.02	0.67	-1.30	10.37	0.26
27	Employment Growth	EMPL	0.12	0.19	-0.34	7.46	0.64
28	Consumer Sentiment	SENT	0.12	4.72	0.40	6.04	0.00
29	Consumer Confidence	CONF	0.36	8.36	0.77	10.43	0.09
30	Diffusion Index	DIFF	8.70	16.93	-0.69	3.70	0.83
31	Chicago PM Business Barometer	PMBB	55.14	7.34	-0.40	3.51	0.88
32	ISM PMI	PMI	52.18	5.26	-0.38	3.71	0.92

Note: An asterisk (*) denotes that the variable is also part of the Goyal and Welch (2008) dataset, † denotes that the variable is included in set of predictors in case of the long-term U.S. equity sample from 12/1926-12/2010. The sample period over which the summary statistics for the predictors are computed is from 01/1983-12/2018.

Table 5: Predictive Variables: Data Source and Construction

No.	Variable	Abbrev.	Description	Data Source
<i>Equity Market Variables and Risk Factors</i>				
1	Dividend Price Ratio (Log)	DP	Dividends over the past year (12-month moving sum) relative to current market prices (in logs)	Goyal/Welch Data
2	Earnings Price Ratio (Log)	EP	Earnings over the past year (12-month moving sum) relative to current market prices (in logs)	Goyal/Welch Data
3	US Market Excess Return	MKT	Fama-French's market factor: U.S. stock market return minus one-month T-Bill rate	Kenneth French's website
4	Size Factor	SMB	Fama-French's SMB factor: Return on small stocks minus return on big stocks	Kenneth French's website
5	Value Factor	HML	Fama-French's HML factor: Return on value stocks minus return on growth stock	Kenneth French's website
6	Short Term Reversal Factor	STR	Fama-French's short-term reversal factor: Return on stocks with low prior one-month return minus return on stock with high prior return	Kenneth French's website
7	Return MSCI World	MSCI	Return (log) on the MSCI world stock market index (MSWRLD\$)	Datastream
<i>Interest rates, Spreads and Bond Market Factors</i>				
8	T-Bill Rate (Level)	TB	Three-month T-Bill rate	Goyal/Welch Data
9	Rel. T-Bill Rate	RTB	T-Bill rate minus its 12 month moving average	Goyal/Welch Data
10	Long Term Bond Return	LTR	Rate of return on long term government bonds	Goyal/Welch Data
11	Rel. Bond Rate	RBR	Long-term bond yield minus its 12 month moving average	Goyal/Welch Data
12	Term Spread	TS	Difference of long-term bond yield and three-month T-Bill rate	Goyal/Welch Data
<i>Liquidity and Credit Risk Variables</i>				
13	Default Spread	DEF	Difference of BAA and AAA bond yields	Goyal/Welch Data
14	Pastor-Stambaugh Liquidity Factor	PS	Measure of stock market liquidity based on price reversals	Pastor and Stambaugh
15	TED Spread	TED	Difference of 3 Month Libor rate (IBFIX3M) minus 3 month T-Bill rate (USGBILL3)	Datastream
<i>Macroeconomic Variables</i>				
16	Inflation Rate, Monthly	INFM	Monthly (log) growth rate of the U.S. consumer price index	Goyal/Welch Data
17	Inflation Rate, YoY	INFA	Year-over year (log) growth rate of the U.S. consumer price index (USCONPRCE)	Datastream
18	Industrial Production Growth, Monthly	IPM	Monthly (log) growth rate of U.S. industrial production (INDPRO)	Federal Reserve Economic Data
19	Industrial Production Growth, YoY	IPA	Year-over year (log) growth rate of U.S. industrial production (INDPRO)	Federal Reserve Economic Data
20	Housing Starts	HS	Monthly change in housing started (HOUST)	Federal Reserve Economic Data
21	M1 Growth, Monthly	M1M	Monthly (log) growth rate of U.S. M1 (M1SL)	Federal Reserve Economic Data
22	M1 Growth, YoY	M1A	Year-over-year (log) growth rate of U.S. M1 (M1SL)	Federal Reserve Economic Data
23	Orders, Monthly	ORDM	Monthly (log) growth rate of New orders of consumer goods and materials (USCNORCGD)	Datastream
24	Orders, YoY	ORDA	Year-over year (log) growth rate of New orders of consumer goods and materials (USCNORCGD)	Datastream
25	Return CRB Spot	CRB	Monthly log difference of CRB spot index (CRBSPOT)	Datastream
26	Capacity Utilization	CAP	Monthly change Capacity Utilization: Total Industry (TCU)	Federal Reserve Economic Data
27	Employment Growth	EMPL	Monthly (log) growth rate of Total Nonfarm Payroll (PAYEMS)	Federal Reserve Economic Data
28	Consumer Sentiment	SENT	Monthly change in University of Michigan consumer sentiment (UMCSENT)	Federal Reserve Economic Data
29	Consumer Confidence	CONF	Monthly change in consumer confidence index (USCNFCONQ)	Datastream
30	Diffusion Index	DIFF	Philadelphia Fed Business Outlook Survey Diffusion Index	Manufacturing Business Outlook Survey
31	Chicago PM Business Barometer	PMBB	Chicago Purchasing Managers Index, Business Barometer (USPMCHBB)	Datastream
32	ISM PMI	PMI	Monthly change in purchasing manager index (USCNFBUSQ)	Datastream