

# Is Economic Uncertainty Priced in the Cross-Section of Stock Returns?

Turan G. Bali

Stephen J. Brown

Yi Tang

Online Appendix

**Table I**  
**Bivariate Portfolio Sorts**

In this table, stocks are first sorted into deciles based on one control variable, and then stocks within each control variable decile are further sorted into deciles based on uncertainty beta ( $\beta^{UNC}$ ). This table reports the equal-weighted (Panel A) and value-weighted (Panel B) 7-factor alphas (in percentage) relative to the market, size, book-to-market, momentum, liquidity, investment and profitability factors ( $\alpha_7$ ) for each uncertainty beta decile, averaged across the ten control groups. The control variables are the market beta ( $\beta^{MKT}$ ), market capitalization measured in millions of dollars (SIZE), book-to-market (BM), momentum (MOM), short-term reversal (REV), illiquidity (ILLIQ), co-skewness (COSKEW), idiosyncratic volatility (IVOL), analyst dispersion (DISP), market volatility beta ( $\beta^{VXO}$ ), annual growth of book assets (I/A), operating profitability (ROE), and lottery demand (MAX). The control variables are defined in Section 3.2. The last row presents the differences in  $\alpha_7$  between Decile 1 (Low) and Decile 10 (High). Newey-West adjusted  $t$ -statistics are given in parentheses.

Panel A. Equal-weighted bivariate portfolio results

Decile	$\beta^{MKT}$	SIZE	BM	MOM	REV	ILLIQ	COSKEW	IVOL	DISP	$\beta^{VXO}$	I/A	ROE	MAX
Low	0.28 (2.82)	0.23 (2.57)	0.29 (3.09)	0.22 (2.70)	0.27 (3.01)	0.27 (2.83)	0.31 (3.31)	0.29 (3.04)	0.18 (1.81)	0.34 (3.12)	0.27 (3.02)	0.26 (2.95)	0.32 (3.18)
2	0.20 (3.20)	0.19 (3.03)	0.12 (1.77)	0.16 (2.60)	0.17 (2.89)	0.15 (2.12)	0.16 (2.06)	0.19 (2.71)	0.15 (2.07)	0.20 (2.39)	0.16 (2.29)	0.17 (2.32)	0.23 (3.46)
3	0.11 (1.83)	0.08 (1.21)	0.10 (1.82)	0.10 (1.82)	0.11 (2.01)	0.08 (1.19)	0.05 (0.72)	0.11 (1.88)	0.04 (0.68)	0.19 (2.64)	0.06 (1.04)	0.10 (1.55)	0.11 (1.72)
4	0.09 (1.62)	0.01 (0.13)	-0.05 (-0.75)	0.08 (1.43)	0.08 (1.42)	-0.02 (-0.38)	0.05 (0.83)	0.08 (1.33)	-0.02 (-0.24)	0.00 (-0.06)	0.03 (0.41)	0.00 (-0.01)	0.05 (0.96)
5	0.01 (0.23)	0.07 (1.25)	-0.01 (-0.15)	0.09 (1.79)	0.04 (0.62)	0.04 (0.66)	0.04 (0.85)	0.02 (0.26)	0.02 (0.29)	0.06 (0.82)	0.01 (0.23)	0.01 (0.10)	0.00 (0.05)
6	-0.02 (-0.47)	0.05 (0.91)	0.00 (0.07)	-0.01 (-0.11)	0.01 (0.25)	0.00 (0.02)	0.02 (0.33)	0.05 (0.81)	-0.05 (-0.80)	0.02 (0.28)	-0.02 (-0.42)	0.00 (-0.01)	0.04 (0.75)
7	0.03 (0.49)	0.00 (0.01)	0.02 (0.27)	0.06 (1.09)	0.02 (0.38)	-0.02 (-0.23)	0.01 (0.14)	0.02 (0.40)	-0.08 (-1.56)	-0.02 (-0.29)	-0.05 (-0.85)	-0.11 (-1.78)	-0.03 (-0.41)
8	-0.08 (-1.24)	-0.03 (-0.41)	-0.10 (-1.41)	-0.05 (-0.84)	-0.02 (-0.39)	-0.07 (-0.93)	-0.07 (-1.12)	-0.10 (-1.46)	-0.07 (-1.04)	-0.09 (-1.27)	-0.11 (-1.81)	-0.06 (-0.82)	-0.07 (-1.13)
9	-0.07 (-1.18)	-0.08 (-0.99)	-0.08 (-1.12)	-0.05 (-0.83)	-0.11 (-1.44)	-0.09 (-1.10)	-0.02 (-0.24)	-0.06 (-0.87)	-0.05 (-0.63)	-0.07 (-0.81)	-0.10 (-1.32)	-0.10 (-1.34)	-0.10 (-1.54)
High	-0.10 (-1.09)	-0.08 (-0.87)	-0.04 (-0.51)	-0.22 (-1.95)	-0.15 (-1.54)	-0.06 (-0.64)	-0.11 (-1.16)	-0.15 (-1.96)	-0.12 (-1.39)	0.02 (0.21)	-0.03 (-0.32)	-0.10 (-1.15)	-0.14 (-1.66)
High–Low	-0.38 (-3.24)	-0.32 (-2.39)	-0.33 (-2.63)	-0.44 (-3.72)	-0.42 (-3.62)	-0.34 (-2.45)	-0.42 (-3.09)	-0.43 (-3.84)	-0.30 (-2.43)	-0.44 (-3.04)	-0.30 (-2.54)	-0.36 (-3.00)	-0.46 (-3.99)

**Table I – continued**

Panel B. Value-weighted bivariate portfolio results

Decile	$\beta^{MKT}$	SIZE	BM	MOM	REV	ILLIQ	COSKEW	IVOL	DISP	$\beta^{VXO}$	I/A	ROE	MAX
Low	0.39 (3.16)	0.22 (2.32)	0.38 (2.70)	0.18 (1.58)	0.40 (3.19)	0.23 (2.41)	0.41 (2.72)	0.41 (2.60)	0.36 (2.51)	0.55 (2.50)	0.42 (2.71)	0.43 (2.65)	0.44 (2.78)
2	0.09 (0.88)	0.21 (3.24)	-0.02 (-0.22)	-0.04 (-0.38)	0.17 (1.75)	0.08 (1.15)	0.08 (0.74)	0.07 (0.61)	0.07 (0.69)	0.09 (0.65)	0.10 (0.97)	0.07 (0.71)	0.08 (0.74)
3	0.07 (0.99)	0.07 (1.07)	-0.01 (-0.17)	-0.07 (-0.89)	-0.03 (-0.39)	-0.01 (-0.17)	0.00 (0.00)	-0.05 (-0.53)	0.00 (0.00)	0.08 (0.97)	0.01 (0.09)	0.10 (1.10)	0.01 (0.09)
4	-0.13 (-1.87)	0.01 (0.18)	-0.10 (-1.43)	-0.08 (-1.21)	0.04 (0.51)	-0.09 (-1.33)	0.01 (0.09)	-0.10 (-1.24)	-0.04 (-0.64)	-0.11 (-1.27)	-0.02 (-0.21)	-0.05 (-0.77)	0.04 (0.53)
5	-0.12 (-2.27)	0.06 (1.17)	-0.12 (-1.69)	-0.05 (-0.60)	-0.08 (-1.35)	-0.05 (-0.92)	0.04 (0.65)	-0.09 (-0.90)	-0.01 (-0.12)	-0.10 (-1.05)	-0.09 (-1.42)	-0.10 (-1.55)	-0.08 (-0.98)
6	0.00 (-0.06)	0.05 (0.88)	-0.06 (-1.14)	-0.16 (-1.87)	-0.11 (-1.49)	-0.06 (-1.21)	-0.03 (-0.60)	-0.06 (-0.96)	-0.04 (-0.70)	-0.11 (-1.30)	-0.04 (-0.56)	-0.11 (-1.70)	0.01 (0.16)
7	-0.15 (-2.27)	0.01 (0.16)	-0.10 (-1.98)	-0.04 (-0.65)	-0.10 (-1.92)	-0.08 (-1.28)	-0.07 (-1.06)	-0.08 (-1.20)	-0.02 (-0.38)	-0.10 (-1.49)	-0.14 (-2.17)	-0.21 (-3.07)	-0.10 (-1.47)
8	-0.26 (-3.53)	-0.03 (-0.44)	-0.19 (-2.62)	-0.22 (-3.16)	-0.15 (-2.24)	-0.18 (-2.28)	-0.10 (-1.71)	-0.27 (-3.77)	-0.08 (-1.17)	-0.25 (-3.33)	-0.16 (-2.45)	-0.10 (-1.51)	-0.20 (-2.97)
9	-0.06 (-0.90)	-0.09 (-1.03)	-0.18 (-2.36)	-0.23 (-3.34)	-0.08 (-1.09)	-0.15 (-1.93)	-0.11 (-1.62)	-0.17 (-2.22)	-0.12 (-1.59)	-0.11 (-1.26)	-0.16 (-1.94)	-0.15 (-2.33)	-0.18 (-2.64)
High	-0.22 (-2.27)	-0.09 (-0.89)	-0.21 (-2.03)	-0.33 (-3.15)	-0.19 (-1.79)	-0.17 (-1.69)	-0.19 (-1.73)	-0.31 (-3.12)	-0.17 (-1.62)	-0.08 (-0.78)	-0.09 (-1.11)	-0.15 (-1.67)	-0.32 (-3.22)
High–Low	-0.62 (-3.46)	-0.31 (-2.20)	-0.59 (-3.16)	-0.50 (-3.20)	-0.59 (-3.67)	-0.40 (-2.80)	-0.59 (-2.98)	-0.73 (-3.48)	-0.53 (-2.68)	-0.77 (-2.89)	-0.51 (-2.79)	-0.58 (-3.00)	-0.75 (-3.59)

**Table II**  
**Subsample Analyses**

For each month, stocks from three different samples are sorted into decile portfolios based on their uncertainty betas ( $\beta^{UNC}$ ), where decile 1 (10) contains stocks with the lowest (highest)  $\beta^{UNC}$  during the previous month. We examine the pricing of uncertainty beta in the cross-section of three different stocks samples: the S&P 500 stocks, the 1,000 biggest stocks, and the 1,000 most liquid stocks. This table reports 7-factor alphas (in percentage) relative to the market, size, book-to-market, momentum, liquidity, investment and profitability factors ( $\alpha_7$ ) for each uncertainty beta decile. The last row presents the differences in  $\alpha_7$  between Decile 1 (Low) and Decile 10 (High). Newey-West adjusted  $t$ -statistics are given in parentheses.

Decile	S&P 500 stocks	1,000 biggest stocks	1,000 most liquid stocks
Low	0.47 (2.97)	0.27 (2.33)	0.30 (2.13)
2	0.17 (1.62)	0.05 (0.53)	0.06 (0.66)
3	-0.07 (-0.70)	-0.04 (-0.56)	-0.06 (-0.73)
4	-0.13 (-1.53)	-0.09 (-1.33)	-0.07 (-1.08)
5	-0.11 (-1.42)	-0.09 (-1.37)	-0.07 (-1.06)
6	-0.09 (-1.14)	-0.07 (-0.95)	-0.04 (-0.66)
7	-0.09 (-1.16)	-0.14 (-2.33)	-0.14 (-2.25)
8	-0.11 (-1.41)	-0.12 (-1.81)	-0.04 (-0.50)
9	-0.15 (-1.56)	-0.16 (-2.24)	-0.16 (-2.26)
High	-0.16 (-1.72)	-0.11 (-1.20)	-0.13 (-1.21)
High–Low	-0.64 (-3.20)	-0.38 (-2.35)	-0.43 (-2.28)

**Table III**  
**Univariate Portfolios of Uncertainty Beta Estimated with Three- and 12-month-ahead Uncertainty Indexes**

For each month, decile portfolios are formed by sorting individual stocks based on their uncertainty betas ( $\beta^{UNC}$ ), where decile 1 (10) contains stocks with the lowest (highest)  $\beta^{UNC}$  during the previous month. In Panel A,  $\beta^{UNC}$  is estimated based on the three-month-ahead uncertainty index. The first column reports the average uncertainty beta of individual stocks in each  $\beta^{UNC}$  decile and the remaining columns present the average excess returns (RET–RF) and alphas ( $\alpha_5^1$ ,  $\alpha_5^2$ ,  $\alpha_4$ , and  $\alpha_7$ ) for the equal-weighted and value-weighted portfolios separately.  $\alpha_5^1$  is the alpha relative to the market, size, book-to-market, momentum, and liquidity factors;  $\alpha_5^2$  is the alpha relative to the market, size, book-to-market, investment, and profitability factors;  $\alpha_4$  is the alpha relative to the market, size, investment, and profitability factors; and  $\alpha_7$  is the alpha relative to the market, size, book-to-market, momentum, liquidity, investment, and profitability factors. The last row presents the alpha differences between decile 1 (Low) and decile 10 (High). Panel B reports the same set of results based on the 12-month-ahead uncertainty index. Newey-West adjusted  $t$ -statistics are given in parentheses. The sample period is July 1977–December 2014.

Panel A. Three-month-ahead uncertainty index

Decile	$\beta^{UNC}$	Equal-weighted					Value-weighted				
		RET–RF	$\alpha_5^1$	$\alpha_5^2$	$\alpha_4$	$\alpha_7$	RET–RF	$\alpha_5^1$	$\alpha_5^2$	$\alpha_4$	$\alpha_7$
Low	-0.63	1.14 (3.68)	0.29 (3.03)	0.34 (2.90)	0.35 (2.97)	0.31 (3.22)	0.94 (2.90)	0.32 (1.73)	0.49 (2.05)	0.49 (2.04)	0.45 (2.14)
2	-0.30	1.02 (4.03)	0.23 (3.18)	0.16 (1.58)	0.18 (1.63)	0.13 (1.77)	0.75 (2.77)	0.14 (0.92)	0.15 (0.86)	0.17 (0.95)	0.11 (0.68)
3	-0.18	0.99 (4.21)	0.22 (3.35)	0.15 (1.99)	0.18 (1.95)	0.13 (1.98)	0.72 (3.17)	0.12 (1.29)	0.11 (1.06)	0.12 (1.15)	0.09 (0.89)
4	-0.10	0.95 (4.16)	0.20 (3.25)	0.11 (1.48)	0.13 (1.51)	0.08 (1.38)	0.78 (3.63)	0.20 (2.24)	0.11 (1.27)	0.12 (1.45)	0.08 (0.99)
5	-0.03	0.88 (4.10)	0.15 (2.94)	0.04 (0.58)	0.06 (0.69)	0.02 (0.27)	0.58 (2.86)	0.02 (0.27)	-0.07 (-1.01)	-0.07 (-0.96)	-0.08 (-1.19)
6	0.04	0.89 (4.07)	0.15 (2.82)	0.06 (0.94)	0.08 (0.97)	0.04 (0.74)	0.72 (3.52)	0.10 (1.60)	0.03 (0.38)	0.04 (0.49)	0.02 (0.24)
7	0.11	0.85 (3.86)	0.08 (1.42)	-0.02 (-0.34)	0.00 (0.02)	-0.03 (-0.60)	0.62 (3.02)	-0.01 (-0.22)	-0.14 (-2.06)	-0.14 (-2.01)	-0.13 (-1.95)
8	0.20	0.80 (3.48)	0.03 (0.42)	-0.07 (-0.89)	-0.05 (-0.59)	-0.08 (-1.16)	0.58 (2.72)	-0.10 (-1.28)	-0.19 (-2.33)	-0.18 (-2.23)	-0.18 (-2.37)
9	0.33	0.81 (3.21)	-0.02 (-0.27)	-0.02 (-0.29)	-0.01 (-0.19)	-0.02 (-0.31)	0.65 (2.66)	-0.05 (-0.59)	-0.09 (-1.04)	-0.09 (-1.00)	-0.08 (-0.89)
High	0.73	0.61 (2.00)	-0.28 (-3.90)	-0.14 (-1.40)	-0.15 (-1.54)	-0.12 (-1.18)	0.46 (1.46)	-0.31 (-2.47)	-0.19 (-1.38)	-0.22 (-1.49)	-0.17 (-1.32)
High–Low		-0.54 (-3.86)	-0.57 (-4.71)	-0.48 (-3.02)	-0.50 (-3.11)	-0.42 (-3.17)	-0.48 (-2.17)	-0.63 (-2.59)	-0.68 (-2.22)	-0.70 (-2.29)	-0.62 (-2.39)

Table III – continued

Panel B. 12-month-ahead uncertainty index

Decile	$\beta^{UNC}$	Equal-weighted					Value-weighted				
		RET–RF	$\alpha_5^1$	$\alpha_5^2$	$\alpha_4$	$\alpha_7$	RET–RF	$\alpha_5^1$	$\alpha_5^2$	$\alpha_4$	$\alpha_7$
Low	-1.08	1.16 (3.80)	0.31 (3.12)	0.33 (2.73)	0.34 (2.79)	0.30 (2.96)	1.03 (3.27)	0.45 (2.49)	0.61 (2.56)	0.61 (2.57)	0.58 (2.72)
2	-0.50	1.02 (3.97)	0.22 (2.89)	0.15 (1.32)	0.17 (1.38)	0.12 (1.45)	0.67 (2.45)	0.06 (0.43)	0.13 (0.68)	0.15 (0.75)	0.10 (0.56)
3	-0.30	0.96 (4.18)	0.19 (3.02)	0.10 (1.22)	0.13 (1.26)	0.07 (1.08)	0.78 (3.30)	0.17 (1.70)	0.09 (0.87)	0.10 (0.98)	0.06 (0.53)
4	-0.16	0.96 (4.24)	0.21 (3.21)	0.12 (1.46)	0.14 (1.47)	0.09 (1.35)	0.74 (3.54)	0.16 (1.76)	0.15 (1.61)	0.17 (1.79)	0.14 (1.53)
5	-0.04	0.86 (3.99)	0.13 (2.31)	0.03 (0.39)	0.05 (0.57)	0.00 (0.00)	0.58 (2.84)	-0.01 (-0.08)	-0.10 (-1.44)	-0.09 (-1.24)	-0.12 (-1.72)
6	0.07	0.90 (4.15)	0.16 (3.17)	0.06 (1.02)	0.09 (1.04)	0.04 (0.89)	0.69 (3.51)	0.11 (1.67)	-0.03 (-0.42)	-0.03 (-0.33)	-0.04 (-0.57)
7	0.19	0.84 (3.71)	0.07 (1.21)	-0.03 (-0.46)	-0.01 (-0.11)	-0.05 (-0.75)	0.61 (2.87)	-0.01 (-0.16)	-0.12 (-1.81)	-0.12 (-1.71)	-0.12 (-1.70)
8	0.33	0.84 (3.60)	0.04 (0.65)	-0.04 (-0.52)	-0.02 (-0.25)	-0.05 (-0.70)	0.61 (2.81)	-0.10 (-1.31)	-0.18 (-1.89)	-0.17 (-1.81)	-0.17 (-1.99)
9	0.56	0.81 (3.18)	0.00 (0.01)	0.00 (-0.01)	0.01 (0.08)	-0.01 (-0.07)	0.68 (2.75)	0.02 (0.15)	0.00 (0.01)	0.00 (0.00)	0.00 (0.05)
High	1.24	0.59 (1.90)	-0.29 (-3.57)	-0.11 (-1.03)	-0.13 (-1.14)	-0.08 (-0.81)	0.41 (1.25)	-0.34 (-2.59)	-0.19 (-1.28)	-0.22 (-1.37)	-0.16 (-1.18)
High–Low		-0.57 (-3.64)	-0.60 (-4.33)	-0.44 (-2.47)	-0.47 (-2.50)	-0.38 (-2.54)	-0.62 (-2.72)	-0.79 (-3.29)	-0.80 (-2.60)	-0.83 (-2.66)	-0.74 (-2.84)

5